THE READING NATURALIST
VOLUME 1 NUMBER 2
CONTAINING

A FIELD KEY TO FOUR HUNDRED COMMON MUSHROOMS AND TOADSTOOLS

BY
F. B. HORA

Published by the
READING AND DISTRICT
Natural History Society
1950

THE READING NATURALIST

VOLUME 1 NUMBER 2

CONTENTS

A FIELD KEY TO COMMON MUSHROOMS AND TOADSTOOLS

BY F. B. HORA

PREFACE

THIS key is an expanded version of a smaller one which I constructed and had duplicated for the use of students in connection with field work on agarics. When I first became associated with this field work, it was soon evident to me that some such key was needed. I was unable to find any work previously published in this country along the lines I wanted. H. J. Wheldon prepared a key to the British Agaricineae which appeared between 1910 and 1913. This, however, required the user to know the spore colour in all cases. Furthermore, it is a key to all species recorded as British at that time, that is to say about 600 more than the number admitted in the Revised list of British Agarics and Boleti published by Pearson and Dennis in 1948. These authors recognise rather more than 1200 Agarics and 47 Boleti: this is a reduction by about one third of the previous number.

The success of my smaller key has encouraged me to publish the present much larger one. In fact, I became agreeably surprised to find how the smaller key enabled students to name many of our common toadstools after little more than an hour's help over the initial difficulties.

I would emphasise that this is essentially a field key. It

cannot replace serious work in the laboratory along modern lines with a good microscope and the usual chemical reagents. Field and laboratory work must go hand in hand, a proper balance being maintained between the two. I believe that training in the field identification of agarics is an excellent way of acquiring skill in the art of differential diagnosis. Laboratory work should serve to confirm, modify, or show the limits of such field observations. I also believe that exclusive reliance on or overemphasis of laboratory methods is as bad as their neglect. It is possible to identify most of our toadstools by field characters, and it will be a sad day when our students will not venture an opinion on any toadstool without recourse to a well-equipped laboratory. The study of any kind of biological systematics must always involve the observation and study of living things in their natural surroundings.

I have seen and handled living specimens of not less than ninety per cent. of the species included in this key. The remainder have been added for the sake of completeness or intrinsic interest.

WHEN THIS KEY FAILS

THE only real test of such a key is: can someone else work it? Although very few rare species are included, the 400-odd species dealt with still represent only about one third of our total agaric flora. For this reason alone, the key must fail at times. But there will be other reasons: ambiguity, characters not sufficiently differential, plain (but honest) errors, etc. When some or all of these things arise, or any other reason that makes the key unworkable, do please write and tell me so, naming, and, for preference, enclosing, the offending species, and stating how they

offend. It is only in this way that progress can be made in a key of this sort. All your criticisms will be helpful to me and will be duly acknowledged. It is intended that improvements to the key will be printed on special perforated paper in subsequent numbers of this journal so that they can be detached and stuck in at the appropriate place. May I add that encouraging remarks, however mild, will be greatly appreciated and duly acknowledged.

EDIBILITY

THE poisonous toadstools and those to be avoided have been indicated in appropriate terms. Those which from my own experience I have enjoyed eating are also given appropriate remarks. To the remainder, and they are the great majority, I have given no gastronomic status. These are all harmless; many of them I have tried myself and found dull, but many have their devotees. It seems to be a matter of taste.

To the beginner who wishes to try the edible qualities of different species I would say this: have the identity of your finds confirmed by a competent mycologist. Their gastronomic properties can then be looked up.

ON SENDING TOADSTOOLS BY POST

I am always pleased to give an opinion on toadstools sent to me. Attention to the following points will be of great help. Send only complete, healthy, freshly gathered specimens, including young stages: they should be dug up, not pulled up. If more than one species is sent, see that they are kept separate by enclosing in a paper bag, or simply wrapping up in newspaper. They are best sent in a tin, but a cardboard box will do. Do not add damp moss

or wet paper. See that they cannot shake about in the container. Choose a posting time so that they reach me during the morning. Above all, avoid the risk of their remaining in the post over the week-end.

HINTS ON THE USE OF THIS KEY

START with species of which you can see several individual specimens at different stages of development. Avoid the isolated, odd individual. Those species which have a ring or volva, or are tufted or grow on wood will probably be found the easiest to name successfully, at least to begin with. Having come to a specific name, the specimens should be checked with a reasonably full description —see References. For the beginner, the value of this key will be greatly increased if he can, in the early stages, obtain some guidance from a more advanced student. Attendance atforays, such as those run by the British Mycological Society, is probably the best way of obtaining such help. *I shall myself be pleased to consider leading a foray if the distance from Reading is not too far and I am notified in good time.*

If you are disappointed with this key, please read the section entitled "when this key fails" before consigning it to the flames.

The University,
Reading.
July 1950.

SCALE OF RELATIVE SIZES OF TOADSTOOLS USED IN THIS KEY

SMALL, where cap does not exceed 3cms. (1.2 in.) i. e. can be covered by a penny, *and* stipe does not exceed diameter of an ordinary pencil (8mm. or 0.6 in.).

VERY SMALL is occasionally used for a cap that can be covered by a sixpence (2cms. or 0.8 in.).

MEDIUM, cap 3-5cms. (1.2-2 in.) and or thickness of stipe less than diameter of ordinary pencil.

LARGE, cap 5-7cms. (2-2.75 in.) diameter of stipe exceeding that of ordinary pencil.

VERY LARGE, cap 7cms. (2.75 in.) upwards; thickness of stipe exceeding diameter of ordinary pencil.

REAGENTS

FERRIC ALUM. A large crystal may be kept in the pocket. It is quite harmless.

AMMONIA SOLUTION. A 25-50 per cent. solution of 0.88 ammonia in water. It has a strong pungent smell of smelling salts, so a violent sniff should not be taken with the nose too near the mouth of the uncorked bottle.

ABBREVIATIONS

± more or less. sp. species (singular), spp. species (plural).

NOMENCLATURE

THIS follows the revised list of British Agarics and Boleti by A. A. Pearson and R. W. G. Dennis. See section on reference works.

KEY TO GENERA

Mushrooms, toadstools or " brackets " with gills, pores or peg-like projecting spines usually on lower surface of the ± expanded fruit body (= cap).

1. Plants with well defined gills, rarely joining together to form a few large pores (= alveoli), but when this does occur, the large pores are most usually near the stipe and the gills are decurrent . . 5
1. Plants without such gills 2
   2. Pores only present, rarely larger than the lead in a pencil . . 3
   2. Peg-like projecting spines only present—HYDNACEAE: *Hydnum*, *Tremellodon*, etc., not here considered.
3. Stipe excentric, lateral or absent; fruit body (cap) of corky to woody consistency, not fleshy nor putrefying in a few days.—POLYPORACEAE: *Polyporus*, etc., not here considered.
3. Stipe central; fruit body (cap) of fleshy consistency, soon putrefying in a few days 4
   4. Cap densely beset with overlapping greyish-black scales, looking rather like an expanded fir cone seen from beneath.—*Strobilomyces strobilaceus*.
   4. Cap virtually smooth, at most with a few soft, but not overlapping flecks.—*Boletus*.
5. Stipe central, rarely somewhat excentric, not definitely lateral nor absent 6
5. Stipe markedly excentric or definitely lateral or absent . . . 98
   6. Gills soft, yellowish pale brown, can be readily pushed off from overlying flesh of cap; become darker brown in a minute or so after bruising; somewhat joined together near stipe to form a few large pores (alveoli). (Gills decurrent.)—*Paxillus* (part).
   6. Not this combination of characters 7
7. Gills little more than raised veins or ribs, mostly repeatedly and dichotomously branched; edge rounded, blunt, not sharp. (Cap colour uniformly grey-black or ± apricot yellow, smooth; gills decurrent.)—*Cantharellus*.
7. Gills well-developed (of normal mushroom type); branching exceptional, and then mostly where gill joins stipe; edge sharp, not rounded nor blunt (Gill attachment various) 8
   8. Cap, gills or stipe, when broken, and without squeezing, exuding an opaque white (rarely ± watery) or coloured juice (latex, milk) 9
   8. Not so 10
9. Medium to very large spp., cap fleshy, convex-flat to funnel-shaped, gills ± adnate to decurrent (hence gills approach stipe in ± descending line).—*Lactarius*.
9. Essentially small spp., cap almost membranous and conical to convex (hence gills approach stipe in ± ascending line under the cap).—*Mycena* (part).
   10. Vertical section of young (unexpanded) cap shows whitish gills with dusky to black colour (the maturing spores) spreading inwards, but starting always at the free ends (often a pinkish zone between blackish and whitish areas). As cap expands, gills slowly " dissolve " (" deliquesce ", " auto-digest ") into a black, inky, fluid, again starting always at the free ends. Finally cap also ± dissolves away. Mostly fragile, ephemeral, spp., cap at

first cylindrical or ovate, membranous or very slightly fleshy; gills thin, very crowded, sides parallel and almost touching, free (sometimes joined to a collar) or slightly adnate. Volva or ring sometimes present on stipe. If tufted, then never a small sp. —*Coprinus*.

10. Not this genus 11

11. Plants growing on burnt ground, or on living or dead remains of other toadstools, or arising from a (buried) fir cone 12

11. Plants not of the above habitats 19

12. Volva present, ring absent; parasitic on Clitocybe sp(p).—*Volvaria surrecta* (= *V. loveiana*).

12. Neither volva nor ring present 13

13. Plants confined to burnt ground 14

13. Not so (small spp.) 17

14. Gills decurrent, shallow, frequently branched, free end rounded, blunt, edge white-fluffy when seen under the lens. Small to medium sp., cap ± grey brown.—*Cantharellus carbonarius*.

14. Gills not decurrent; the combination of other characters not applying 15

15. Young dark-brownish, almost membranous cap beset with numerous white, fibrillose, teeth-like scales, persisting longest at margin; mature gills black. Small sp., growing in troops.—*Psathyrella pennata*.

15. Cap at all times devoid of such tooth-like scales; mature gills not black 16

16. Cap sticky-slimy, ± rusty yellowish-brown; cuticle of cap can be peeled off. Mostly a small sp., gills dirty pale yellowish-brown.—*Flammula carbonaria*.

16. Cap not sticky-slimy, ± dark brownish-black; cuticle cannot be peeled off. Small sp., gills ± greyish.—*Collybia ambusta*.

17. Plants arising from a (buried) fir cone.—See *Collybia*.

17. Plants growing on living or dead remains of other toadstools (usually *Lactarius*, *Russula*) 18

18. Very small, but otherwise perfectly normal-looking toadstools with closely set (crowded) gills. No special smell.—*Collybia* (part).

18. Very small, gills feebly developed or somewhat thickish; widely spaced (not crowded), the general effect being an appearance of rather abnormal toadstools. Smell " nauseous " or strongly of " new meal ".—*Nyctalis*.

19. Membranous ring (superior, dependent) *and* volva present, the volva often reduced to scales, rims or belt-like zone(s). Warts, scales, patches, etc. (when present) on cap, easily pushed off (finger nail) without tearing underlying tissue. (Gills quite free, persistently white).—*Amanita*.

19. Membranous ring *or* volva present, *not* both. Warts, scales, patches, etc. (when present) on cap, not detachable without tearing underlying tissue 20

19. Neither ring nor volva present. Sometimes a cobweb-like filamentous veil (cortina) extends over gill chamber in young, ± unopened specimens, often leaving remnants on edge of expanding cap and a ring-like filamentous zone or zones (but not a membranous ring) on the stipe 29

20. Membranous ring only present (in a few cases reduced to little more than a ridge, or disappearing as plant matures) . . 21
20. Volva only present 28
21. Plant confined to dung; cap smooth, sticky-slimy without detachable pellicle, mature gills black, gills adnate or almost free. Mostly medium sized buff-coloured plant, with persistently dome-shaped cap.—*Ane laria semi-ovata* (= *A. separata*)
21. Not this combination of characters 22
22. Gills quite free; plants not growing on wood. (In mature specimens, stipe can often be seen to fit into cap like ball and socket joint) 23
22. Gills not free; plants often growing on wood (stumps, trunks, etc.) or on saw-dust 24
23. Gills persistently pure white, rarely with very faint suggestion of pink, never maturing to dark chocolate brown.—*Lepiota* (part).
23. Gills almost blood-red, maturing to dark reddish-brown. Cap with ± denticulate edge.—*Lepiota haematosperma.*
23. Gills when young (cap ± unexpanded) grey or distinctly pink, maturing to dark chocolate brown.—*Psalliota.* The Mushroom genus.
24. Gills adnate or sinuate; not growing on wood (stumps, trunks, etc.) nor on sawdust, nor tufted 25
24. Gills arcuate-decurrent to ± decurrent, or plants growing on wood or sawdust or ± tufted 27
25. Cap sticky or slimy; gills at first dusky and ± mottled, maturing blackish or ± chocolate brown and then with ± distinct purplish tinge 26
25. Cap not sticky nor slimy; gills persistently white to creamy, not mottled.—*Lepiota* (part).
26. Cap with pellicle that can be peeled off. Mature gills with purplish tinge. Spores purplish—*Stropharia.*
26. Cap without detachable pellicle. Mature gills black. Spores black.—*Anellaria semi-ovata* (= *A. separata*).
27. Mature gills white to off-white. *Either* cap and stipe pure white, slimy, of ± gelatinous consistency and not attached to long, branching, cord-like, brown to black threads (rhizomorphs) which ramify under bark of tree, *or* cap ± honey-coloured to brownish and growing from rhizomorphs. Spores white.—*Armillaria.*
27. Mature gills yellowish, rusty yellowish ochre to brownish. Plants usually yellowish, cap usually with darker pressed down or erect scales. Spores ± ochre brown.—*Pholiota.*
28. Edge of cap conspicuously striate; gills persistently white. Stipe appearing somewhat as if its cuticle were torn. Spores white.—*Amanitopsis.*
28. Edge of cap not striate; mature gills pink. Cuticle of stipe smooth. Spores pink.—*Volvaria.*
29. Gills of characteristic waxy appearance and consistency, ± widely spaced (not crowded) and attached to cap by unusually wide base. Plants not tufted nor growing on wood (stumps, trunks, etc.). Other characters vary with habitat, thus:—(*a*) woods and plantations: gills adnate-decurrent or arcuate-decurrent to markedly decurrent; stipe ± dotted with granulations above or somewhat scaley or with a ± fibrillose ring-like zone above. Cap colours

predominantly whitish, or dull greyish, dull brownish, sometimes with dull olivaceous or purplish tinge. Bright colours most usually absent, except as occasional flecks. (Plants slimy or sticky); (*b*) grasslands (lawns, meadows, pastures, commons, heathy grassland, etc.): gill attachment various; cap whitish, but mostly brightly coloured: crimson, red, yellow 30

29. Gills not of characteristic waxy appearance and consistency, nor attached by a wide base. Compare above habitat characteristics . 31
30. Mature gills greyish to black; cap rose red, brownish, rusty-brownish or brownish with purplish tinge. Mostly top-shaped spp., strictly confined to conifer plantations. Spores black. (Gills markedly decurrent).—*Gomphidius.*
30. Mature gills not greyish to black. Plants not confined to conifer plantations. Spores white.—*Hygrophorus.*
31. Plants ± tufted (excluding those growing in troops, etc.) . . 32
31. Plants growing singly (occasionally 2 or 3 plants may have their stipe pressed together towards the base, or the plants may grow in troops, etc.) 54
32. Growing on wood essentially ± above ground (stumps, trunks) or on sawdust 34
32. Growing on the ground, amongst litter, twigs, etc., or may be on *buried* wood 36
33. Gills decurrent, or if not decurrent than the free edge appearing as if pieces had been chipped or clipped out at ± irregular intervals, and then the plants of distinctly leathery even ± corky consistency, pliant not easily cracking 34
33. Gills not decurrent, edge not jagged 37
34. Medium to large spp. 35
34. Small ± membranous sp., confined to coniferous stumps.—*Omphalia campanella.*
35. Edge of gills appearing as if pieces had been chipped or clipped out at ± irregular intervals (plants of distinctly leathery, even corky consistency, pliant, not easily cracking).—*Lentinus* (part).
35. Edge of gills even 36
36. Gills branched, joining together towards the stipe, sometimes extending down stipe as wide meshwork of slightly raised lines. Plants fleshy, predominantly whitish, greyish, ± pale yellowish.—*Pleurotus* (part).
36. Gills not branched nor joining together. Plants leathery, predominantly tan colour, sometimes with reddish flush or tinged lilac.—*Panus torulosus.*
37. Rather small sp., cap persistently dome-shaped, at first yellowish and smooth, maturing to grey and then conspicuously radiately grooved. Mature gills grey-black, ascending under cap and ± adnate. On wood of broad-leaved trees only.—*Psathyrella disseminata.*
37. Not this combination of characters 38
38. Stipe, at least towards the base, ± densely hairy or velvety with short hairs; best seen when dry.—See *Collybia* (part).
38. Stipe essentially without short hairs; best seen when dry . 39
39. Stipe stout, tough, spindle-shaped, with very evident longitudinal grooves. Whole plant ± reddish-brown.—*Collybia fusipes.*
39. Not this combination of characters 40

40. Cap sticky or slimy, beset (at least when young) with ± whitish flecks. Whole plant straw-yellow (cap paler towards edge) and commonly with a greenish tinge.—*Flammula gummosa.*

40. Cap not stickey or slimy, flecks absent from cap . . . 41

41. Plants restricted to wood of coniferous trees 42

41. Plants restricted to wood of broad-leaved trees 43

42. Cap ± pale ochre colour; flesh practically without taste.—*Hypholoma capnoides.*

42. Cap rusty yellowish orange or ± tawny; flesh distinctly bitter.—*Flammula sapinea.*

43. Cap and stem predominantly yellowish (cap sometimes with brick-red flush); flesh distinctly bitter.—*Hypholoma* (part).

43. Cap and stipe not predominantly yellowish; usually greys to browns; flesh not bitter 44

44. Cap convex, rather fleshy, not striate at margin, rich date-brown when water-soaked drying out ± ochreous. Spores dusky not white 45

44. Cap ± conical, almost membranous, grey-brown or if brown, then margin striate; not drying out ± ochreous. Spores white.—*Mycena* (part).

45. Gill chamber of unexpanded cap covered with cobweb-like filamentous veil, remnants of which are usually visible round margin of ± expanded cap.—*Hypholoma* (part).

45. Cobweb-like veil quite absent.—*Psilocybe* (part).

46. Rather small plant, cap persistently dome-shaped, at first yellowish and smooth, maturing to grey and then deeply and radiately grooved. Mature gills grey-black, ascending under cap and ± adnate. Spores blackish.—*Psathyrella disseminata.*

46. Not this combination of characters 47

47. Cap sticky or slimy, either straw-yellow (paler towards edge) and often with greenish tinge, or ± egg yellow (spores ± rusty). . 48

47. Cap not sticky or slimey; colours various 49

48. Gills free, cap distinctly membranous, ± egg-yellow (no green tinge) at first ovate, then expanding, becoming radiately grooved; often splitting at margin.—*Bolbitius* (part).

48. Gills broadly adnate, cap quite fleshy, beset with whitish scales (at least when young). Greenish tinge commonly present.—*Flammula gummosa.*

49. Stipe velvety with short hairs or woolly below. Small to medium spp., distinctly tough, pliant, almost leathery, cap somewhat pinkish pale brown or ± buff coloured.—*Marasmius* (part).

49. Stipe not velvety with short hairs 50

50. Whole plant rusty yellowish orange or tawny; flesh distinctly bitter. (On buried coniferous wood.)—*Flammula sapinea.*

50. Only the cap orange brown. Flesh slightly acid.—*Clitocybe flaccida.*

50. Above colours absent; flesh not bitter 51

51. Large to very large plants; cap (and stipe) essentially tough and pliant, ± umbonate at first, later expanding and often irregular. Gills (often in same specimen) ± sinuate to somewhat decurrent. Plants grey-brown.—*Tricholoma* (part).

51. Small to medium spp., the combination of other characters not

applying 52

52. Gills free; young cap almost milk-white, later brownish and with faint but distinct lilac flush. Small to medium sp., ± leathery, pliant.—*Marasmius wynnei.*

52. Gills adnate or sinuate 53

53. Cap ± conical, grey-brown to brownish; not drying out ± ochreous or whitish. Gills persistently whitish. May be distinct nitrous smell. Spores white.—*Mycena* (part).

53. Cap convex to flat, ± brownish or whitish when water-soaked, drying out ± ochreous. Mature gills brownish with purplish or distinct lilac tinge. No nitrous smell. Spores ± brownish with purplish tinge. 45

54. Plants growing on wood essentially ± above ground (stumps, trunks) or on sawdust 55

54. Plants growing on ground amongst litter, twigs, etc. . . 60

55. Plant ± violaceous (also the gills, the edge persisting violaceous). Small to medium plant on wood of broad-leaved trees.—*Leptonia euchroa.*

55. Not so 56

56. Gills quite free 57

56. Gills sinuate or adnate 58

57. Cap membranous, sticky-slimy, commonly with raised veins forming a sort of network; gills yellowish brownish. Spores rusty yellowish-brown.—*Pluteolus.*

57. Cap distinctly fleshy, not sticky-slimy; reticulation absent, but may be radiately fibrillose or felty squamulose. Spores and mature gills pink.—*Pluteus* (part).

58. Cap with purple to brownish granules on a ± yellow background; gills yellow. Confined to coniferous wood.—*Tricholoma rutilans.*

58. Not this combination of characters 59

59. Cap brown, slimy, with radiating wrinkles, commonly from a central umbo. Stipe widening slightly downwards, remarkably solid and prolonged into a long underground " radicle " which is attached to (buried) wood of broad-leaved trees, especially beech.—*Collybia radicata.*

59. Whole plant rusty yellowish to tawny; not slimey; no " radicle ". Confined to coniferous wood.—*Flammula sapinea.*

60. Gills broadly adnate to markedly decurrent; mature cap commonly ± funnel shaped 61

60. Gills free, adnate or sinuate, or doubtfully decurrent; mature cap rarely funnel shaped 70

61. Medium to large spp. 62

61. Small spp. 66

62. Stipe when rubbed with ferric alum giving *finally* (i.e. within about 1 minute) a ± greenish or pinkish colour (gills not soft, not easily pushed off from overlying flesh of cap nor staining brownish when bruised).—*Russula* (part).

62. No reaction to ferric alum. 63

63. Gills soft, light brownish, becoming brown where bruised after about 1 minute; easily pushed off from overlying flesh of cap.—*Paxillus* (part).

63. Not this combination of characters 64

64. Mature gills pinkish; cap white, soft, like kid glove. Cap, at least when mature, somewhat lobed at edge and irregular; stipe often ± excentric. (Distinct smell of "new meal".) Spores pink.—*Clitopilus prunulus.*

64. Mature gills not pinkish, the combination of other characters not applying 65

65. Mature gills dark grey to almost black. Top-shaped plants, cap sticky-slimy. Gill chamber of young plants covered by fibrillose veil, often seen on stipe of older plants as ± fibrillose zones. Plants confined to plantations of conifers. Spores blackish.—*Gomphidius.*

65. Mature gills not dark grey to almost black; cap not sticky-slimy; veil or its remains quite absent. Plants not confined to plantations of conifers. Spores white.—*Clitocybe.*

66. Cap ± convex and somewhat sticky, clear deep pink to rose-red. Mature gills greyish, thick, widely spaced and forked. Confined to conifer plantations and probably exclusively to pinus. Spores blackish.—*Gomphidius roseus.*

66. Cap usually depressed towards the centre and the combination of other characters not applying. Spores never blackish . 67

67. Cap, gills, stipe some shade of brownish. Spores brownish . 68

67. Gills, at least, not brownish. Spores white or pink . . . 69

68. Gill chamber of very young plants covered by fibrillose, cob-web-like veil, usually seen as flecks round edge of ± flattened (mature) cap.—*Tubaria.*

68. No such veil or its remains.—*Psilocybe* (part).

69. Mature gills pinkish. Spores pink, angular.—*Eccilia.*

69. Mature gills usually whitish, not pinkish. Spores white, smooth. (Spp. more numerous and usually more common than those of *Eccilia.*)—*Omphalia.*

70. Young dusky coloured gills mottled or variegated with numerous small patches (the maturing spores), best seen by section through centre of cap. Spores dark brownish (usually with purplish tinge) or essentially black . . . 71

70. Mottled or variegated gills at no time present. Spores white, pink, rusty yellowish-ochre or rusty brown 72

71. Young cap with conspicuous fibrillose veil, which remains for some time on cap edge and leaves ring-like fibrillose zone on upper part of stipe. Large sp., with dull ochre brown cap when water-soaked, drying out paler. Spores dark brown with purplish tinge.—*Hypholoma velutinium.*

71. No such fibrillose veil, but cap edge may slightly over reach the gills and be ± denticulate. Spores dark brown (purplish tinge absent) or essentially black.—See *Panaeolus.*

72. Gill chamber of young plants covered by a fibrillose cobweb-like veil (cortina), remains of which in older plants may often be seen as fibrils at cap edge, or as fibrillose zone(s) on stipe, or sheathing stipe for about two-thirds from below upwards as a stocking-like covering 73

72. Not so 78

73. Cap smooth, often sticky-slimy. Mostly medium or larger spp. . 74

73. Cap rough with fibrils radiating from centre, the fibrils commonly separating longitudinally as cap expands; or beset with (non-)

detachable scales, flecks, etc.; usually cigar brown to dark-brownish (rarely reddish), not sticky-slimy. Mostly small to medium spp. 76

74. Stipe essentially cylindrical, at most tapering very slightly downwards 75

74. Stipe swollen below, hence ± club-shaped or with basal marginate bulb.—*Cortinarius* (part).

75. Cap sticky-slimy, colours light, usually and predominantly pale yellow ochre, not ± dark brownish. Mature gills pale watery brownish, never with a rusty appearance. Spores cigar brown, never with a rusty appearance.—*Hebeloma* (part).

75. Cap not sticky-slimy, colours dark predominantly brownish. Mature gills usually rusty yellowish ochre or rusty cinnamon, sometimes yellowish, olivaceous or blood red. Spores rusty yellowish ochre or rusty cinnamon.—*Cortinarius* (part). . . . .

76. Plants of damp ± boggy places and essentially in association with alders or willows.—*Naucoria* (part).

76. Not so 77

77. Mature gills and spores pale brown to cigar brown, without a rusty cinnamon appearance.—*Inocybe*.

77. Gills creamy to rusty cinnamon. Spores rusty cinnamon.—cf. *Cortinarius bolaris*, *C. pholideus*.

78. Gill free, adnate, sinuate (or emarginate), the gill edge being either horizontal (to ground level) or ± ascending under the cap 79

78. Gills doubtfully decurrent, the gill edge descending from horizontal as it approaches the stipe, not ± horizontal to ascending under the cap 66

79. Mature gills pink or blue to mauve. Plants with no distinct smell of rotten fish, but may be radish smell. Spores white or flesh to salmon pink 80

79. Mature gills some other colour, usually some shade of brown. Included here are plants with mature gills and spores pinkish brown and distinct smell of rotten fish. Spores some shade of brown, never white or pink 86

80. Gills free.—*Pluteus* (part).

80. Gills adnate or sinuate 81

81. Margin of cap striate, gills connected by veins, cap and stipe usually uniformly pinkish to lilac. Whole plant smelling strongly of cut radish.—*Mycena pura*.

81. Not this combination of characters 82

82. *Either* mature gills powdered with a white bloom (the mature spores), cap and stipe pinkish yellowish pale brown *or* whole plant deep mauve. In both cases stipe is distinctly fibrous in structure, almost pliant, not easily cracking when slightly bent (but fibres may split longitudinally). Spores white, ± globose and finely prickly.—*Laccaria*.

82. Not this combination of characters 83

83. Gills sinuate (or emarginate); stipe fleshy[1] to fibrous[1], not cartilaginous[1] 84

83. Gills adnate; stipe cartilaginous 85

84. Usually small to medium spp., without purplish or violet

[1] See glossary.

colours or flushes being present. Spores salmon pink, polygonal in outline.—*Entoloma* (part).

84. Usually large spp. with purplish or violet colours or flushes. Spores very pale pink, not polygonal.—*Tricholoma* (part).

85. Cap mostly convex but depressed at centre, rough with fibrils, scales, etc., edge (at least when young) distinctly inrolled.—*Leptonia.*

85. Cap mostly conical and papillate, smooth; edge (at least when young) somewhat turned under, scarcely inrolled.—*Nolanea.*

86. Cap deep brick-red-brown to almost black when water-soaked (edge paler), drying out to ± pale ochre; stipe deep dark brown to almost black. Small to medium sp., smelling strongly of rotten fish or ± mouldy cucumber. (Spores and gills ± pinkish pale brown.)—*Naucoria cucumis.*

86. Not this sp. 87

87. Gills quite free; cap membranous, sticky-slimy, ± yellowish. Small to medium plants of grassland. (Spores rusty-brown.)—*Bolbitius* (part).

87. Gills adnate or sinuate, or if appearing to be free, then cap not membranous 88

88. Gills at least some shade of brownish, never white . . 89

88. Gills not some shade of brownish; usually white, off-white, cream, yellow 91

89. Cap dome-shaped or conical. Small spp., the stipe usually at least three times longer than diameter of cap. Edge of young cap not incurved.—*Galera.*

89. Cap convex to ± flat. Small to large spp., the stipe rarely more than three times longer than diameter of cap. Edge of young cap ± incurved 90

90. Cap ± sticky-slimy, colours not dark brownish; gills pale watery brown, clearly sinuate. Spores cigar brown. Medium to large spp.—*Hebeloma* (part).

90. Cap not sticky-slimy, colours most usually dark brownish; gills ± rusty ochre brown, most usually free to adnate, not clearly sinuate. Small to medium spp.—*Naucoria* (part).

91. Plants small 92

91. Plants medium but more usually larger 94

92. Cap dome-shaped or conical; gills usually ascending under cap. Plants tender, not leathery and not reviving on being wetted after drying out 93

92. Cap mostly expanded and flat (may be slight hump at centre), the gill edge being ± horizontal. Plants tough, leathery, pliant, readily reviving on being wetted after drying out.—*Marasmius* (part).

93. Gills white to off-white; spores white.—*Mycena* (part).

93. Gills ± honey coloured; spores yellowish-brown.—*Galera* (part).

93. Gills grey to black; spores blackish.—*Psathyrella* (part).

94. Stipe when rubbed with ferric alum giving finally (i.e. within about 1 minute) a usually ± pinkish, but occasionally ± greenish coloration. Gills brittle, with no or very few intermediate gills.—*Russula* (part).

94. No such ferric alum reaction. Gills not brittle, usually with

numerous intermediate ones 95
95. Gills clearly sinuate (or emarginate); stipe fleshy . . . 96
95. Gills free or adnate, not clearly sinuate; stipe cartilaginous or leathery or horny 97
96. Gills pale watery brown, cap smooth; spores cigar brown. *Hebeloma* (part).
96. Gills not pale watery brown, usually white, off-white, yellow, ± mauve, spores white sometimes with slight suggestion of pink.—*Tricholoma* (part).
97. Gills closely set and crowded; plants generally not reviving on wetting after being dried out.—See *Collybia*.
97. Gills ± widely spaced, not crowded; plants readily reviving on being wetted after drying out.—*Marasmius* (part).
98. Gill edge longitudinally split into two halves, the free ends being ± rolled back. More or less shell-shaped, tough sp., of ashy grey colour, laterally attached to wood. Stipe absent.—*Schizophyllum commune*.
98. Gill edge not thus split 99
99. Whole plant of corky or ± woody consistency. Cap ± shell shaped, velvety with a very short " nap " and often with series of concentric lines. Gills whitish to very pale yellowish ochre, occasionally branched and anastamosing. Stipe absent; attached laterally and most usually to birch wood.—*Lenzites betulina*.
99. Plants at most leathery, not corky or woody 100
100. Edge of gills appearing as if pieces had been clipped or chipped out at ± regular intervals. Plants tough and leathery; large to very large spp.—*Lentinus* (part).
100. Gill edge even 101
101. Stipe densely covered with a brownish-black velvet-like " nap ". Large to very large sp., with yellowish brown decurrent gills.—*Paxillus atrotomentosus*.
101. Stipe not so 102
102. Small spp. 103
102. Medium or larger spp. 104
103. Spores whitish.—*Pleurotus* (part).
103. Spores ± pinkish pale brown.—*Crepidotus* (part).
104. Gills easily pushed off from overlying flesh of cap, pale yellowish brown, becoming dark brown within about a minute of bruising.—*Paxillus* (part).
104. Not so 105
105. Gills white, off-white, ± creamy, pinkish or grey . . . 106
105. Not these colours; usually pale watery brownish . . . 107
106. Plants tufted.—*Pleurotus* (part).
106. Not tufted.—*Clitopilus prunulus*.
107. Spores whitish.—*Pleurotus* (part).
107. Spores ± pinkish pale brown.—*Crepidotus* (part).

KEY TO SPECIES

AMANITA

1. Cap white, whitish, very pale yellowish, with or without a pale greenish tinge; no red colours. Flakes on cap present or absent . . 2
1. Cap scarlet, reddish or orange. Colours bright or dull. Flakes or warts on cap normally present 3
1. Cap colour predominantly brownish: dark greyish olive brown, ± brown to yellowish-brown; sometimes (as also stipe) flushed with lilac 4
   2. Volva extending in one or more flaps up stipe. Cap flakes typically absent.—*A. phalloides*. Deadly poisonous: recoveries exceptional and only after intense suffering.
   2. Volva forming distinct rim round the suddenly swollen base. Cap flakes typically present. Broken flesh with smell of freshly cut raw potatoes or radish.—*A. citrina* (= *A. mappa*). Not edible.
3. Flesh where eaten by animals reddish, or becoming reddish after cutting. Uncut stipe often with reddish flush. Cap dull reddish brown.—*A. rubescens*. Edible when cooked, but best avoided until known with certainty on account of confusion with *A. muscaria*.
3. Flesh where eaten by animals not reddish, nor becoming reddish after cutting. Uncut stipe never with reddish flush. Cap bright scarlet to orange yellow.—*A. muscaria*. Poisonous, sometimes deadly.
   4. Brownish cap and often white bulbous stipe with distinct lilac tinge. Broken flesh smelling faintly of freshly cut raw potatoes or radish.—*A. porphyria*. Not edible.
   4. Lilac tinge quite absent 5
5. Cap margin striate; upper surface of ring smooth; bulbous stipe with one or more circular rims above the bulb. Cap greyish brown to brownish yellow.—*A. pantherina*. Poisonous.
5. Cap margin not striate; upper surface of ring striate; club-shaped stipe with no circular rims. Cap greyish brown or dull dark greyish. —*A. excelsa* (= *A. spissa*). Edible when cooked, but to be avoided on account of confusion with *A. pantherina*.

AMANITOPSIS

Cap mouse-grey.—*A. vaginata*. Edible.
Cap yellowish-brown.—*A. fulva*. Edible.

ANELLARIA

Cap light brownish-yellow to darker brownish-yellow, smooth, sticky or slimy, dome-shaped and never expanding. Small to medium sp., on dung.—*A. semi-ovata* (= *A. separata*).

ARMILLARIA

Whole plant white, slimy and of gelatinous consistency. Cap without scales. Medium to large sp., saprophytic or parasitic on feeble beech trees.—*A. mucida*.
Whole plant light brown to honey-coloured, not slimy nor of gelatinous consistency. Young cap (at least) beset with small brownish or blackish scales. Commonly tufted on dead wood, the long, blackish boot-lace like threads (rhizomorphs) spreading under the bark.—*A. mellea*.

BOLBITIUS

1. Generally grouped or tufted sp., the expanded cap up to 2 in. across. Stipe, at least when young, ± scurfy with white flecks.—*B. vitellinus*.
1. Generally not grouped or tufted, the expanded cap smaller, stipe smooth or at most mealy at apex 2
2. Stipe white, mealy above.—*B. titubans*.
2. Stipe yellowish, at least above.—*B. fragilis*.

BOLETUS

1. Ring present, best seen in young specimens. (Cap slimy, either buff-coloured and ± flushed with purplish or bright golden-yellow) . 2
1. Ring absent 3
2. Cap bright golden-yellow. (Confined to larches.)—*B. elegans*.
2. Cap ± buff coloured, usually with central purplish flush.—*B. luteus*.
3. At least upper part of stipe with network of raised lines (often restricted to extreme apex) 4
3. No such network, but stipe may be rough with granules, etc., or may appear as if stippled 11
4. Pores finally deep orange to deep red 5
4. Pores white, greyish, yellowish, greenish or flesh pink . . 7
5. Cap off-white to ± ashy-grey. Cut flesh white or at most pale cream before turning blue. Stipe with yellowish and reddish colours, network usually red.—*B. satanas*. Poisonous.
5. Cap some other colour. Cut-flesh yellow before turning blue. Network usually red on yellow background 6
6. Cap olivaceous-brown or reddish brown.—*B. luridus*.
6. Young cap yellowish, becoming blue on slightest touch, finally changing to red, this being the usual mature colour.—*B. purpureus*.
7. White flesh of cap not becoming blue on exposure to air after cutting 8
7. White flesh of cap (or stipe) becoming at once, or almost at once, ± intensely blue on exposure to air after cutting 9
8. Pores fleshy pink; taste of flesh distinctly bitter.—*B. felleus*. Not edible.
8. Pores whitish or very pale yellowish-green; taste of flesh not at all bitter. (Network often restricted to extreme apex of stipe).—*B. edulis*. Very good eating.
9. Cap reddish-brown to bay brown. Network and stipe yellowish; pores yellowish becoming slowly greenish when bruised.—*B. appendiculatas*.
9. Cap whitish to ashy-grey. (Flesh ± bitter. Bruised tubes becoming greenish.) 10
10. Stipe reddish-purple except at yellowish apex.—*B. calopus*.
10. Stipe ± uniformly yellowish.—*B. albidus*.
11. Stipe ± throughout rough with small brown to black scurf-like scales (pores greyish white) 12
11. Not so, but stipe may be slightly longitudinally ribbed or appear as if stippled with red 14
12. Cap ± orange-reddish, the cuticle slightly exceeding and turned back over the pores.—*B. versipellis*.
12. Cap brownish, grey-brown to almost black 13

13. Cut white flesh not changing colour within 30 minutes or at most to a pale flesh-pink. Growing under birches.—*B. scaber.*
13. Cut white flesh changing to ± violaceous-blackish within about 30 minutes. Growing under poplars.—*B. duriusculus.*
    14. Pores finally deep orange to red. Cut flesh at once becoming dark blue.—*B. erythropus.*
    14. Pores some other colour (flesh changing, if at all, slowly pale-bluish) 15
15. Yellowish stipe dotted with granules at extreme apex. (Cap ochre-brown, pores and flesh become rose-lilac on treatment with ammonia.) *B. granulatus.*
15. No such granulations (ammonia reaction usually negative) . 16
    16. Flesh with very peppery acrid taste. (Cap coppery yellowish-brown; stipe yellowish growing from bright yellow mycelium.) —*B. piperatus.* Not edible.
    16. Not this combination of characters 17
17. Pores distinctly arcuate-decurrent. Pores compound i.e., 2 or 3 smaller pores appearing as if grouped into a larger pore. (Cap coppery buff-yellowish).—*B. bovinus.*
17. Pores free to adnate, never arcuate-decurrent, nor the combination of other characters applying 18
    18. Cap dark bay brown; bruised (mature) pores becoming clear green in a few seconds. Cut flesh turning bluish.—*B. badius.*
    18. Not this combination of characters 19
19. Cap predominantly cafe au lait to dull yellowish ochre. Usually strong and unpleasant smell 20
19. Cap some other colour. Plants with no special smell . . 21
    20. Cap beset with somewhat darker flecks. Bruised (mature) pores not changing colour. Cut flesh slowly turning bluish in parts. Stipe not relatively stout nor pubescent below.— *B. variegatus.*
    20. Cap without darker flecks. Bruised (mature) pores turning ± olive in about a minute. Cut flesh remaining yellowish or intensifying slightly. Stipe relatively stout, pubescent below.— *B. impolitus* (cf. *B. subtomentosus* below.)
21. Cap red or purple red, sometimes tinged yellow brown; cuticle often cracking. Stipe usually flushed with red.—*B. versicolor.*
21. Cap ± brown and when cut showing reddish line under cuticle. Gaps between natural cracks on (mature) cap also red. Stipe usually flushed with red.—*B. chrysenteron.*
21. Cap ± olive pale brown. No red line under cuticle of cut cap. Gaps between natural cracks on (mature) cap yellowish. Stipe not flushed with red, but often with a few anastamosing rib-like raised lines.—*B. subtomentosus* (cf. *B. impolitus* above).

CANTHARELLUS

1. On burnt ground. Cap dark brown to almost black, ± funnel-shaped or at least depressed at the centre, surface slightly rough. Small to medium sp. with greyish gills.—*C. carbonarius.*
1. Not on burnt ground 2
    2. Gills crowded and repeatedly and regularly dichotomously branched 3
    2. Gills not crowded; branching irregular. (Gill edge blunt, rounded) 5

3. Cap (and stipe) greyish, papillate, finally ± funnel-shaped. Gills whitish, edge flat. Small to medium sp., the gills often spotted pinkish.—*Clitocybe umbonata.*
3. Whole plant orange or pale creamy; gill edge sharp. Medium to large plants 4
4. Whole plant ± orange.—*Clitocybe aurantiaca.* Edible.
4. Whole plant ± creamy.—*Clitocybe aurantiaca* var. *albida.* Edible.
5. Cap fleshy, stipe solid; whole plant egg-yellow.—*Cantharellus cibarius.* Very good eating.
5. Cap membranous, greyish to brownish; stipe hollow . . . 6
6. Cap brownish, stipe yellow to orange.—*C. tubaeformis.*
6. Whole plant greyish-brown, drying out paler.—*C. cinereus.*

CLITOCYBE

1. Gills repeatedly and regularly dichotomously forked . . . 2
1. Gills not thus forked 4
2. Cap (and stipe) greyish, papillate, finally ± funnel-shaped. Gills whitish, edge flat. Small to medium sp., the gills often spotted pinkish.—*C. umbonata.*
2. Whole plant orange or ± creamy. Gill edge sharp. Mostly medium to large plants. 3
3. Whole plant ± orange.—*C. aurantiaca.* Edible.
3. Whole plant ± creamy.—*C. aurantiaca* var. *alba.* Edible.
4. Plants with pleasant smell " of aniseed ". Medium to large plants; gills between adnate and decurrent 5
4. No characteristic smell 6
5. Whole plant blue-green or sea-green.—*C. odora.*
5. Cap pale yellowish-ochre when water -soaked drying out to almost white.—*C. suaveolens.*
6. Cap with thin flesh, ± greyish translucid when water-soaked, but on drying out becoming opaque and whitish, or the water-soaked colours becoming much paler (hygrophanous) . . 7
6. Cap distinctly fleshy and not affected by changes in water content. Gills markedly decurrent or arcuate-decurrent . . . 11
7. Cap, when mature, saucer to funnel-shaped, the gills then appearing decurrent 8
7. Cap, when mature, convex to flat, or at most depressed at the centre, the gills, appearing little more than adnate. (Small to medium spp.) 10
8. Stipe whitish above, brownish below. Medium sized sp., ± translucid greyish when water-soaked, becoming opaque-whitish when dry. No smell of " new meal ". Stipe apex not mealy.—*C. dicolor* Lange.
8. Stipe ± of same colour throughout 9
9. Apex of stipe with network of darker filaments. Cap darkish-brown when water-soaked, becoming paler on drying out; sometimes greyish-brown. Medium to large sp.—*C. cyathiformis.*
9. Apex of stem wthout such a network. Medium sized sp. with translucid pale brownish cap when water-soaked, drying opaque off-white. Bruised flesh smelling and tasting of " new meal " or cucumber. Apex of stipe not mealy.—*C. vibecina.*
10. Strong smell of " new meal "; apex of stipe not mealy. Small to medium sp. with greyish-brown cap.—*C. ditopus.*

10. No special smell. Stem apex mealy. Small to medium sp. with greyish-brown cap when water-soaked, drying out paler.—*C. metachroa.*

11. Cap greyish, convex or somewhat shallowly depressed towards the middle. (Large to very large spp.) 12

11. Cap not greyish; predominantly whitish to yellowish-ochre . 13

12. Gills (and cylindrical stipe) whitish.—*C. nebularis.*

12. Gills creamy; stipe club-shaped.—*C. clavipes.*

13. Predominantly creamy to yellowish-ochre or ± orange-brown spp., with deeply decurrent gills. Mature cap funnel-shaped . . 14

13. Predominantly white spp., the gills adnate to arcuate-decurrent . 16

14. Cap ± orange-brown. Medium to large, sometimes tufted sp.—*C. flaccida.*

14. Cap creamy to yellowish ochre 15

15. Large to very large stout plant, at least 4 in. across.—*C. geotropa.*

15. More slender plant, rarely exceeding 3 in. across.—*C. infundibuliformis.*

16. Growing in woods 17

16. Growing in grass. (Medium sized spp.) 20

17. Large spp. 18

17. Small spp. 19

18. In woods of broad-leaved trees.—*C. cerussata.*

18. In coniferous woods.—*C. pithyophila.*

19. In woods of broad-leaved trees.—*C. phyllophila.*

19. In coniferous woods.—*C. candicans.*

20. Cap with faint tinge of pinkish, usually zoned and with a bloom that soon disappears. No smell of " new meal ".—C. *rivulosa.* Poisonous.

20. Cap without pinkish flush, not zoned; bloom persistent. Faint but distinct smell of " new meal ".—*C. dealbata.* Poisonous.

CLITOPILUS

Cap fleshy towards centre, thin at margin; at first convex later ± saucer-shaped, margin mealy. Stipe sometimes ± excentric. Faint but distinct smell of " new meal ". Medium to large sp.—*C. prunulus.*

COLLYBIA

1. Cap pale greyish-brown, almost membranous, streaked with radiating brown fibrils; gills widely spaced, thick. Large to very large sp. with cylindrical stipe fixed into substratum by means of whitish, branched mycelial cords.—*C. platyphylla.*

1. Not this sp. 2

2. Cap brown, slimey, with radiating wrinkles and commonly with central umbo. Stipe widening slightly downwards, markedly solid and prolonged into a long subterranean " radicle " which is attached to (buried) wood. Medium to large sp. with sinuate gills.—*C. radicata.*

2. Not this sp. 3

3. Plants tufted *and* growing on wood 4

3. Plants growing on unburnt ground, not attached to wood, sometimes grouped or tufted, or arising from (buried) fir cone . . 7

3. Plants growing on burnt ground or on dead remains of other agarics.

(Small spp.) 12
4. Stipe ± velvety with short hairs, to at least half-way up . . 5
4. Stipe glabrous, or at least with a " bloom " or basal woolliness. 6
5. Medium to large sp. with sticky orange-yellowish cap and yellowish gills. Stipe yellowish-red.—*C. velutipes.*
5. Small to large sp. with rusty-brownish cap when water-soaked, drying out to yellowish-brown; not sticky. Gills white. Stipe bright reddish-brown with slight purplish tinge.—*Marasmius acervatus.*
6. Stipe spindle-shaped with conspicuous longitudinal grooves. Medium to large sp. with foxy-brown cap and stipe.—*C. fusipes.*
6. Stipe cylindrical, or at most compressed, bright reddish-brown with slight purplish tinge. Small to large sp. with rusty brownish cap when water-soaked, drying out to yellowish brown.—*Marasmius acervatus.*
7. Stipe velvety with shorter or longer hairs to at least half-way up, or arising from (buried) fir cones 8
7. Stipe glabrous or at least covered with whitish bloom . . . 10
8. More or less tufted sp., not arising from buried fir cone. Small to medium sp. with pale rusty-brown cap when water-soaked, drying out to whitish.—*Marasmius confluens.*
8. Not tufted, but springing from (buried) fir cones. Small spp. . 9
9. Vernal sp., stipe usually not less than three times the diameter of cap and densely woolly-hairy on lower half. Spore print blue with iodine solution.—*Marasmius esculentus.*
9. Autumnal sp., stipe usually less than three times longer than diameter of cap, and not much more than extreme base woolly-hairy. Spore print not changing colour on addition of iodine solution. —*Marasmius myosurus.*
10. Stipe stout, thicker than a pencil, longitudinally striate with fibres 11
10. Stipe quite smooth, thinner than a pencil. Medium sized hygrophanous sp., somewhat rusty-yellowish when water-soaked, drying out almost whitish.—*C. dryophila.*
11. Cap dry, at first white, soon mottled as well as the gills with fox-red spots. Large to very large sp., often grouped but not tufted.—*C. maculata.*
11. Cap greasy to touch, ± brown when water-soaked, drying out unevenly to pale yellowish-brown. Medium to large sp., the cap with small central umbo.—*C. butyracea.*
12. Growing on dead, usually black, remains of other toadstools 13
12. Growing on burnt ground. Cap and stipe dark brown to almost blackish; gills greyish.—*C. ambusta.*
13. Stipe growing from a small, hard tuber-like body (sclerotium) . 14
13. No such sclerotium.—*C. cirrata.*
14. Sclerotium brown-purplish-black.—*C. tuberosa.*
14. Sclerotium yellowish-ochre.—*C. cirrata* var. *cookei.*

COPRINUS

1. Tufted spp., the cap ± grooved at the margin. (Young cap mealy or with glistening particles) 2
1. Growing singly 3
2. Stipe sheathed below (from base upwards) by the adherent veil,

leaving distinct rim at top of sheath, where veil broke off as cap expanded. Cap whitish to greyish-yellow, darker at centre with brownish scales.—*C. atramentarius.*

2. No such sheath. Cap yellowish-brown or slightly rusty-yellowish-brown, beset with glistening particles.—*C. micaceus.*

3. Cap ovoid to cylindrical and covered with a white felt-like covering which may break up in various ways as cap expands . . . 4
3. Cap covered with a loose meal 5
3. Cap devoid of such coverings, of greyish colour, with deep grooves radiating from small central brownish area. Stipe smooth.—*C. plicatilis.*

4. Cap cylindrical, the felt-like covering remaining continuous and in the form of overlapping fluffy scales.—*C. comatus.* Edible.
4. Cap ovoid, the felt-like covering breaking up into ± irregular flakes which eventually drop off.—*C. picaceus.*

5. Mealy covering entirely snow-white.—*C. niveus.*
5. Mealy covering off-white to almost grey.—*C. stercorarius.*

CORTINARIUS

1. Cap sticky or slimy at least when moist. (Stipe sticky or slimy or not) 2
1. No part of plant is either sticky or slimy 15

2. Bulbous base of stipe with ± distinct rim (i.e. bulb marginate) 3
2. Stipe equal throughout, or club-shaped or bulbous at the base, but *not marginate* 8

3. Plant having, somewhere, shades of violet, blue or purple . . 4
3. No such shades present 7

4. Gills becoming purplish when bruised (young gills same shade of violet or blue) 6
4. Gills unaffected by bruising 5

5. Young gills at first whitish. Large sp., with greyish-blue cap, somewhat ochry towards centre.—*C. caesiocyaneus.*
5. Young gills at first bluish-mauve. Large sp. with clear light blue cap, soon discolouring to ± dirty yellowish-brown. Mainly a beech wood sp.—*C. caerulescens.*

6. Stem solid; young gills deep violet. Large sp., cap purplish-violet dark brown, sometimes with olivaceous tinge, soon discolouring through dirty yellowish. Mainly in coniferous woods. *C. purpurascens.*
6. Stem stuffed, then hollow; young gills very pale lilac. Large plant, cap brownish dull yellow-ochre, with a purplish tinge at first. Mainly a sp. of broad-leaved woods.—*C. purpurascens* var. *subpurpurascens.*

7. Young gills whitish or off-white. Medium to large sp., cap yellowish-ochre, sometimes somewhat rusty at centre; when young ± sprinkled with a whitish hairy hoariness. Mainly a beechwood sp. Gill edge jagged.—*C. multiformis.*
7. Young gills rosy violet to violaceous purple. Medium to large sp. with yellow cap, somewhat rusty towards centre. Stipe deeply inserted in the bulb and springing from a yellow mycelium. Gill edge jagged. Mainly a beechwood sp..—*C. calochrous.*
7. Young gills light yellow changing to rusty orange. Large to very large sp. with tawny-orange cap. Gill edge entire.—*C. fulgens.*

8. Stipe sticky or slimy at least when moist, or flesh bitter . . 9
8. Stipe quite dry, not sticky or slimy, nor flesh bitter . . 14
9. Cap deeply radiately grooved to about one-third the way in. Stipe tapering above and below ± distinctly fibrillose. Large to very large sp., cap light ochre or pale yellowish-brown.—*C. elatior*.
9. Not this combination of characters 10
10. Stipe sheathed, more especially towards the base, with concentric, floccose, interrupted zones 11
10. Stipe quite smooth 13
11. Margin of cap quite smooth 12
11. Margin of cap striate, or slightly radiately grooved. Medium to large sp., the cap greyish-brown or dull yellowish to ochre-brown. Stipe with lilac or bluish tinge.—*C. mucifluus* (compare *C. elatior* above).
12. Cap orange-tawny. Medium to large sp., the brownish floccose zones mostly in lower half of stipe.—*C. collinitus*.
12. Cap essentially chestnut. Medium to large sp., stipe whitish. (Essentially a plant of coniferous woods).—*C. mucosus*.
13. Young gills with flush of pale blue. Cap yellowish without any trace of blue. Medium to large sp., flesh without noticeably bitter taste. —*C. delibutus*.
13. Young gills whitish to off-white, without any blue colour. Cap at first uniformly pale bluish-violaceous. Medium sized sp. with distinctly bitterish flesh.—*C. croceo-caeruleus*.
14. Stipe sheathed with ± concentric brownish or ochreous zones or spots. Very large sp. with yellow to ochre cap. Mainly associated with birches.—*C. triumphans*.
14. Stipe fibrillose, club-shaped, without concentric zones or spots. Young gills lilac. Medium to very large sp., the cap at first greyish-lilac soon discolouring to dull yellow-ochre, but flesh flushed bluish, soon fading on exposure to air.—*C. largus*.
15. Cap and stipe ± distinctly scaley 16
15. Not so 17
16. Scales reddish. Medium sized, yellowish-red sp. mainly in beechwoods.—*C. bolaris*.
16. Scales blackish-brown, ± recurved. Mostly medium sized ± dark brownish sp.—*C. pholideus*.
17. Stipe encircled with one or more bright reddish zones or bands. Large sp., cap brownish.—*C. armillatus*.
17. No such red band(s) 18
18. Violet, purplish or lilac colours present, at least in the young gills 19
18. No such colours present, not even in the young gills . . 25
19. The ± club-shaped stipe sheathed from below upwards ending in a ± rim-like zone at the upper part of the stipe 20
19. Stipe not thus sheathed. May be whitish belt(s) . . . 21
20. Whole plant silvery-whitish with flush of very pale blue. Medium to large plant. Cut flesh and young gills very pale bluish.—*C. albo-violaceus*.
20. Cap ± brown. Young gills violet, later ± dark brown. Rim of upper part of sheath on stipe almost ring-like. Medium sized sp., with sweetish smell, mainly in beechwoods.—*C. torvus*.

21. Cap hygrophanous. Mostly small to medium plants . . . 22
21. Not hygrophanous. Not further considered.
22. Cap yellow-brown, stipe whitish (with violaceous flush). Medium sized sp. with cylindrical stipe.—*C. bicolor.*
22. Cap brown to dark chestnut brown. (Stipe without belts but with violet or lilac tinges above) 23
23. More or less tufted sp., with somewhat club-shaped stipe. Medium to large plant, cap ± umbonate.—*C. saturninus.*
23. Not tufted. May be grouped 24
24. Gills dark brownish. Medium sized sp., cap dark chestnut brown, stipe slightly rusty brown below, cut flesh violaceous. —*C. castaneus.*
24. Gills pale cinnamon. Small to medium plant, cap bay-brown, tinged purplish at first. Stipe silvery white below. Cut flesh brownish.—*C. erythrinus.*
25. Large plant. Cap dark brownish. Stipe club-shaped, pale brownish, densely fibrillose from below upwards to a darkish ring-like zone.—*C. brunneus.*
25. Small to medium plants; stipe cylindrical or at most, slightly thickened at extreme base or tapering downwards 26
26. Gills blood-red or cinnabar red. (Cap not hygrophanous.) . 27
26. Gills without these colours 30
27. Cap brownish, sometimes with olivaceous tinge 28
27. Cap and stipe ± blood-red or cinnabar-red 29
28. Stipe, at least below, covered with reddish fibrils. Cap chestnut-brown.—*C. phoeniceus.*
28. Stipe tawny-yellowish. Cap brownish usually with olivaceous tinge.—*C. semisanguineus.*
29. Stipe rarely exceeding diameter of cap. Essentially a plant of woods of broad-leaved trees, especially beech.—*C. cinnabarinus.*
29. Stipe about twice the diameter of the cap. Almost entirely a conifer wood plant.—*C. sanguineus.*
30. Gills at first yellowish, becoming pale cinnamon. Medium sized sp. with yellowish stem and ± umbonate yellowish-brown to brownish cap, often tinged olivaceous. Cut flesh yellow.—*C. cinnamomeus.*
30. Not this sp. 31
31. Stipe with at least one whitish fibrillose ring-like zone. Cap almost orange-brown (paler on drying out); gills rusty, stipe dull reddish-brown. Medium sized plant, often with smell of cut radish.—*C. hinnuleus.*
31. Stipe white floccosely-scaley below a ± ring-like zone. Cap (and stipe below the fibrils) of a dark brownish colour and beset throughout with numerous short, white fibrils especially towards the margin. Medium sized plant with ± umbonate cap, mainly under birches. —*C. hemitrichus.*

CREPIDOTUS

1. Medium sized sp.; cap ± coffee-dash colour when water-soaked, drying out whitish, quite smooth and of somewhat gelatine-like consistency. Stipe virtually absent. Spore print pale dull brown with pinkish tinge.—*C. mollis.*
1. Small spp.; cap, at least towards edge, somewhat velvety (lens).

Spore print pale ochre brown or fleshy pink 2

2. Cap with dull yellowish tinge; only edge of cap shortly pubescent. —*C. pubescens.*

2. Cap without, yellowish tinge; throughout ± shortly hairy, more so towards edge.—*C. variabilis.*

ECCILIA

Medium sized sp. cap generally convex and depressed towards the centre (umbilicate). Colour when water-soaked predominantly brownish and pellucid striate; drying out greyish. Gills adnate to decurrent, at first white then pink. —*E. griseo-rubella.*

ENTOLOMA

1. Cap campanulate and umbonate, unaffected by changes in water content (not hygrophanous), more or less beset with flocci or fibrils 2

1. Cap essentially smooth, hygrophanous or not 3

2. Stipe brownish with dull purplish fibrils. Medium to large sp., with ± greyish-brown cap.—*E. porphyrophaeum.*

2. Stipe devoid of any colour. Small to medium sp. with greyish-brownish cap.—*E. jubatum.*

3. Cap ± sticky, not affected by changes in water content, rather fleshy and without any silky apppearance. More or less greyish-yellowish spp., with smell of " new meal " 4

3. Cap not sticky, its appearance altered by water content, almost membranous and when dry having a silky appearance . . . 5

4. Cap convex, or with very broad central hump. Young gills yellow before changing to pinkish. Large to very large sp., 2 or 3 plants often joined at their stipe base, but not tufted.—*E. lividum.* Poisonous; sometimes fatal.

4. Cap convex to plane with distinct umbo. Young gills white. Large sp. with creamy to pale ochre cap.—*E. prunuloides.*

5. Large spp. (growing in troops or even ± tufted) . . . 6

5. Small to medium spp. 7

6. Spring or early summer sp., cap distinctly umbonate. Large sp. with greyish cap, dotted or splashed with darker spots.—*E. clypeatum.*

6. Autumnal sp., not umbonate. Large sp., with greyish cap drying out to pale yellowish.—*E. rhodopolium.* Poisonous.

7. Cap and stipe whitish, smell not distinctive. Growing in woods.—*E. speculum.*

7. Cap brownish. Essentially grassland spp. 8

8. Gills with prominent transverse ribs, best seen by section through cap. No distinctive smell.—*E. costatum.*

8. No such transverse ridges. Distinctive smell of "new meal" or cucumber.—*E. sericeum.*

FLAMMULA

1. Growing on burnt ground. Small orange-brown sp., with sticky cap growing in troops.—*F carbonaria.*

1. Not growing on burut ground. 2

2. Pale straw-yellow tufted sp., with sticky ± scaly cap. Medium sized sp., groping on or near wood or in grassy places. —*F. gummosa*

2. Golden-yellow-tawny sp., growing singly or in 2's or 3's, always attached to coniferous wood.—*F. sapinea.* Not edible.

GALERA

Cap small to medium, dome-shaped, not expanding; striations absent except at extreme edge. Gill edge straight.—*G. tenera.*
Cap small, dome-shaped, not expanding; striations on cap clearly present. Gill edge curved.—*G. hypnorum.*

GOMPHIDIUS

1. Cap pinkish to rose-red. Flesh at base of cut stipe yellowish with flush of reddish. Small to medium sp., of coniferous woods and plantations.—*G. roseus.*
1. Cap brownish with or without a purplish-violaceous tinge . . 2
   2. Cap convex, umbonate. Young stipe with zones of scale-like fibrils above. Flesh at base of cut stipe yellowish-coppery-red. Medium to large sp., of coniferous woods.—*G. viscidus.*
   2. Cap convex, but depressed towards centre and without an umbo. Stipe with fibrils but not obviously zoned. Flesh at base of cut stipe bright yellow. Medium to large sp., of coniferous woods.—*G. glutinosus.*

HEBELOMA

1. Young specimens with fibrillose veil, which in older plants remains as fibrillose covering on stipe from below upwards, ending in a ± ring-like fibrillose zone just below stipe apex 2
1. No such veil at any stage. Stipe at most powdery or somewhat flocculose 4
   2. Large fleshy sp. with cap and stipe ± coffee-dash colour. Cut flesh of stipe similarly and uniformly coloured.—*H. fastibile.* Not edible.
   2. Medium spp. of similar basic colour, but much darker towards centre of cap. Base of stipe both inside and outside becoming flushed dirty brown from the base upwards 3
3. Pale margin of young cap distinctly fibrillose.—*H. mesophaeum.* Not edible.
3. Pale margin of young cap as well as stipe virtually devoid of fibrils.—*H. testaceum.* Not edible.
   4. Stipe scarcely exceeding diameter of cap, usually shorter; ± mealy or floccose. Medium sized plant with ± distinct smell of radish.—*H. crustuliniforme.* Not edible.
   4. Stipe about twice the diameter of cap, at most a little mealy at apex. No radish smell.—*H. longicaudatum.* Not edible.

HYGROPHORUS

1. Growing in woods or plantations; gills arcuate-decurrent to decurrent. Veil present in young plants, often showing in older plants as delicate flakes at cap margin, or leaving a ± ring-like fibrillose zone on stipe apex. Stipe ± scaly throughout or dotted above with granules 2
1. Essentially grassland spp.; gills variously attached. Veil absent. Stipe without ring-like zones nor dotted with granules above . 6
   2. Cap brownish with or without an olivaceous tinge . . . 3

2. Cap white or off-white 4
3. Gills pale yellow. Cap not umbonate, olive-brown and like the stipe very slimy. Medium sized sp. of coniferous woods.—*H. hypothejus.*
3. Gills white. Cap umbonate, olive-brown and like the stipe very slimy. Medium to large sp.—*H. olivaceo-albus.*
4. Cap margin and upper part of stipe beset with bright yellow flocci. Medium to large sp. almost confined to beechwoods.—*H. chrysodon.*
4. No such bright yellow flocci 5
5. Cap ± uniformly white (may become ± parchment-yellow with age). Medium to large sp., smell not distinctive.—*H. eburneus.*
5. Cap with dull-yellowish flush towards centre. Medium sized sp. with strong distinctive smell of goats (resembling larvae of goat moth).—*H. cossus.*
6. Cap white, off-white or buff-coloured. Not slimy or sticky spp. (Gills decurrent) 7
6. Other and usually bright colours present: yellow, with or without greenish flushes, scarlet to red or if greyish-brown then with strong nitrous smell. Essentially sticky or slimy spp. . . . 10
7. Cap buff-coloured. Stout top-shaped medium to large plant.—*H. pratensis.* Edible.
7. Cap white or whitish 8
8. Distinct and pleasant smell of " russian leather ". Small sp. with few and widely spaced gills.—*H. russo-coriaceus.*
8. No distinctive smell 9
9. Small sp. with umbilicate and almost membranous cap.—*H. niveus.*
9. Medium sized sp. with fleshier cap ± convex to saucer-shaped.—*H. virgineus.*
10. Gills almost free, at most emarginate 1
10. Gills between broadly adnate and decurrent, not sinuate or emarginate 16
11. Cap greyish-brown with strong nitrous smell. Small to large sp.—*H. nitratus.*
11. Not this sp. 12
12. Apex of stipe distinctly greenish. Medium sized slimy of mixed yellowish-green colours.—*H. psittacinus.*
12. Not this sp. 13
13. Cap scarlet to red; may or may not discolour to various shades of yellow or black, especially after bruising 14
13. Cap predominantly yellow 15
14. Large sp. with convex cap becoming plane; no part turning black or bruising.—*H. puniceus.*
14. Medium sp. with pronounced and persistently conical cap, turning black within a few minutes of bruising.—*H. conicus.*
15. Stipe fibrillosely striate, not sticky. Medium to large bright golden yellow sp., the stipe about as long as diameter of cap.—*H. obrusseus.*
15. Stipe almost smooth, distinctly slimy. Small to medium lemon-yellow sp., the stipe about twice as long as diameter of cap.—*H. chlorophanus.*
16. Cap ± mealy, not sticky 17
16. Cap from first quite smooth and sticky 18
17. Small vermilion sp., the gills yellow, sometimes with flush of same

colour as cap. Meal on cap rather scanty.—*H. miniatus.*

17. Small scarlet to orange sp., the gills pure white, or at most, creamy. Meal on cap abundant, especially at centre.—*H. turundus.*
    18. Cap foxy-yellow, the colour somewhat obscured by a lead-coloured slime. Stipe similarly coloured and with lead-coloured apex. Small to medium tough plant.—*H. laetus.*
    18. Cap and stipe ± uniformly waxy-yellow. Small to medium sp. —*H. ceraceus.*
    18. Cap blood-red, fading to yellowish. Small to medium sp., the gills ± flushed with same colour as cap, the stipe usually compressed.—*H. coccineus.*

HYPHOLOMA

1. Solitary or at most grouped sp. (but not tufted), the brown gills variegated with numerous darker, almost blackish, patches. Young cap with conspicuous fibrillose veil, which remains for some time on cap edge and leaves ring-like fibrillose zone(s) on stipe. Large sp. with dull ochre-brown cap when water-soaked, drying out paler.— *H. velutinum.*
1. Densely tufted spp., gills uniformly coloured, not variegated . 2
    2. Cap and stipe predominantly yellowish, sometimes with reddish flush towards centre of cap. Appearance of cap unaffected by changes in water content (not hygrophanous). Rather tough spp., with ± fleshy cap 3
    2. Cap coffee-coloured to date-brown. Yellow colours absent. Stipe white. Appearance of cap changing with water content (hygrophanous). Rather fragile spp., with almost membranous cap 5
3. Flesh very bitter; young gills yellowish. Confined to wood of broad-leaved trees 4
3. Flesh with no special taste; young gills white. Confined to coniferous wood. Medium to large sp.—*H. capnoides.*
    4. Cap with central flush of brick-red. Medium to very large sp. —*H. sublateritium.* Not edible.
    4. Cap without central flush of brick-red, usually only darker towards centre.—*H. fasciculare.* Not edible.
5. Cap rich date-brown drying out to cafe au lait. Gills pale brownish to ± chocolate brown. Medium sized sp., lilac or violet tinges absent.—*H. hydropgilum.*
5. Cap ± honey-coloured, drying out almost whitish, usually, especially the gills, ± tinged with lilac or violet. Medium sized sp., —*H. candolleanum.*

INOCYBE

The majority of spp. of this genus can scarcely be identified without microscopical examination. The following, however, have fairly well defined characters. (The spores of these selected spp. are smooth, not nodulose nor with ± projecting and radiating spines.)

1. Plants with distinct sweetish, aromatic smell of ripe fruit, but sometimes ± mouldy as of over-ripe fruit. Bruised external flesh not becoming deep pink. (Medium to large spp.) 2
1. Such fruity smell generally absent, but if present then bruised external flesh becomes deep pink. Otherwise any smell is usually described

as " earthy " or " spermatic " 3

2. Cap dull pale yellowish ochre, at first convex, then flattening out; covered with darker fibrils or fibrillose scales. Flesh, when cut, especially at base of stipe slowly changing to pale rusty. Smell fruity, not mouldy. (Muricate fusiform cystidia present.)—*I. pyriodora.*

2. Cap dull cigar-brown or fawny brown, remaining convex, not flattening out; beset with ± recurved fibrillose scales, especially towards centre. Flesh, when cut, especially at base of stipe, changing ± rapidly to deep pinkish. Smell fruity but mouldy. (Muricate fusiform cystidia absent.)—*I. cervicolor.*

3. Mature (expanded) cap whitish or ± deep lilac. (Bruised external flesh not becoming deep pink) 4

3. Mature cap not so. (If whitish when young, then bruised external flesh becoming deep pink) 5

4. Cap persistently whitish; small to medium sp., cap convex, flattening out and somewhat umbonate; ± silky-fibrillose (Muricate fusiform cystidia present).—*I. geophylla.*

4. Cap ± deep lilac, otherwise as above.—*I. geophylla* var. *lilacina.*

5. Bruised external flesh everywhere taking on a deep pink colour. Mature cap ± ochre-brown (whitish when young) finally (unbruised specimens) flushed with ± brownish scarlet especially towards ± umbonate centre; at first convex, ± flattening out and commonly splitting at margin. Medium to sometimes large sp. with faint but ± sweetish, fruity smell. (Muricate fusiform cystidia absent.)—*I. patouillardii.* Poisonous, sometimes deadly.

5. Bruised external flesh not taking on a deep pink colour . . 6

6. Cap dull yellowish-ochre to fawny-ochre, radiately fibrillose, the fibrils separating as cap expands, showing whitish underlying flesh, more especially towards edge of cap; conical at first, flattening out and distinctly ± acutely umbonate. Large plant with cylindrical stipe and " earthy " smell. (Muricate cystidia absent.)—*I. fastigitia.* Poisonous, sometimes deadly.

6. Cap predominantly brownish. Spp. scarcely to be identified in the field.—*I. brunnea, I. eutheles*, etc.

LACCARIA

Whole plant mauve. Medium sized sp.—*L. amethystina.*

Whole plant pinkish-yellow-ochre-light brown. Medium sized sp.—*L. laccata.*

LACTARIUS

1. Milk coloured from the first or within about 2 minutes . . 2

1. Milk white, opaque, or translucid watery white, or almost watery, unchanged for at least 2 minutes 3

2. Milk deep saffron to orange. Medium to very large sp. confined to conifers.—*L. deliciosus.* Edible.

2. Milk sulphur yellow within about 2 minutes. Medium to large almost flesh-coloured sp. with zoned cap. Most usually under oaks.—*L. chrysorheus.* Not edible.

3. Cap white or pinkish (brown colours absent). No characteristic pleasant smells (press gills close to nose) 4

3. Cap some other colour. May be pleasant smells 6

4. Cap uniformly white, quite dry, not slimy or sticky, edge not shaggy. Very large funnel-shaped spp. with acrid milk . . 5
4. Cap with pinkish zones on white background, edge very shaggy (best seen in rather young specimens). *L. torminosus*. Not edible.

5. Cap velvety, especially towards incurved edge; gills not especially crowded nor repeatedly forked.—*L. vellereus*. Not edible. (Commonly confused with *Russula delica*, but latter has flesh only slowly becoming ± peppery, and the gills develop a glaucous tint, especially after gathering.)
5. Cap smooth; gills very crowded, repeatedly forked.—*L. piperatus*. Not edible.

6. Cap greyish or lead-greyish with, sometimes, a faint pink or lilac tinge 7
6. Cap brownish-black, with or without an olivaceous flush, or olivaceous or dark greyish-green or light dirty brown. Red colours absent. Cap usually ± slimy. Milk acrid . . . 9
6. Cap dark reddish foxy-brown, or pinkish-brown, or ± bright orange to orange-brown, or cut-liver brown . . . 11

7. Plant with distinct smell of coconut. Medium to large plant confined to ground around birches.—*L. glyciosmus*.
7. Not this sp. 8

8. Milk and bruised whitish gills becoming grey within about 20 minutes. Medium to large sp.—*L. vietus*. Not edible.
8. Milk unchanging. Creamy yellow gills ageing to dull pale ochre. Medium to large sp. with ± zoned greyish to yellowish cap.—*L. pyrogallus*. Not edible.

9. Cap blackish-olivaceous-brown. All parts giving intense violet colour with ammonia. Large to very large sp. especially associated with birches.—*L. plumbeus* (= *L. turpis*). Not edible.
9. Cap predominantly greyish to greyish-green, sometimes ageing to pale dirty brown. No ammonia reaction 10

10. Cap usually distinctly zoned with darker spots. Bruised whitish gills and milk slowly turning dirty grey. Medium to large sp., more especially in beechwoods.—*L. blennius*.
10. Cap scarcely zoned. Creamy gills ageing to dull pale ochre, unaffected by bruising. Especially (? exclusively) on ground by hazels.—*L. pyrogallus*. Not edible.

11. Cap ± bright orange or orange-brown. Medium to large sp., the milk slowly becoming distinctly bitterish.—*L. aurantiacus*. Not edible.
11. Not this sp. 12

12. Milk white and opaque 13
12. Milk watery or whitish translucent. (Taste always mild) . 17

13. Cap dark reddish-foxy-brown or cut-liver brown . . . 14
13. Cap pinkish light brown, usually ± zoned. Faint but distinct and characteristic pleasant " oily " smell (press gills close to nose). Medium to large sp. Confined to ground under oaks.—*L. quietus*.

14. Margin of cap (generally incurved) ± crenate. Cap cut-liver-brown at centre, paler towards edge. Milk placed on back of (especially sweaty) hand turns ± bright yellowish in about 10 minutes. Medium to large sp. of coniferous woods.—*L. hepaticus* (= *L. theiogalus* sensu C. Rea).

14. Not this combination of characters. 15
15. Plant with very pleasant persisting smell, developing especially after drying, usually described as of melilot or fenugreek. Medium sized sp. with brick-red-brown cap, usually papillate. Milk mild, almost watery, opalescent not white opaque.—*L. camphoratus.*
15. Not this combination of characters. Smell absent . . . 16
16. Cap dark-reddish-foxy-brown, with central papilla. Milk very hot after about 45 seconds. No special smell. Medium to large sp. especially of coniferous woods.—*L. rufus.* Not edible.
16. Rather similar plant, but milk persistently mild. Smell and taste very faint, but often like ivy. Medium to large sp. more especially associated with broad-leaved trees.—*L. subdulcis.*
17. Plant, especially on drying, developing a strong persistent smell of melilot, fenugreek. See 15.
17. Faint but distinct rather unpleasant " smell of bugs " . . 18
18. Cap dark-bay-brown; smell pronounced but disappearing on drying. Medium sized sp. mainly of frondose woods.—*L. cimicarius.*
18. Cap rather more tawny-brown; smell faint. Small to medium sp.—*L. serifluus.*

LENTINUS

1. Cap ± yellowish orange-brown, quite smooth, funnel-shaped. Medium to large sp. tufted on wood of broad-leaved trees, especially beech. Smell strong, very pleasant, persisting long after gathering.—*L. cochleatus.*
1. Cap whitish, pale yellowish or coffee-dash colour, not smooth but beset with ± darker scales. Smell faint, pleasant or not . . 2
2. Large to very large sp., cap whitish to creamy, ± funnel-shaped or at least somewhat depressed towards centre and covered with almost blackish radiately arranged fibrillose scales. Often tufted sp., confined to wood of broad-leaved trees.—*L. tigrinus.*
2. Large to very large sp., cap yellowish ochre ± convex to funnel-shaped and covered with ± reddish-brown scales. Confined to wood of coniferous trees, rarely tufted.—*L. lepidus.*

LENZITES

Cap and gills of corky or ± woody consistency, ± semi-circular up to about 3 in. across; velvety with a very short " nap " and often with a series of concentric lines. Gills whitish to very pale yellowish ochre, occasionally branched and anastamosing. Stipe absent. Most commonly on but not restricted to birch stumps. Absent from coniferous wood. —*L. betulina.*

LEPIOTA

1. Tufted sp., cap distinctly membranous, at first smooth, soon breaking up into ± coarse flocci; margin soon deeply, radiately grooved. Medium sized sp. with white gills.—*L. caepastipes.*
1. Gills almost blood-red maturing to dark reddish-brown. Small to medium sp., cap darkish grey, with ± denticulate edge. Often grouped, but not tufted.—*L. haematosperma.*
1. Not tufted, gills white or whitish, cap ± fleshy 2
2. Cap uniformly smooth or silky; gills joined to collar at stipe

apex, otherwise quite free. Predominantly large white plant with fleshy cap, the mature gills (also spores) with very faint flesh-pink tinge.—*L. naucina*. Edible.

2. Not this sp. Cap scaly or granular 3

3. Gills quite free; stipe fitting into cap like ball and socket joint. Cap cuticle breaking up into coarse fibrillose scales or conical warts; not granular 4

3. Gills adnate, at least not clearly free. No ball and socket joint, the flesh of cap and stipe continuous without a break. Whitish, pinkish or ± ochre spp. with granular cap often with a denticulate edge and granular, peronate stipe 7

4. Apex of stipe surrounded by distinct hard collar to which gills are joined. Ring of mature specimens movable, being cut off both above and below. Large to very large spp. with coarsely scaly cap and ± bulbous stipe 5

4. No such collar. Ring not movable, being cut off above only and sheathing stipe below, hence stipe is peronate to ring . . 6

5. Flesh of stipe on being cut turning ± orange in a few seconds. Stipe without spiral snake-like markings.—*L. rhacodes*. Very good eating.

5. Flesh not thus changing. Stipe with characteristic and beautiful spiral snake-like markings.—*L. procera*. Excellent eating.

6. Large sp., the brownish cap beset with numerous hard conical warts, which leave a circular scar on falling off. Gills very often forked. Strong unpleasant smell.—*L. acute-squamosa*. Not edible.

6. Small to medium sp., cap with concentric red-brown scales on white background. Umbo red-brown. Unpleasant smell recalling cut radishes.—*L. cristata*. Not edible.

7. Cap off-white to slightly dirty-pinkish.—*L. carcharias*.

7. Cap ± yellow-ochre.—*L. amianthina*.

LEPTONIA

1. Edge of gill not differently coloured from the sides 2

1. Edge of gill persistently dark violet-blue to black; sides much paler, becoming even paler with age 4

2. Stipe, or part of it, yellow to white 3

2. Stipe dark violaceous blue. Small sp. with bluish-black cap.—*L. lampropus*.

3. Stipe becoming blue to green when bruised. Small sp. with yellowish cap ± tinged olivaceous.—*L. euchloa*.

3. Stipe whitish unaffected by bruising. Small sp. with rich creamy cap.—*L. sericellus*.

4. Growing on stumps. Gill edge dark violaceous, not jagged. Small to medium sp. with dark violaceous cap.—*L. euchroa*.

4. Growing on the ground. Gill edge black, jagged.—*L. serrulata*.

MARASMIUS

1. Stipe appearing *either* as if rooted in the ground, sawdust, etc., not piercing leaves, twigs, wood, *or* growing amongst litter, etc., from a (generally) easily visible mycelium. (Medium sized spp.) . . 2

1. Stipe appearing to pierce the (unburied) substrate of leaves, twigs, wood, there being no visible, fluffy, mycelium 8

2. Stipe uniformly coloured, solid, leathery not horny, nor chan-

nelled on the outside and not dilating at apex where it abuts the cap. Essentially buff-coloured spp. without distinctive smell . 3

2. Stipe at least in mature spp. paler above, dark brown to blackish below, hollow or channelled on outside, almost horny, ± tapering downwards, but typically dilating above at extreme apex where it abuts the cap. Sometimes with smell or taste of onion or garlic 5

3. Stipe woolly below.—*M. peronatus*. Not edible.

3. Stipe not woolly 4

4. Gills wide spaced, thick.—*M. oreades*. Good eating.

4. Gills crowded, thin.—See *Collybia*.

5. With distinct smell or taste of onion or garlic 6

5. No such smell or taste (but may be others) 7

6. Tufted medium sized sp. with brownish cap, the stipe almost black at the base and covered with a whitish bloom. Taste of garlic persists in mouth for about 30 minutes. Growing (? always) on rotting sawdust.—*M. cauveti*[1] Maire and Kuhner.

6. Solitary sp. with medium sized whitish cap, somewhat grooved at margin. Growing mostly amongst beech litter or on wood.—*M. alliaceus*.

7. Cap and upper part of stipe, at least when young, whitish, and when mature pale brownish with lilac flush. Stipe not velvety at base. Small to medium sp. mostly tufted in beech litter.—*M. wynnei*.

7. Cap and upper part of stipe pale yellowish. Stipe velvety at base. Small sp. generally grouped but not tufted amongst beech litter.—*M. lupuletorum*.

8. Foetid medium sized sp. growing out of wood. Cap brownish ± deeply and radiately grooved.—*M. foetens*.

8. Not this sp. Plants with cap smaller than a sixpenny piece (¾ in.) 9

9. Gills joined to collar at apex of stipe. Cap whitish, stipe black, looking like a horse-hair.—*M. rotula*.

9. No such collar 10

10. Gills vein-like, branched and wrinkled; stipe whitish above, brownish below and very shortly velvety (lens). Pure white plant most commonly growing out of leaves.—*M. epiphyllus*.

10. Not this sp. Gills normal 11

11. Stipe rarely exceeding diameter of cap. Cap off-white with pale reddish-brown centre. Stipe growing out of dead branchlets, twigs, stems.—*M. ramealis*.

11. Not this sp.; stipe much longer than diameter of cap . . 12

12. Stipe glabrous, shining black, looking like a horse-hair. No special smell.—*M. androsaceus*.

12. Stipe densely but shortly velvety. Whitish plant with strong foetid smell and growing from dead conifer needles.—*M. perforans*.

MYCENA

1. Stipe with distinct basal disc. (Minute spp., cap white) . . 2

1. No such disc 3

2. Cap sprinkled with minute glistening particles. Pellicle of cap

[1] First described in 1935 by Maire & Kühner from specimens gathered in Algiers and since recorded from France. This first British record is due to Professor T. M. Harris, F.R.S. I am indebted to Mr. A. A. Pearson who sent specimens to Professor Kühner of Lyons for identification.

not separable. Commonly on bark, often of living trees.—*M. tenerrima.*

2. No such glistening particles. Pellicle of cap separable.—*M. stylobates.*

3. Stipe, when broken, yielding an opaque white or coloured milk . 4

3. No such milk 8

4. Milk white, opaque 5

4. Milk coloured 6

5. Cap greyish-brown to brownish.—*M. galopus.*

5. Whole plant pure white.—*M. galopus* var. *alba.*

5. Cap blackish.—*M. galopus* var. *nigra.*

6. Milk ± orange. Cap brownish.—*M. crocata.*

6. Milk dull dark red or purple-red 7

7. Edge of gill dull reddish-brown. Small sp., cap pinkish-brown, not obviously continued beyond gills. Growing singly.—*M. sanguinolenta.*

7. Edge of gill not differently coloured. Small sp., cap pinkish-grey-brown, the margin exceeding gills and ± denticulate. Almost tufted on rotten wood.—*M. haematopus.*

8. Stipe slimy. Pellicle of cap separable as one piece. Small to medium spp. with very pale grey-brown cap. 9

8. Stipe not at all slimy 11

9. Stipe clear yellowish, at least above. Cap exceeding gills in form of denticulate edge 10

9. Stipe whitish to greyish-brown. Cap edge not exceeding gills and not denticulate. Small plant with off-white to dirty-white cap and faint rancid smell. Almost confined to coniferous woods.—*M. vulgaris.*

10. With strong rancid fat smell. Ageing plants becoming blotched foxy-red.—*M. viscosa.*

10. Smell faint, indefinite. No blotching.—*M. epipterygia.*

11. Gill edge coloured differently from the sides (lens) . . . 12

11. Gill edge of same colour as sides or whitish 15

12. Gill edge red or orange-yellow 13

12. Gill edge dark to almost blackish-purple 14

12. Gill edge date-brown, without red colour. Rather small sp.; cap dull yellowish-brown, and when water-soaked, with broad, darker, radiating lines to about half-way in. Never a woodland sp., almost exclusively in lawns or at least amongst grass.—*M. avenacea.*

13. Gill edge red. Very small sp. with pinkish cap and gills.—*M. rosella.*

13. Gill edge orange-yellow. Very small sp. with dull brownish cap and greyish gills.—*M. elegans.*

14. Medium sized sp. with purplish-lead coloured cap and gills similarly coloured. Essentially a sp. of broad-leaved woods especially beech not of conifers. Gill edge blackish-violet or blackish-purple.—*M. pelianthina.*

14. Rather small sp. with greyish-brown cap when water-soaked drying out greyish. Gills whitish-grey. Essentially a sp. of coniferous woods. Gill edge dark (brownish) purple.—*M. rubro-marginata.*

15. Stipe steel-blue-grey with silvery longitudinal striations. Medium

sized sp. with brownish-grey cap growing on or very near wood, most commonly grouped or even tufted.—*M. polygramma.*

15. Not this sp.; stipe ordinary 16
16. Small to medium brown or grey spp., tufted or at least grouped on rotting wood, stumps, etc. 17
16. Not so 18
17. Small tufted sp., cap margin exceeding gills and ± denticulate. Gills not veined nor becoming pinkish with age. Confined to oak stumps.—*M. inclinata.*
17. Medium sized mostly grouped plants. Cap not exceeding gills nor denticulate. Gills veined, becoming pinkish with age. Mostly on birch and alder stumps.—*M. galericulata.*
18. Cap ± brightly coloured; orange to red, pinkish, pale lilac to pale violet, yellowish to ± olivaceous. Smell, when present, of radish, not nitrous 19
18. Cap pure white or whitish, or dull browns to greys. Smell, when present, nitrous, not of radish 20
19. Cap orange-red to red. Very small sp. with yellowish stem.—*M. acicula.*
19. Cap predominantly pinkish to pinkish lilac. Medium sized hygrophanous sp. with interveined gills and ± strong radish smell.—*M. pura* (cf. *Laccaria laccata*).
19. Small olivaceous sp. with striate cap and greyish stipe.—*M. chlorantha* (= *M. lineata* sensu Lange)
20. Cap pure white to pale yellowish white 21
20. Cap dull browns to greys 22
21. Minute pure white plant, the cap about $\frac{1}{10}$ in. across. On dead leaves, more especially beech leaves.—*M. capillaris.*
21. Rather small whitish to yellowish plant, the slightly umbonate cap having a scalloped appearance towards the edge as it dries out. Stipe white or very faintly tinged with pale yellow.—*M. flavo-alba.*
22. Rather small to small plants with distinct nitrous smell. . 23
22. Nitrous smell absent. Spp. not further keyed out.
23. Small ± tufted sp. growing on or in close association with tree stumps.—*M. alcalina.*

NAUCORIA

1. Cap deep brick-red-brown to almost black when water-soaked (edge paler), drying out to ± pale ochre. Stipe deep dark brown to almost black. Small to medium sp. smelling strongly of rotten fish or ± mouldy cucumber. (Spores and gills ± pinkish pale brown).—*N. cucumis.* Not edible.
1. Not this sp. 2
2. Young cap (at least) ± beset with flecks, scales or fibrils. Plants virtually confined to ± swampy ground around alder trees. (Spores rusty brown) 3
2. Young cap virtually devoid of flecks, etc. Plants not associated with alders 4
3. Cap ± bay brown (sometimes with rusty tinge) when water-soaked, drying out ± ochre. Small sp. the young cap ± granular to scaly (margin fibrillar); stipe also ± fibrillosely-scaly.—*N. conspersa.*
3. Cap ± dirty ochre when water-soaked, drying out paler. Small sp., the young cap with minute granular meal, soon disappearing.

Stipe same colour as cap, becoming brownish from below upwards. —*N. escharoides.*

4. Plants essentially of grassy places: meadows, pastures, grassy road-sides. Not on wood, in woods or similar uncultivated places. Spores (and generally gills) ± cigar-brown, *not* rusty . 5
4. Plants of other habitats and characteristics. Not further considered.
5. Stipe not exceeding diameter of cap. Small to medium sp., cap convex ± ochre colour, darker towards centre, slightly sticky in moist weather and with " new meal " smell.—*N. vervacti.*
5. Stipe at least twice diameter of cap 6
6. Stipe slightly bulbous below and arising from a boot-lace like mycelial cord. Small sp., cap becoming ± flat and of pale yellowish-brown colour, somewhat sticky in moist weather. Slight " meal " smell.—*N. arvalis.*
6. Stipe slightly swollen below but no mycelial cord; no smell of " meal ". Cap remaining ± dome-shaped 7
7. Cap sticky (obvious only in damp weather). Small to medium sp., the dome-shaped cap ± yellowish to pale brown.—*N. semi-orbicularis.*
7. Cap always dry, not sticky. Otherwise similar to above and considered by some not specifically distinct.—*N. pediades.*

NOLANEA

Cap ± ovate and umbonate or papillate; when water-soaked, of a date-brown to umber-brown colour and striate to about half-way in, becoming much paler on drying out. Spores characteristically 4 (sometimes 6) angled. Medium sized sp. of pastures and grassy clearings in woods.—*N. staurospora.*

Cap ± ovate to convex, with characteristic yellowish-ochre tinge, striate to about half-way in (at least when water-soaked). Medium sized sp. confined to coniferous woods.—*N. cetrata.*

NYCTALIS

Cap mealy, not membranous; gills poorly developed, narrower than overlying flesh of cap; smell unpleasant.—*N. asterophora.*

Cap almost membranous, silky, not mealy; gills ± normally developed, deeper than overlying flesh of cap; smell ± pleasant, of " new meal ". —*N. parasitica.*

OMPHALIA

1. Young cap ± shallowly dome-shaped, sometimes with very slight depression at the very centre. Small spp., the stipe rarely less than twice the diameter of cap 2
1. Cap ± funnel-shaped or saucer-shaped or at least flat, from the beginning. Edge of young cap slightly incurved. Small to medium sized spp., the stipe rarely exceeding the diameter of the cap . 5
2. Tufted sp., confined to coniferous wood (stumps, etc.). Small plant, cap ± umbonate, ochre colour with darker striations towards the margin. Stipe ± bay-brown, at least below.—*O. campanella.*
2. Not tufted 3
3. Cap with dull colours: off-whites, greys, browns. Not further

considered.

3. Cap ± clear ochre-orange 4
   4. Stipe apex flushed violet. Rather small sp. amongst moss and in grass.—*O. fibula* var. *swartzii*.
   4. Stipe uniformly coloured. Rather small sp.—*O. fibula*.
5. Cap, at least, wholly white. spp. not further considered.
5. Cap not so 6
   6. Cap and stipe almost black when water-soaked, drying out greyish. Gills very closely set, white. Medium sized sp., the cap depressed at centre, striate when water-soaked.—*O. maura*.
   6. Not this combination of characters 7
7. Cap when water-soaked dull brown with ± olivaceous tinge and with darker striations, drying out almost white, gills off-white and widely spaced. Medium sized sp. common in peaty ground.—*O. umbellifera*.
7. Cap reddish-brown, orange-brown to ± bright orange . . . 8
   8. Cap bright orange or orange-yellow. Gills and stipe yellowish. Medium sized sp. mainly of boggy places.—*O. postii*.
   8. Cap reddish-brown to orange light brown, stipe rather paler. Small sp. with striate cap when water-soaked.—*O. pyxidata*.

PANAEOLUS

1. Cap ± uniformly coloured, or with slightly different tinge at centre but with no darker marginal belt. Edge of cap slightly exceeding gills and sometimes ± denticulate (Gill colour predominantly black) 2
1. Cap with ± persisting darker marginal belt, the edge not exceeding the gills and not denticulate 4
   2. Plant predominantly whitish with ± yellowish, often cracking, centre to the cap. Small to medium sp. with ± dome-shaped cap.—*P. papillionaceus*. Not edible.
   2. Plants predominantly reddish-brown to pinkish-light-brown . 3
3. Cap with network of raised ribs. Small sp. with ± dome-shaped cap. —*P. retirugis*. Not edible.
3. No raised ribs on cap. Small to medium sp. with reddish-brown stipe.—*P. campanulatus*. Not edible.
   4. Gill colour (and spores) essentially black 5
   4. Gill colour (and spores) essentially dark brownish . . . 6
5. Cap brownish to blackish, ± convex and with no central umbo. Small sp.—*P. fimicola*. Not edible.
5. Cap reddish-brown, flattening on expansion and with broad central umbo. Medium sized sp.—*P. sub-balteatus*. Not edible.
   6. Cap convex, brownish, not slimy. Small sp.—*Psilocybe foenisicii*.
   6. Cap ovate-conical with distinct drawn-out apex, never expanding, the edge remaining incurved; dull yellow to yellowish-brown, slimy.—*Psilocybe semi-lanceata*.

PANUS

Stipe ± central, not ± suddenly swollen at apex. Medium to large sp., cap pinkish pale brown when water-soaked, ± funnel-shaped and often flushed lilac, drying out yellowish. More or less tufted sp. on wood of broad-leaved trees; flesh not bitter.—*P. torulosus*.

Stipe definitely lateral and ± suddenly swollen at apex. Small to medium sp., cap pale brownish. On wood of broad-leaved trees; flesh distinctly bitter.—*P. stipticus*.

PAXILLUS

1. Stipe present, central to eccentric 2
1. Stipe absent. Dull yellowish ± elongated sp. (to about 4 in.) attached laterally to coniferous wood.—*P. panuoides.*
   2. Stipe yellowish pale brown, not velvety. Large to very large sp. with ± dull yellow-brown cap (tinged olivaceous when young), the margin inrolled and almost woolly, at least when young. Not confined to coniferous woods.—*P. involutus.*
   2. Stipe covered with a brownish almost black velvety nap. Large to very large sp., stipe usually eccentric, probably confined to coniferous woods.—*P. atro-tomentosus.*

PHOLIOTA

1. Growing on wood or tufted spp. 2
1. Growing on ground, not tufted. (Cap smooth, not scaly) . . 7
   2. Cap distinctly scaly. Large to very large spp. predominantly yellow to tawny 3
   2. Cap not scaly 5
3. Cap and stipe sticky or slimy; beset with brownish scales. Large yellowish sp. growing on beech wood.—*P. adiposa.*
3. Cap and stipe not sticky or slimy 4
   4. Cap and stipe with well-developed erect and recurved dark brown scales. Large to very large sp. with ± yellow-ochre cap.—*P. squarrosa.*
   4. Cap with feebly developed scales of same colour as cap and pressed down, not erect or recurved. Stipe sheathed from below to ring with a ± fibrillose, not scaly, covering. Large to very large sp. with ± tawny cap.—*P. spectabilis.*
5. Cap distinctly hygrophanous, varying brownish to yellowish according to water content 6
5. Not so. Medium to large sp., cap ± coffee-dash colour, darker towards centre (stipe not scaly)—usually on poplar, elm or willow.—*P. aegerita.*
   6. Stipe below ring densely covered with darker recurved scales. Medium to large sp., confined to wood of broad-leaved trees. Cap brown when water-soaked drying out to yellowish, not striate at margin.—*P. mutabilis.* Edible.
   6. Stipe below ring without recurved scales. Small to medium sp. confined to coniferous wood. Cap ± honey coloured when moist, drying out dark brownish; striate at margin.—*P. marginata.*
7. Ring membranous, hanging down and radiately grooved on upper surface. Small to medium hygrophanous sp. with ± cafe au lait coloured cap when water-soaked, drying out paler.—*P. togularis.*
7. Ring not so 8
   8. Stipe hard, not becoming hollow. Medium sized sp. of cultivated places. Cap ± off-white. Taste slightly unpleasant; no smell of " new meal ".—*P. dura.*
   8. Stipe stuffed becoming hollow, hence not hard. Medium sized sp. of fields, meadows and woods. Cap ± coffee-dash colour. Taste and smell pleasant of " new meal " but faint.—*P. praecox.*

PLEUROTUS

1. Medium to very large spp. 2
1. Very small to small spp. (Stipe definitely lateral or absent.) Cap white ± kidney-shaped 7
   2. Stipe central, excentric to almost lateral 3
   2. Stipe definitely lateral 6
3. Gills decurrent or arcuate-decurrent 4
3. Gills sinuate or adnate. Very large sp., cap whitish to creamy dirty yellow, stipe ± excentric. On wood of broad-leaved trees, often parasitic.—*P. ulmarius.*
   4. Cap at all times whitish to pale yellowish, stipe usually well developed, central to almost lateral. Gills deeply decurrent . 5
   4. Young cap brownish-black to brownish violaceous ageing through greyish to dirty yellowish; stipe absent, or if (feebly) developed, then almost lateral. Gills arcuate-decurrent. Tufted on stumps and trunks of broad-leaved trees.—*P. ostreatus.*
5. Young plants enclosed by a veil which leaves a ring-like zone at stipe apex, soon disappearing as cap expands, but veil remains may still often be seen on cap margin. Large to very large sp., cap whitish and with pressed down greyish scales, growing tufted on wood of broad-leaved trees. Bruised mature gills become slowly yellow (may take an hour or more).—*P. dryinus.*
5. No such veil or its remains, but very young cap may be mealy. Large to very large sp., cap whitish to creamy, growing tufted on wood of broad-leaved trees.—*P. cornucopiae.*
   6. Densely tufted medium sized sp., cap brownish-grey and ± tongue-shaped; gills anastamosing and deeply decurrent. Mostly on rotting sawdust.—*P. petaloides* var. *geogenius.*
   6. Not densely tufted; medium sized sp., cap yellowish-green to olivaceous; gills pale yellowish. On wood of broad-leaved trees. *P. serotinus.*
7. Stipe present, but very short. Cap pure white or with faint flesh tinge; pellicle detachable. Mature gills white. On twigs and wood of conifers.—*P. mitis.*
7. Stipe absent. Cap whitish without detachable pellicle. Mature gills ± cafe au lait colour. On twigs, wood, leaves, etc.—*P. septicus.* Commonly confused with *Crepidotus variabilis* but spore print of *P. septicus* is only slightly off-white, whereas *Crepidotus variabilis* has distinctly pinkish pale brown spores.

PLUTEOLUS

Cap smooth, small to medium, membranous, lead-grey and sometimes with a pinkish tinge; striate to about half-way in.—*P. aleuriatus.*

Similar, but cap with network of raised lines.—*P. aleuriatus* var. *reticulatus.*

PLUTEUS

1. Cap whitish to greyish and (like the stipe) covered with fibrillose scales more especially towards the centre. Large to very large sp.—*P. cervinus* var. *patricius.*
1. Cap yellow; cuticle virtually smooth, not becoming mealy, fibrillose or felty-squamulose as the cap expands. Medium to large sp., edge of

cap ± striate.—*P. leoninus*.

1. Cap brownish, dark, dull brown to almost black. Cuticle mealy or becoming fibrillose or felty-squamulose as cap expands, rarely ± smooth 2
   2. Medium to large spp., the whitish to pale brownish stipe covered with somewhat dark brown fibrils. Cuticle of cap becoming felty-squamulose or breaking up into ± radiating fibrils, not mealy 3
   2. Small spp., stipe not streaked with brownish fibrils. Cuticle of cap smooth or mealy 4
3. Gill edge dark brownish.—*P. umbrosus*.
3. Gill edge of same colour as sides.—*P. cervinus*. Edible.
   4. Cap sooty-brown, umbonate, edge not striate 5
   4. Cap yellowish-brown, not umbonate, edge finely striate. Stipe whitish, dull yellow below.—*P. chrysophaeus*.
5. Stipe uniformly white.—*P. nanus*.
5. Stipe yellowish below.—*P. nanus* var. *lutescens*.

PSALLIOTA

1. Mature cap with well-developed reddish-brown to dark brown scales, so that the colour would be called brown or brownish and not white or whitish. (Cut flesh changing at once to bright blood-red or after some minutes to dull reddish-brown or appearing dull reddish-brown and not undergoing further change) . . . 2
1. Mature cap silky-smooth or fibrillosely-scaly, but the colour essentially whitish to brassy, there being no obviously darker scales. (Sun-scorched plants may be somewhat tan coloured) . . . 8
   2. Flesh (and bruised gills) everywhere on cutting becoming immediately bright blood-red 3
   2. Flesh not so, or may change slowly to dull reddish-brown or be dull reddish-brown from the first 4
3. Young stem when rubbed becoming pinkish. Large to very large plant mainly associated with broad-leaved trees, oak, hazel, beech.—*Ps. haemorrhoidaria*.
3. Young stem when rubbed becoming yellowish. Medium to very large plant mainly associated with coniferous trees.—*Ps. sanguinaria*.
   4. Ring with obvious warts, scales or patches on lower surface of ring 5
   4. Ring quite smooth on under surface 7
5. Stipe smooth below ring. Ring beset on lower surface with white flocci.—*Ps. silvatica*. (Sun-scorched plants of *Ps. arvensis* may come here.)
5. Stipe rough below ring with flocci or scales. Lower surface of ring with bright or dull yellowish patches (cap with definite tinge of yellowish or light tan) 6
   6. Stipe not exceeding diameter of cap. Cap bruising yellowish; cut flesh dull reddish-brown at least in places. Large to very large sp. mainly in pastures. Young gills pinkish. *Ps. villatica*. cf. *Ps. arvensis*.
   6. Stipe exceeding diameter of cap. Rubbed stipe and cut flesh yellowish to dull orange. Young gills whitish, not maturing through a pink stage. Very large sp. mainly of woods.—*Ps. augusta*. Edible.

7. Base of stipe ± bulbous, often yellowish; dark red-brown scales of cap densely overlapping, so that the colour is predominantly brown. Medium to large sp. of woods.—*Ps. silvatica.*

7. Base of stipe tapering, not yellowish; cap scales light brown, not densely overlapping so that colour is as much white as brown. Medium to large sp. of pastures and meadows, not in association with trees. (Young gills pink from the first.)—*Ps. campestris.* The well-known edible Field Mushroom.

8. Stipe with one or more belts some distance below the ring, with flocci on the lower surface, the belt(s) joined to a covering which almost forms a sheath to the base of the stipe. Centre of cap ± brassy-yellowish when mature. Medium to large sp. of gardens, even pavements. (Young gills pink from the first.)—*Ps. edulis* K. & M. (= *Ps. rodmani* (Peck) Lange.). Edible.

8. Stipe not so 9

9. Cut flesh of slightly swollen base, and all external parts on bruising, turning bright yellow within a matter of seconds. Medium to large sp. never growing away from trees.—*Ps. xanthoderma.* Poisonous to some.

9. Cut flesh of base of stipe not staining yellow. External parts may become yellowish slowly after rubbing or bruising . . . 10

10. Ring simple, i.e. without (sometimes radiately arranged) scales or patches on lower surface. Cut flesh sometimes staining very faint, dull pinkish. Gills pinkish from the first . . . 11

10. Ring double, i.e. with obvious patches on the lower surface. Bruised or rubbed external parts or cut flesh often staining ± yellowish; pinkish stains absent. Young gills greyish . . 12

11. Medium to large sp. The cap remaining whitish and not becoming yellowish. Essentially a sp. of meadows and pastures away from trees.—*Ps. campestris.* The well-known edible Field Mushroom.

11. Small to medium sp., the whitish cap with a yellowish sometimes rusty tinge, especially towards the centre.—*Ps. comtula.*

12. Lower part of ring with regularly and radiately arranged patches, giving a many-pointed star-like appearance. Stipe often swollen below, but not forming a ± distinct basal bulb. Essentially a sp. of fields and meadows.—*Ps. arvensis.* The Horse Mushroom. Edible.

12. Lower part of ring with ± irregularly arranged patches. Stipe with ± distinct basal bulb. Essentially a sp. associated with trees.—*Ps. silvicola.*

PSATHYRELLA

1. Cap of young plants with white radiating fibrils or, at least the edge, denticulate with fibrillose squamules 2

1. All such fibrils or squamules absent from the young cap . . 4

2. Essentially a sp. of burnt ground. Young cap denticulate with white fibrillose scales. Small to medium sp. with dark brownish cap.—*Ps. pennata.*

2. Not growing on burnt ground. Young cap beset with white fibrils, not denticulate-scaly 3

3. Cap dark brownish when water-soaked, drying out paler, stipe ± fibrillose. Small sp. with brownish gills, sometimes ± tufted.—*Ps. semi-vestita.*

3. Cap lead-greyish when water-soaked, drying out whitish; stipe with spreading fibrillose scales. Small to medium sp. with grey to black gills.—*Ps. fibrillosa.*
   4. Tufted or densely gregarious small sp. growing on or around stumps of broad-leaved trees. Cap dull yellowish to lead-grey, soon becoming radiately grooved.—*Ps. disseminata.*
   4. Not this sp. 5
5. Small but usually medium sized spp. with bluntly conical cap and scarcely adnate gills. (No pinkish tinge anywhere on cap or gill edge. Stipe not " rooting ") 6
5. Small to medium-sized spp. with broadly adnate gills . . . 7
   6. Cap brownish and radiately striate when water-soaked, drying out to almost coffee-dash. Small to medium sized sp.—*Ps. subatrata.*
   6. Cap pale tan to dull ochre when water-soaked, not striate, drying out to ± coffee-dash. Small to medium sp.—*Ps. conopilea.*
7. Small to medium sp. with distinctly " rooting " stipe. Cap pale brownish to pale dull ochre and like the gill edge, commonly with a ± distinct pink tinge. Stipe not mealy at apex.—*Ps. gracilis.*
7. Small spp. with no " rooting " stipe, but stipe mealy at apex. Cap cone-shaped 8
   8. Cap smooth, ashy-grey, appearing as if sprinkled with minute glistening particles.—*Ps. atomata.*
   8. Cap ± radiately grooved, greyish-yellow and with crenate margin. —*Ps. crenata.*

PSILOCYBE[1]

1. Densely tufted medium sized hygrophanous sp.; cap date-brown when water-soaked drying out pale ochre-brown. Stipe white, smooth.—*Ps. spadicea.*
1. Not this combination of characters. (Stipe reddish-brown to brownish, at least below and rather rough with fibres, not smooth) 2
   2. Gills ± ascending, narrowly adnate or sinuo-adnate . . 3
   2. Gills ± horizontal, broadly adnate or weakly decurrent. Small hygrophanous sp., cap reddish-bay-brown when water-soaked, ochre pale-brown when dry. Stipe at most only slightly exceeding diameter of cap.—*Ps. bullacea.*
3. Spp. essentially growing amongst mosses (Hypnum, Polytrichum, Sphagnum) both in coniferous woods and peaty bogs . . . 4
3. Spp. growing in or on the margins of woods, mainly in wet places, but not in association with mosses. (Cap predominantly dull reddish-brown) 5
   4. Cap dull reddish-brown when water-soaked, drying out to brownish yellow; edge not striate. Small sp., essentially of wet peaty places.—*Ps. uda.*
   4. Cap creamy honey coloured when moist (sometimes with olive tinge), edge striate. When dry, of a dull yellowish colour and not striate. Small sp. in close association with the moss tufts (Polytrichum, Sphagnum) amongst which it grows in peaty bogs.—*Ps. elongata.*
5. Gills greyish without any yellowish colour; stipe about as long as the diameter of cap. Medium sized sp.—*Ps. sub-ericea.*
5. Gills yellowish, becoming ± olive and purple tinged when

[1] For those spp. of *Psilocybe* with mottled gills, see *Panaeolus.*

mature. Stipe about 2–3 times longer than diameter of cap. (Small to medium sized sp.).—*Ps. ericea.*

RUSSULA

1. Cap at first white, the margin for a long time inrolled; with age becoming spotted brownish and finally turning wholly black. Gills with many intermediate smaller gills (not reaching the stipe). (Large to very large spp., flesh mild or acrid) 2
1. Cap variously coloured, never becoming wholly black; gills without (or almost so) any smaller intermediate ones. Reaction to ferric alum none or most usually some shade of salmon-pinkish. (Green in *R. xerampelina* and may be dull olive in *R. cyanoxantha*) . . . 5
   2. Broken flesh (cap, gills) not changing colour; young cap whitish, velvety, the gills glancing glaucous just above attachment to stipe (often more visible an hour or so after gathering.)—*R. delica.* Commonly confused with *Lactarius vellereus*, q.v.
   2. Broken flesh changing to reddish or blackish, but not at once . 3
3. Gills very thick and widely spaced. Broken flesh red then black.—*R. nigricans.*
3. Gills ordinarily thin and crowded 4
   4. Cut flesh becoming red before blackening.—*R. densifolia.*
   4. Cut flesh turning black, not passing through a red stage.—*R. adusta.*
5. Reaction to ferric alum nil, or slowly becoming dull olive, never pink. Cap of mixed colours: yellowish-greenish-violet-pinkish. Gills white and when stroked with thumb feel greasy; also pliant, not easily broken when finger is drawn across them. No special smell. Cut flesh unchanging.—*R. cyanoxantha.* Good eating.
5. Reaction to ferric alum distinctly greenish in a few seconds, never pink. Cap varying reddish, purplish to ± brownish. Gills yellowish to ochre, not greasy to touch, not pliant but brittle, and easily breaking. Mature specimens with distinct smell of boiled crab (not detectable by everybody). Gills, stipe and cut flesh staining brownish.—*R. xerampelina* and its vars.
5. Reaction to ferric alum *at first* ± pinkish or creamy-pinkish and not distinctly greenish in a few seconds 6
   6. Cap predominantly greyish-lilac, greenish or yellowish to brownish. Red colours not predominant 7
   6. Cap predominantly bright or dull red, violet or purple to almost black, sometimes with a greenish or olivaceous tinge . . 17
7. *Either* flesh of cap or gills acrid *or* cap brownish with ± deeply grooved margin and smell pleasant (bitter almonds) or unpleasant (rancid oil). Otherwise cap yellowish, smooth 8
7. Flesh mild (or slightly bitterish). If cap yellowish to brownish then margin smooth 12
   8. Margin of cap finally ± deeply grooved. Cap predominantly same shade of brown. (Smell rancid or of bitter almonds) . 9
   8. Margin of cap persistently smooth. (Spores white) . . 11
9. Medium to large sp. Smell unpleasantly rancid, but faint.—*R. pectinata.* Not edible.
9. Very large sp. or distinct smell of bitter almonds . . . 10
   10. Smell unpleasantly rancid, strong.—*R. foetens.* Not edible.
   10. Smell pleasant: bitter almonds, crushed cherry laurel leaves.—

R. laurocerasi.

11. Whole plant uniformly pale dull yellowish-ochre. Smell faint, but distinct, of crushed pelargonium leaves.—*R. fellea.* Not edible.
11. Cap almost bright yellowish-ochre, but gills and stipe white. No distinctive smell.—*R. ochroleuca.* Not edible.
12. Cap predominantly greenish to greyish-green . . . 13
12. Cap predominantly yellowish or brownish, but sometimes with olivaceous flush 16
13. Cuticle of cap breaking up into ± mealy patches.—*R. virescens.* Good eating.
13. Not so 14
14. Cap flesh under cuticle peeled from edge ± reddish to violet. Cap greyish-lilac. Spores creamy.—*R. grisea.*
14. Cap flesh under cuticle peeled from edge not reddish to violet 15
15. Gills and spores white.—*R. heterophylla.*
15. Gills and spores creamy.—*R. aeruginea.*
16. Cap almost bright yellowish-ochre; upper part of (often greyish) stipe with network of faintly raised ribs (lens).—*R. ochroleuca.* Not edible.
16. Cap dark, dullish brown, olivaceous towards centre. Stipe always white, raised ribs absent.—*R. heterophylla.*
17. Flesh of cap or gills acrid 18
17. Flesh not acrid (sometimes bitterish) 27
18. Cap pure pink, orange to red or scarlet. (Blue colours virtually absent) 19
18. Cap purplish, lilac-pink or purple-black to almost black; sometimes greenish-olivaceous towards centre . . . 22
19. Edge of gills bright lemon yellow. Cap orange-reddish.—*R. aurata.*
19. Not this sp. 20
20. Stem and gills becoming yellow when bruised (thumb nail). Cap scarlet.—*R. luteo-tacta.* Not edible.
20. Stem and gills remaining unchanged when bruised; cap red . 21
21. Cap medium to large. Flesh under cuticle peeled from edge ± rosy and firm, not crumbly.—*R. emetica.* Not edible
21. Cap small to medium. Flesh under cuticles peeled from edge white and not firm but crumbly.—*R. fragilis.* Not edible.
22. Stipe ± flushed with purple or violet 23
22. Not so, but may be slightly rusty at base 24
23. Young gills pale sulphur yellow. Cut flesh and gills turn red on contact with ammonia.—*R. drimea.* Not edible.
23. Young gills pure white. No ammonia reaction.—*R. queletii.* Not edible.
24. Stipe white or at most faint neutral grey. Edge of cap virtually smooth 25
24. Stipe ageing to yellow. Cap usually with greenish centre, the margin at first finely striate and finally ± grooved. Only the gills somewhat bitterish. Confined to ground around birches. —*R. versicolor.* Not edible.
25. Cap dark, dull blood-red, with almost black centre, often discolouring to yellow in the form of spots or larger areas. Flesh slightly acrid 26
25. Cap crimson purple and with distinctly olivaceous centre, but soon fading to almost whitish; flesh very acrid.—*R. fallax.* Not edible.

26. Cap with central umbo; cuticle can be peeled from edge to about half-way. Confined to ground around pines.—*R. caerulea.* Not edible.
26. No umbo. Only extreme edge of cuticle can be peeled off. Not confined to pines.—*R. atro-purpurea.*

27. Cap with pure (primary) colours : either uniformly some shade of red, or part red part ± yellowish but no admixture with light or dark blue shades (pinkish & tinged brownish or pale olive in *R. vesca.* See 30) 28
27. Not so 31
28. Mature gills and spores white to creamy 29
28. (Mature gills and) spores almost bright yellowish to ochre. Cap brick-red, cuticle peeling to about half-way. Stipe white or with pinkish flush, ± parallel veined, firm not spongy.—*R. velenovskyi.*

29. Stipe with (lateral) pinkish flush (rarely absent). Cap carmine or clear red with characteristic " bloom." Cuticle nowhere peeling (except sometimes old, dried out specimens ?) Stipe ± smooth. Flesh of cap & stipe firm, hard, not spongy.—*R. lepida.*
29. No pinkish flush on white stipe (may be rusty at base) . . . 30
30. Cap clear rose to light pink, uniformly so but more often part yellowish. Cuticle reaching to edge, peeling to about half-way. Gills almost free, forked at base. Spores creamy.—*R. rosea.*
30. Cap pinkish, usually tinged brownish or pale olive, sometimes wholly pinkish-buff. Cuticle mostly falling short of cap edge, peeling to about half-way. Gills almost decurrent, (?) not forked. Spores pure white.—*R. vesca.* Edible.

31. Stipe flushed with pink or purplish red 32
31. No flush on white stipe 33
32. Cap reddish pale purple ± olivaceous towards centre. Mature gills and spores yellow to ochre. (Mainly in beechwoods on chalk).—*R. alutacea.*
32. Cap mostly lead grey to lilac, greenish at centre. Spores creamy. —*R. grisea.*

33. Cap dark purple red to almost black at centre or if somewhat violaceous or lilac then cap umbonate and plant confined to pine trees 26
33. Cap essentially violaceous becoming tinged brownish or if somewhat dark purplish red then cap not umbonate. Plant associated with broad-leaved trees, especially oak.—*R. brunneo-violacea.*

SCHIZOPHYLLUM

Cap small to medium, kidney shaped to semi-circular. Whole plant predominantly ashy-grey. Gills longitudinally split into two halves, the free ends being ± rolled back. On fallen trunks, timber, boxes, etc. —*S. commune.*

STROBILOMYCES

Large to very large sp., cap densely beset with overlapping greyish-black scales. Cut flesh whitish at first, then pinkish and finally blackish. Mainly in woods of broad-leaved trees.—*S. strobilaceus.*

STROPHARIA

1. Plants with some pale purple, bluish or bluish-green colours on cap or stipe. Cap slimy, sometimes predominantly whitish. Bluish, etc., colours often discolour or wash out to ± dull yellowish-ochre. (Not growing on dung or heavily manured ground) . . . 2
1. No such purple, blue or green colours. Cap predominantly yellowish, never whitish 3
   2. Cap with thick, verdigris blue-green slime, often dotted with whitish scales especially towards margin. Stipe slimy. Medium sized sp.; gills at first greyish, finally purplish chocolate brown. —*S. aeruginosa.*
   2. Cap preominantly whitish; stipe slightly translucent and tinged faint yellowish but with pale clear bluish-green flush (sometimes better seen by splitting stipe longtidunally). Stipe not slimy. Small sp.—*S. albo-cyanea.*
   2. Cap predominantly whitish, but the thick slime flushed with pale purple towards the cuticle. Medium sized sp. with whitish stipe. —*S. inuncta.*
3. Cap when young beset with numerous ± concentrically arranged triangular scales, but soon falling off. Stipe also ± squamulose up to ring, whitish above, somewhat rusty below and about 3 times diameter of cap. Medium sized sp. with ± ochre-coloured convex cap (slightly rusty towards centre), growing in troops, but not on dung.—*S. squamosa.*
3. Young cap smooth, not beset with scales 4
   4. Plants virtually confined to dung. Cap slimy dome-shaped or convex, not flattening out. Stipe rarely less than twice diameter of cap 5
   4. Plant not growing on dung (nor heavily manured soil). Cap almost not sticky, finally flattening out, not remaining convex. Stipe rarely exceeding diameter of cap. Medium sized sp. with yellowish-ochre cap.—*S. coronilla.*
5. Cap persistently dome-shaped. Stipe slimy from ring downwards, smooth. Small sp. with olive-grey to purplish brown gills.—*S. semi-globata.*
5. Cap broadly convex. Stipe dry, sheathed below ring with white flocci. Small to medium sp. with dirty pale yellowish to chocolate brown gills.—*S. merdaria.*

TRICHOLOMA

1. More or less tufted spp., cap and stipe essentially tough and pliant. Cap ± umbonate at first, later expanding and often irregular. Gills (often in same specimen) ± sinuate to somewhat decurrent. (Colours dull: no yellowish, reddish, purplish, violet colours) . . . 28
1. Plants not complying with above characters; i.e. typically not tufted, above colours may be present. Gills uniformly sinuate . . 2
   2. Cut or bruised flesh undergoing no colour change. Cut flesh if coloured from first, then not bluish-black. Above colours often present 3
   2. Cut or bruised flesh becoming bluish-black in a matter of minutes. (Cap colours dull grey-browns.) Medium to large spp. with ± smooth cap 27
3. Stipe sheathed from below with a fibrillose covering ending above

in a ± well-developed ring. Cap fibrillose, of ± rusty-brownish colour. Stipe below ring of same colour, but white above ring. Gills often somewhat dark spotted. Large to very large sp., the cut flesh becoming slightly rusty.—*T. robusta.*

3. Stipe with no obvious ring 4
   4. Plant growing on coniferous stumps; gills yellow. Large to very large sp., the cap with purplish-reddish granulations or scales over a yellowish background.—*T. rutilans.*
   4. Growing on the ground 5
5. Cuticle of cap smooth, not broken up in any way, nor sticky. Brightish colours often present: deep pink, olive, sulphur-yellow, blue to lilac 6
5. Cuticle of cap broken up in various ways (granules, felty scales, etc.) or ± streaked with pressed down radiating fibres; or the cap sticky and then the gills ± discoloured with rusty brownish spots. Above brightish colours, except yellowish, absent 17
   6. Plants with some shades of blue or lilac 7
   6. Not so 9
7. Cap essentially ± translucent when water-soaked (i.e. distinctly hygrophanous), drying out opaque. Medium to large sp., often ± tufted; cap dirty brownish lilac, often wavy-deformed, the gills ± violaceous.—*T. sordidum.*
7. Plants not hygrophanous (spores very pale pink) 8
   8. Cap and stem ± violaceous. Medium to large sp. with blue to lilac gills.—*T. nudum.* Good eating.
   8. Cap coffee-dash to almost greyish; stipe with flush of blue. Large to very large sp., the gills off-white to very faintly pinkish.—*T. personatum.* Good eating.
9. Occurring only in spring. Large to very large sp., the convex cap whitish to coffee-dash colour, slightly darker towards centre. Distinct and pleasant taste and smell of " new meal ".—*T. gambosum.* St. George's Mushroom. Very good eating.
9. Autumnal species 10
   10. Cap sulphur-yellow or deep pink 11
   10. Not these colours 12
11. Whole plant sulphur-yellow with strong, pungent, sulphurous smell (or of " gas works "). Medium to large sp.—*T. sulphureum.* Not edible.
11. Only the cap deep pink. Small sp. mainly growing in grass.—*T. carneum.*
   12. Mature gills flushed or spotted with pinkish or rusty brown; young gills often becoming so on bruising 13
   12. Gills remaining whitish or creamy, not discolouring as above. 14
13. Plant with distinct smell of soap; taste slightly bitterish. Large plant with grey-greenish, olivaceous or brownish cap, the margin *not* grooved.—*T. saponaceum.*
13. No such soapy smell; taste distinctly bitter. Large to very large plant with yellowish to ochre cap (darker towards centre), the margin distinctly grooved.—*T. acerbum.* Not edible.
   14. Cap when water-soaked grey-brown to almost brownish-black, drying out paler, convex at first, then flattening out or ± saucer-shaped and somewhat depressed round a central umbo. Stipe with distinctly fibrous outer layer, streaked or not with

dark-brown fibres, inner flesh (of stipe) becoming ± dirty brownish from base upwards. Gills white or off-white. (Spores warted, the warts turning blue-black in iodine solution. Gill edge beset with characteristic harpoon-like cystidia.) *Melanoleuca* section of Tricholoma 15

14. Cap unaffected by changes in water-content. Stipe characteristics not as above. Cap white, creamy or reddish-brown. (Spores smooth, unaffected by iodine solution. No harpoon-like cystidia) 16

15. Large to very large sp., the cap when fully grown ± saucer-shaped. Stipe whitish, streaked with dark brown fibrils. Gills between adnate and slightly decurrent. Whole plant with unpleasant, nauseous smell.—*T. grammopodium.*

15. Large plant, the cap when fully grown remaining flattened out. Stipe whitish to pale brownish, but not obviously streaked with dark brown fibres. Gills sinuate, not decurrent. Plant without distinctive smell.—*T. melaleucum.*

16. Cap white or creamy. Smell unpleasant, taste rather bitterish. Large to very large plant growing (? always) under birches.—*T. album.*

16. Cap reddish-brown, paler towards margin. Smell faintly of "new meal", taste very bitter. Large plant.—*T. amarum.* Not edible.

17. Cap quite dry, the cuticle breaking up into numerous fibrillose or felt-like scales as cap expands. Cap predominantly dark mouse-grey or rusty dark-brown 18

17. Cap sticky; smooth or broken up in various ways: fibrils, scales, etc. Cap predominantly reddish-brown (and then ± smooth), yellow, grey or white 20

18. Cap dark mouse-grey, the gills uniformly coloured at first white, slowly becoming very pale grey as plant matures. Medium to large plant, the cuticle broken up into numerous fibrillose scales, granulations, etc.—*T. terreum.*

18. Cap rusty dark brown, the gills discolouring to rusty reddish-brown, either ± uniformly or in patches, as the plants mature. (Spp. confined to coniferous woods). 19

19. Cap with felt-like scales from the first, and margin ± shaggy with hairs. Medium to large plant with remains of fibrillose veil (cortina) on stipe.—*T. vaccinum.*

19. Cap, when unexpanded, smooth, cuticle breaking up into ± densely overlapping fibrillose scales on expanding; margin never beset with shaggy hairs. Medium to large plant; the stipe without any trace of a cortina.—*T. imbricatum.*

20. Cap reddish-brown, to bay brown, the gills becoming spotted with the same colour 21

20. Cap yellow, lead-grey-violaceous, or whitish, the gills not becoming spotted with reddish-brown 24

21. Internal flesh of stipe, especially in upper part, ± bright yellow. Gills also yellow. Large plant mainly associated with birches.—*T. flavo-brunneum.*

21. Not this combination of characters 22

22. Cap streaked with radiating, pressed down fibres. Apex of stipe white and mealy, sharply separated as if by a distinct

boundary from the rusty lower part of stipe. Large to very large sp. of coniferous woods.—*T. albobrunneum.*

22. Cap essentially smooth; stipe not sharply demarked into two differently coloured parts 23

23. Plant with strong smell of " new meal ". Large to very large plant. —*T. pessundatum.*

23. No smell of " new meal ". Large plant.—*T. ustale.*

24. Cap yellow 25

24. Cap ± white 26

24. Cap lead-grey with or without a violet tinge. Large to very large sp. the cap with numerous radiating pressed down dark violaceous fibres. Gills white maturing to very pale green or pale yellow. Stipe white sometimes with tinge of yellowish. Cut flesh, especially of upper part of stipe pale yellow.—*T. portentosum.*

25. Cap with numerous pressed down scales (rarely smooth), the gills also pale yellowish. Medium to large sp. of coniferous woods.— *T. flavo-virens* (= *T. equestre*).

25. Cap with radiating pressed down darkish fibres; gills much paler yellow than the cap. Medium to large sp.—*T. sejunctum.*

26. Cap uniformly white, ± radiately fibrillose, but sometimes spotted with rose, blue or violet. Large to very large sp. without distinctive smell.—*T. columbetta.*

26. Whitish cap with central flush of pale yellow-ochre. Large sp. with pleasant fruity smell.—*T. resplendens.*

27. A few spp. comprising the section *Nigrescentia* of Kuhner, scarcely to be distinguished without examination of spores. None common except *T. immundum.* Cap sooty to greyish brown when water-soaked, drying out paler. Smell of " new meal " when freshly gathered. Spores almost spherical.

28. Cuticle thick almost horny and can be peeled from margin almost to centre. Large species with brownish, somewhat veined cap, the cuticle finally breaking up into darker granulations.—*T. loricatum.*

28. Cuticle not horny, nor peeling, nor breaking up into granulations. Large to very large sp., cap convex, greyish-brown when water-soaked, drying out paler.—*T. aggregatum.*

TUBARIA

1. Growing in bogs or amongst sphagnum moss. Stipe more than four times diameter of cap 2

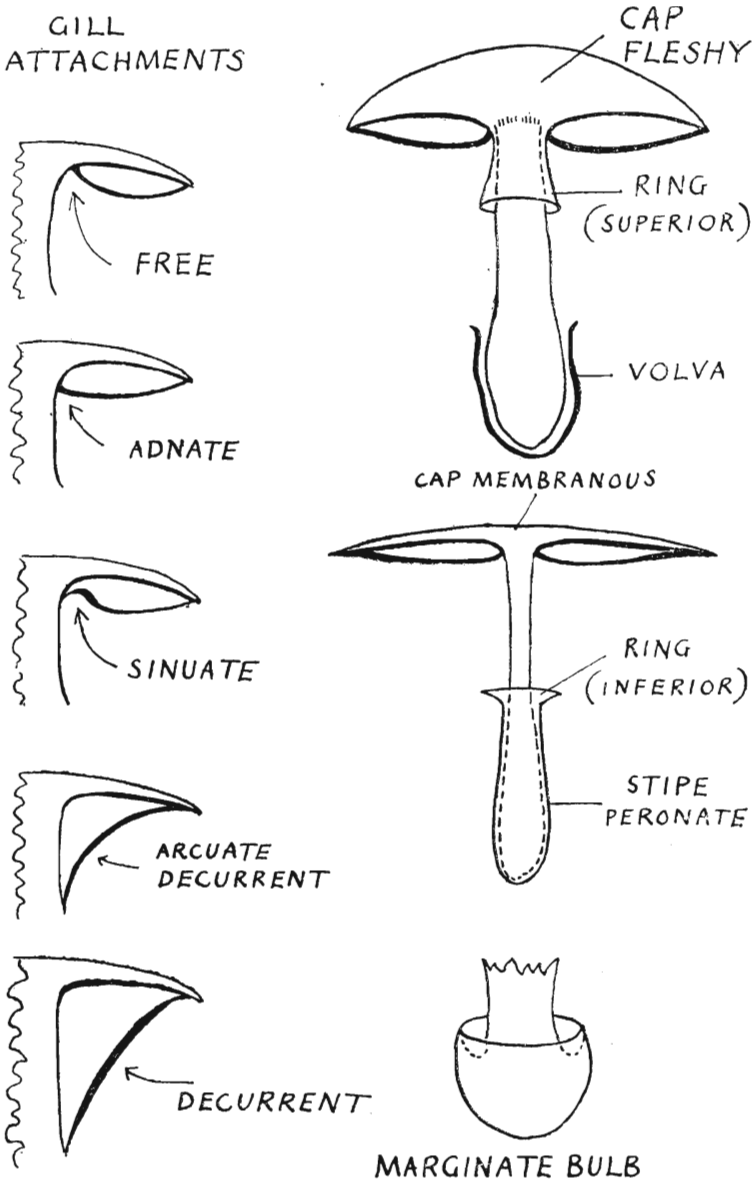
1. Growing on twigs, amongst grass, humus, etc., Stipe rarely exceeding three times diameter of cap. Small sp. cap at first convex, soon flattening out and finally ± depressed at centre; hygrophanous, ± honey-brown and pellucid-striate when water-soaked, drying out ± pale dirty yellowish-white. Cap margin beset with white flecks (remains of veil). Gills ± arcuate-decurrent. Stipe hollow, ± mealy. —*T. furfuracea.*

2. Cap papillate. Small sp., cap conical to convex, not flattening out; pale yellowish-brown when water-soaked.—*T. paludosa.*

2. Cap not papillate. Small sp., cap convex at first, sometimes finally ± depressed at centre; somewhat reddish-bay-brown when water-soaked.—*T. stagnina.*

VOLVARIA

1. Parasitic on Clitocybe sp(p).—*V. surrecta* (= *V. loveiana*)
1. Not parasitic. (Large to very large spp.) 2
   2. Cap slimy, smooth; growing in rich ground.—*V. speciosa.*
   2. Cap dry, silky-fibrillose; growing on dead wood.—*V. bombycina.*


GILL
ATTACHMENTS
FREE
ADNATE
SINUATE
ARCUATE
DECURRENT
DECURRENT
CAP
FLESHY
RING
(SUPERIOR)
VOLVA
CAP MEMBRANOUS
RING
(INFERIOR)
STIPE
PERONATE
MARGINATE BULB

GLOSSARY
OF TERMS

ADNATE (of gills, pores), the inner end of gills or pores more or less attached to stipe. See figure.

ANASTAMOSING (of gills), connecting more or less crosswise to form variously shaped areas surrounded by gills.

ARCUATE-DECURRENT (of pores or gills), the free ends curved rather than forming a straight line as they pass down the stipe. See figure.

CARTILAGINOUS (of stipe), of gristly nature, pliant, not easily cracking when bent. A very useful field character but a real stumbling block to the beginner. Help is often obtained by cutting the whole fungus longitudinally through the centre of cap and stipe and then examining the cut surface. In cartilaginous stipes, the texture of tissue forming stipe and cap is different. This is generally easy to see in *Collybia*. In the fleshy stipe (see fleshy), the texture of both appears the same, the cap looking like a mere expansion of the stipe. This is well seen in most species of *Tricholoma*, *Cortinarius*.

CORTINA (of veil), cobwebby structure spread over developing gill chamber. Best seen in young specimens.

CROWDED (of gills), appearing close-set; often due to relatively large number of intermediate gills. Examples are the mushrooms, *Collybia*.

CUTICLE (of cap, stipe). The outermost layer. Does not include detachable flakes, warts etc. in *Amanita*.

DECURRENT (of gills, pores), descending down stipe, the free edge being more or less straight. See figure.

DICHOTOMOUS (of gills), dividing into two equal branches.

EMARGINATE, See sinuate.

EXCENTRIC (of stipe), not attached at cap centre but shifted to one side, not, however, involving cap margin. cf. lateral.

FIBRILS (of hyphae), collected together longitudinally to form thread-like fibres.

FIBRILLOSE (of cap, stipe); more or less beset with fibrils,

FIBROUS (of stipe), of stringy consistency, approaching cartilaginous q. v. Many fleshy stipes have a fibrous outer coat and this difference in texture can usually be seen in longitudinal section as indicated under cartilaginous.

FLESHY (of cap), thick towards centre, so that there is a considerable amount of "meat" to the cap, as in the common edible mushroom; not membranous q. v. Flesh usually not less than .25 in. thick at cap centre. See figure.

FLESHY (of stipe), of spongy consistency, easily cracking when bent, not pliant. A very useful field character, but difficult to grasp for the beginner. Help is often obtained by cutting the whole fungus longitudinally through the centre of cap and stipe, and then examining cut surface. In the fleshy stipe, the texture of the tissue forning stipe and cap appears similar, the cap looking like an extension of stipe. This is well seen in *Tricholoma*, *Cortinarius*. In the cartilaginous stipe (see cartilaginous) the two tissues appear different. This may be easily seen in most species of *Collybia*.

FREE (of gills, pores), the inner end of the gills not attached to stipe. See figure.

GROUPED (of plant arrangement), where several individuals of same species grow closely together but do not spring from a common point, nor arise from a

common base. cf. tufted.

HYGROPHANOUS (of caps), of those species whose caps when water-soaked (best seen during or just after rain) appear more or less translucent rather like gelatine, the attachment of gills being then often visible through cap tissue (=pellucid striate). Such hygrophanous caps on drying out become opaque and commonly more or less whitish, or at least the dried out colour is much paler than the water-soaked one. The main difficulty in recognising a hygrophanous cap in the dried out state. For this a vertical section through the cap centre often helps, as the innermost flesh is less exposed to drying out than the more superficial and thus appears darker. Also, a cap may be put in water, when the majority of hygrophanous caps will soon reassume the water-soaked state in about 30 minutes.

LATERAL (of stipe), where stipe attachment comes off at and involves cap margin, so that there is no cap margin above one side of attachment.

MARGINATE BULB (of stipe), where circular ridge, border or groove occurs at junction of stipe with basal bulb. See figure.

MEMBRANOUS (of cap), where the cap flesh is everywhere thin, rarely more than .1 in., so that there is very little "meat". See figure.

PAPILLATE (of cap), where there is a small nipple-like cone at cap centre.

PELLUCID STRIATE (of cap), where basal attachment of gills to cap can be seen through the more or less translucid flesh. Often seen in water soaked hygrophanous caps. See hygrophanous.

PERONATE (of stipe), where stipe is sheathed by a stocking-like covering from base upwards, and often to a more or less membranous ring or ring-like zone,

whence "peronate to ring". See figure.

PUBESCENT (of cap, stipe), beset with short hairs; best seen when dry.

RING, more or less membranous structure on stipe. May hang from above where stipe joins cap (superior, descending), or may be continuous with peronate covering (inferior, ascending), or may be movable. Sometimes falls off soon after cap expands; it is then said to be fugacious; hence young stages should be looked at. Occasionally it is reduced to little more than a rim. See peronate, also figure.

SINUATE (of gills), applied where gill attachment is more (emarginate) or less (sinuate) scooped out just before joining stipe. Well seen in *Tricholoma*, *Hebeloma*. See figure.

SQUAMULES (of cap, stipe), small, more or less fluffy scale-like bodies.

SQUAMULOSE, beset with squamules.

STIPE. The "stem" which supports the cap.

STRIATE (of cap), having longer or shorter radiating lines or (of stipe) having longitudinally arranged slightly raised lines.

TROOPS (of plant arrangement), same as grouped, q.v.

TUFTED (of plant habit), where several separate stipes (usually more than 3) arise from same point of attachment to mycelium.

UMBO (of cap), more or less broad convex hump or bump at cap centre.

UMBONATE, having an umbo,

VEIL(S), the envelopes or coverings of certain toadstools during development, leaving various remains in adult stages, or none. Only two need be considered. (1) universal veil, completely envelopes button stages, (2) partial veil, spread across developing gill-chamber.

Either veil may be more or less membranous or cobwebby (fibrillose). Remains of a membranous universal veil may be seen in adult stages of *Amanita* as detachable flakes or warts etc. or as a volva q. v. A membranous partial veil contributes towards ring on stipe. A cobwebby universal veil occurs in young stages of many species of *Cortinarius*, e.g. those with a marginate bulb. Remains of this veil can often be seen collapsed on stipe in adult stages. A cobwebby partial veil is the cortina q. v. of *Cortinarius*, *Hypholoma*, seen only in young stages, but remains often hang from edge of more or less expanded cap, or collapsed on stipe as fibrillose zone.

VOLVA, typically a bag-like membranous structure into which stipe fits. Is generally below ground level, hence often missed if toadstool is pulled up instead of being dug up with a knife or trowel. May be reduced to warts or scales at base of stipe as in some species of *Amanita*. See figure.

REFERENCES

LANGE, J. Flora Agaricina Danica. Copenhagen. 1935-1940. Five vols. text, five vols. plates all in colour. A superb work dealing with over 1000 species covering field and laboratory characters. Keys to species but not to genera. Price about £25.

MAUBLANC, A. Les champignons de France. Paul Lechevalier, 12, Rue de Tournon, Paris VIe. 2 vols. 1946. An excellent work for the beginner containing coloured plates and full descriptions of about 200 species included in this key: contains key to genera but not to species. Price about 25s.

PEARSON, A. A. Notes on the Boleti, with short mono-

graph and key. The Naturalist, 1946. Indispensable to the study of this genus. Price about 2s.

PEARSON. A. A. The genus Russula. The Naturalist 1948. Is also a short monograph, containing a key to all the British species. Is equally indispensable to the study of this difficult genus. Price about 2s 6d.

PEARSON, A. A. and DENNIS, R. W. G. Revised list of British Agarics and Boleti. Trans. Brit. Mycol. Soc. xxxi, 1947. The best account giving the composition of our agaric flora, with notes on the excluded species. Although essentially a check list, it is again indispensable. Price about 5s.

REA, CARLTON. British Basidiomycetae. Cambridge 1922. The standard textbook but now out of print. Gives full descriptions of all species, but since it includes about 600 species of Agarics now excluded in the revised list of Pearson and Dennis, it must be used in conjunction with that list. Keys to genera, but not to species.

RAMSBOTTOM, J. A. A handbook of the larger British fungi. British Museum. Tabular key to genera, but not to species. Short descriptons of all the common species. Very useful and easily obtainable. Price about 7s 6d. Dr. Ramsbottom has also published two volumes in the King Penguin series illustrating in colour our poisonous toadstools and a selection of our best known edible ones. Short descriptions are also included. These are excellent value.

A SKETCH OF THE GEOLOGY OF THE COUNTRY AROUND READING

Professor H. L. Hawkins, D.Sc., F.R.S., F.G.S.

§ 1. *Introduction.*

The following notes are designed to assist workers in branches of Natural History other than Geology. They attempt to indicate the various types of subsoil in the neighbourhood rather than to explain how or why these came to be where they are.

A line running through Marlow, Henley and Newbury serves to divide the area into two characteristic and very different regions. To the north of this line are the Chalk hills; while to the south of it come the low clay-lands leading to the sandy heaths of Aldershot. The line is an expression of the general " tilt " of the British area towards the South-east; through most of geological time it has been usual for north-western Britain to rise while the south-eastern part foundered towards the Netherlands.

This generalisation illustrates one of the predominant features of the Reading area. We are on the sinking side of Britain, and such a region is more likely to acquire new coverings of silt than to lose those already present. Elevated districts come under the scour of the weather, and as they are pushed up the rain and rivers eat ever more deeply into their substance; but depressed areas are sheltered, and often act as temporary quarters for the debris from the higher areas on its way to the sea. This superficial covering of broken rock is known as " Drift ": Reading is in a drift-laden area. Over almost half of the area under description, the " solid " rocks are obscured by a veneer of clay-with-flints, gravel or river-silt that is often thick enough to decide the character of the subsoil regardless of the nature of the strata beneath. Hence a description of the genuine geological structure of the district might often prove misleading to a field-naturalist.

One of the most characteristic qualities of the local topography is directly connected with the prevalence of drift-deposits. Although the area is by no means devoid of hills, it is usual to find at the top of the climb a wide area as flat as the valley below. All of these high plains are covered by stretches of the " Plateau drift ". Along the sides of these valleys comparable areas of flat " terrace-gravel " form shelves at various heights above the flood-plains, notable in Reading itself. Usually the " bed-rock " appears at the surface only along the slopes that separate one platform of drift from another.

§ 2. *The Solid Rocks.*

The oldest series of strata to reach the surface in our district is the *Lower Greensand*, a representative of the Lower Cretaceous system. The brown sands and soft sandstones of this series appear in the extreme north-west around Clifden Hampden and Burcot and again in the extreme south-east near Seale and Puttenham. The southerly

[1] This is condensed from the paper under this title that appeared in *Quaestiones Naturales*, 1933.

extension of the latter exposure is responsible for the Hindhead country, but within our chosen limits the development and extent of the deposit is so small that it needs only passing mention. It is uncertain whether the Lower Greensand underlies the whole of our area. It has been proved by deep borings to exist under Winkfield, Maidenhead and Slough; but it is a very patchy deposit, and it would be rash to assume that it would be met with everywhere, even near its visible outcrop.

With reasonable confidence we can regard the *Gault Clay* (the lower member of what may be called the Middle Cretaceous system) as forming a continuous layer over all of the district excepting the tracts of Lower Greensand. It crops out as a belt about 2½ miles wide between Didcot and Chalgrove, and again as a very narrow band at the foot of the southern slope of the Hog's Back. Its yielding nature has allowed the weather to erode it into a low-lying tract, and most of its northern crop (around Wittenham and Dorchester) is obscured by wide and thick terraces of gravel. In spite of its feeble showing at the surface, the Gault clay has an important subterranean influence, for it is a very impervious stratum (and amply thick to be effective) acting as a water-tight floor to the vast spongy reservoir of the Chalk. Indeed, the line of outcrop of the top of the Gault, with its frequent and reliable springs, determined in no small degree the distribution of early human settlement.

The *Upper Greensand*, which follows directly above the Gault, is by way of-being a hill maker. In the north-west it projects through the mantle of gravel to form the Hadden and Sinodun Hills. Under the Berkshire Downs (from Steventon westward from our district) it forms a prominent line of foot-hills traversed by the Icknield Way. In this area the Upper Greensand is very largely composed of a calcareous sandstone known locally as "Malm", and when dry it can easily be mistaken for Chalk but for its gritty "feel." It is famous as orchard ground, but within our area it has small scope for showing its qualities owing to the drift-cover. South of the Hog's Back the Upper Greensand reappears in a harder and sandier guise, but as a very narrow belt. An interesting additional appearance of it occurs in the heart of the vale of Kingsclere, where a blister-like wrinkle of the strata has (with the aid of denudation) revealed the upper part of the series. Here it is a truly green sand, often including much chert; and, true to type, even in this case it constitutes Isle Hill in the middle of the Vale.

The lowest bed-rock to reach the surface near Reading is the *Chalk*. This formation attains a thickness of about 750 feet locally; but it is far from being the monotonous series that might be expected. We can find in our district ample justification for recognition of four distinct types of chalk. At the base of the series is the "Chalk Marl". This is a hundred-foot succession of seams of greenish-grey calcareous clay and thin harder bands of impure chalk; its outcrop is usually marked by the belt of low ground at the foot of the Chalk scarp.

Next above comes the "Grey Chalk", another hundred feet, but this time of massive impure chalk. This division usually forms the lower slope of the Chalk scarp. The third division of the Chalk in upward succession is the Middle Chalk, which is tough and nodular at the base and a normal soft chalk above. This division, which is about 200 feet thick, is mainly shown at the surface on the true scarp-face of the Downs. Lastly (in our district) comes the "White Chalk with Flints" (the Upper Chalk), some 300 to 400 feet of soft chalk frequently reinforced by seams of siliceous concretion known as Flint. This division is responsible for the greatest area of the chalk country, for it occupies the hill-tops and gently inclined dip-slopes. For this reason, it is often obscured by drift, and, were it not for the deep dry-valleys whose steep sides are washed bare, but little of this great mass would be seen at the surface.

These successive changes in the character of the Chalk are trivial by comparison with those that follow them.

Perhaps the best place in which the contrast between the Chalk and overlying Eocene strata can be studied at present is in the lime and sand pit near Pincent's Farm, Theale. Here we find a bed of water-worn pebbles of flint set in muddy greenish sand resting on a planed-off surface of pure white chalk. Patches of Oyster-shells often occur in or just above this gravelly bed, and layers of peaty matter, or of pipe-clay showing beautiful impressions of the leaves of land-plants, appear locally within a few feet of the top of the Chalk.

The *Reading Beds* consist of about 75 feet of sands and mottled clays. Except for the lowest ten feet (already described) they are very variable in character both vertically and horizontally; but on the whole the lower part is sandy and the upper part is chiefly clay. The sand-banks yield excellent building sand, and are worked in several pits around Tilehurst and Calcot. Here and there these sands have been hardened to form massive concretions known as Sarsens. The brightly coloured clays provide the raw material of one of Reading's claims to fame, for they can be made into tiles and rough pottery of more than ordinary quality.

The *London Clay*, averaging about 350 feet in thickness, naturally covers a wider area than the Reading Beds; but almost as much of it is hidden under drift as reaches the surface. Its lowest layer is usually a sand packed with marine shells; the outcrop of this thin porous layer is often marked by a belt of springy ground. The bulk of the London Clay is stiff and blue; it is much dug for brickmaking. Westwards, towards Newbury, the London Clay becomes rapidly thinner and more sandy, and banks of coarse shingle occur in it.

By a gradual increase of sandiness the London Clay passes up into the *Bagshot Sands*, which, with the overlying *Bracklesham Beds* capped by the pure *Barton Sands*, are responsible for the belt of heath country from Bucklebury and Greenham Commons in the west to Finchampstead and Aldershot in the east. These sands are not only

the uppermost part of the Eocene system, but are the latest records of " solid " geology in the district. Of the next three periods of Tertiary geological history there is no tangible record; and the " drifts " of Pleistocene and Modern origin are separated from the Barton Sands by an interval at least as long as that between the Reading Beds and the Chalk.

The crisis of crustal folding that determined the present distribution of the " solid " rocks in the district occurred during this interval. In the succession of wave-like ripples into which the Alpine " Storm " drove the strata of Southern England, our area occupies the greater part of one of the troughs. In the hollow of the trough the Eocene deposits have been preserved, but on the rising sides (over most of which they must once have been spread) they have either been washed away completely or reduced to outlying relics such as that at Nettlebed.

§ 3. *The Drift Deposits.*

Although, as explained above, the drift exercises a very profound influence on the character of the district, it cannot receive proportionate treatment here. For our present purpose we can adopt a crude classification of the drift into four main divisions—the Clay with Flints, the Plateau Gravel, the Terrace Gravel and the Alluvium.

The *Clay with Flints* is restricted to the Chalk areas. It caps practically the whole of the top ridge of the Chilterns. It is the chief support of the beech woods and provides the anomaly of an almost lime-free soil on hills made of pure limestone.

There is no hard and fast separation between the *Plateau Gravels* and those of the higher river-terraces; but for convenience one may class the wide spreads of gravel that occur more than 100 feet above the present rivers as belonging to the plateau type. North of the Kennet–Thames they belong to the "Northern Drift", and may be recognised by the inclusion of abundant pebbles of quartzite and other rocks that must have been imported from a distance. South of the Kennet–Thames, they are part of the "Southern Drift," composed almost entirely of local materials with occasional admixture of material derived from the Weald.

The *Terrace Gravels*, which represent the successive phases of maturity and rejuvenation of rivers flowing over a spasmodically rising plain, are chiefly grouped into three stages in this district. The highest and oldest is about 90 feet above present river-levels. The middle terrace is from 30 to 50 feet above river-level, while the lowest terrace is but a few feet above the flood-plains. The ingredients of these gravels are much like those of the Plateau spreads, and show much the same differences north and south of the Kennet–Thames.

The *Alluvium* may be considered as the current gravel-terrace in process of formation. That of the Thames valley is usually silty and gravelly, and often contains fresh-water shells in abundance. That of the Kennet valley is apt to include thick layers of sedge-peat.

PLANT HUNTING IN THE LOWER CHILTERNS

K. I. Butler & A. M. Simmonds

The chalk-slopes and beechwoods which lie within a ten-mile radius of north-west of Reading are a veritable treasure-ground for botanists. In addition to the usual chalk-loving plants several comparatively uncommon species may be found.

The Natural Order *Orchidaceae* is well represented. In June 1946, the writers recorded eleven species in this area. An unforgettable sight was that of a typical chalk-slope so thickly sprinkled with *Orchis pyramidalis* and *O. maculata* that it was scarcely possible to avoid treading on the blossoms. Mingled with them were smaller numbers of *Habenaria conopsea* (Fragrant Orchis). Pyramid and Spotted orchids occur on most of the slopes. *O. maculata* exhibits variations due to varying habitats.

That striking example of plant-mimicry, *Ophrys apifera* likewise is found on many slopes. Since this flower has been proved to be self-pollinating, it has been thought by some that the species of bee, which the labellum of the flower so closely imitates, has died out; hence the plant has developed another method of pollination. Rather less frequent than *O. apifera* is the less conspicuous but equally interesting *O. muscifera* (Fly Orchis), usually found on the borders or just within the woods.

Of the less common species, *Habenaria viridis*, (Frog Orchis) recorded in 1946, is another insignificant in size and colour. Its flowers are a dingy brownish-green and the spur, usually a conspicuous feature in Orchis, is rounded; from some angles the flower has a fancied resemblance to a tadpole ! Another inconspicuous dweller on the open chalk slopes is *Herminium monorchis* (Musk Orchis). It is but a few inches high with small yellowish flowers faintly redolent of musk. First recorded in 1942, its numbers had increased in 1946 and a second small colony was discovered on another slope. *Habenaria bifolia*, the graceful Butterfly Orchis, with translucent creamy flowers delicately tinged with green occasionally rewards the searcher in damp woods.

A fairly recent addition to our local records is *Aceras anthropophora*, (Man Orchis), first observed in 1936. It occurs on one slope only and the numbers fluctuate annually. In 1946, (apparently a good orchid year) it was flourishing, but subsequent records show a decrease which we hope is only temporary. *Listera ovata* (Common Twayblade) occurs in many situations and at varying heights, in both sun and shade. It may easily be identified by its two large ovate opposite leaves. The whole plant is slightly viscid. A quite frequent dweller in the beechwoods is *Cephalanthera grandiflora* (White Helleborine). Usually the flowers remain closed, but when open they are of a typical orchid formation except that there is no rostellum. Darwin suggested that a close self-pollination is induced by minute insects which crawl into the flowers and disseminate the pollen.

Another orchid which has a preference for the deep shade is the saprophyte, *Neottia nidus-avis*, (Bird's-nest Orchis). This species is entirely without chlorophyll and derives nourishment from decaying vegetation among which it grows, and its yellow and brown hues render it difficult to see. *Epipactis latifolia* (Broad-leaved Helleborine) is fairly widely distributed. It, too, is a shade-lover, and is a later flowering species; the shoots appear several weeks before the flowering period. Occasionally a form with purplish-green leaves occurs, and in 1949 an albino form was brought into Reading Museum. *E. violacea* has been recorded. *Epipogum aphyllum* (Leafless Epipogum) one of Britain's rarest orchids has been recorded from South Oxfordshire, but not recently. Its extreme rarity may be due to the fact that it only very occasionally produces flowering shoots. *Orchis hircina* (Lizard Orchis), always spasmodic, made its most recent appearance at the edge of a wood in 1934. Oxfordshire claims to be the only county where *Orchis Simia* (Monkey Orchis) now grows, and the " one sheltered locality on the chalk " (to quote W. A. Seaby) comes within our area. In 1933 it was recorded that 80-100 flowering spikes had been produced annually ! Since then there has been a considerable decrease, less than a dozen were seen in 1949.

Latest in flowering is *Spiranthes autumnalis* (Autumn Ladies Tresses); it occurs but sparingly on one of the lower slopes, and was seen in 1946 and again in 1949.

An interesting discovery in 1946 was that of *Potentilla argentea* (Hoary Cinquefoil), growing in a disused gravel-pit near Nuffield. Druce in his " Flora of Oxfordshire " (1886) says " very rare, probably extinct," but the Society's " List of Flowering Plants " (1900) records it as occuring in Caversham Warren ! It may be distinguished from *P. tormentilla* by the white down on stems and leaves and five-petalled corolla. In the same neighbourhood *Helleborus viridis* (Green Hellebore) flourishes; it also occurs sparingly at Maidensgrove and near Maidensgrove Scrubs, where may be found *Paris quadrifolia* (Herb Paris).

Monotropa hypopitys (Yellow Bird's Nest) a parasite, pushes its bent flower-stalk through the dead leaves in many a beechwood. The calyx and prominent flat-topped stigma persist in a dry state well into early winter and then present an identification puzzle. The plant is a member of the family ERICACEÆ, as is also *Pyrola minor* (Small Winter Green), which is a survivor of the flora of the cool-forest period when the climate of this locality was similar to that of North Britain at the present time. This charming little plant with its fresh green leaves and delicate waxy flowers occurs sparingly and does not appear happy under present local conditions. First recorded in 1937, and subsequently lost for some years, it was rediscovered in 1946, not flourishing, but maintaining a brave fight. Another, and more extensive colony was shown to us in the vicinity, but this although well-established produces very few flowers. Seven species of the genus *Hypericum* are recorded, but *H. montanum*

and *H. androsaceum* are infrequent.

Of the FILICES mention should be made of the curious *Ophioglossum vulgatum* (Adder's Tongue) recorded twice in 1948 from the vicinity of Nettlebed. This most unfernlike plant may be overlooked in consequence of the superficial resemblance of the barren fronds to young leaves of *Arum maculatum*. *Ceterach officinarum* (Scaly Spleenwort or " Rusty-back ") may be seen growing in the chinks of a flint wall around a farm-yard, and *Asplenium Ruta-muraria* (Wall-Rue Spleenwort) occurs in similar habitats.

THE DRAGONFLIES OF BERKSHJRE

Philip S. Corbet, B.Sc.

Despite their large size and brilliant coloration dragonflies are studied by very few amateur entomologists. Both their habits and their habitats often make capture a difficult task and this has probably discouraged many who might otherwise have become enthusiasts. For the collector they are unsatisfactory because they rapidly lose their colours after death.

This lack of interest in the past has made the existing information concerning their distribution very incomplete and fauna lists for many British counties may well be deficient in some of the rarer or more local species. Consequently the appearance of a new county record may represent the belated discovery of a dragonfly which had previously been overlooked, or it may indicate an increase in the range of a successful species. It is usually possible, however, to determine the category of such a record without much difficulty.

Twenty-eight of the forty British species have been recorded from Berkshire. Of these, one species, *Sympetrum flaveolum*, owes its inclusion in the county list to a large immigration in 1926, and another, *Gomphus vulgatissimus*, represents an obsolete record still in need of confirmation. *Gomphus*, if still occurring here, should be found flying along the sheltered reaches of the Thames during May and June.

In 1949, three obsolete records were confirmed: *Cordulegaster boltonii*, *Aeshna cyanea* and *A. juncea*, and two new county records were established: *Sympetrum sanguineum* and *Orthetrum cancellatum*. The former is common but closely resembles the widespread *S. striolatum* for which it has doubtless been mistaken in the past. *O. cancellatum*, however, is probably a recent arrival since it is known to be increasing its range and its occurence in Berkshire is very localised. This species resembles *Libellula depressa* when in flight, but could hardly be confused after capture. With the addition of these two species the Berkshire list is probably almost complete since the other British species are either rare or else restricted to the north or west.

As a group, dragonflies possess a wide range of tolerance and are

seldom found restricted to one type of habitat. Although their environmental preferences are not sharply defined, nevertheless certain species tend to typify habitats, if only by being more abundant there than elsewhere.

A characteristic dragonfly fauna centres around a pond on acid heathland. The small, black and yellow *Sympetrum scoticum* and the emerald-green *Lestes sponsa* are often very common. *Aeshna juncea* may also be present, one or two males flying strongly overhead while a female furtively oviposits amongst the *Sphagnum* and *Juncus* around the edge of the pond. *Libellula depressa* and *L. quadrimaculata* may dart to and fro close to the water, and, if the surrounding moorland is marshy, *Orthetrum coerulescens* will put in an appearance. Hawking strongly along the peat runnels one may expect to see *Cordulegaster boltonii*, occasionally pausing on a clump of *Juncus* to consume a recently captured bee. The latter species prefers streams having a gravel bottom, the muddier ones being colonised by *Pyrrhosoma nymphula*, *Ceriagrion tenellum* and *Agrion virgo*. Around the ponds one may expect the ubiquitous *Ischnura elegans*, *Enallagma cyathigerum* and *Coenagrion puella* to be present in some numbers.

Larger dragonflies are found in sheltered lakes surrounded by trees and also in slowly flowing rivers. The Emperor Dragonfly, *Anax imperator*, which inhabits such places, is fortunately quite common in Berkshire. To watch two or three males competing for superiority over a large pond or lake on a hot July afternoon is an unforgettable experience. They throw aerial somersaults backwards and forwards with effortless ease, often rising twenty feet as if in a single movement, only settling when a passing cloud temporarily obscures the sun. Then their bright blue bodies, so conspicuous in flight, seem to merge into the background upon which they rest.

Later in the year, the Aeshnas appear. The Brown Aeshna, *Aeshna grandis*, is very abundant around large lakes and also may be seen flying along the banks of the Kennet Canal as late as eight o' clock on a summer evening. This species will oviposit equally readily in lakes and slowly flowing canals. The Scarce Aeshna, *A. mixta*, a late summer dragonfly, is locally common around Reading. Although met with along the rivers and over large lakes and gravel-pits, it is more often seen hawking along woodland lanes or sheltered roads. This dragonfly is extremely difficult to net, being a powerful flier and choosing resting places which are usually inaccessible. *Aeshna cyanea*, the Southern Aeshna, occurs commonly around lakes and ponds but it is often encountered patrolling a street or garden on a warm evening.

Members of the family Libellulidae are especially abundant in lakes and backwaters where the water is stationary. This is probably because their eggs are scattered freely, unlike those of other dragonflies which are inserted into the tissues of water-plants, and would run the risk of being carried away by moving water. *Sympetrum striolatum*, *S. sanguinuem*, *Libellula depressa* and *L. quadrimaculata*

are the commoner representatives of the family while *Cordulia aenea* and *Orthetrum cancellatum* are more localised.

Among the damselflies inhabiting sheltered lakes and canals *Erythromma naias*, an eastern species; *Platycnemis pennipes* and *Agrion splendens* deserve mention as characteristic forms. The latter species lives in muddy, reed-lined canals, thus never occurring in the same locality as its congener, *A. virgo*, which favours swifter and more acid streams.

Two species that I have not seen but which are reported to occur in Berkshire are *Brachytron pratense*, the Hairy Dragonfly, whose haunt is along rivers and canals and *Coenagrion pulchellum*, which is probably capable of breeding in almost any sheltered body of water. The remaining species recorded from the county have already been mentioned.

Although our knowledge of the distribution and habits of adult dragonflies is being steadily increased, information concerning the ecology and duration of the aquatic stages is almost non-existent. A great many problems connected with the factors controlling the rate of growth still remain to be solved and future workers have an opportunity to make valuable contributions to our knowledge of this difficult but fascinating group of insects.

SPRING BIRD WATCHING IN CAVERSHAM GARDENS, ORCHARDS AND PLANTATIONS

Dr. E. V. Watson

Gardens and orchards are, on the whole, among the richest of all bird habitats. The favoured garden and adjoining strip of orchard land will carry a bird population far in excess of that carried by most types of open country. It will tend, moreover, to be rich not merely in individuals, but in range of species. This was true of a large garden that I knew well, many years ago in Surrey, where as many as 100 nests of a varied assortment of species could be found in a matter of a few acres of land; and it is true, too, of the small area in Caversham that I am considering in this article.

The particular area that I have in mind lies west of the Woodcote Road, between the Upper and Lower Warrens, although the facts relating to its bird life would apply in a general way to almost any suitable stretch of garden, orchard and plantation in the Caversham area. Abundance of food and cover, wealth of nesting sites, diversity of habitat—these sum up the essentials of " suitability "; and these are the conditions which make it possible to see around 50 species fairly easily in the course of a short period of bird-watching in this small area.

Chill March winds are still blowing, and the shrubs and hedge-tops are as yet scarcely dusted with green, when the first Chiffchaff

is heard repeating its simple unvarying phrases in the better-wooded corner of our area. It is in the vanguard of summer visitors, but it arrives upon a scene in which perhaps a dozen pairs of Robins have already staked out their territory, and where many another resident species is preparing to breed.

Hedge Sparrows—more conspicuous now than at any other season are pouring forth a rather squeaky, but not unpleasing medley from the briar or hawthorn sprig; Wrens burst out into vociferous acclamation of spring—and their territorial rights; Long-tailed Tits by March are no longer touring the countryside in troops, but are carefully searching the hedgerow in pairs for suitable places to build those perfectly domed nests of theirs; Bullfinches that have remained in pairs all the winter, having done their worst on the blossom buds of the fruit trees, are now piping furtively from some evergreen in the vicinity; and Greenfinches—still to some extent gregarious, trill unceasingly from the tops of cypresses. Long before the first Chiffchaff proclaims that Spring has indeed come, the Blackbird will have added its incomparably rich and mellow notes to the chorus formed by those birds that sing in the garden on mild days in the dead of winter:—birds like the Song Thrush that " sings each song twice over," the Missel Thrush whose wild notes defy the storm, and the Robin that is never averse to giving a snatch of song—often of surprisingly fine quality—on the least promising of winter days. The " see-saw " of the Great Tit and the tinkling bell of the Blue Tit must also be regarded as songs. They ring out from the plantation very early in the year.

The coming of the Chiffchaff heralds the arrival of the other summer birds—immigrants that in less than 2 months must nearly double the population of our little area. Early in April, the Blackcap will be here, adping a new and vital note of song to the swelling chorus. One day in the middle of April 1949, as many as 4 Blackcaps could be heard singing within a quarter of a mile along the Lower Warren. This may have signified a wave of passage, though plenty stay to rest at Caversham. The " descending scale " of the Willow Warbler will be heard too in the first week of April, but perhaps another ten days or a fortnight will elapse before it echoes from almost every strip of hedge or clump of trees—as indeed it will when we receive the impact of the main wave of immigrants. Our record too often take account of the onfliers or " advance guard " that give us our early dates, whilst ignoring the arrival of the main wave, which, for any species, is surely of just as real interest.

By the third week of April other voices will have been added—the rather harsh and unmelodious song of the Common Whitethroat, the matchless notes of the Nightingale, and—of course—the Cuckoo, that haunt the fringes of our immediate area. By this time, too, the Wryneck will have arrived—a very local species and accordingly one of the most cherished summer visitors to Caversham gardens. Perhaps it will be interested in the dead timber of those two

ancient oaks that have already attacked both Greater and Lesser Spotted Woodpeckers. This last species will often advertise its presence by a high-pitched call-note, repeated several times in quick succession, as one did a few days ago when it perched for a moment on one of the Lombardy poplars at the bottom of my small garden. But how swiftly it is off to another tree, there perhaps to " drum " after the fashion of the larger species, but with less power. The Wryneck repeats a single note, too, but it is of a very different quality, not high like that of the little Woodpecker, but a lower pitched, somewhat haunting rattle. The term rattle, however, fails to suggest its musical quality.

Another bird, whose song is perhaps more accurately described as a " rattle " is the Lesser Whitethroat. It may be heard at Caversham in late April, at about the same time that the first Wood Warbler is uttering its peculiar sibilant trill from the tops of near-by beeches. The White rumped House Martins, also, will have returned by now to those houses—rather few and far between nowadays—that are fortunate enough to boast a little Martin colony. April will in all likelihood be nearly over before we hear again the rhythmical, soothing " purrr, purrr " of the Turtle Dove and the eerie screaming of the Swifts. These are among the sounds of hot summer days and long summer evenings.

Last of all birds to return will be the Spotted Flycatcher—so unobtrusive in repose and so unmistakeable in action. Indeed, it it will probably be the second week in May before we see it making again those characteristic sallies after flies and other insects. By then the almost full canopy of foliage, and the squawks and chirpings of innumerable fledglings will be adding greatly to the difficulties of the bird-watcher.

Finally, a word about some of Caversham's less usual birds. For instance, there are the occasions when a pair of Hawfinches display their big beaks and striking wing-pattern in the garden of some fortunate person—or unfortunate, if it happens to be the owner's peas or cherries that attract them. Again, in rough ground on the fringe of Caversham, where building ceases and country begins, I have seen in June that handsome bird—a cock Red-backed Strike. Finally, and much more startling still, there was that occasion in 1948, when the inhabitants of one Caversham garden awoke one spring morning to find a Hoopoe strutting about on their lawn. The bird is rare, but there is no mistaking the pattern of that singularly ornamental plumage. It remained for about a week but few ornithologists saw it. They saw only the report of it which appeared in the popular press.

RECORDERS REPORTS—GEOLOGY

Professor H. L. Hawkins, D.Sc., F.R.S., F.G.S.

The narrow gorge of the Kennet valley between Katesgrove and Coley provides the steepest hills in Reading south of the Thames. Alpine Street on the east side, and Garnet Street on the west, have very sharp gradients, and they naturally traverse the less precipitous parts of the valley-side.

The deepest part of the gorge cuts through the hills in a south-to-north direction. The strata there dip gently towards the south-east, so that the river is flowing obliquely against the dip. The floor of the valley (apart from superficial deposits) is cut into the Chalk, while the sides consist mainly of the Reading Beds. But whereas these sands and clays almost reach down to river-level on the Katesgrove side, they rest on the Chalk about thirty feet above the flood-plain on the Coley side.

On the east, old and new clay-pits have left their scars along the valley-wall above Elgar Road. On the west, much of the steep slope is built over, although recent slum-clearance has left some gaps. But before the buildings were erected in the Coley district, that side of the valley had also been the scene of much excavation. Sand-pits extended from Berkeley Avenue almost to Castle Hill (Field Road occupies the floor of these old pits), and recent trial-borings have shown that large chalk-pits were scooped out lower down the hillside above Wolseley Street.

Coley Place seems to have skirted the top of a Chalk-pit which has since been filled in with rubbish to a depth of more than thirty feet. But in one of the old sand-pits, just east of the present line of Field Road (and about 100 yards north of Garnet Street), the underlying Chalk was evidently dug in a pit that may have had a tunnelled connection with the Wolseley Street quarry. This chalk "mine" was more than thirty feet deep, and like the main pit was filled in with rubbish. Before that rubbish was fully consolidated, the houses on the east side of Field Road were built. To-day, Nos. 59 to 75, which more or less straddle the "mine", are in sorry plight; No. 63 has disappeared, No. 61 is uninhabitable, and the others are in various stages of collapse.

A series of trial-borings has revealed the presence of these forgotten and obscured workings, and also the block of undisturbed ground that separates them. About mid-way between the Field Road subsidence and Coley Place, the top of the Chalk was proved at 150 feet above sea-level. About 150 feet to the south, another boring proved the chalk at 145 feet, and at a similar distance to the north it was indicated at 155 feet above sea-level. The dip of the strata is shown by these and other borings to be of the order of 1 in 45 in a south-easterly direction.

The steep sides of this (geologically speaking) newly-cut gorge are naturally unstable, especially the western slope with its downward

dip. But the immediate responsibility for the disastrous instability of parts of the Coley side must be ascribed to " Man as a geological agent".

EXTRACT FROM BOTANY REPORT

Miss K. I. Butler

The last months of 1948 marked the advent of that phenomenal weather which was to break so many records during the forthcoming year. Miss R. Crosbie reported *Campanula rotundifolia*, Harebell in bloom in late November, and on December 9th Mr. Fishlock saw *Daphne mezereum*, in flower. Mr. Fishlock made some observations on the early flowering of fruit trees—Prunus with some flowers on it before the end of January, was in full bloom by the end of February; Almond trees flowered early in March, and a Pear tree was in full bloom early in April. Normally, Plum flowers first, then Pear, then Apple—this season they were more or less telescoped and all flowering at the same time.

Although ponds and lakes presented a somewhat sorry sight, with partially dried-up beds and banks, some members were able to get on closer acquaintance with such plants as *Littorella uniflora*, Shoreweed,which was observed on the dried-up bed of Kingsmere Lake, and again at Frensham Pond, and also *Ranunculus drouettii*, and *Ranunculus trichophyllus*, two of our less common Batrachians, found by Mr. L. Williams on the margin of a pond between Tidmarsh and Theale.

It will be remembered that in 1948 *Ophioglossum vulgatum*, Adder's Tongue was located in two different areas in Oxfordshire. Another success has been added by Miss J. M. Watson, who found it growing in a damp meadow near Easthampstead Park, some plants 4 to 5 inches high, apparently a new record for Berkshire.

The following less common plants were observed during the year:—*Thesium humifusum*, Bastard Toadflax—located on the Moulsford Downs and a new record. *Coronopus didymus*, Lesser Swine or Wart Cress—a plant of the coast and rarely seen inland, was found by Mr. N. Peskitt, near Emmer Green. *Polygonum bistorta*, Bistort more often seen in the north than in the south, and *Pedicularis palustris*, Red Rattle, were both seen near the canal at Thatcham.

Mr. L. Williams reports some less common plants found in the district:—*Geranium lucidum*, Shining Cranesbill, so reminiscent of the west country, in a hedge at Greenham Common—apparently the same place as recorded by Druce in his Flora of Berks. *Medicago falcata*, Sickle Medick, by the river Kennet. This is a native of East Anglia, and only adventive in Berks. *Chenopodium murale*, Nettle-leaved Goosefoot, one plant in a heap of sand near Crowthorne. *Lamium hybridum* an uncommon plant of waste places, found at Tilehurst. *Polystichum aculeatum*, Prickly Shield Fern, in a wood between Little Heath and Sulham. *Orabanche major*, Giant Broom-

rape, by the roadside near Streatley, and again near Kingsclere.

The highlight of the year, was the discovery by Mrs. Simmonds of *Illecebrum verticillatum*, Whorled Knotweed. Prior to 1891 this plant was only recorded from Devon and Cornwall, and the Channel Islands, so its discovery in that year growing on the damp sandy margin of a pool near Wellington College, was of singular interest. Druce in the 1919 Supplement to his Flora records it again near Kings Mere Lake with the suggestion that it had spread from the original locality to other places about Wellington College, or it had been previously overlooked. Mrs. Simmonds has found it growing at the edge of a sandy road near Kings Mere Lake. It is most encouraging to know that during fifty odd years this uncommon little flower is still holding its own.

The year 1949 was not a particularly good one for our local species of wild Orchids, many of which were much reduced in numbers. Attention is drawn to the existence of that rarity *Orchis simia*, Monkey Orchis, always a precarious one, firstly on account of the depredations of the so called collector (nine blooms were seen on June 5th, but by June 12th every one had been picked); secondly through the exigencies of the times. In 1944 it miraculously survived in spite of timber being hauled across the slope on which it grows. In 1949 it was further threatened by the ploughing up of the said slope. This should be a matter of great concern to all naturalists, for this is the sole remaining locality for *Orchis simia* in Great Britain. Fortunately further investigation showed that the small area of the slope on which it grows had just escaped the plough.

Mrs. Simmonds and Mr. L. Williams both remarked on the following somewhat unusual occurrences this year :—(1) Bracken fruiting profusely. (2) Beech, Hornbean and Sycamore comparatively flowerless.

The Fungus Foray in the woods around Kingswood Common and Wyfold Court yielded between seventy and eighty species, in spite of the dry season. New species identified were:—*Amanita excelsa*; *Boletus piperatus*; *Lepiota cristata*; *Pleurotus ostreatus*; *Lycoperdon excipuliforme*.

FXTRACT FROM ORNITHOLOGY REPORT

Mr. J. Bowden

November 21st—Glorious day, bright sunshine and warm; went with Mr. Gribble to the Theale Gravel Pits to look for wild duck, etc. Skylark singing lustily to which we both listened for a few minutes. Counted between 50–60 Coots on the water and 3 Great Crested Grebe, 1 Moorhen and in the far distance 5 small duck, which we reckoned were Tufted duck, probably immature. From Theale we went directly to Cranemoor Lake and on looking over the park wall were delighted to see about 50 Canada Geese, there were also Mallard, Coot, etc.

About 40 Golden Plover seen in the fields north of the Bath Road, near Newbury, on March 1st. Their flight was very rapid, wheeling and turning repeatedly; the characteristic angular and pointed wings being very noticeable. Rooks nesting at Padworth within a few yards of the main Bath Road in small Willow trees not more than 25 feet from the ground. The weather during the first few days of April was very cold, bitter north winds, which brought splashes of snow and passing scuds of hail, but this being the Spring of the year some of the migratory birds had already arrived. I heard and saw a Swallow at Woodley on April 3rd and at Burghfield on April 7th saw a pair of Willow Wrens busily searching a thornhedge which was yet quite bare of leaves. Mr. Williams saw a Yellow Wagtail by the river at Streatley (April 19th) and a Wryneck at Burghfield.

In spite of its shy and retiring habits I was able to watch a Blackcap in a small spinney near Camberley on May 24th. I was attracted by its singing (which is very beautiful); after his little outburst of song it frequently made a peculiar ticking sound almost exactly like a Stonechat.

Mr. Gribble saw 4 Swifts on April 30th (a week earlier than usual) and a pair of Grey Wagtails near the lock between Burghfield and Theale. May 13th—14 Black Terns present at Burghfield Gravel Pits. He observed most of them perching on a log of wood, several were taking May flies. The same evening he saw a Common Sandpiper and heard a Grasshopper Warbler and Nightingale. On May 22nd Woodlarks and Wheatears on the Fairmile, and near Goring by a farm track a pair of Stone Curlews. Also seen at Burghfield Gravel Pits (June 1st) a pair of Little Ringed Plover, a great rarity for Berkshire. Mr. Runge found a Reed Warbler's nest in the reed beds at Thatcham on June 4th, it contained 3 eggs. Upon his second visit (June 17th) he discovered a fourth egg, larger and similar in coloration, which he very considerately removed to save the Small Warbler the trouble of feeding a voracious young cuckoo.

Mrs. Simmonds reports Stone Curlew heard in Unhill Bottom (April 26th), Red Shanks seen and heard near Burghfield Bridge May 11th, also Common Tern, Dunlin Ringed Plover, Little Ringed Plover, Yellow Wagtail, etc. A carefully constructed nest lined with Sallow fluff found by Mrs. Simmonds amongst some nettles was probably that of a White Throat.

At Englefield Park on August 27th, Mr. Gribble and I saw two or three Green Sandpipers after much searching and waiting. The difference to be seen in flight is the very pronounced white on the rump which is clearly seen; the Common Sandpiper does not show this.

Mr. Fishlock sent me a note from the " Daily Telegraph " which I abbreviate :—The writer was awakened by the clear flute like notes of the Golden Oriole which even hushed the Missel Thrushes in their chatter. In seeing the bird, the impression was not so much of the gold as the flame coloured breast.

COMMITTEE
1949-50

President

Mrs. A. M. Simmonds

Vice-Presidents

Mr. W. A. Smallcombe B.Sc. Mr. C. Runge

Professor H. L. Hawkins D.Sc., F.R.S., F.G.S.

Hon. Secretary — Mr. W. C. Fishlock

Hon. Treasurer — Mr. B. R. Baker

Other Members

Mr. P. A. Betts — Miss K. I. Butler

Mr. T. L. Gwatkin — Miss L. E. Cobb

Miss B. M. Jones — Miss K. M. Mason

Hon. Recorders

GEOLOGY—*Professor H. L. Hawkins D.Sc., F.R.S., F.G.S.*

BOTANY — *Miss K. I. Butler*

ENTOMOLOGY—*Mr. L. H. Williams B.Sc.*

ORNITHOLOGY—*Mr. J. Bowden*

The Society organises summer excursions and winter lectures. Members of the Society receive copies of this Journal. All enquiries to the Hon. Sec., Mr. W. C. Fishlock,