

The Mollusca of Somerset.

BY E. W. SWANTON,

Member of the Conchological Society of Great Britain and Ireland.

INTRODUCTION.

THE earliest reference to the shells of Somerset with which I am acquainted is that given by Emmanuel Mendes da Costa in his *Historia Naturalis Testaceorum Britanniae* (1778), wherein that most assiduous collector remarks concerning *H. lapicida*, "I have found them on the rocks at and near Matlock in Derbyshire; about Bath in Somersetshire, also on rocks; in Surrey, Wiltshire, and Hampshire, in the moss on the bodies of large trees, and in woods."

It is a matter of regret that no well-known conchologist resided in Somerset in the XVIII Century. The adjacent counties of Wilts, Dorset, and Devon were more fortunate in this respect. Colonel Montagu, F.L.S., the author of the well-known *Testacea Britannica*, was born at Lackham in Wilts, in 1755. He studied very closely the mollusca of the northern part of that county before removing to Kingsbridge in Devon, where he devoted the remainder of his life to an investigation of the ornithology and conchology of South Devon. His contemporary was Dr. Pulteney, who published, in 1799, a catalogue of birds, shells, etc., of the county of Dorset.

In 1822, Mr. J. S. Miller published in the *Annals of Philosophy* a list of land and freshwater shells occurring in the environs of Bristol, but it was not until the middle of the

XIX Century that the conchology of Somerset received serious attention. In 1860 the Rev. A. M. Norman published, in Vol. X of these *Proceedings*, a paper on the Inland Mollusca of Somerset. The records chiefly concern the north and north-western districts, but so carefully had the author investigated the molluscan fauna therein, that he was able to remark in his preface, "one hundred and six species are included in the present catalogue. Deducting five as perhaps erroneously recorded, the remaining number of Somersetshire mollusca will be found to exceed those hitherto met with in any county or district." He hints that it was the first catalogue to enumerate 100 species. It formed the basis of papers on the mollusca of the Bristol district by Messrs. Leipner, Ord, and Poulton, which were published in the seventies.

Though fifty years have passed since it appeared, it is my great pleasure to observe that its learned author (now Rev. Canon A. Merle Norman, D.C.L., F.R.S., etc., of world-wide reputation as a conchologist) is still with us. I wrote to him soliciting notes when I commenced to put together my material for this paper, he replied that he could not give me any additional information as he had not resided in Somerset since the publication of the list.

The molluscan fauna of the coast is apparently poor in species; the polluted waters of the Bristol Channel are probably inimical to molluscan life, but I suspect that the paucity of records is to be partly explained by the absence of observers. On the other hand, the inland fauna is a very rich one, probably not excelled by any other county. Factors contributory to this are the numerous rivers and streams and the great diversity of soil. It is necessary briefly to consider the physical and geological features of the county before reviewing its mollusca from an ecological standpoint.

The majority of the rivers rise in the eastern uplands and flow westwards into the Bristol Channel. The largest is the

Bristol Avon, forming the dividing line from Gloucestershire. Its tributaries, the Frome and Chew, carry off the waters from the north-east side of the Mendips. The river Yeo takes the drainage of the north-western slopes of the Mendips, and enters the channel a few miles below Clevedon. The Axe conducts the waters from the southern slopes of the same range to the sea below Weston-super-Mare. The Polden Hills are drained on the north by the Brue, which also carries off the waters of the eastern uplands about Bruton and Castle Cary, in the neighbourhood of which towns enormous numbers of shells may be found in the rejectments left on the banks after heavy floods. Mr. John Morland, in a recent letter to me, comments upon the large numbers of shells occurring in the "drift" left by this river near Glastonbury. "I think I obtained 60 or more species from this source, including a single specimen of *Acme fusca*." The southern slopes of the Poldens are drained by the Cary, a tributary of the Parrett, which it enters near Dunball station, below Bridgwater, in an artificial channel under the name of King Sedgemoor Drain or Cut. Another tributary of the Parrett, the Yeo (formerly Ivel), enters Somerset near Yeovil, and passing through Ilchester, joins the parent stream at Langport. From Langport the Parrett meanders across the county to the sea, and forms, with the tributary Yeo, the dividing line between the two vice-counties, North and South. The Devonshire Axe and the Exe, which drain respectively the southern slopes of the Blackdown Hills and Exmoor, flow southward into Devonshire.

The wild stretches of Exmoor comprise some of the highest land in the county, attaining 1,707ft. at Dunkery Beacon. The Quantock hills stretch from a few miles to the north-west of Taunton towards the sea in the direction of Watchet, but do not reach the coast; Wills Neck, the highest point, is 1,262ft. The Mendips stretch from the neighbourhood of Wells to Weston-super-Mare, and are the most extensive hills

in the northern half of the county. There is much rugged land with beautiful scenery in the eastern parts around Penselwood.

Summarising briefly the geological aspects of the county, the Palæozoic rocks appear in the north-east (Bristol and Radstock coalfields), and in the west (Quantocks and Exmoor), the hollow between them is filled with Mesozoic rocks. The Old Red sandstone appears on the Mendips, also on the banks of the Avon near Clifton. The Devonian formation occurs in the north-west corner of the county, on the Quantocks, and on Exmoor in the extreme west. The Carboniferous limestone crops out between Clifton and Clevedon, and flanks the slopes of the Mendips; the Coal measures occur at Clapton-in-Gordano, Nailsea, and Radstock. The Trias appears between Taunton and Wiveliscombe. The Rhætic beds are largely exposed on the coast at Watchet, and irregularly at other places. The Lias occupies a large tract in the centre of the county, and is well seen at Street. The Oolite forms a ridge on the east and south-east, stretching from Bath through Frome to Wincanton and Henstridge. The escarpments of the limestones of the Lias and Oolite face the west or north-west, the dip being easterly. The Cretaceous rocks (chiefly Upper Greensand) are well developed about Penselwood in the east, and the Blackdown hills in the south. There are numerous post-Pliocene beds in the county, such are everywhere of special interest to the conchologist, as they frequently contain sub-fossil shells in large numbers. The gravel, silt, and peat beds at Burnham, Sedgemoor, Wedmore, etc., and the raised beaches about Weston-super-Mare, come under this heading. Much of the alluvium and peat has been deposited since Roman times. Deposits 12ft. in depth occur at Bath and on the levels at Burnham.

Valley gravel occurs along the Brue valley near Bruton, Castle Cary, and other places. Messrs. Santer Kennard and B. B. Woodward, who examined some material from a deposit

near Castle Cary, found the following species, all of which were obviously of great antiquity :

- Hygromia hispida, *Linné.*
- Hygromia rufescens, *Pennant.*
- Helix hortensis, *Müller.*
- Cochlicopa lubrica, *Müller.*
- Ancylus fluviatilis, *Müller.*
- Bithynia tentaculata, *Linné.*
- Valvata piscinalis, *Müller.*
- Pisidium amnicum, *Müller.*

A paper by Mr. Herbert Bolton, F.R.S.E., Curator of the Bristol Museum, on the Occurrence of a Shell-bearing Gravel at Dunball Island, was published in the *Proceedings* of the Bristol Naturalists' Society in 1904. At a depth of about 24ft. from Ordnance datum, or 44ft. from the surface, a layer of sand, mud, and fine gravel, averaging 5½ft. in thickness, contained the following species, *Macoma balthica* being the dominant :

LAND AND FRESH-WATER.

- Vitrea cellaria, *Müller* (= *Hyalinia cellaria*, *Westerlund*).
- Pyramidula rotundata, *Müller.*
- Hygromia hispida, *Linné.*
- Vallonia pulchella, *Müller.*
- Helix hortensis, *Müller.*
- Cochlicopa lubrica, *Müller.*
- Succinea putris, *Linné.*
- Ancylus fluviatilis, *Müller.*
- Limnæa peregra, *Müller.*
- Planorbis albus, *Müller.*
- Planorbis glaber, *Jeffreys.*
- Planorbis umbilicatus, *Müller.*
- Paludestrina stagnalis, *Baster* (= *Hydrobia ulvæ*, *Pennant*).
- Bithynia tentaculata, *Linné.*
- Bithynia leachi, *Sheppard.*
- Valvata piscinalis, *Müller.*

Pomatias elegans, Müller (= *Cyclostoma elegans*, Müller).
Neritina fluviatilis, Linné.

MARINE.

Scrobicularia plana, *Da Costa* (= *S. piperata*, *Bellonius*).
Macoma balthica, Linné (= *Tellina balthica*, Linné).
Littorina obtusata, Linné.
Littorina rudis, *Maton*.
Leuconia bidentata, *Montagu*.

The peat beds yield but scanty molluscan remains. I have examined many sections in the neighbourhood of Shapwick, but succeeded in finding nothing more than fragments of various species of *Planorbis* and *Pisidium*, in such a condition as to render specific identification impossible. Many years ago Mr. Arthur Bulleid, F.S.A., shewed me some shells from the peat at the Glastonbury Lake-village, they comprised three common inhabitants of the rhines at the present time, viz. :

Valvata piscinalis, Müller.
Bithynia tentaculata, Linné.
Pisidium amnicum, Müller.

Raised beaches occur at Anchor Head and Woodspring Hill north of Weston-super-Mare. They are between 20 to 30ft. above high-water mark, and are covered by blown sand, rubble, and talus. They consist of sand and shingle (Carboniferous Limestone pebbles with occasional flints) well stratified and often compacted. Mr. E. C. H. Day, F.G.S., published, in the *Geological Magazine* of 1866, a paper on these raised beaches. He observes that the shingle was cemented into masses of conglomerate so hard "that it required violent labour with heavy tools to break them." Embedded in the masses were bones of horses and hyænas (cave), with numerous shells of *Littorina littorea*, Linné and *Tellina tenuis*, *da Costa*. Mr. H. B. Woodward is of opinion that these remnants of

raised beaches are "possibly of the same age as some of the valley gravels into which they may have merged."

The following species have been recorded from them :

Mytilus edulis, Linné.

Ostrea edulis, Linné.

Macoma balthica, Linné (= *Tellina balthica*, Linné).

Cardium edule, Linné.

Littorina littorea, Linné.

Buccinum undatum, Linné.

Old beaches have been traced on the Lias and Red Marl in

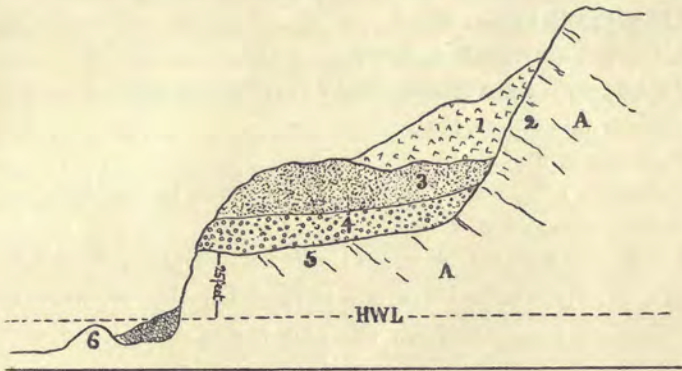


Diagram of a Raised Beach, etc., at Birnbeck Cove,
Weston-super-Mare (after Day).

1. "Head." 2. Ancient Cliff. 3. Ancient Dunes. 4. Ancient Beach.
5. Ancient Shore. 6. Present Beach.
AA. Carboniferous Limestone. HWL. High-water Level.

many parts of the moorlands, in places inland and about the present sea level. They are known as the Burtle Beds, being so named by De la Beche because they were at one time well shown at Burtle near Glastonbury. They may be traced along many parts of the border of King's Sedgemoor, Sutton Mallet, Weston Zoyland, Chedzoy, and Middlezoy, in the last they are sometimes dug by the roadside. These beaches are composed of sand with occasional pebbles (sometimes cemented into hard bands) and recent marine shells. "Whether these

Burtle Beds were contemporaneous with the raised beaches, or were due to later incursions of the sea over the lowlands, is not certain" (H. B. Woodward).

Mr. Henry Corder obtained the following shells from a very fossiliferous patch of Burtle Bed at Perry Green, Wembdon, by a wet roadside ditch :

Mytilus edulis, Linné.

Ostrea edulis, Linné.

Macoma balthica, Linné (= *Tellina balthica*, Linné).

Cardium edule, Linné.

Gibbula cineraria, Linné (= *Trochus cinerarius*, Linné).

Littorina littorea, Linné.

Littorina neritoides, Linné.

Paludestrina stagnalis, Baster (= *Hydrobia ulvæ*, Pennant).

Natica catena, da Costa.

Buccinum undatum, Linné.

Ocenebra erinacea, Linné (= *Murex erinaceus*, Linné).

Nassa reticulata, Linné.

Tornatina obtusa, Montagu (= *Utriculo obtusus*, Montagu).

Mr. H. St. George Gray has recorded the occurrence of the following species from the excavation of Wick Barrow, Stogursey :¹

Vitrea alliaria, Müller.

Helix aspersa, Müller (abundant).

Helix nemoralis, Linné (common).

Cœcilioides acicula, Müller (= *Achatina acicula*, Müller).

Pomatias elegans, Müller (= *Cyclostoma elegans*, Müller).

Patella vulgata, Linné.

A Holocene deposit on Brean Down (south side) yielded four species when I examined it in June, 1910 :

Vitrea cellaria, Müller.

Helicella virgata, da Costa.

Helicella caperata, Montagu.

Helicella barbara, Linné (= *Helix acuta*, Müller).

1. *Proc. Som. Arch. Soc.*, LIV, ii, 52.

It is highly probable that further search would yield many additional species.

The geological systems above alluded to comprise many formations and sub-divisions. Though very complex—ranging from the Old Red Sandstone to the Chalk—yet, from an ecological standpoint, they may be classed under the three headings of sandstones, limestones, and deep marls and clays, as pointed out by Dr. C. E. Moss in his admirable paper on the Geographical Distribution of Vegetation in Somerset.¹ I have drawn largely upon his paper for my botanical notes in the subjoined brief survey of the inland mollusca of the county, and have much pleasure in here acknowledging my indebtedness, and expressing my appreciation of its value.

Dr. Moss observes that “East Somerset has a slightly higher summer temperature and a slightly lower winter temperature than West Somerset, and also from the geological and botanical standpoints, East Somerset has more in common with eastern England than with south-western England.” An examination of the molluscan fauna gives zoological support to this conclusion, *e.g.* we do not find *Jaminia anglica* in the eastern part of the county; other examples might be quoted.

Considered as a whole, the mollusca of Somerset belong to the Lusitanian group, the term “Lusitanian” being understood to include the extreme south-west of Europe (and north-west Africa), and not limited to Lusitania of Roman times, which included only a large area of Portugal. A “Lusitanian” mollusc is one which has migrated from South-Western Europe to Central, Southern, or Northern Europe, either in pre-glacial times or later. Forbes considered that the Lusitanian elements are the oldest of the components of our existing fauna and flora, and date from Miocene times. Molluscs of this group occur chiefly, as far as the United Kingdom is concerned, in the mountainous districts of the south-west and

1. *Royal Geographical Society*, 1907.

| | | | | | Cornwall W. | Cornwall E. | Devon S. | Devon N. | Somerset S. | Somerset N. | Wills N. | Wills S. | Dorset. |
|--|-----|-----|---|---|-------------|-------------|----------|----------|-------------|-------------|----------|----------|---------|
| Testacella maugeri | ... | ... | x | - | - | x | X | X | / | x | x | | |
| T. haliotidea | ... | ... | - | - | x | / | / | / | - | x | / | | |
| T. scutulium | ... | ... | - | - | - | - | - | X | - | - | x | | |
| Limax maximus | ... | ... | x | x | x | x | X | / | x | x | x | | |
| L. flavus | ... | ... | x | x | - | / | X | X | / | / | / | | |
| L. arborum | ... | ... | x | x | - | - | X | / | x | x | x | | |
| Agriolimax agrestis | ... | ... | x | x | x | x | X | X | x | x | x | | |
| A. lævis | ... | ... | x | x | x | x | / | / | x | / | x | | |
| Milax sowerbyi | ... | ... | x | x | x | x | X | X | - | x | x | | |
| M. gagates | ... | ... | x | x | x | x | X | / | x | - | x | | |
| Vitrina pellucida | ... | ... | x | x | x | x | X | X | / | x | x | | |
| Vitrea crystallina | ... | ... | - | x | x | x | X | X | x | x | x | | |
| V. lucida (= <i>Draparnaldi</i>) | ... | ... | x | x | x | x | X | X | - | - | x | | |
| V. cellaria | ... | ... | x | x | x | x | X | X | x | x | x | | |
| V. rogersi (= <i>helvetica</i>) | ... | ... | x | x | x | - | X | X | / | / | x | | |
| V. alliaria | ... | ... | x | x | x | x | X | X | / | x | / | | |
| V. nitidula | ... | ... | x | x | x | x | X | X | x | x | x | | |
| V. pura | ... | ... | x | x | x | x | X | X | x | x | / | | |
| V. radiatula | ... | ... | - | - | - | x | X | X | x | x | x | | |
| Zonitoides nitidus | ... | ... | x | x | x | x | X | X | - | / | / | | |
| Z. excavatus | ... | ... | x | - | x | x | X | X | - | - | x | | |
| Euconulus fulvus | ... | ... | - | x | x | x | X | X | x | x | / | | |
| Arion ater | ... | ... | x | x | x | x | X | X | x | x | x | | |
| A. subfuscus | ... | ... | x | x | x | x | X | / | / | / | x | | |
| A. intermedius (= <i>minimus</i>) | ... | ... | - | x | x | x | / | / | - | x | - | | |
| A. hortensis | ... | ... | x | x | x | x | X | X | x | x | x | | |
| A. fasciatus (= <i>circumscriptus</i>) | ... | ... | x | x | x | x | X | / | x | x | x | | |
| Punctum pygmaeum | ... | ... | x | x | x | x | X | / | x | / | / | | |
| Sphyradium edentulum (= <i>Vertigo edentula</i>) | ... | ... | - | - | - | x | X | / | / | x | x | | |

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| Pyramidula rupestris | ... | ... | ... | x | x | x | - | X | X | x | x | x | x | x |
| P. rotundata | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | x |
| Helicella virgata | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | x |
| H. itala (=ericetorum) | ... | ... | .. | x | - | - | - | X | X | x | x | x | x | x |
| H. caperata | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | x |
| H. barbara (=acuta) | ... | ... | ... | x | x | x | x | - | X | - | - | - | x | |
| H. cantiana | ... | ... | ... | - | - | x | - | X | X | / | / | / | x | |
| Hygromia fusca | ... | ... | ... | - | x | x | x | X | X | - | / | / | | |
| H. granulata | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | x |
| H. hispida | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | x |
| H. revelata | ... | ... | ... | x | x | x | x | - | - | - | - | - | - | - |
| H. montivaga | ... | ... | ... | x | - | - | - | - | - | - | - | - | - | - |
| H. rufescens | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | x |
| Acanthinula aculeata | ... | ... | ... | - | x | - | x | X | / | x | x | x | x | x |
| Vallonia pulchella (aggregate) | ... | ... | ... | x | x | x | - | X | X | x | x | x | x | x |
| V. costata | ... | ... | ... | - | - | x | x | X | X | x | / | x | x | |
| V. excentrica | ... | ... | ... | - | - | x | x | X | X | - | x | x | x | |
| Helicigona lapicida | ... | ... | ... | - | - | x | x | X | X | / | x | x | x | |
| H. arbustorum | ... | ... | ... | - | x | x | x | X | X | x | x | x | x | |
| Helix aspersa | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| H. pomatia | ... | ... | ... | - | - | x | - | - | - | / | / | - | - | |
| H. nemoralis | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| H. hortensis | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| H. pisana | ... | ... | ... | x | - | - | / | - | - | - | - | / | - | |
| Ena montana | ... | ... | ... | - | - | x | - | - | X | / | / | / | - | |
| E. obscura | ... | ... | ... | x | - | x | x | X | X | x | x | x | x | |
| Cochlicopa lubrica | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| Azeca tridens | ... | ... | ... | x | - | - | - | - | X | - | x | / | - | |
| Cæcilioides acicula | ... | ... | ... | - | - | - | - | X | X | x | x | x | x | |

| | | | | | | Cornwall W. | Cornwall E. | Devon S. | Devon N. | Somerset S. | Somerset N. | Wills N. | Wills S. | Dorset. |
|--|-----|-----|-----|---|---|-------------|-------------|----------|----------|-------------|-------------|----------|----------|---------|
| <i>Jaminia secale</i> | ... | ... | ... | - | - | x | - | - | - | X | / | / | x | |
| <i>J. anglica</i> (= <i>Pupa ringens</i>) | ... | ... | ... | - | - | - | x | - | / | - | - | - | - | |
| <i>J. cylindracea</i> | ... | ... | ... | x | x | x | x | X | X | / | / | x | x | |
| <i>J. muscorum</i> | ... | ... | ... | x | - | x | x | X | X | / | x | x | x | |
| <i>Vertigo minutissima</i> | ... | ... | ... | - | - | - | - | - | X | - | - | - | x | |
| <i>V. antivertigo</i> | ... | ... | ... | - | - | x | x | - | X | - | x | x | x | |
| <i>V. substriata</i> | ... | ... | ... | - | - | - | x | - | - | / | - | - | - | |
| <i>V. pygmæa</i> | ... | ... | ... | - | x | x | x | X | X | x | - | - | x | |
| <i>V. moulinsiana</i> | ... | ... | ... | - | - | - | x | - | - | - | - | - | x | |
| <i>V. pusilla</i> | ... | ... | ... | - | - | x | x | - | / | - | - | - | / | |
| <i>V. augustior</i> | ... | ... | ... | - | - | - | - | - | / | / | - | - | - | |
| <i>Balea perversa</i> | ... | ... | ... | - | x | x | x | X | X | x | x | / | / | |
| <i>Clausilia laminata</i> | ... | ... | ... | x | - | x | x | / | X | x | x | x | x | |
| <i>C. biplicata</i> | ... | ... | ... | - | - | - | - | - | / | / | / | - | - | |
| <i>C. bidentata</i> | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| <i>C. rolphii</i> | ... | ... | ... | - | - | x | - | - | X | - | x | / | / | |
| <i>Succinea putris</i> | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| <i>S. elegans</i> | ... | ... | ... | x | x | x | x | X | X | x | / | x | x | |
| <i>S. oblonga</i> | ... | ... | ... | - | - | - | x | - | X | - | / | - | - | |
| <i>Carychium minimum</i> | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| <i>Phytia myosotis</i> | ... | ... | ... | - | - | x | x | - | / | - | - | - | - | |
| <i>Ovatella bidentata</i> | ... | ... | ... | - | - | x | x | - | / | - | - | - | / | |
| <i>Ancylus fluviatilis</i> | ... | ... | ... | x | x | x | x | X | X | / | / | x | x | |
| <i>Acroloxus lacustris</i> | ... | ... | ... | - | - | x | - | / | X | x | x | / | / | |
| <i>Limnæa auricularia</i> | ... | ... | ... | - | - | x | - | / | X | x | x | - | - | |
| <i>L. peregra</i> | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| <i>L. palustris</i> | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| <i>L. truncatula</i> | ... | ... | ... | x | x | x | x | X | X | x | x | x | x | |
| <i>L. stagnalis</i> | ... | ... | ... | - | - | - | - | X | X | x | x | x | x | |

| | Cornwall W. | Cornwall E. | Devon S. | Devon N. | Somerset S. | Somerset N. | Wilt's N. | Wilt's S. | Dorset. |
|--|-------------|-------------|----------|----------|-------------|-------------|-----------|-----------|---------|
| <i>Limnæa glabra</i> | x | x | - | - | - | X | x | x | x |
| <i>Amphipeplea glutinosa</i> | - | - | - | - | / | - | - | - | / |
| <i>Planorbis corneus</i> | - | - | - | - | / | X | x | x | - |
| <i>P. albus</i> | x | x | x | x | X | X | x | x | x |
| <i>P. glaber</i> | - | - | x | - | - | X | x | - | x |
| <i>P. crista</i> | x | x | x | - | X | X | / | / | x |
| <i>P. carinatus</i> | - | - | x | - | X | X | x | x | - |
| <i>P. umbilicatus</i> | - | - | x | - | X | X | x | x | x |
| <i>P. vortex</i> | - | x | x | - | X | X | x | x | x |
| <i>P. spirorbis</i> | x | x | x | x | X | X | x | x | - |
| <i>P. contortus</i> | - | - | x | - | X | X | x | x | x |
| <i>P. fontanus</i> | - | - | x | - | X | X | x | - | / |
| <i>Segmentina nitida</i> (= <i>P. lineatus</i>) | - | - | - | - | - | - | x | x | x |
| <i>Physa fontinalis</i> | - | - | x | - | X | X | x | x | x |
| <i>Aplecta hypnorum</i> | - | - | x | - | X | X | x | x | / |
| <i>Paludestrina jenkinsi</i> | - | - | x | x | - | - | - | - | - |
| <i>P. ventrosa</i> | - | - | - | - | - | / | - | - | / |
| <i>P. stagnalis</i> | - | x | x | - | - | / | - | - | - |
| <i>Bithynia tentaculata</i> | x | - | x | x | X | X | x | x | x |
| <i>B. leachii</i> | - | - | x | - | - | X | / | x | / |
| <i>Vivipara vivipara</i> | - | - | x | - | / | X | x | x | - |
| <i>V. connecta</i> | - | - | - | - | - | / | - | - | - |
| <i>Valvata piscinalis</i> | x | - | x | - | X | X | x | x | x |
| <i>V. cristata</i> | - | - | - | - | / | X | / | x | / |
| <i>Pomatias elegans</i> | x | - | x | x | X | X | x | x | x |
| <i>Acicula lineata</i> | - | - | - | - | X | X | / | / | x |
| <i>Neritina fluviatilis</i> | x | - | x | - | X | X | x | x | x |
| <i>Dreissensia polymorpha</i> | - | - | x | - | - | X | x | / | - |
| <i>Unio pictorum</i> | - | - | x | - | - | X | x | x | x |

| | | | | | | Cornwall W. | Cornwall E. | Devon S. | Devon N. | Somerset S. | Somerset N. | Wilt's N. | Wilt's S. | Dorset. |
|---------------------------|-----|-----|-----|---|---|-------------|-------------|----------|----------|-------------|-------------|-----------|-----------|---------|
| Unio tumidus | ... | ... | ... | - | - | - | - | - | - | / | X | x | - | x |
| Anodonta cygnæa | ... | ... | ... | - | x | x | x | x | / | X | / | x | x | |
| Sphærium rivicola | ... | ... | ... | - | - | - | - | - | - | X | x | x | x | |
| S. corneum | ... | ... | ... | - | - | x | x | X | X | X | x | x | x | |
| S. lacustre | ... | ... | ... | - | - | x | x | X | X | X | x | x | x | |
| S. pallidum | ... | ... | ... | - | - | - | - | / | / | - | - | - | - | |
| Pisidium amnicum | ... | ... | ... | - | - | x | - | - | X | / | x | x | | |
| P. henslowianum | ... | ... | ... | - | - | - | - | - | X | x | x | / | | |
| P. subtruncatum | ... | ... | ... | x | x | x | x | X | X | x | x | x | | |
| P. pulchellum | ... | .. | ... | - | - | x | - | - | X | / | / | x | | |
| P. pusillum | ... | ... | ... | x | x | x | x | X | X | x | x | x | | |
| P. nitidum | ... | .. | ... | - | - | x | - | X | X | / | - | x | | |
| P. obtusale | ... | ... | ... | - | - | - | - | X | X | - | / | - | | |
| P. gassiesianum (=roseum) | ... | | ... | - | x | x | - | X | X | x | - | x | | |

the west of Ireland, and the south-west of England and Wales. Dr. Scharff considering discontinuous distribution to be an index of antiquity, assigns our terrestrial mollusca to two provinces :

(1) England and Wales (except south-west).

(2) South-west England and Wales, and the whole of Scotland and Ireland.

The second province contains six species which are entirely absent from the first, viz.: *Testacella maugei* Férussac, *Geomalacus maculosus* Allman, *Helicella barbara* Linné, *Hygromia revelata* Férussac, *Helix pisana* Müller, and *Jaminia anglica* Férussac.

Three, viz.: *Testacella maugei*, *Helicella barbara* (= *Helix acuta*), and *Jaminia anglica* (= *Pupa ringens*) occur in Somer-

set, and it remains for some zealous conchologist to add a fourth, *Hygromia revelata*, which should be looked for on hills near the coast in the extreme west of the county.

With the single exception of *Geomalacus maculosus*, all the Lusitanian species occur in the Channel Islands.

The Census List published by the Conchological Society forms the basis of the list given above, which shews the comparative distribution of the land and freshwater mollusca of the five south-western counties of England. Records marked X have been verified by the Society's Recorder. Excepting Dorset, all the counties are divided into "vice-counties," the areas of which are defined as follows in the Census List.

Cornwall W. and E., divided by the high road from Truro through St. Columb to the inland extremity of Padstow Creek.

Devon N. and S., divided by the watershed line which commences at the Tamar, about midway between Tavistock and Launceston, passes over the ridge of Dartmoor, and joins the western canal at Tiverton.

Somerset N. and S., divided by the river Parret from Bridgwater to Ilchester, the line thence curving round to the north extremity of Dorsetshire.

Wilts N. and S., separated by the Kennett and Avon Canal.

I do not quite understand what is implied by the above definition of the dividing line of the vice-counties of Somerset, which is apparently based upon H. C. Watson's subdivision in *Cybele Britannica*, and prefer to divide north from south by the Parret to Langport, and its tributary the Yeo to Ilchester and Yeovil. The Parret does not pass through Ilchester.

One hundred and thirty non-marine species have been recorded from the five counties. Eight are not known to occur in Somerset, viz., *Hygromia revelata*, *Férussac*; *Hygromia montivaga*, *Westerlund*; *Helix pomatia*, *Linné*; *Helix pisana*, *Müller*; *Vertigo substriata*, *Jeffreys*; *Vertigo moulinsiana*,

Dupuy; *Segmentina nitida*, Müller (= *Planorbis lineatus*, Walker); and *Paludestrina jenkinsi*, Smith.

We may adopt, as a convenient basis for some comments on the ecology of Somerset mollusca, the headings under which Dr. Moss has arranged the systems of vegetation of the County.

I. LOWLAND AREA.

A. COAST REGION.

- (1). MUDDY SALT MARSH FORMATION.
- (2). DUNE FORMATION.

B. THE LEVELS.

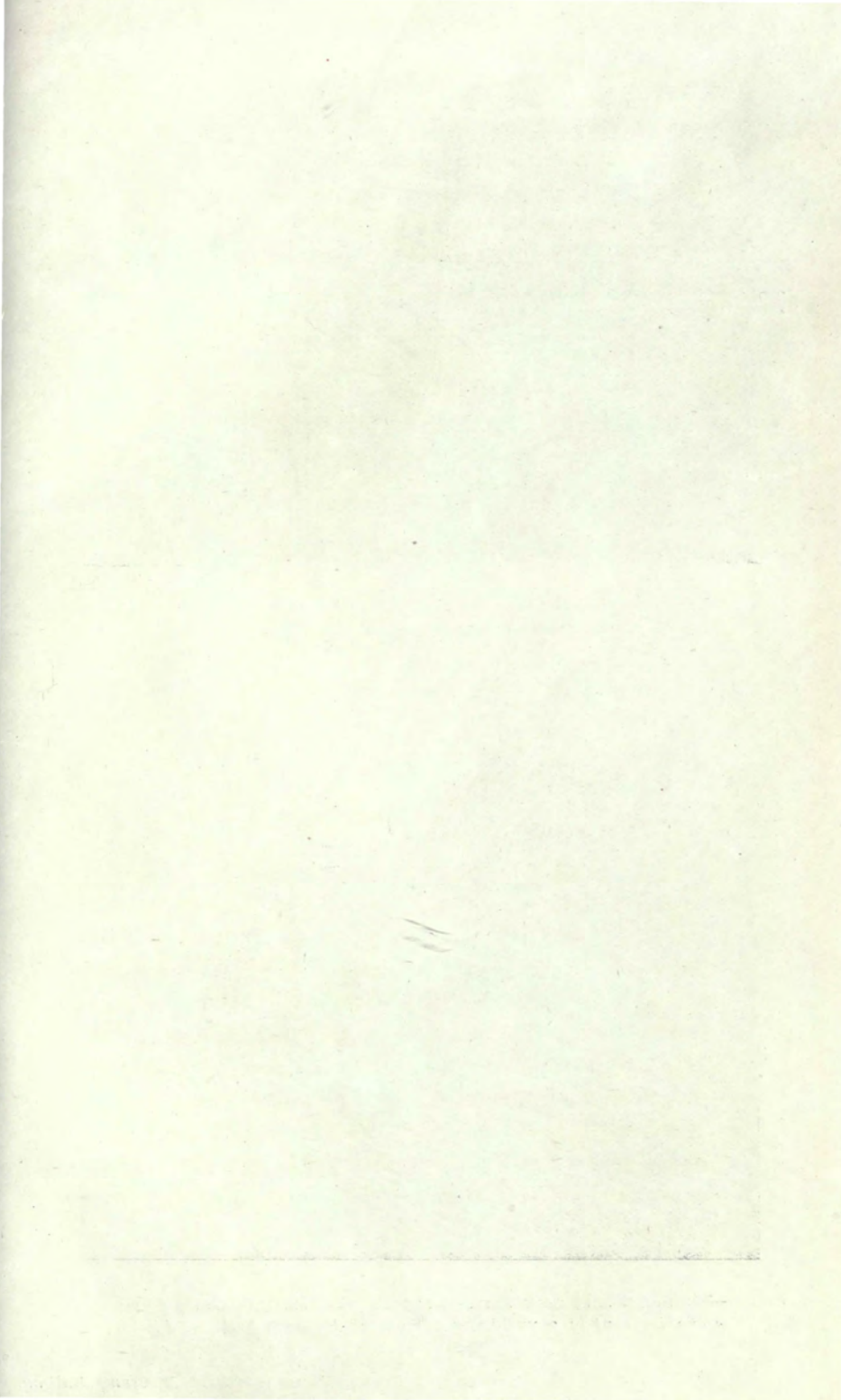
- (1). AQUATIC FORMATION.
- (2). PEAT-MOOR FORMATION.

II. UPLAND AREA.

- A. THE DEEP MARLS AND CLAYS.
- B. THE LIMESTONES.
- C. THE SANDSTONES.

I. LOWLAND AREA.

Characterised by extensive recent deposits. Mud flats, sand hills, alluvium and peat bogs. Dr. Moss observes that "the area represents a gain of *terra firma*, from the sea chiefly, by various means of reclamation, and the retention of the land is still a matter of difficulty and expense. The area is indeed a great monument to the patience, skill and industry of the Somersetshire people. The land was primitively treeless. Not a single example of natural woodland occurs, and even plantations are uncommon." The ancient shore may be traced here and there many miles inland, the sub-fossil shells occurring in it and in the raised beaches, etc., of this area have been noted above.



TIDAL
débris.

Salsola
Kali, L.



FIXED
DUNES.

EMBRYONIC
DUNE.

FIG. 1.—The coast between Berrow and Burnham. *Helix aspersa*, Müller, and *H. nemoralis*, L. are abundant on the embryonic dune.



FIG. 2.—Shifting Dunes near Berrow, capped with Marram Grass (*Ammophila arenaria*, Link); a well-known haunt of *Helicella barbara*, Linné.

A. COAST REGION.

(1). MUDDY SALT MARSH FORMATION.

Muddy salt-marshes occur at the mouths of the rivers. The extreme conditions of life on the seaward side explain the paucity of their molluscan fauna. *Littorina rudis*, *Maton*, and *Paludestrina stagnalis*, *Baster* (= *Hydrobia ulvæ*, *Pennant*) occur in large numbers associated with halophytic plants such as *Salicornia europæa*, *Linné*; *Glyceria maritima*, *Mert* and *Koch*, and *Triglochin maritimum*, *Linné*. On the landward side conditions are less unfavourable, the mud is seldom tide-washed, and the water is usually fresh. In the marshes and rhines, which are brackish during very high tides, *Limnæa truncatula*, *Müller*, occurs in great numbers, its frequency is very noticeable during dry summers, when the water in the rhines is low. The strong rush of water up the river mouths frequently carries *Macoma balthica*, *Linné*; *Littorina obtusata*, *Linné*; *Littorina rudis*, *Maton*, and others, considerable distances inland.

Phytomyosotis, *Draparnaud*, and *Ovatella bidentata*, *Montagu*, are frequent under stones just above high water mark at the mouths of all the tidal rivers.

(2). DUNE FORMATION.

The sand dunes are frequented by an interesting association of a few species, the individuals of which often occur in enormous numbers. Amongst the strand plants of the foreshore (*Atriplex hastata*, *Linné*; *Salsola Kali*, *Linné*, and other representatives of the Chenopodiaceæ) dead shells of *H. aspersa*, *Müller*, and *H. virgata*, *da Costa*, chiefly occur. Behind the foreshore there is an association of plants (see Plate I, fig. 1) with sea-couch grass (*Agropyron junceum*, *Beauv.*) the dominant one, and the sand sedge (*Carex arenaria*, *Linné*) the sub-dominant. Amongst these we find

Helix aspersa, Müller (dominant), associated with

Helicella virgata, da Costa.

Helicella caperata, Montagu.

Helix nemoralis, Linné.

H. aspersa is usually very abundant, such broad-leaved plants as *Rumex crispus*, Linné, and *Cynoglossum officinale*, Linné, affording a welcome retreat during periods of drought. The homing instinct of this species may be well seen on a hot morning following a wet night, when many isolated plants are surrounded at distances varying from a foot to a yard by belated individuals who failed to gain the shade and protective screen reached by their more punctual brethren.

Behind the Sea-couch Grass association we have the high dunes capped with Marram Grass (*Ammophila arenaria*, Link). (Plate 1, fig. 2). The side of the dune which faces the sea is always steep, but the slope never exceeds 30°, and the sand is continually blowing over it to the lesser slope on the leeward or landward side.

On very windy days countless dead shells of *Paludestrina stagnalis*, Baster; *Helicella barbara*, Linné; *Helicella virgata*, da Costa, and *Jaminia muscorum*, Linné, are often blown into little heaps up the dune face, rolling back again between the gusts. *Helicella itala*, Linné, and *H. caperata*, Montagu, also occur with them but in lesser numbers. At the base of the dunes bleached shells of *Helix aspersa*, Müller, lie in hundreds.

Amongst the Marram Grass and on the leeward slope of the dunes we find the following association :

Helicella barbara, Linné (*Helix acuta*, Müller), dominant.

Jaminia muscorum, Linné (= *Pupa marginata*, Draparnaud),
sub-dominant.

Helicella virgata, da Costa.

Helicella itala, Linné (= *H. ericetorum*, Müller).

Helicella caperata, Montagu.

Helix aspersa, Müller.

Helicella barbara is partial to the roots of the Marram Grass, coming forth in surprising numbers in rainy weather. *Jaminia muscorum* frequents the roots of the grasses *Festuca rubra*, L., var. *arenaria*, Fries; *Festuca membranacea*, Druce; *Agropyron junceum*, Beauv.; and *H. aspersa* shews a partiality for *Euphorbia paralias*, Linné, and the less widely distributed *Iris foetidissima*, Linné.

At the base of the dune slopes the following association occurs :

- Jaminia muscorum*, Linné (dominant).
- Agriolimax agrestis*, Linné.
- Vitriina pellucida*, Müller (amongst moss).
- Helicella caperata*, Montagu.
- Hygromia rufescens*, Pennant.
- Helix aspersa*, Müller.

The chief plants with which these are associated are *Carex arenaria*, Linné; *Festuca rubra*, var. *arenaria*, Fries; *Ononis repens*, Linné, var. *horrida*, Lange; *Lotus corniculatus*, Linné; and *Thymus serpyllum*, Linné; with the last named *Helix caperata* is chiefly associated.

B. THE LEVELS.

The flat plain of the Levels consists of tidal, lacustrine, and river deposits, protected from inundation at abnormally high tides by the dunes, the sea-walls, and the sluices at the mouths of the tidal rivers. Inundations occasionally occur. The whole district is under pastoral cultivation, and the fields are separated by shallow ditches, or rhines.

(1). AQUATIC FORMATION.

Amongst the vegetation of the marshy land, on the margins of the rhines, we find the following molluscan association :

- Agriolimax agrestis*, Linné.
- Vitrea crystallina*, Müller.

- Vitrea alliaria*, Miller.
Zonitoides nitidus, Müller (local).
Arion subfuscus, Draparnaud.
Arion hortensis, Férussac.
Arion fasciatus, Nilsson.
Pyramidula rotundata, Müller (common).
Hygromia hispida, Linné (common).
Hygromia rufescens, Pennant (dominant).
Cochlicopa lubrica, Müller.
Carychium minimum, Müller.

H. hispida occurs in great numbers wherever nettles fringe the rhine, it bears submergence well, and may be not infrequently found crawling on the stems of aquatic plants. *Agriolimax agrestis* is apparently the only species in this association which is unable to survive prolonged submergence. I noticed, in several localities which had been recently flooded, this species lying dead, obviously drowned, in some numbers near the margins of the rhines.

The edges of the rhines are fringed with aquatic plants, characterised by their upright leaves, e.g., *Phragmites communis*, Trin.; *Iris pseudacorus*, Linné; *Typha latifolia*, Linné; and *Spartanium erectum*, Linn. Crawling on their stems and leaves, often in large numbers, are:

- Succinea elegans*, Risso (dominant).
Succinea putris, Linné.
Limnæa peregra, Müller.
Limnæa truncatula, Müller.

The dredge-net obtains from amongst the submerged stems of these plants the following:

- Limnæa palustris*, Müller.
Planorbis umbilicatus, Müller (= *P. complanatus*, Jeffreys).
Planorbis vortex, Linné.
Planorbis fontanus, Lightfoot (= *P. nitidus*, Müller, of Jeffreys).
Physa fontinalis, Linné.
Valvata cristata, Müller.

Sphærium corneum, Linné.

Pisidium pusillum, Gmelin (= *P. fontinale*, Draparnaud).

Beyond the Upright-leaf association or Reed belt we frequently find the surface of the rhine covered with plants characterised by their floating leaves, amongst the dominant species we may mention *Hydrocharis morsus-ranæ*, Linné; *Lemna minor*, Linné (other species of *Lemna* occur, *L. trisulca*, Linné, abundantly in some parts), *Glyceria fluitans*, Br., and *Ranunculus heterophyllus*, Weber. Dr. Moss observes that the Upright-leaf and the Floating-leaf associations are kept in their respective positions by the ditching operations of the farmers, "but for this work, the upright-leaf forms would eventually occupy the whole rhine, which would become filled with humus and silt. This process can be seen taking place in the disused brick-ponds which are not cleaned by the ditchers."

In rhines partially silted up we find *Sphærium corneum* and *Pisidium pusillum* in the mud, the last mollusc to retain its hold under the gradual change of conditions is *Limnæa truncatula*. The molluscs to be found in connection with the Floating-leaf association are :

Limnæa peregra, Müller.

Limnæa palustris, Müller.

Limnæa stagnalis, Linné.

Planorbis corneus, Linné (local).

Planorbis umbilicatus Müller (dominant).

Planorbis vortex, Linné.

Planorbis spirorbis, Linné.

Planorbis contortus, Linné.

Physa fontinalis, Linné.

Bithynia tentaculata, Linné.

Sphærium corneum, Linné.

Limnæa palustris and *Limnæa stagnalis* are typical shallow-water species. The *Lemna* often forms such a dense carpet of vegetation on the rhine surface, that a piece a yard square

may be dragged out by the scoop. The smaller species of *Planorbis*, *Physa fontinalis*, and the young of *Limnæa peregra* creep on the lower (submerged) surface in great numbers.

In rhines containing but little weed and much "green scum" I found *Bithynia tentaculata* in great plenty associated with *L. palustris*, *L. stagnalis*, *P. nitidus*, and *V. piscinalis*. From a rhine covered only with a single species of *Ranunculus*, apparently typical *R. heterophyllus*, Weber, I dredged *Limnæa peregra* and *Bithynia tentaculata*, neither in great numbers.

In the largest rhines and in the canals the greater width of the channel lessens the competition between the plants, and the open centre permits sufficient light to enter the water to allow of the growth of submerged leaf plants such as *Ranunculus circinatus*, Sibth; *Hippuris vulgaris*, Linné; various species of *Potamogeton* and *Chara*, *Utricularia vulgaris*, Linné; *Hottonia palustris*, Linné; and *Myriophyllum verticillatum*, Linné. Here we find the following association:

- Limnæa peregra*, Müller.
- Valvata piscinalis*, Müller.
- Anodonta cygnæa*, Linné (local).
- Sphærium rivicola*, Leach (rare).
- Sphærium lacustre*, Müller.
- Pisidium amnicum*, Müller.

(2). PEAT-MOOR FORMATION.

The molluscan fauna of the rhines of the peat-moors much resembles that of other parts of the Levels. *Succinea elegans* is the dominant species in the reed belt, and often occurs in multitudes on the stone walls of the bridges crossing the lesser rhines. Two or three large slabs of Lias stone lying flat on the walls form the bridge proper; swallows not infrequently build their nests on the walls just below the slabs.

Molluscs are certainly less abundant (as may indeed be noted throughout the Levels), both in species and numbers, in rhines containing no duckweed. Wherever *Lemna* occurs

there *Planorbis* abounds, in company with *Linnæa stagnalis*, *Limæa palustris*, and *Bithynia tentaculata*, an association everywhere indicative of shallow water. I find no *Pisidium* in rhines overshadowed by oaks, as near Shapwick station. Oaks are uncommon on these moors, which differ from the rest of the levels in having plantations here and there of birch, alder, Scots pine, spruce and larch. In the plantations near Shapwick station I noted the following association :

- Agriolimax agrestis, *Linné.*
- Vitrina pellucida, *Müller.*
- Vitrea crystallina, *Müller.*
- Vitrea alliaria, *Müller.*
- Zonitoides nitidus, *Müller.*
- Arion ater, *Linné.*
- Arion subfuscus, *Draparnaud.*
- Pyramidula rotundata, *Müller.*
- Hygromia hispida, *Linné.*
- Hygromia rufescens, *Pennant.*
- Vallonia excentrica, *Sterki.*
- Helix nemoralis, *Linné.*
- Cochlicopa lubrica, *Müller.*
- Carychium minimum, *Müller.*

Arion ater was a very dark form. The heathland on these moors yielded *Arion subfuscus*, *Hyalinia alliaria*, and *Pyramidulata rotundata*. The peat-moors must be a very dreary region in winter time. The moors in some parts are often under water in flood time, the inhabitants then get about in curious flat-bottomed boats or punts, and are sometimes compelled to enter their homes through the upper windows!

The monotony of the coast-line of the Levels is relieved in the neighbourhood of Weston-super-Mare by rocky headlands of Carboniferous Limestone. On the most imposing of these, viz. Brean Down, I found the following molluscs :

- Agriolimax agrestis, *Linné.*
- Vitrea crystallina, *Müller.*

- Vitrea cellaria*, Müller.
Vitrea nitidula, Draparnaud.
 **Punctum pygmæum*, Draparnaud.
Pyramidula rupestris, Draparnaud.
Pyramidula rotundata, Müller.
 **Helicella virgata*, da Costa.
 **Helicella caperata*, Montagu.
Helicella barbara, Linné.
Hygromia hispida, Linné.
 **Hygromia rufescens*, Pennant
 **Vallonia pulchella*, Müller.
Vallonia excentrica, Sterki.
Helicigona lapicida, Linné.
 **Helix aspersa*, Müller.
 **Helix nemoralis*, Linné.
Ena obscura, Müller.
 **Jaminia cylindracea*, da Costa.
 **Jaminia muscorum*, Linné.
Clausilia bidentata, Ström.

The comparison of the molluscan fauna of Brean Down with that of the islets known as the Steep Holm and the Flat Holm is of interest, because the islets are of the same geological formation (Carboniferous Limestone), and were at one time connected with the peninsula of Brean Down, which may also be termed an island of limestone. The species marked with an asterisk in the above list have been noted by Mr. Francis Knight as occurring on the Holms, with "*Hyalinia* several species," (presumably the three species of *Vitrea* given above), also *Pupa secale*, Draparnaud; *Clausilia laminata*, Montagu; and *Pomatias elegans*, Müller; a trio I failed to note on Brean Down, but which doubtless occur there. The holocene deposit on Brean Down has been already alluded to (p. xvi).

II. THE UPLAND AREA.

The region of deep marls and clays, limestones and sand-

stones. The recent deposits are very scanty, consisting chiefly of alluvium on the margins of rivers and streams. The soils of this area do not shew such a marked diversity of vegetation as one might expect. They differ, however, in one particular, a very important one in connection with this paper, in the presence of large woods of oak, ash, and oak-hazel. Ash woods occur chiefly on the limestones, oak on the sandstones, and oak-hazel on the deep marls and clays. There are no such woods on the Levels, only plantations of recent origin.

A. THE DEEP MARLS AND CLAYS.

The deep marls and clays consist of large tracts of New Red (Keuper) Marl at the foot of the Carboniferous Limestone hills, about Taunton and Wellington, and the uplands bordering the Bridgwater Levels; of Lias, the northern slopes of the Polden Hills are Lower Lias, the Middle and Upper Lias occupy the country about Ditchat, West Pennard, Butleigh, and Street. The Bradford Clay, Fuller's Earth, and Oxford Clay are exposed in the eastern uplands.

There are extensive oak-hazel woods in the Butleigh and Copleigh districts. On the margins of these woods we find in association with *Primula vulgaris*, Huds; *Spiræa ulmaria*, Linné; *Ranunculus ficaria*, Linné, and other hedgerow plants:

Hygromia rufescens, Pennant (dominant).

Agriolimax agrestis, Linné.

Arion ater, Férussac.

Vitrea nitidula, Draparnaud.

Helix nemoralis, Linné.

Cochlicopa lubrica, Müller.

In the deeper parts of the woods we find, under sticks amongst such plants as *Mercurialis perennis*, Linné; *Nepeta hederacea*, Trev.; and *Euphorbia amygdaloides*, Linné:

Limax maximus, Linné, associated with

Vitrina pellucida, Müller.

Euconulus fulvus, Müller.

Agriolimax agrestis, Linné.

Sphyradium edentulum, Draparnaud (= *Vertigo edentula*).

Pyramidula rotundata, Müller.

Clausilia bidentata, Ström.

Carychium minimum, Müller.

The characteristic species in the apple orchards is *Balea perversa*, Linné, which occurs on the moss-clad trunks of old trees, often in company with *Clausilia bidentata*, Ström.

The open hedgerows contain the following association :

Hygromia rufescens, Pennant (dominant).

Agriolimax agrestis, Linné.

Arion ater, Linné.

Arion hortensis, Férussac.

Helicigona arbustorum (uncommon).

Helix aspersa, Müller.

Helix hortensis, Müller.

All the members of this association shew a marked predilection for dead hawthorn leaves, and dead vegetation of any kind. *H. arbustorum* is of restricted range, occurring only in damp spots, and often in association with ivy (*Hedera helix*, Linné).

In damp meadows on heavy clay we find the following association :

Agriolimax agrestis, Linné (dominant).

Arion ater, Linné.

Arion hortensis, Férussac.

Arion fasciatus, Nilsson.

Vallonia excentrica, Sterki (rarely).

Vertigo pygmæa, Draparnaud (rarely).

Agr. agrestis often occurs in extraordinary abundance, and with the three *Arion* may be noted during hay harvest beneath grass which has been cut for three or four days.

B. THE LIMESTONES.

The limestones consist chiefly of large tracts of Carboniferous Limestone on the Mendips (the slopes of which are generally flanked by Dolomitic Conglomerate), and the outcrops of Bath Oolite, Coral Rag, Inferior Oolite, Fuller's Earth Rock, Forest Marble, and Cornbrash in the east of the county, well shown about Bath and Wincanton. Woods and natural copses of ash are very abundant on the slopes of the hills. "The ultimate or stable plant association on all the limestones of Somerset appears to be an ash wood" (Moss). With the ash are associated oak, beech, and horse chestnut, in many woods there is a dense undergrowth of hazel, and oak, beech, and alder border the streams. The characteristic ground vegetation of these woods is large patches of Dog's Mercury (*Mercurialis perennis*, L.) and Wood Garlic (*Allium ursinum*, Linné). Comparative lists of the ground plants of Somerset woodlands may be consulted in Dr. Moss's paper.

In the upper woods we have :

Clausilia bidentata, Ström. (dominant) : associated with

Limax arborum, Bouchard-Chantereaux.

Vitrina pellucida, Müller.

Vitrea cellaria, Müller.

Vitrea alliaria, Miller.

Vitrea pura, Alder.

Pyramidula rotundata, Müller.

Helix fusca, Montagu (rare).

Helix nemoralis, Linné.

Jaminia cylindracea, da Costa.

Cochlicopa lubrica, Müller.

In the lower woods (moist) we have :

Clausilia bidentata, Ström.

Vitrina pellucida, Müller.

Vitrea cellaria, Müller.

Vitrea alliaria, Miller.

- Euconulus fulvus*, Müller.
Pyramidula rotundata, Müller.
Helix granulata, Alder (rare).
Helicigona arbustorum Linné (local).
Carychium minimum, Müller.

The characteristic association of hazel and ash copses and hedges is the following :

- Pomatia elegans*, Müller (dominant) : with
Vitrina pellucida, Müller.
Vitrea cellaria, Müller.
Vitrea nitidula, Draparnaud.
Hygromia rufescens, Pennant.
Helix hortensis, Müller.
Ena obscura, Müller.

Pomatias elegans (= *Cyclostoma elegans*), our only operculate land snail, abhors damp situations, and is almost invariably found beneath hazel on dry calcareous soils.

In the ash copses of spontaneous growth on the dry slopes of the limestone hills we find :

- Ena montana*, Draparnaud ; associated with
Helix nemoralis, Linné (dominant).
Pyramidula rupestris, Draparnaud.
Hygromia rufescens, Pennant.
Helix aspersa, Müller.
Jaminia secale, Draparnaud.
Jaminia cylindracea, da Costa.
Clausilia laminata, Montagu.
Clausilia bidentata, Ström.
Clausilia rolphii, Leach.

Ena montana is the characteristic species of the limestone hills of the south of England. It does not occur in the north. A reference to the Somerset records shews that it is by no means a common species in the county. *Jaminia secale* is another species with a restricted British range, being chiefly

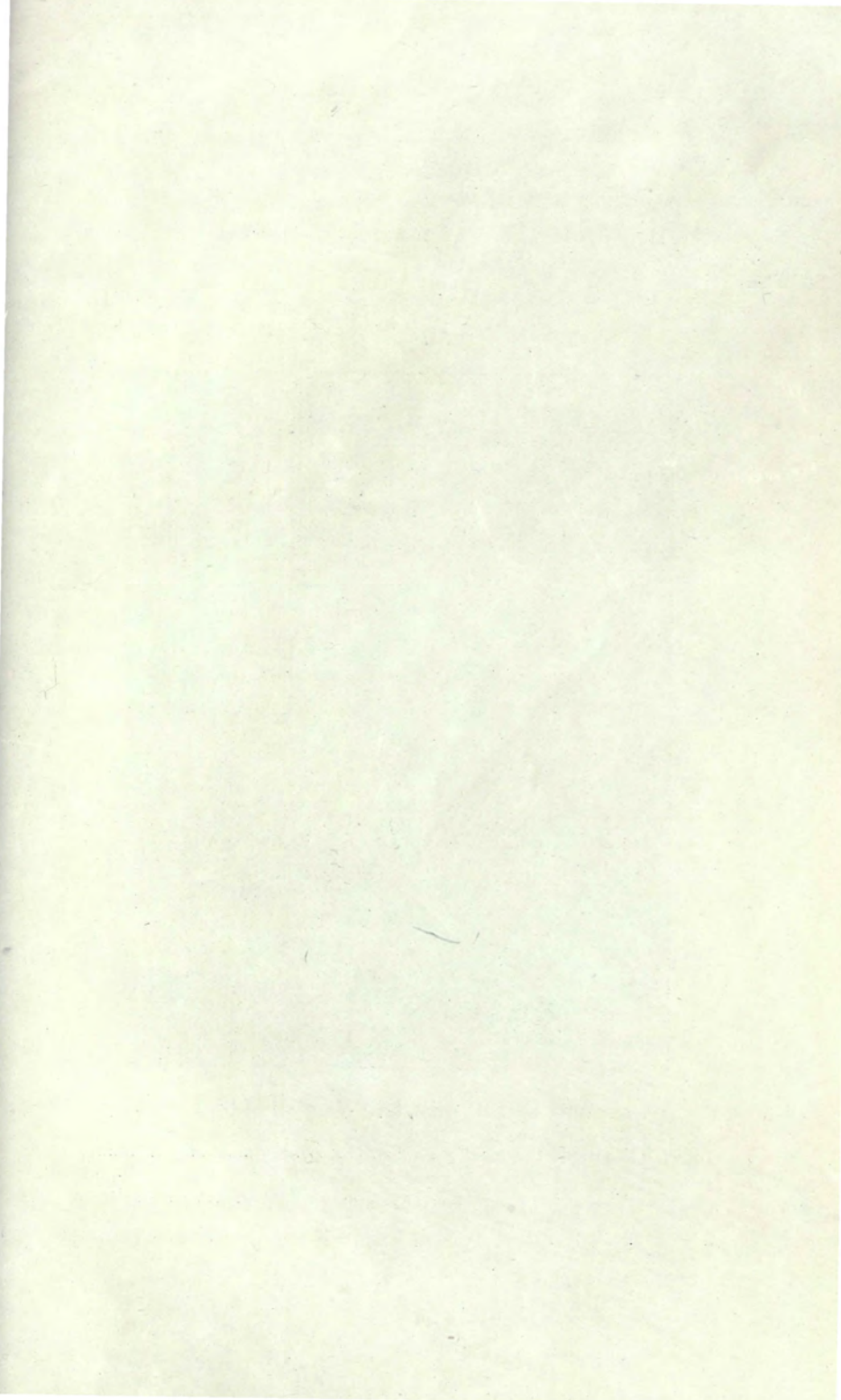
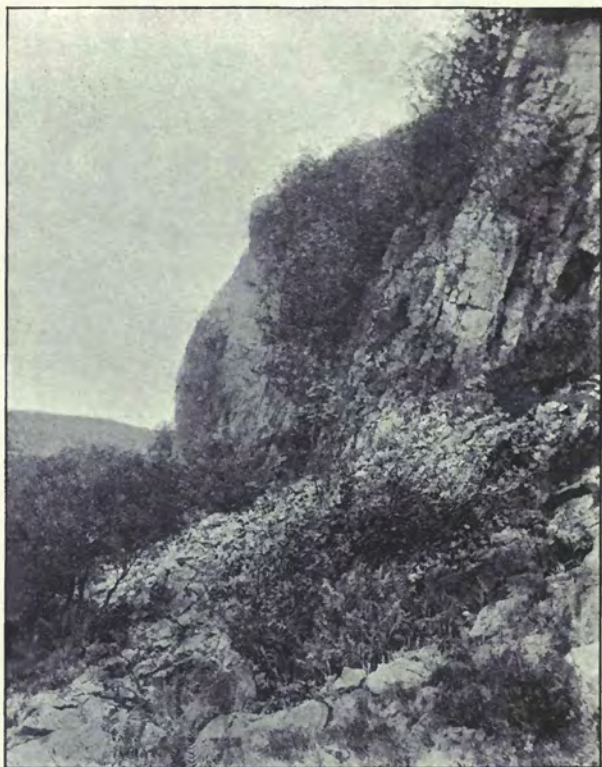


PLATE II.



ASH COPSE AND LIMESTONE CLIFF.

In such situations the local *Ena montana*, *Draparnaud* may be found.

From a photograph by Mr. W. B. Crump, Halifax.

confined to the limestones of the west. Plate II shews a typical haunt of *E. montana* and associated species. *Clausilia rolfhii* (a very rare species) is associated with it on Creech Hill near Milton Clevedon. I have noted the same association in the ash-hazel copses of Sussex. *H. nemoralis* is usually associated with the common gorse (*Ulex europæa*, Linné), and is fond of climbing the ash saplings; very rarely we find *H. hortensis* with it in the woods, but they are frequently found together in hedge-banks.

Before passing on to the consideration of the mollusca of the cultivated areas on the limestone, we may note an association which occurs on the natural pastures and heath pastures of the uncultivated grass-lands. On these the soil is usually very shallow, ant-heaps ("emmet's butts" in the present day vernacular, *A.S. Emetes'-byht*) abound. Dr. Moss observes there is frequent and rapid transition of the two types, and that "even on the natural pasture heather and heath plants are frequently found on old ant heaps Possibly the formic acid of the ants is inhibitive to the growth of the limestone plants: and thus the heath plants, to whom a sour soil is by no means fatal, are enabled to survive."

On the natural pasture we find:

Agriolimax agrestis, Linné.

Vitrea nitidula, Draparnaud.

Pyramidula rotundata, Müller.

Helix nemoralis, Linné.

Helicella virgata, da Costa.

Helicella caperata, Montagu.

Jaminia cylindracea, da Costa.

None in great abundance, and *H. nemoralis* usually with Gorse (*Ulex europæa*). The association appears to be intermediate between that of the upper woods and the open cultivated pastures. On the heath pasture we have

Pyramidula rotundata, Müller (dominant): associated with

Limax arborum, Bouchard-Chantereaux.

Agriolimax agrestis, Linné.

Vitrea alliaria, Miller.

Walls. Hedgerows are often replaced by walls on the Carboniferous Limestone. On these we find

Pyramidula rupestris, *Draparnaud* (dominant): associated with *Helicigona lapicida*, Linné.

Hygromia hispida, Linné.

Hygromia rufescens, *Pennant*.

Helicella caperata, *Montagu*.

Jaminia cylindracea, *da Costa*.

The usual association on old walls in the vicinity of towns, villages, and isolated farms on the Oolite is:

Helicigona lapicida, Linné (dominant): with

Helicella caperata, *Montagu*.

Hygromia hispida, Linné.

Hygromia rufescens, *Pennant*.

Helix aspersa, Müller.

Vallonia pulchella, Müller.

Vallonia costata, Müller.

Jaminia cylindracea, *da Costa*.

The two species of *Vallonia*, with *J. cylindracea*, haunt the edges of the flat slabs which frequently cap the walls. *J. cylindracea* sometimes occurs in almost incredible numbers amongst the roots of *Festuca rigida*, *Knuth*, *Festuca ovina*, Linné, *Poa pratensis*, Linné, and other wall-loving grasses. Wherever the Red Valerian (*Kentranthus ruber*, *D.C.*) occurs, we find *H. aspersa* in large numbers. *H. rufescens* and *H. hispida* appear to be more particularly associated with ivy.

In permanent pastures we find the following association:

Agriolimax agrestis, Linné.

Vitrea nitidula, *Draparnaud*.

Vitrea cellaria, Müller.

Helicella virgata, *da Costa*.

Helicella itala, Linné.

Helicella caperata, *Montagu*.

Hygromia rufescens, *Pennant*.

Hygromia hispida, *Linné*.

Cochlicopa lubrica, *Müller*.

H. virgata, *H. itala*, and *H. caperata* are the dominant species on dry upland calcareous pastures. Forms with well developed dark bands predominate. It is supposed that this type of banding is protective, serving to make the shell easily visible to sheep. Indistinctly marked and light unicolorous forms are not so easily seen, and are often eaten.

Cæcilioides acicula, *Müller*, a truly subterranean species, respecting the habits of which little is known, is abundant in some districts on the Oolite, judging from the numerous shells washed from the soil during heavy storms. I have never found it alive. It is probably gregarious; after floods I have seen in quarries about Wincanton, the high-water mark indicated on the side of the quarry by a narrow white zone of thousands of dead shells. Its occurrence in burial places has been noted in many parts of Britain, including Somerset (p. xvi).

C. THE SANDSTONES.

The sandstone areas of Somerset occupy much of the highest land in the county, and comprise, geologically, the Devonian with Old Red Sandstone, Coal Measures, Upper Greensand, and Chalk. The Devonian tracts of Exmoor culminate in Dunkery Beacon, 1,707ft., the highest point in the county. The Old Red Sandstone is exposed on the top of Mendip, highest point Blackdown, 1,008ft., and in certain other localities in the north-west, where the Carboniferous rocks have been worn away. The Upper Greensand occurs in the eastern part of the county, bordering on Stourton and Kilmington (Wilts), the highest point is King Alfred's Tower, 850ft. There are small chalk areas in the neighbourhood of Crewkerne. Dr. Moss is of opinion "that the differences between the vege-

tation of the sandstones and that of the limestones depend more upon the presence or absence of humus than upon their siliceous or calcareous nature."

There are large oak woods in the neighbourhood of Pen Selwood, some of these are of ancient character, and are possibly vestiges of the ancient forest of Selwood which originally covered about 20,000 acres. In these we find :

Clausilia bidentata, Ström. (dominant) : associated with
Limax maximus, Linné.

Limax arborum, Bouchard-Chantereaux.

Vitrea alliaria, Miller.

Arion ater, Linné.

Pyramidula rotundata, Müller.

Hygromia rufescens, Pennant.

Jaminia cylindracea, da Costa.

Cochlicopa lubrica, Müller.

The above association is characteristic of all the oak woods on the upper sandstones: in some of the low-lying woods *Vitrea crystallina*, Müller; *Euconulus fulvus*, Müller; *Vertigo pygmæa*, Draparnaud; and *Carychium minimum*, Müller, also occur, with *Agriolimax agrestis* and *Agriolimax lævis*.

In mixed woods with conifers, on the lower slopes between Dunkery Beacon and the village of Luccombe, I noted the following association :

Limax arborum, Bouchard-Chantereaux.

Agriolimax agrestis, Linné.

Agriolimax lævis, Müller.

Arion intermedius, Norman.

Arion hortensis, Férussac.

Pyramidula rotundata, Müller.

Helix aspersa, Müller.

Helix hortensis, Müller.

Clausilia bidentata, Ström.

Concerning the beech woods on the sandstones in the eastern part of the county, Dr. Moss remarks "there is not a natural

beech wood of even moderate dimensions to be found in the district." He notes that some beeches to the east of Alfred's Tower are of considerable dimensions, "even here, however, the occurrence of the beeches, old as they undoubtedly are, in straight rows, suggests artificial planting." The typical molluscan association of these woods is the following :

Clausilia laminata, Montagu (dominant): with

Limax arborum, Bouchard-Chantereaux.

Vitrina pellucida, Müller.

Vitrea alliaria, Miller.

Vitrea nitidula, Draparnaud.

Vitrea pura, Alder.

Hygromia hispida, Linné.

Hygromia rufescens, Pennant.

Cochlicopa lubrica, Müller.

Ena obscura, Müller (abundant).

Clausilia bidentata, Ström. (abundant).

There is a very meagre molluscan fauna on the uncultivated grass-lands and heath pastures of the whole of the sandstone area. The upland heath moors at Blackdown, on the Quantocks, and on Exmoor, are large tracts, with the three species of heather, *Calluna vulgaris*, Hull; *Erica tetralix*, Linné; and *Erica cinerea*, Linné, the dominant plants; *Vaccinium myrtillus*, Linné; *Molinia cærulea*, Moench; *Agrostis*, spp.; and *Pteris aquilina*, Linné, the sub-dominants.

Ling and bracken are apparently tenanted only by

Hyalinia alliaria, Miller.

Arion subfuscus, Draparnaud.

Pyramidula rotundata, Müller,

a trio always associated with sandstone heaths. With these species we find on Exmoor *Arion intermedius*, Norman, and *Limax arborum*, Bouchard-Chantereaux, the latter, however, occurring chiefly on the lower slopes in the vicinity of the oak woods.

The fluviatile mollusca of the Upland Area must now be considered.

The Swan Mussel, *Anodonta cygnæa*, *Linné*, is frequent in the majority of the larger ponds, canals, and rivers, where it prefers a muddy bottom. It is of gregarious habit, and frequently attains considerable dimensions. It is the largest of our freshwater bivalved molluscs, safe from foes (excepting a few internal parasites) in its deep-water home, it probably lives to a great age. The canals teem with molluscan life. In the open water we find :

Anodonta cygnæa, *Linné* ; associated with

Limnæa peregra, *Müller*.

Valvata piscinalis, *Müller*.

Pisidium amnicum, *Müller*.

Sphærium corneum, *Linné* (local).

Sphærium lacustre, *Müller*.

Neritina fluviatilis, *Linné* (on rocks).

Dreissensia polymorpha, *Pallas* (local).

In the reed-belt of the canals, rivers, and ponds, the association is the same as that of the reed-belt of the rhines on the Levels (see p. xxviii); the associations of the respective margins are also identical.

Anodonta cygnæa is absent from some of the rivers, and *Neritina fluviatilis* is to be found only on stones in slow-running waters.

The shallow non-calcareous streams on the heathy sandstones, *e.g.* Penselwood, yield :

Planorbis albus, *Müller*.

Ancylus fluviatilis, *Müller*.

Limnæa peregra, *Müller*.

Pisidium pusillum, *Gmelin*.

The cattle ponds on the grass-lands yield *Sphærium lacustre*, *Müller*, a highly specialised species with closely fitting valves, able to retain life for a long time in summer drought, buried in the moist clay of ponds that are quite dried up on the surface.

RECORDS OF SOMERSET MOLLUSCA.

THE arrangement here followed is that of the latest lists published by the Conchological Society. The great changes in nomenclature which have recently taken place necessitate the inclusion of numerous synonyms.

The exclamation mark indicates that the species (or variety) has been seen by the author in the locality mentioned.

All records of varieties are included, but the recorded stations of species, which there is every reason to think are generally distributed in the county, have been omitted.

Collections of Somerset shells in the Museums at Bristol, Bath, Sexey's School, Bruton, and Haslemere (Surrey), have been examined during the preparation of these records, also private collections formed by the late Mr. Kenneth McKean (Bath), and Mr. William Herridge (Torquay).

LAND AND FRESH-WATER.

The latest list of British non-marine mollusca published by the Conchological Society enumerates 170 species (inclusive of brackish-water forms). Ten of these are aliens, and sixteen occur only in a fossil state in Post-Pliocene deposits, leaving a total of 144 native species living in Britain at the present time. The following pages contain records of no less than 122 species, a very high percentage indeed. Ninety-five are recorded from the southern, and 121 from the northern division. The only species recorded from South Somerset alone is *Amphipeplea glutinosa*. In all probability *Hygromia revelata*, *Férussac*; *Vertigo moulinsiana*, *Dupuy*; *Vertigo substriata*, *Jeffreys*; and *Segmentina nitida*, *Müller*, will be added to the list within the next few years, all have been found in neighbouring counties.

TESTACELLIDÆ.

TESTACELLA MAUGEI, *Férussac*.

According to Norman this species was observed in nursery grounds at Clifton (Glos.) in 1814. "From that time to the present (*i.e.* 1860) it has thriven and propagated freely in its

original locality, and has likewise been introduced with plants into many other gardens in the West of England." Its discovery in Messrs. Miller and Sweet's nursery at Clifton (now Garraway's) by Mr. T. Drummond was the first British record. Mr. J. De C. Sowerby thought it might have been imported along with plants from Teneriffe or elsewhere, but it is now held that the three species of *Testacella* which occur in these Islands are indigenous.

It has been lately recorded by Santer Kennard from a Holocene rain-wash at Porlock Weir.

North.

Long Ashton Vicarage. Plentiful; *Mrs. Falloon*. There are specimens from this locality in the Bristol Museum.

Brislington; *A. M. Norman*.

Bath; *Jenyns Museum coll.*

Clevedon; *A. M. Norman*.

Garden near Axbridge; *Miss H. J. Taylor*.

Axbridge; *Miss Ffoulkes Taylor*.

Castle Cary; *W. Macmillan*.

Greinton. Abundant; *W. S. Clark*.

Street; *W. S. Clark*.

Weston-super-Mare; *W. Robinson*.

South.

Taunton; *A. M. Norman*.

Garden at Taunton; *W. Gyngell*.

Bridgwater. Abundant; *H. Corder*.

TESTACELLA HALIOTIDEA, Draparnaud.

Much rarer than the preceding species. Norman apparently doubted its occurrence in the county, "In all instances in which we have had the opportunity of examining the specimens, the species has proved to be *T. maugei*."

North.

Weston-super-Mare; *W. Robinson*.

Beckington; *H. Franklin Parsons*. Recorded by W. Mark Webb in "Journ. Malacology," 1897, p. 49.

South.

Bridgwater; *B. B. Woodward*.

Gardens, Taunton; *Tate*.

TESTACELLA SCUTULUM, Sowerby.

The only record that I can find of this species is that given in Leipner's Bristol List, 1875, viz., Leigh Woods, rare,

T. G. Ponton, 1862. (The record from Taunton in Vol. VII of *The Naturalist* was incorrect; Norman pointed out that the species was *T. maugei*). *Scutulum* has been found in Dorset, and is probably widely distributed in N. Somerset. All members of the genus are of subterranean habit, and do not come up to feed until late at night, hence are often overlooked. Many of the records have been made in the spring and autumn of very wet years, when the excessive saturation of the soil has driven them to the surface by day.

(Since the above was written Mr. J. Ponsonby has found *T. scutulum* in a garden at Brympton, near Yeovil).

LIMACIDÆ.

LIMAX MAXIMUS, Linné.

Generally distributed.

Concerning its variation, Norman observed that "the striped and spotted varieties are common. We met with a variety in Cleeve Coombe remarkably distinct, and we believe hitherto unrecorded. It was altogether pitchy black, without spots or markings of any kind, and fully six inches long."

Var. *cinereo-niger*, Wolf. Some authorities give it a specific rank. Norman's Cleeve Coombe variety is described in Taylor's *Mon. Brit. L. and F. Moll.*, II, 68, as *L. cinereo-niger*, var. *maura*. It is also recorded from Horner by F. J. Partridge.

Weston district; *F. A. Knight*.

Var. *ferrussaci*, Moquin-Tandon.

Bridgwater; *W. Vinson*.

Holton!

Var. *fasciata*, Moquin-Tandon.

Bratton St. Maur!

Var. *maculata*, Picard. (Norman's spotted variety).

Bratton St. Maur. Abundant!

Rimpton!

West Pennard!

Bath; *Mrs. Oldroyd*.

Hatch Beauchamp; *E. Wake-Bowell*.

Var. *cellaria*, D'Argenville. (Norman's striped variety).

Bratton St. Maur. Common!

Rimpton!

L. FLAVUS, Linné.

Apparently rare, but is probably much more frequent than the records would lead one to suppose.

North.

Bristol and Bath; *Captain Brown*.

Bath; *C. J. Waterfall*.

Rimpton!

Bridgwater; *W. Vinson*.

Weston district; *F. A. Knight*.

Var. *suffusa*, *Roebuck*.

Bath; *C. J. Waterfall*.

L. ARBORUM, *Bouchard-Chantereaux* (= *L. marginatus*, Müller).

Widely but not generally distributed.

North.

On trees and rocks in Goblin, Cleeve, and Brockley Coombes, and some of the glens running up into the

Mendips, near Wells; *A. M. Norman*.

General in the Bristol district; *Cundall*.

Coombe Down, Bath; *Mrs. Oldroyd*.

Lily Wood, Bratton St. Maur; Milton Clevedon!

Weston district; *F. A. Knight*.

South.

Very common in the woods around Hatch Park, near Taunton; *E. Wake-Bowell*.

Porlock; *L. E. Adams*.

Dulverton; *H. Watson*.

Luccombe!

AGRIOLIMAX AGRESTIS, Linné.

Generally distributed. The most abundant of our slugs, often a great pest in gardens.

Var. *sylvatica*, *Moquin-Tandon*.

Bath; *C. J. Waterfall*.

Bratton St. Maur and Wincanton district, frequent!

Var. *punctata*, *Picard*.

Hatch Beauchamp; *E. Wake-Bowell*.

Var. *nigra*, *Morelet*.

Bratton St. Maur; Glastonbury! Under damp wood near to buildings and sheds.

Var. *lilacina*, *Moquin-Tandon*.

Bridgwater; *W. Vinson*.

Var. *tristis*, *Moquin-Tandon*.

Bratton St. Maur! In meadows, under sticks that had lain for a long time on the ground.

A. LÆVIS, *Müller*.

Probably not so uncommon as the lack of records would indicate.

North.

Among heaps of stones by the side of the lane which runs parallel with the cliff from Walton to Portishead, and among decaying vegetation by the side of a rhine in Portishead Moor; *Norman*.

Coombe Down, Bath; *Mrs. Oldroyd*.

Under logs and bark in damp situations, Bratton St. Maur!

South.

Not uncommon by a ditch, Hatch Beauchamp; *E. Wake-Bowell*.

Luccombe!

MILAX SOWERBYI, *Férussac* (= *Amalia sowerbyi*, *Férussac*, and *Amalia marginata*, *Müller*).

Easily known by the prominent pale keel, it usually occurs in gardens, and the paucity of records probably arises from its subterranean habit; it usually hides by day in worm burrows.

North.

Bath; *Mrs. Oldroyd*.

Clevedon, in gardens, and in the copse between the upper Clevedon and the beach; *Norman*.

Weston district; *F. A. Knight*.

Abundant in gardens in Hill Road, Weston-super-Mare!

South.

Somewhat sparingly at Hatch Beauchamp, more common at Beer Crowcombe; *E. Wake-Bowell*.

Dulverton; *H. Watson*.

Var. *nigrescens*, *Roebuck*.

Bridgwater; *W. Vinson*.

M. GAGATES, *Draparnaud*.

Also chiefly subterranean, coming forth to feed at night.

North.

Specimens in the British Museum are labelled "Bath, J. E. Daniel."

South.

Allotment gardens, near canal and gasworks, Bridgwater ;
W. Vinson.

Var. *plumbea*, *Moquin-Tandon.*

Specimens in the British Museum labelled "Bath, J. E. Daniel" (*T. D. A. Cockerell in Ann. and Mag. Nat. Hist.*, 1891, p. 330).

ZONITIDÆ.

VITRINA PELLUCIDA, *Müller.*

"Widely distributed but not abundant"; *Norman.*

North.

Common in the Wincanton district and around Milton Clevedon !

There are specimens in the Jenyns coll., Bath Museum, and from Long Ashton in the Bristol Museum.

Rimpton ! Bratton St. Maur !

Weston district ; *F. A. Knight.*

Clevedon ; *Miss L. C. Jones in Leipner's List.*

Plantations on the peat moors at Shapwick, etc. !

Amongst moss in the dune hollows about Berrow and Burnham !

South.

Hatch Beauchamp, near Taunton : not very common ;
E. Wake-Bowell.

Brympton ; *J. Ponsonby.*

Dulverton ; *H. Watson.*

Wellington ; *W. Gyngell.*

VITREA CRYSTALLINA, *Müller* (= *Hyalinia crystallina*, *Westerlund* ; and *Zonites crystallinus*, *Gray*).

Generally distributed amidst moss and decaying leaves and sticks in damp situations. Santer Kennard reports its occurrence in a rainwash of probably no great age at Alcombe, near Minehead. There are typical specimens in the museums of Bath and Bristol.

Var. *complanata*, *Jeffreys.*

Leigh Woods, Bristol ; *Jeffreys.*

Var. *contracta*, *Westerlund.*

Near Minehead ; *C. Oldham.*

VITREA LUCIDA, *Draparnaud* (= *Hyalinia draparnaldi*, *Beck*).

Apparently rare; possibly often confused with *V. cellaria*. It is sometimes a little difficult to distinguish between the shells of these species, but the deep slaty-blue colour of the animal, extending even to the side areas of the sole, serves at once to distinguish *V. lucida* from *V. cellaria*.

North.

Abundant in gardens at Hill Road, Weston-super-Mare!

South.

Mr. John Taylor received one specimen from Mr. Ponsoby which was presumably taken at Brympton.

Var. *albina*, *Moquin-Tandon*. Specimens in the Bristol Museum are said to have been taken in Somerset.

VITREA CELLARIA, *Müller* (= *Hyalinia cellaria*, *Westerlund*, and *Zonites cellarius*, *Moquin-Tandon*).

Generally distributed in woods and open country, also in the vicinity of human habitations. Animal pale-grey. I have observed it in a Holocene deposit on Brean Down, Weston-super-mare.

Var. *compacta*, *Jeffreys*.

A somewhat flatter form, found by Mr. Hugh Watson at Dulverton, is recorded in *Taylor's Monograph*, Vol. II, p. 37. This variety is intermediate between *V. lucida* and typical *V. cellaria*, having the shell of the former and the anatomical structure of the latter.

Var. *albina*, *Moquin-Tandon*.

Bath; *Mrs. Oldroyd*.

Holbrooke, Bratton St. Maur!

Dulverton; *H. Watson*.

VITREA ROGERSI, *B. B. Woodward* (= *Hyalinia helvetica*, *Auctt.*, and *Zonites glaber*, *Jeffreys*).

Apparently a very local and rare species: it may be assumed, however, that it occurs in the recesses of the majority of the larger woods in the county.

North.

Creech Hill, near Bruton!

Weston district; *F. A. Knight*.

Weston wood!

Bath; *Kenneth McKean*.

South.

Hatch Beauchamp, a small form; *E. Wake-Bowell*.
 Minehead; *L. E. Adams*.
 Near Taunton!

VITREA ALLIARIA, *Miller* (= *Hyalinia alliaria*, *Miller*, and
Zonites alliarius, *Gray's Turton's Manual*, p. 168).

This species was first identified by Mr. Miller of Bristol, and described by him in *Ann. Phil. N.S. iii*, p. 379. It is widely distributed, and is always more frequently met with on the Greensand than any other representative of the family.

North.

Common in woods, on hedgebanks, and under stones;
Norman.

Leigh Woods and Portishead; *Cundall*.

Combe Down, Bath; *Mrs. Oldroyd*. There are examples in the Jenyns coll. in the Bath Museum.

Bratton St. Maur, Wincanton, and Creech Hill, near Bruton!

Weston district; *F. A. Knight*.

Plantations about Shapwick!

South.

Brympton; *J. Ponsonby*.

Dulverton; *H. Watson*.

Dunkery Beacon!

Var. *viridula*, *Jeffreys*.

Gwyn Jeffreys remarks that Norman found it in Somerset, but does not give locality.

Near Minehead; *L. E. Adams* and *C. Oldham*.

VITREA NITIDULA, *Draparnaud* (= *Hyalinia nitidula*, *Draparnaud*, and *Zonites nitidulus*, *Gray*).

Generally distributed, frequent under stones and sticks in hedges and woods.

Var. *helmi*, *Alder*.

Abbots Leigh; *Bristol Museum Coll.*

Penselwood!

Miss F. M. Hele found a form in Combe Dingle, near Bristol, which Taylor has described in his *Monograph* as var. *virens-albida*, *Michaud*, sub-var. *opaca* (= *helmi*, with the last whorl much expanded).

Var. *nitens*, *Michaud*.

Dulverton; *H. Watson*.

VITREA PURA, Alder (= *Hyalinia pura*, Westerlund, and *Zonites purus*, Jeffreys).

Generally distributed. Gregarious amongst leaves, moss, etc., in hedges and woods.

There are two forms of this species, white and horn-coloured, and both are equally common. It may therefore be considered a dimorphic species, but many authorities consider one form alone as the type. Those who deem the colourless form the type, allude to the horn-coloured one as var. *nitidosa*, Gray; if the latter is considered typical, then the former becomes var. *margaritacea*, Jeffreys.

VITREA RADIATULA, Alder (= *Hyalinia radiatula*, Alder, and *Zonites radiatulus*, Gray).

Apparently uncommon.

North.

“At roots of stunted grass, growing in the crevices of limestone rocks on Elson Hill, and in similar situations on the eastern scarp of Clevedon Hill”; Norman.

Weston district; *F. A. Knight*.

Leigh Woods, Bristol; *Cundall*.

Bath; *Jenyns Coll. Bath Museum*.

Rimpton!

South.

Brympton, Yeovil, uncommon; *John Ponsonby*.

Var. *viridiscenti-alba*, *Jeffreys*.

Brympton; *J. Ponsonby*.

ZONITOIDES NITIDUS, Müller (= *Hyalinia nitida* Westerlund and *Zonites lucidus* Gray's Turton).

Uncommon. Gregarious on the borders of ditches, rhines, rivers and canals.

North.

“Damp situations. Under stones on the grass in Kenn and Portishead Moors;” Norman.

Weston-super-Mare; *Crotch*.

Weston district; *F. A. Knight*.

Rejectamenta of a stream at Shepton Montague, near Bruton!

Glastonbury Fens; *F. Townsend*, 1852, *Haslemere Mus. Coll.*

Monkton Combe, Bath; *Kenneth McKean*.

Plantations on the peat moors at Shapwick, etc!

South.

Brympton, a damp spot in the Park ; *J. Ponsonby.*

ZONITOIDES EXCAVATUS, *Bean* (= *Hyalinia excavata* *Westerlund* and *Zonites excavatus* *Gray*).

Under decaying wood and leaves often in company with the ubiquitous *Pyramidula rotundata*. Taylor remarks of it (*Monograph*, III, p. 137), "a species that has probably been misunderstood and overlooked on the continent, as it is very unlikely to be so strictly confined to the limits of the British Isles, as its recorded distribution would indicate." The only extra British localities at present known are Esschen, near Antwerp, and Flensburg in Schleswig. Distribution sporadic in the British Isles. It is rare in Somerset.

North.

Pyllle ; *F. N. Townsend*, 1856, *Haslemere Mus. Coll.*

Under loose stones outside the camp on Worlebury, Weston-super-Mare ; *F. A. Knight.*

Weston Wood !

South.

Dulverton ; *H. Watson.*

Var. *vitrina*, *Férussae.*

Dulverton ; *Hugh Watson.*

EUCONULUS FULVUS, *Müller* (= *Hyalinia fulva*, *Mörch*, and *Zonites fulvus*, *Jeffreys*).

Generally distributed, chiefly found under rotting sticks in damp situations.

Var. *Mortoni*, *Jeffreys*. Recorded by *Jeffreys* in *British Conchology*, 1862, p. 171, from Somerset, but without locality. It is possible that the "small" specimens found by *Norman* on Elton Hill, Clevedon, and among rushes in Walton Moor, come under this heading.

[There may be seen in the Bath Museum a single specimen of a fossil species of *Hyalinia*, found by Mr. Moore in a bed of lias clay twelve feet in thickness, at a depth of 270 feet, in the Charter House lead mines in the Mendips. It is a minute species, less than one millimetre in diameter. Moore described it under the name of *Helix Dawsoni* in *Quar. Jour. Geol. Soc.*, 1867, p. 549, pt. xv, f. 12].

ARIONIDÆ.

ARION ATER, *Linné.*

Generally distributed. Norman remarks that "on the low grounds and in damp situations this *Arion* is always black; in drier situations, hills, and woods, it varies greatly in colour." The var. *aterrima*, *Taylor*, the whole body uniformly black, which is usually found in mountainous regions, also occurs sporadically at low levels. I found two specimens in one of the heath plantations near Shapwick Station. In typical *A. ater* the medium area of the footsole is paler than the rest.

Var. *rufa*, *Linné.*

Bristol; *W. D. Roebuck.*

Bath; *C. J. Waterfall.*

Bratton St. Maur and Bruton district!

Dulverton; *H. Watson.*

Var. *brunnea*, *Roebuck* (= *castanea*, *Dum. and Mort.*)

Bath; *C. J. Waterfall.*

Bridgwater, in allotment gardens; *W. Vinson.*

Dulverton; *H. Watson.*

Bratton St. Maur and Wincanton district generally!

Var. *plumbea*, *Roebuck.*

Rimpton!

Bridgwater; *W. Vinson.*

Dulverton; *H. Watson.*

Var. *reticulata*, *Roebuck.*

One example from Hatch Beauchamp; *W. Wake-Bowell.*

Var. *rubra*, *Baudon.*

Rimpton!

Var. *alba*, *Linné.*

Gardens at the foot of West Hill, Wincanton; *W. Herridge.*

In a lane at Stoke Trister, near Wincanton!

In my paper in the *Journal of Conchology* I alluded to a beautiful variety found in a lane at Stoke Trister, near Wincanton. Ground colour yellowish white, lineoles vivid orange, a broad black band extending the whole length of the back, mouth and tentacles also black. Foot pale. This large and very showy form which apparently comes under *Roebuck's* variety *albolateralis* (see *J. C.*, 1883, p. 39, and *Taylor's Monograph*, ii, p. 185) was also observed at Dulverton by Mr. Hugh

Watson. Taylor also describes a variety *succinea*, Müller, animal yellowish with reddish-orange foot-fringe; this form was taken by Mr. W. Vinson at Bridgwater. Neither *albolateralis* nor *succinea* are mentioned in the latest edition of the Conchological Society's list of British non-marine Mollusca.

ARION SUBFUSCUS, *Draparnaud*.

Frequent in the woods and hedgerows in the hilly districts in the eastern part of the county. A characteristic species on the Neocomian sands.

North.

Penselwood! Milton Clevedon! Bratton St. Maur!
Frequent about Wincanton!
Woods at Butleigh near Glastonbury!
Rimpton!
Plantations on the turf moors at Shapwick, etc.!

South.

Hatch Beauchamp, Taunton. Under stones beneath *Pinus-sylvestris*; *E. Wake-Bowell*. Near Taunton!
Bridgwater; *W. Vinson*.
Dulverton; *Hugh Watson*.

Var. *brunnea*, *Lehmann*.

Bridgwater; *W. Vinson*.

The var. *Krynickyi*, *Kaleniczenko*, sub-var. *griseus* *Collinge*, which I found feeding on gorse broom on Bratton Hill, near Wincanton (J.C., 1899), is var. *succinea* *Bouillet*, sub-var. *Krynickyi* of Taylor's *Monograph*, ii, 202.

ARION INTERMEDIUS, *Normand* (= *Arion minimus*, *Simroth*).

A small species, abundantly distinct in the spiked tubercles covering the body, hence sometimes known as the hedgehog slug. In spite of this very distinctive peculiarity it is very often mistaken for young *A. ater* or pale forms of *Arion hortensis*, and for that reason I do not think it is so uncommon in the county as the paucity of records would lead one to suppose.

North.

Clevedon; *E. J. Lowe*.

Bath; *E. J. Lowe*.

Rimpton!

Wincanton district, common!

West Pennard, Glastonbury!

South.

Dulverton ; *H. Watson.*

Minehead and Taunton ; *E. J. Lowe.*

Common at Porlock, Minehead and Watchet ; *L. E. Adams.*

Near Dunkery Beacon, and about Luccombe !

ARION HORTENSIS, *Férussac.*

Generally distributed. Often a great nuisance in gardens.

Var. *cærulea Collinge.* Bratton St. Maur. Frequent !

Taylor's record in *Monograph*, ii, p. 215, of var. *fasciata*, *Moquin—Tandon*, sub var. *elongata* (= *Arion elongatus Collinge*) for this county is an error. It was found at Southampton.

ARION FASCIATUS, *Nilsson* (= *A. bourguignati*, *Mabille* and *A. circumscriptus*, *Johnston*).

Though many records of this species are not forthcoming it cannot be considered rare. It is often mistaken for the preceding species, which differs however in the yellow foot-sole, etc. In *A. fasciatus* the foot-sole is always white.

North.

Bratton St. Maur and Wincanton district generally.

Common !

West Pennard !

Rimpton !

Turf moors at Shapwick, Edington, etc. !

South.

Porlock ; *L. E. Adams.*

Dulverton ; *H. Watson.*

Luccombe !

ENDODONTIDÆ.

PUNCTUM PYGMÆUM, *Draparnaud* (= *Helix pygmæa*, *Draparnaud*).

A minute species, probably often overlooked.

North.

At roots of grass on Clevedon and Elton Hills ; *Norman.*

Ashley Hill, Bristol ; *Bristol Mus. Coll.*

Bath ; *Jenyn's Coll.*

Bratton St. Maur, and Wincanton district, uncommon !

Rejectamenta of river Brue, Glastonbury ; *O. Morland.*

Weston district ; *F. A. Knight.*

South.

Vauxhall and Brympton, Yeovil ; *J. Ponsonby*.
 Hatch Beauchamp ; *Wake-Bowell*.
 Wellington ; *W. Gyngell*.

SPHYRADIUM EDENTULUM, *Draparnaud* (= *Vertigo edentula*,
Draparnaud).

Apparently very local, but may be suspected to have a wide distribution in damp woods. There are specimens without statement as to locality in the Jenyn Coll., Bath Museum.

North.

About Holbrook, near Wincanton !
 Rejectamenta of the Cale at Burton's Mill, above Wincanton, and the gully stream at Bratton St. Maur !
 Abundant (with *V. pygmaea*) in an old quarry in Weston Wood, and in the Brue drift ; *F. A. Knight*.

South,

Pitt Wood, and Brympton, Yeovil, on nettles and dead leaves, *J. Ponsonby* ; near Minehead, *Adams and Oldham*.

Var. *columella*, *G. von Martens*.

Two specimens from rejectamenta of the gully stream at Bratton !

PYRAMIDULA RUPESTRIS, *Draparnaud* (= *Helix rupestris*,
Draparnaud).

Common on walls and exposed cliffs in many parts of the county. Gregarious, often active in the depth of winter.

North.

" Common in the crevices of limestone rocks at Clevedon and Elton Hills, Cleeve Foot, Wrington Hill, Cheddar Cliffs, etc., and often exceedingly abundant among the rotten mortar of old walls, as behind the Royal Hotel at Clevedon, and in many spots on the Mendips" (Norman, under *Helix umbilicata*, Montagu). Jenyns Coll., as *Helix umbilicata*, Bath Museum.

Mr. Taylor considers Montagu's *Helix umbilicata* to be identical with *Helix rupestris* var. *depressa* Westerlund, and remarks that "this, the depressed form of the species, is more especially prevalent in the north of Europe, the bulk of the British specimens being probably referable to it, the spire becomes more elevated as the southern range increases." He figures it in his *Mono-*