FAUNA PERTHENSIS;

OR,

CONTRIBUTIONS TOWARDS A KNOWLEDGE

OF THE

ANIMALS INHABITING PERTHSHIRE.

PART I.—LEPIDOPTERA.

By F. BUCHANAN WHITE, M.D.,

Member of the Entomological Society, and President of the Perthshire Society of Natural Science.

PERTH:
PUBLISHED BY THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE.
1871.

PRICE:
EIGHTEENPENCE: TO MEMBERS OF THE SOCIETY, ONE SHILLING.

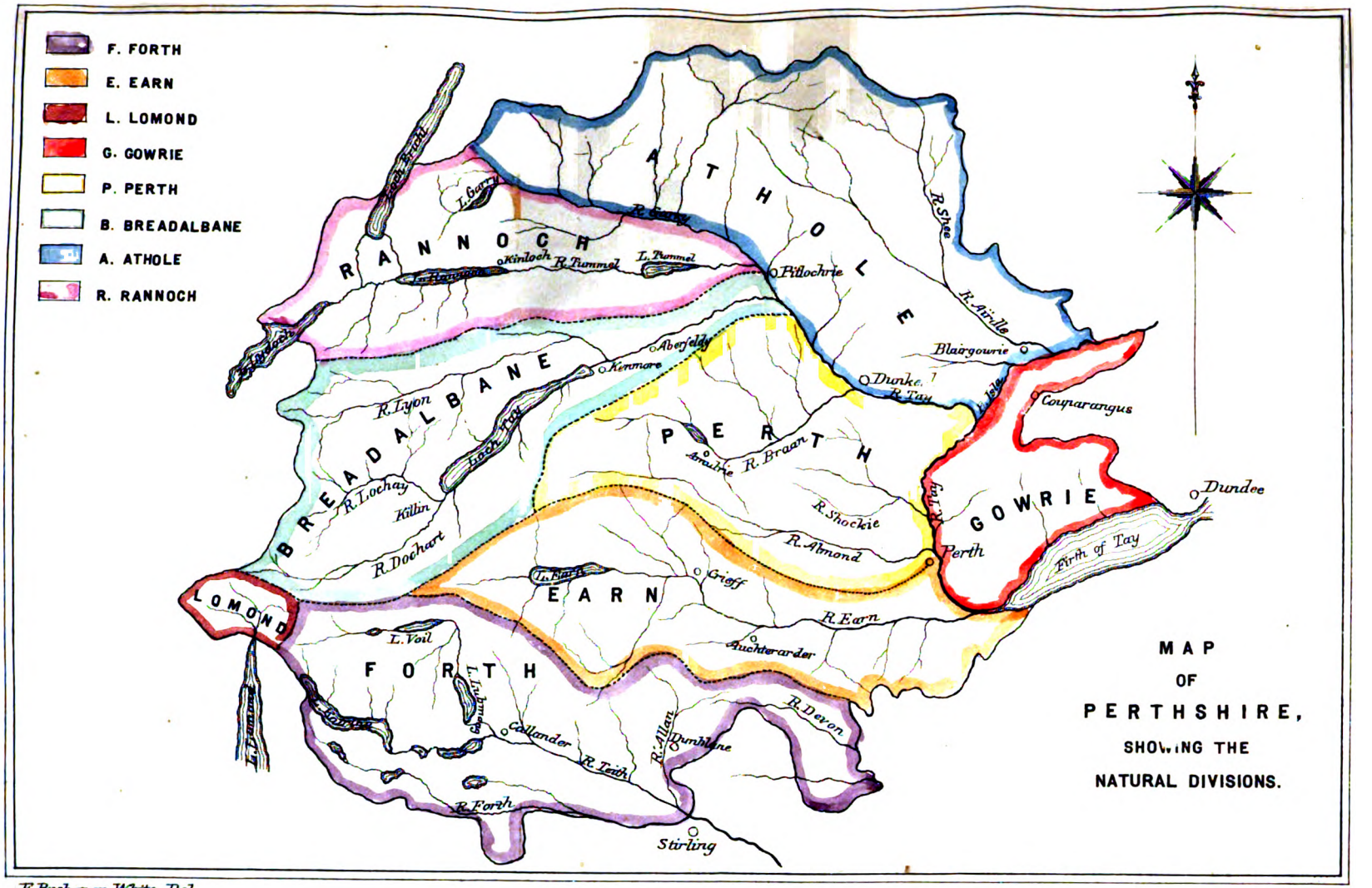
Published Quarterly, on the First of January, April, July, and October,

THE SCOTTISH NATURALIST:

A MAGAZINE OF SCOTTISH NATURAL HISTORY.

Price (paid in advance), 3s. per annum.

Orders for copies to be sent to Mr. A. T. Scott, Clydesdale Bank, Perth.



F. Buchanan White, Del.

FAUNA PERTHENSIS;

OR,

CONTRIBUTIONS TOWARDS A KNOWLEDGE

OF THE

ANIMALS INHABITING PERTHSHIRE.

PART I.—LEPIDOPTERA.

BY

F. BUCHANAN WHITE, M.D.,

Member of the Entomological Society, and President of the Perthshire Society of Natural Science.

PERTH:

PUBLISHED BY THE PERTHSHIRE SOCIETY OF NATURAL SCIENCE.

1871.

PREFACE.

In publishing the first of a series of lists of the Fauna of Perthshire, a word or two of explanation is due regarding the reasons for beginning with the Lepidoptera. It would, of course, have been more correct to have commenced either with the highest or lowest forms of animal life, but as our knowledge of the Perthshire Fauna is unfortunately yet very far from being complete, and as it was considered advisable that a beginning should be made, it naturally followed that a selection was made of that group with which the majority of our workers have occupied themselves. For the same reason, it is probable that the lists of other groups, (which we hope in course of time to be enabled to issue,) will appear, not in their proper sequence, but as the information acquired permits. It is therefore likely that the next lists will be those of some class of the Vertebrates or of the Mollusca, and we earnestly request that all interested in the Natural History of the county will endeavour to obtain information, especially as regards the distribution of species belonging to these groups. At the same time, it should be remembered that a great deal remains to be done before we can be said to have any knowledge of the other orders of the Insecta.

In conclusion, I hope that all in whose power it does, or may, lie, will kindly communicate to me any additions, either in species or localities, that may be made to this list, of the imperfections of which I am but too well aware.

F. B. W.

PERTH, April, 1871.

GENERAL INTRODUCTION.

THE NATURAL DIVISIONS OF PERTHSHIRE.

THE County of Perth is about 70 miles in length (from east to west), and 66 miles in breadth (from north to south); and its area is about 1,664,690 acres,—of which 38,274 are covered with water, and 8,607 are foreshores.* Of the 1,617,807 acres composing its land area, somewhat less than 300,000 are under tillage; many acres are under natural or planted wood; and a vast extent of the highland part of the county is moorland, and covered with heather (*Erica* and *Calluna.*) In altitude, the county varies between sea-level and nearly 4,000 feet.

At the meeting of the Perthshire Society of Natural Science, on 5th May, 1870, I read a paper "On the best method of dividing Perthshire into districts." The substance of this paper (*vide* the published Reports of the Proceedings of the Society), is as follows:—

"To ascertain, in as perfect a manner as possible, the distribution throughout the county, of the animals and plants indigenous to Perthshire, it is expedient to divide the county into certain districts, and to find out the productions of each of these.

The county may be divided in two ways:—

1st, Artificially.
2nd, Naturally.

The first is by the parishes; but this method is, for various reasons, unsuitable for our purpose; we must therefore adopt a natural method of division. In a county made up, as Perthshire is, of Lowlands and Highlands, the best mode of division probably would be into Littoral, Lowland, Subalpine, and Alpine districts. But the difficulty of defining, in a sufficiently workable manner, the boundaries of each division, and showing where one ends and another begins, makes this plan also unsuitable. We may, however, adopt a modification of it in combination with the next method, which is not only a scientific one, but easily followed out on paper and on the ground.

"This plan is to divide by the watersheds of the principal rivers. In this manner we obtain natural divisions of Perthshire, and by ascertaining the Fauna and Flora of each district, we will be able to obtain accurate information as to the distribution of species throughout the county.

"To each division has been given an appropriate name, the initial letter of which can be used for the sake of brevity and convenience. The districts are as follows:—

1. Forth (F.), including all parts drained by the Forth and its tributaries.
2. Earn (E.), drained by the Earn and its tributaries.
3. Lomond (L.), a small district draining into Loch Lomond.
4. Gowrie (G.), all parts east of the Tay and south of the Isla.
5. Perth (P.), drained by the Almond and Braan, and by the tributaries on the west side of the Tay between these two rivers.

* Perthshire has, however, no true sea-coast.

6. Breadalbane (B.), drained by Loch Tay and its influents, and by the Lyon and the Tay as far as the mouth of the Tummel.
7. Athole (A.), including all parts of the county east of the Tay, Tummel, and Garry, and north of the Isla.
8. Rannoch (R.), drained by Loch Rannoch and its influents, by the Tummel, by Loch Garry, and by the west side of the river Garry.

"These, then, are the divisions by the watersheds. Let us now see how they are situated as regards the first-mentioned mode of natural division into Littoral, Lowland, Subalpine, and Alpine districts.

"'Littoral' includes the parts immediately adjoining the sea, or the tidal portion of rivers, and only a few feet in elevation above the sea level.

"'Lowland' are those inland parts not much elevated above the sea level.

"'Subalpine' includes the lower ranges of hills and country adjacent; and

"'Alpine,' the hills above (say) 2000 feet.

"We find, therefore, that the eight districts arrange themselves thus :—

1. Alpine and Subalpine—Rannoch, Athole, Breadalbane, and Lomond.
2. Alpine, Subalpine, Lowland, and Littoral—Earn, Forth, and Perth.
3. Subalpine, Lowland, and Littoral—Gowrie.

"In making up lists of the productions of the whole county, it will be sufficient to merely indicate by means of the initial letters, the districts in which the species has been detected, and to denote whether the species is Alpine, Subalpine, Lowland, or Littoral, whether it is common or rare, and to give in the latter case one or two habitats; but in making up a list of the species of a district it will be better to particularise in what part of the district the species is found or is most common. For this purpose, those districts which admit of it have been subdivided. These subdivisions with their characters are :—

Rannoch, into	(a) Rannoch—Alpine and Subalpine.	
	(b) Garry	do.
Breadalbane, into	(a) Tay	do.
	(b) Lyon	do.
Athole, into	(a) Upper Athole	do.
	(b) Lower Athole	do.
Perth, into	(a) Perth—Littoral, Lowland, and Subalpine.	
	(b) Upper Almond—Alpine and Subalpine.	
	(c) Braan	do.
Earn, into	(a) Upper Earn	do.
	(b) Lower Earn—Littoral, Lowland, and Subalpine.	
Forth, into	(a) Upper Forth—Alpine and Subalpine.	
	(b) Lower Forth—Littoral, Lowland, and Subalpine.	

"In the first two, the subdivisions have been made by the watersheds of the respective rivers, which give names to the subdivisions; but in the other four, by the difference in the nature of the country, the lower subdivisions of each containing (for the most part), except as regards the range of the Ochils, the low-lying alluvial country, and the upper the high-lying uncultivated land. These subdivisions are clearly indicated on the map, and can be easily detected in practice."

For several reasons, I have preferred this mode of division to that of Mr. H. C. Watson, as set forth in the "Cybele Britannica." Mr. Watson's "sub-province" 29 includes Perthshire, and he divides† this "sub-province" into "vice-counties," of which the following are parts of Perthshire:

No. 87, West Perth. No. 88, Mid Perth. No. 89, East Perth.

† Cybele Britannica, vol. iv., p. 141.

"West Perth" corresponds to my district "Forth," including, in addition, Clackmannanshire, and part of Stirlingshire; "East Perth" consists of the districts "Gowrie" and "Athole"; and "Mid Perth" corresponds to the remaining five districts.

I may here take the opportunity of expressing my regret that, for certain reasons connected with the constitution of the Society, it was necessary, in drawing up lists of the animals and plants of this part of Britain, to limit the field of our operations to the district contained within the artificial and arbitrary boundaries of a county, instead of selecting the natural district of the basin of the Tay and its tributaries.

THE GEOLOGY OF PERTHSHIRE.

Geologically, Perthshire may be divided into two portions, by a line from the south-west to the north-east, entering the county not far from Loch Katrine, and passing out near Blairgowrie: south of this line the geological formation belongs to the Old Red Sandstone, with igneous rocks (felspathic) of the same period; north of the line we find the Lower Silurian.

This latter part, which comprises about two-thirds of the county, is sub-divided by a somewhat sinuous line entering the county at the north of the Lomond district, passing Loch Tummel at its eastern end, and leaving the county near the head of Glen Shee. South of this sinuous line, the Altered Lower Silurian (Clay, Chlorite and Mica slates, and Gneissoze rocks,) prevails, with an irregular and interrupted band—extending from Loch Katrine, by Loch Tay, Aberfeldy, and Pitlochrie, to Glen Shee—of Quartzoze flagstones, Quartz rock, and associated Limestones; north of the sinuous line, we have Quartzoze flagstones, Quartz rock, and associated Limestones, with some patches of intrusive Greenstone, Basalt, &c.

A comparison of the accompanying map with Murchison & Geekie's Geological Map of Scotland will show that the geological formations of the various districts of Perthshire are as follows :—

FORTH.—Old Red Sandstone (with igneous rocks), and Lower Silurian.

EARN.—Old Red Sandstone (with igneous rocks—the Ochils), and Altered Lower Silurian.

LOMOND.—Altered Lower Silurian.

GOWRIE.—Old Red Sandstone (with igneous rocks—the Sidlaws.)

PERTH.—Old Red Sandstone, and Altered Lower Silurian.

BREADALBANE.—Altered Lower Silurian, and Quartzoze flagstones, &c., appearing on each side of Loch Tay, along the valley of the Tay, and in the west and north-west of the district.

ATHOLE.—Old Red Sandstone, to the south and east of Dunkeld and Blairgowrie; the southern portion of the remaining part of the district being Altered Lower Silurian, divided by a band of Quartzoze flagstones, &c.; and the northern part, Quartz rock, with intrusive Greenstone, Basalt, &c.

RANNOCH.—Quartzoze rock, &c., with intrusive Greenstone, Basalt, &c.

THE CLIMATE OF PERTHSHIRE.

The mean annual temperature of Perthshire is, according to Mr. Buchan, * 48°, that of Iceland being 38°, Shetland 45°, London 51°, and Paris 52°. The mean temperature of the months varies from 38° in January (Iceland 30°, Shetland 39°, London 39°, Paris 38°), to 59° in July (Iceland 51°, Shetland 54°, London 64°, Paris 66°.)

Of course, the mean annual temperature of highlying districts, such as Rannoch,† is lower, but may be calculated by deducting 1° for every 300 feet of elevation; but at the same time, it must be taken into consideration that places remote from the sea have a relatively higher summer temperature, and this especially on the eastern slope of Scotland.

THE RAINFALL OF PERTHSHIRE.

The following are extracts from a paper on the rainfall of Scotland, by Mr. Buchan‡ :-

Forth District,—"The marked feature in the rainfall of this district is the extraordinarily rapid increase

* Journal of the Scottish Meteorological Society Nos. 28 & 29, 1871.

† Loch Rannoch s 716 feet above the level of the sea. ‡ Journal of Scottish Meteorological Society, No. 27, 1870.

in ascending the respective valleys. . . . From these results, it follows that the average rainfall of the more elevated districts of this region amounts at least to 90 inches per annum; and that, on descending the different valleys, it gradually diminishes to 38 inches in the neighbourhood of Stirling. While thus the quantity generally diminishes in the lower districts, the distribution of the rainfall is far from being determined by mere height. Indeed, so far as the amount at particular situations in each district is concerned, it is dependent on local situation and exposure."

Earn District,—The rainfall varies from 30 inches, at Auchterarder, to 82 inches, at Stronvar, near the head of the valley.

Valley of the Tay,—Mr. Buchan infers from certain results, that "from 27 to 29 inches of rain falls annually in open situations at some distance from hills in the Carse of Gowrie, and in the lower parts of Strath Tay and Strath Isla." As we ascend the Tay the rainfall gradually increases, being at Logierait 34 inches, Aberfeldy 42, Taymouth 40, and Tyndrum, near the valley of the Tay, and close to the watershed separating the east from the west drainage of Scotland, 104 inches, (the mean of $4\frac{1}{3}$ years.) "It is thus seen that the annual rainfall at the western extremities of the Perthshire valleys, which border on the watershed of the country, amounts to 90 inches and upwards annually."

FAUNA PERTHENSIS.

PART I.—LEPIDOPTERA.

As might be expected from the varied surface of the county—numerous high mountains, wide-spreading moors, large extent of natural woodland, and rich alluvial valleys—the county of Perth posseses a tolerably rich Lepidopterous Fauna. That is to say, rich in regard to the degrees of latitude within which Perthshire lies; for, whereas we find on the southern coasts of Britain 906 species of the larger Lepidoptera,* in Perthshire only 450 have as yet been detected.

The following table, compiled from Mr. Jenner Fust, jun.'s "Distribution of Lepidoptera in Great Britain," (supplemented, as regards Scotland, from my own notes), shows the diminution in number of species of the larger Lepidoptera as we advance from the south to the north of Britain† :—

Provinces.	Latitude.	Number of Species.
1–7	South of 53°	906
8–10	Between 53° & 54° 30′	647
11, 12	„ 54° & 55° 45′	490
13, 14	„ 55° & 56°	425
15‡, 16	„ 56° & 57° 30′	481
17	„ 57° 30′ & 58° 30′	218

From this table it would appear that the Perthshire list is nearly as large as that of the Provinces (15 and 16) with which it is associated, and of which it forms but a small part. That the Perthshire list is not so large as the provincial, is due to several causes, but chiefly, I think, to the absence in Perthshire of a sea-coast, and consequently, not only the absence of littoral species, but of several species which, though found inland in the south, become littoral in the north.

It has been suggested (by Herr Maassen in Stett. Ent. Zeit.) that the proportion of moths to butterflies in a county or district is as 26 to 1. In Britain, however, the proportion seems to be $31\frac{5}{67}$ to 1, and therefore, supposing that this proportion hold good for all parts of Britain, the number of Perthshire moths—the butterflies being 31 in number—should be $963\frac{21}{67}$; or of the larger Lepidoptera, 497¼, and of the smaller, 499½.

In the following list I have, in addition to showing the district distribution as far as is yet known, given, for the benefit of collectors in or near Perth, a *few* localities for each species that occurs in this

* By the larger Lepidoptera, I do not mean the Macro-lepidoptera only, but all to the end of the Crambites, thus including some of the Micro-lepidoptera.

† The lists for Provinces 13 and 14 are probably, and for Province 17 certainly, incomplete.

‡ Includes Perthshire.

neighbourhood, and indicated by the terms, "rare," "common," "abundant," &c., the comparative rarity or abundance, in the county, of each species. Moreover, I have mentioned the principal varieties, when such occur; and in cases where the typical form is not found, the variety or race that occupies the place of the type. In denoting these varieties or races, I have employed Dr. Staudinger's terms,* "aberration" and "variety." His definitions of these terms are :—"aberration," (contracted "ab."), those forms which are found in the same locality, and at the same season, as the type; "variety," (contracted "var."), local varieties or races which may perhaps, in course of time, become distinct species,—some of them, indeed, being already considered such by certain authors. In addition, Dr. Staudinger appends to certain species, regarding whose claims to be considered more than simple races he is in doubt, the term, "Darwinian species," and in several instances I have adopted this term.

The districts into which we have divided Perthshire have been very unequally worked. The districts nearest Perth (E., G., and P.), have been, at least in regard to the larger species, well examined within a few miles of the city, but in regard to the smaller species (especially the Tineina), and at some distance from the city, they still remain almost unworked. The other districts, with the exception of Rannoch, have met with much less attention, indeed from one of them (Lomond) a single species only is recorded. Rannoch alone can be said to have been systematically examined, and probably even here only a limited space—the south side of the Loch, from Schiehallion to Grayvel. That Rannoch has been thus favoured, is owing to its fame as a producer of boreal and alpine species, and the consequent visits of persons whose whole time and attention (at least as long as they are in the district) is devoted to entomology. It is from this cause that Rannoch *appears* to be so much richer than the other districts in species belonging to the genera Eupithecia, Scoparia, and Crambus.

The following table shows the number of species detected up to the present time in each district :—

	F.	E.	L.	G.	P.	B.	A.	R.	PERTHSHIRE
RHOPALOCERA,	23	23	...	25	22	8	16	17	31
NOCTURNI,	26	47	...	43	39	5	7	37	65
NOCTUÆ,	46	122	...	114	118	4	14	98	160
GEOMETRÆ,	50	96	...	87	86	15	16	89	145
PYRALIDES,	7	17	1	10	11	2	...	16	28
CRAMBITES,	2	12	...	7	6	1	2	14	22
	154	317	1	286	282	35	55	271	451

Within three miles of Perth, 313, and within seven miles, 349, species have been taken.

In connection with the distribution of species in Perthshire, there are several points of great interest, to which at present I cannot do more than briefly allude.

One of these is the relation existing between the RANGE OF A SPECIES AND THAT OF ITS FOOD-PLANT, and is a subject that would probably repay investigation, though the limited area of Perthshire scarcely affords sufficient scope, so many other circumstances having, at the same time, to be taken into considera-

* Catalog der Lepidopteren des Europæischen Faunengebiets, 1871.

tion. It is, perhaps, probable that in the centre of the area to which a species is limited, its range is co-extensive with that of the food-plant; but that, on the outskirts of this area, certain circumstances (such as the predominance of other species better fitted to survive in the struggle for existence, the prevalence of certain enemies, &c.,—the causes, perhaps, of the limitation of the area), acquire greater force, and hence, even though the food-plant remains abundant, the species is only able to survive in isolated localities, where circumstances are in some manner especially favourable to its existence. For example, *Endromis versicolora*, and *Asteroscopus nubeculosus*, whose food-plants, birch and alder, are widely diffused, occur only in Rannoch, where circumstances seem especially favourable to insect life;* while *Lycæna Artaxerxes*, of whose area of distribution this county is near the centre, occurs wherever its food-plant, *Helianthemum vulgare*, grows. In like manner, species once existent here (e.g., *Pararge megæra*,) have failed to maintain their position, and been driven back; while others have attempted (e.g., *Sterrha sacraria*), but not yet succeeded, in gaining a place.

The GEOLOGICAL FORMATION of the various districts has, not impossibly, some influence on the distribution, but, till each district is thoroughly explored, it is impossible to arrive at any conclusion.

That CLIMATE has no little influence upon the range of species is very evident, but in Perthshire we have not much room for the investigation of this influence, except in connection with altitude. Certain species only occur at certain heights on the mountains, and this is probably due, not, in any of our species, from the restricted range of the food-plant, but from the lowering of the temperature, thus not only affording appropriate conditions, but preventing the intrusion of species which, with a higher temperature, would possibly crowd out the others. Apart from altitude, we have a few insects occurring in parts of the county that have a higher local temperature; for example, *Lithosia lurideola*, near the Bridge of Allan, a very sheltered place.

In connection with the climate, the MARKED DIFFERENCE IN COLORATION of boreal from southern specimens of certain species should be considered. This difference generally consists in a darker or more intensified colour, and is due, I think, not to the latitude, but, in some cases at least, to the greater humidity of the atmosphere. *Aplecta occulta* occurs from the south to the north of Britain; and the general idea of entomologists is, that whereas the southern examples are grey, the northern ones are black. In a great measure this is true, but only of specimens from localities having a large rainfall. Thus we find that Rannoch specimens are usually black; but that specimens taken near Stanley and Scone, where the rainfall is probably less than half that of Rannoch, resemble southern ones, and are grey. The same is the case (as Dr. Boswell Syme informs me), with specimens taken at Balmuto, in Fifeshire. Again, *Xylophasia monoglypha (polyodon)*, occurs throughout Britain, and in certain localities nearly black specimens are found. Here, again, we find that where the rainfall is greatest, there the dark specimens are most numerous. In the neighbourhood of Perth dark specimens are rare; at Rannoch they are commoner than the type. So, at York, which is a moist place, and in Ireland, dark examples are common. It is clear, however, that some other cause assists in this change of colour, for the Trichoptera, which, as larvæ, are always in the water, are also subject to it. While some species have a tendency to become infuscated and smaller, others have their colours more diluted, or more intensified, as well as their stature increased, in boreal specimens; while others do not undergo any change. The intensified colour and increased size is probably due to causes similar to those by which the colours and size of alpine flowers are increased. Whether this intensifying of colour and increase of stature in one set, and the infuscation and decrease in stature in another, are due to the humidity of the atmosphere acting differently upon different species,—and what effect the (probably) more succulent food and longer day in summer may have in causing these circumstances,—is a subject worth investigation, and which I hope to be able to discuss at greater length in a list of the Scottish Lepidoptera that I have in contemplation.

THE LOCALITIES WHENCE OUR SPECIES ARE DERIVED is another subject of no little interest, and in

* Not only for northern, but southern forms, as will be seen from the list.

the case of a few species in the list I have suggested the probable derivation.* Some would appear to have been brought here during the glacial period, and to be thus coæval with some of our alpine plants; others, of which this is the most northern habitat, seem to have come from the Alpine ranges of Central Europe; but the majority have been derived from the south-east, and arrived here before the land communication with the continent was destroyed. Had that land remained for a greater length of time, our Fauna would have been, like the Scandinavian, greatly increased; as it is, we have only the species which succeeded in establishing themselves before the disruption took place, for possibly others which reached us, did not gain a footing, and the communication being cut off, could not, from deficient numbers, compete with the older colonists. A few species (*e.g.*, the common *Pierides* and *Abraxas grossulariata*, &c.,) are I think, much later introductions, only occurring near cultivated land.

In this list I have adopted, in several cases, specific names different from those generally used in Britain, but in all cases the change has been made to that name which, from Dr. Staudinger's Catalogue,† would appear to have had priority of publication. For the sake of preventing confusion, I have appended to each altered name, that by which the species is known in Britain. Before a few species I have placed [, to indicate that, though probably taken in Perthshire, yet from the absence of recent specimens, some doubt is attached to them; while some other species I have excluded altogether, till better evidence of their being Perthshire species is brought forward. In regard to the species in the list, I have, in every case, satisfied myself of their authenticity: in the case of the local collections, by an examination of the specimens; and in the case of those at a distance, by the good authority on which each species rests its claims to appear in the Perthshire lists.

The names of all those who have, with great kindness, assisted me in the compilation of this list, appear therein; and to them I tender my hearty thanks, and especially to those who reside elsewhere, and upon whom the Society has no claims.

RHOPALOCERA.

NYMPHALIDÆ.

MELITÆA.		
AURINIA Rott. *(Artemis S. V.)*	F. E. ... G. P.	Local: Durdie, Kilspindie, Methven, Trossachs, B. of Allan.
ARGYNNIS.		
SELENE	F. E. ... G. P. ... A. R.	Common: Kinnoull, Glen Farg, Methven.
EUPHROSYNE	F. E. ... G. P.	Less common than *Selene:* Scone, Birnam, Crieff.
AGLAIA	F. E. ... G. P. B. A. R.	Not uncommon: Kinnoull, Methven, Birnam.
PAPHIA	... ... G.	Rossie Priory *(A. Guthrie);* also near Errol?
VANESSA.		
URTICÆ	F. E. ... G. P. B. A. R.	Abundant.
IO	F.	Near Bridge of Allan: rare. *(W. D. Paterson.)*
[ANTIOPA	... ... R.	One said to have been taken by Turner.
PYRAMEIS.		
ATALANTA	F. E. ... G. P. ... ... R.	Common; sometimes less so.
CARDUI	F. E. ... G. P. B. A. ...	Sometimes common.

* By such terms as "from the north," "from the south," &c.

† Catalog der Lepidopteren, 1871.

SATYRIDÆ.

PARARGE.

EGERIA	... ... G.	Local, and not very common: Kinnoull, Muirhall, and Rossie Priory. The northern form *Egerides*.
MEGÆRA	... E. ... G. P.	Formerly abundant, but has not been seen since 1860.

SATYRUS.

SEMELE	F. E. ... G. ... ... A. ...	Locally abundant: Kinnoull, Moncrieffe.

EPINEPHELE.

JANIRA	F. E. ... G. P. ... A. R.	Abundant.
TITHONUS	... ... G.	Kinnaird Castle. (*A. Guthrie.*)
HYPERANTHUS	F. E. ... G. P. ... A. ...	Locally common: Kinnoull, Glenfarg. The ab. *Arete* Müll. occurs.

CŒNONYMPHA.

PAMPHILUS	F. E. ... G. P. ... A. R.	Abundant.
TIPHON Rott. *(Davus F.)*	F. E. ... ... P. B. A. R.	Var. *Laidion* Bk. Local, rare in the Lowlands: Moncrieffe, Methven Moss. *Laidion* seems to be confined to Scotland and Ireland. *Isis*, which occurs here as an aberration, is the Lapland race.

EREBIA.

EPIPHRON	... ... B. ... R.	The var. *Cassiope* F.* Alpine and local, not occurring below 1600 feet? Rannoch and the Breadalbane Mts. From the Alps?
ÆTHIOPS Esp. *(Blandina F.)*	F. ... ... A. R.	Locally abundant: Trossachs, Pitlochrie, and Rannoch. From Central Europe?

PIERIDÆ.

PIERIS.

BRASSICÆ	F. E. ... G. P. B. A. R.	Abundant, but always near cultivation.
RAPÆ	F. E. ... G. P. B. A. R.	„ „
NAPI	F. E. ... G. P. B. A. R.	„ „

ANTHOCHARIS.

CARDAMINES	F. E. ... G. P.	Sometimes common: Almond, Muirhall, Methven.

LYCÆNIDÆ.

LYCÆNA.

MINIMA Fss. *(Alsus S. V.)*	F. E. ... G. P.	Sometimes common.
ICARUS	F. E. ... G. P. ... A. R.	Common.
ARTAXERXES	F. E. ... G. P. ... ... R.	Common wherever *Helianthemum vulgare* grows: Kinnoull, Moncrieffe. A geographical race of *Astrarche* Bg., *(Agestis H.)*
ÆGON	... ... R.	Near Killicrankie. *(D. P. Morison.)*

POLYOMMATUS.

PHLÆAS	F. E ... G. P. ... A. ...	Sometimes common.

THECLA.

RUBI	... E. ... G. P. ... ... R.	Not uncommon: Kinnoull, Methven, Birnam.
QUERCUS	F. E. ... G. P. ... A. ...	Not uncommon in the Lowlands: Kinnoull, Moncrieffe, Broxy. None of the *Hesperidæ* have been detected in Perthshire, though *Nisoniades Tages* very possibly occurs.

*Our insect seems to be intermediate between the English one (var. *Cassiope*) and the var. *Pyrenaica*, H. S.

NOCTURNI.

HEPIALIDÆ.

HEPIALUS.

HUMULI	F. E. ... G. P. ... ... R.	Common, less so in the highlands.
SYLVINUS	F. E. ... G. P.	Not uncommon: Craigie, Rossie Priory, Kinnoull.
VELLEDA	F. E. ... G. P. B. ... R.	Common, but local: Annate Burn, Stormontfield, Durdie. The ab. (of the male) *Gallicus* Ld. occurs.*
LUPULINUS	F. E. ... G. P.	Not common: Annate Burn, Pittheavlis, Glen Farg, Dupplin.
HECTA	F. E. ... G. P. ... ... R.	Local: Annate Burn, Stobhall, Durdie, Dupplin, Rossie Priory.

COSSIDÆ.

COSSUS.

LIGNIPERDA.	... ... R.	About L. Rannoch.

PSYCHIDÆ.

PSYCHE.

HIRSUTELLA H. *(Calvella O.)*	... ... R.	*(T. Blackburn.)*
OPACELLA	... ... R.	*(J. B. Hodgkinson.)* No species of *Zygænidæ* appears to occur in Perthshire, though there is a tradition of *Zygæna filipendulæ* having been taken on Kinnoull Hill. All the British species of *Zygæna*, except the typical *minos*, are found in Forfarshire, the next county.

SESIIDÆ.

SESIA.

TIPULIFORMIS	... ... G.	Longforgan. *(A. Guthrie.)*
SCOLIÆFORMIS	... ... R.	Near L. Rannoch. *(N. Cooke.)*

TROCHILIUM.

CRABRONIFORME Lewin. *(Bembeciforme H.)*	F. E. ... G. P.	Not uncommon: Kinnoull, Athole Bank, Stormontfield Dupplin.

SPHINGIDÆ.

MACROGLOSSA.

BOMBYLIFORMIS	F. E. ... G. P. ... ... R.	Not common: Moncrieffe, Dalcrue, Durdie.
STELLATARUM	F. E. ... G. P.	Sometimes common: Craigie, Kinnoull, Banks of Tay and Almond.

CHÆROCAMPA.

PORCELLUS	F. E. ... G. P.	Common in the Lowlands; rare, or absent, in the Highlands.
ELPENOR	... E. ... G. ... ... A. ...	Sidlaws and Alyth *(A. Guthrie)*; Abernethy?
CELERIO	... ... P.	Rare. In or near Perth, in 1862 and 1865, a few specimens. One was found just emerged from the puparium, and the wings in process of being developed.

DEILEPHILA.

GALII.	... E. ... ... P.	Larvæ found on *Galium verum* near Craigie, in 1859 *(J. Lamb and J. Trotter)*, and near Stanley, in 1870 *(T. Marshall)*.

SPHINX.

CONVOLVULI	F. E. ... G. P. ... ... R.	Not common: Craigie, Elcho, Moncrieffe, Scone.

* Formerly called *Carnus*, in Britain. The true *Carna* Esp. is an alpine species, and quite different.

ACHERONTIA.

ATROPOS F. E. ... G. P. ... ... R. Sometimes rather common in the larva state.

SMERINTHUS.

POPULI F. E. ... G. P. ... ... R. Not uncommon: Greyfriars, Woody Island.

SATURNIDÆ.

SATURNIA.

PAVONIA F. E. ... G. P. B. ... R. Common on the moors.

ENDROMIDÆ.

ENDROMIS.

VERSICOLORA ... ... R. Near Loch Rannoch.

BOMBYCIDÆ.

PŒCILOCAMPA.

POPULI F. E. ... G. P. ... ... R. Not very common: Kinnoull, Broxy, Dupplin.

BOMBYX.

CALLUNÆ F. E. ... G. P. ... A. R. Common on the moors.

RUBI F. E. ... G. P. ... ... R. „ „

LASIOCAMPA.

POTATORIA ... ... R. Moor of Rannoch. (*E. Birchall.*)

DREPANULIDÆ.

DREPANA.

FALCATARIA ... E. ... G. ... ... R. Local: Kinnoull. Scottish specimens are much paler than South English.

LACERTINARIA ... ... P. ... A. ... Local: Methven, Dunkeld.

NOTODONTIDÆ.

HARPYIA.

FURCULA ... E. ... G. P. ... ... R. Not uncommon: Banks of Almond, Earn, Annate Burn, Methven.

VINULA ... E. ... G. P. ... ... R. Common.

NOTODONTA.

TREMULA Cl. (*Dictæa L.*) ... E. ... G. P. ... ... R. Not common: Kinnoull, Cherrybank, Invermay, Birnam.

DICTÆOIDES ... E. ... ... R. Not common: Invermay, (*J. Trotter*); Rannoch.

ZICZAC ... E. ... G. P. ... ... R. Not uncommon: Invermay, Birnam, Methven.

TREPIDA ... E. ... ... P. ... . Rare: Invermay, (*J. Trotter*); Stanley, (*J. Allen Harker*).

DROMEDARIUS ... E. ... G. P. ... ... R. Not uncommon: Kinnoull, Birnam, Banks of Earn.

CHAONIA F. ... ... Rare: near Loch Katrine, (*Lovell Keays*).

LOPHOPTERYX.

CARMELITA ... ... R. (*J. B. Hodgkinson*).

CAMELINA ... ... G. P. ... ... R. Not uncommon: Kinnoull.

PTEROSTOMA.

PALPINA ... E. ... ... Local: Crieff.

PHALERA.

BUCEPHALA ... E. ... G. P. ... A. ... Common.

PYGÆRA

PIGRA Hufn. (*Reclusa S. V.*) ... ... G. ... ... R. Local: Stobhall? Common in Rannoch.

LIPARIDÆ.

ORGYIA.

ANTIQUA ... E. .. G. P. ... ... Usually common.

DASYCHIRA.

FASCELINA ... E. ... G. P. ... A. R. Common on the moors; Moncrieffe, Methven, Birnam.

ARCTIIDÆ.

SPILOSOMA.

MENTHASTRI F. E. ... G. P. ... . Abundant.

LUBRICIPEDA ... ... G. ... ... R. Local: Longforgan *(A. Guthrie);* Pitlochrie *(E. Birchall).* Perth?

MENDICA ... ... G. ... ... Local: Longforgan *(A. Guthrie).*

FULIGINOSA F. E. ... G. P. ... ... R. Var. *borealis* Stdg. Common.

ARCTIA.

CAJA F. E. ... G. P. ... ... Common.

NEMEOPHILA.

PLANTAGINIS F. E. ... G. P. ... ... R. Not uncommon: Kinnoull, Durdie. The ab. *hospita* is not rare.

RUSSULA ... E. ... G. P. ... A. R. Not uncommon: Kinnoull, Broxy, Methven.

EUCHELIA.

JACOBÆÆ ... E. ... ... P. ... ... Broxy, (many years ago) *(J. Lamb);* Craigie, (introduced).

LITHOSIDÆ.

GNOPHRIA.

RUBRICOLLIS F. E. ... G. ... ... Not common: Balthayock, Moncrieffe, Invermay.

LITHOSIA.

LURIDEOLA Zink. F. ... ... Near Bridge of Allan *(W. D. Paterson).*
(Complanula B.)

SETINA.

IRRORELLA ... E. ... ... Crieff *(A. Guthrie).*

NUDARIA.

MUNDANA F. E. ... G. P. B. ... R. Not uncommon, but local: Craigie, Annate Burn.

SENEX ... E. ... ... Crieff *(A. Guthrie).*

NOLA.

CONFUSALIS ... E. ... ... A. ... Moncrieffe *(W. Herd)*, Pitlochrie *(J. B. Hodgkinson).* From the south.

CUCULATELLA ... E. ... ... Moncrieffe (*W. Herd.*)

NYCTEOLIDÆ.

HYLOPHILA.

PRASINANA ... E. ... G. P. ... ... Not very common: Kinnoull, Methven.

SARROTHRIPA.

UNDULANA H. ... E. ... G. ... ... R. Not common: Moncrieffe, Kinnoull.
(*Revayana S. V.*)

CYMATOPHORIDÆ.

THYATIRA.

BATIS F. E. ... G. P. B. ... ... Not very common: Annate Burn, Craigie, Moncrieffe, Methven.

CYMATOPHORA.

DUPLARIS ... E. ... ... B. ... R. Local: Moncrieffe, Crieff, Killin.

OR F. ... ... P. ... ... R. Local: Methven, Rannoch. Probably co-extensive with *Populus tremula.*

ASPHALIA.

FLAVICORNIS ... E. ... G. ... ... R. Local: Kinnoull, Crieff, Rannoch.

NOCTUÆ.

DILOBA.

CÆRULEOCEPHALA	... E. ... G. P.	Common in the Lowlands.

DEMAS.

CORYLI	... E. ... G. P. ... A. R.	Not uncommon: Kinnoull, Moncrieffe, Birnam.

ACRONYCTA.

LEPORINA	... E. ... ... P. ... ... R.	Not very common: Woody Island, Birnam.
PSI	F. E. ... G. P.	Common, more especially in the Lowlands.
MEGACEPHALA	... ... G.	Local: Stormontfield (*T. Marshall.*)
LIGUSTRI	... E. ... ... P.	Not very common. Probably co-extensive with *Fraxinus*,—*i.e.*, throughout.
RUMICIS	F. E. ... G. P. ... ... R.	Common.
MENYANTHIDIS	F. ... ... P. ... ... R.	Local: Amulree, Rannoch. Ab. *Salicis*, Curt., Trossachs.
MYRICÆ	... ... R.	Local: Rannoch. Staudinger suggests that this species is a variety of *Euphorbiæ*. It has not been found elsewhere than in Scotland and Ireland.

BRYOPHILA.

PERLA	... E. ... G. P.	Common in the Lowlands.

LEUCANIA.

CONIGERA	... E. ... G. P.	Not uncommon: Moncrieffe, Bonhard, Stanley, Methven.
LYTHARGYRIA	... E. ... G. P.	Common.
COMMA	F. E. ... G. P.	Becoming commoner: Moncrieffe, Stanley, Stormontfield.
IMPURA	F. E. ... G. P. ... ... R.	Common.
PALLENS	... E. ... G. P.	Not so common as *impura*.

NONAGRIA.

FULVA	... ... G. P.	Local: Stormontfield, Stanley, Scone, Methven. The ab. (? var.) *fluxa* is commoner than the type; indeed, it is doubtful whether the latter occurs here at all.

CALAMIA.

LUTOSA	... E. ... ... P.	Hitherto rare, but probably common in the reed-beds on the Tay.

CHORTODES.

ARCUOSA	... E. ... G. P.	Local: Bonhard, Stanley, Moncrieffe.

DASYPOLIA.

TEMPLI	F. ... ... G. P.	Not common: Bowerswell, Perth, Pitroddie, Balquhidder. From Scandinavia.

GORTYNA.

OCHRACEA H. (*Flavago S.V.*)	... E. ... G.	Local: Moncrieffe, Craigie, Stormontfield.

HYDRŒCIA.

NICTITANS	F. E. ... G. P. ... A. R.	Not uncommon: Craigie, Scone, Methven.
MICACEA	F. E. ... G. P. ... ... R.	Not uncommon: Kinnoull, Stanley. *H. petasitis* should be looked for on the banks of rivers where the butter-bur abounds.

AXYLIA.

PUTRIS	... E. ... G. P.	Not common: Buckie-braes, Longforgan, Stanley, Methven.

XYLOPHASIA.

RUREA	F. E. ... G. P. ... ... R.	Common. The ab. *alopecurus* is not rare.
LITHOXYLEA	... E. ... G. P. ... ... R.	Becoming commoner: Craigie, Stanley, Dupplin.
MONOGLYPHA Hfn. *(Polyodon L.)*	F. E. ... G. P. ... .. R.	Abundant. The dark forms (ab. *infuscata* mihi) are commoner in the Highlands than in the Lowlands, and are rather smaller.

HELIOPHOBUS.

POPULARIS	... ... G. P. ... A. ...	Not common: Kinnoull, Stanley, Dunkeld.

CHARÆAS.

GRAMINIS	... E. ... G. P. B. A. R.	Common: Kinnoull, Methven, Dunkeld.

LUPERINA.

TESTACEA	.. E. ... G. P.	Not uncommon: Moncrieffe.

CRYMODES.

EXULIS	... ... R.	Very rare. Of this interesting species a few specimens have been taken in Rannoch; and it has also occurred in the Island of Arran, and in several parts of Inverness-shire. The metropolis of the species is Iceland, and it has been found in Greenland and Labrador. According to Dr Staudinger, whose acquaintance with this species is greater than that of any other entomologist, it varies to an incredible extent, (*incredibiliter aberrans*), and is perhaps a "Darwinian species" of *Maillardi*, (an inhabitant of the Alps, Pyrenees, and Norway), which again is possibly a "Darwinian species" of *Zeta*, a species from the Alps and Pyrenees. Apart from its rarity, *C. exulis* possesses the additional interest of being perhaps (along with *Pachnobia alpina*), one of the most ancient Lepidoptera inhabiting Britain, and coeval with the alpine plants of our mountain summits, the survivors of the Flora of the glacial period.

MAMESTRA.

ALBICOLON	... ... P.	Not common: Stanley (*T. Marshall*).
FURVA	... E. ... ... R.	Not common: Craigie.
BRASSICÆ	F. E. ... G. P.	Common.

APAMEA.

BASILINEA	F. E. ... G. P. ... ... R.	Common.
PABULATRICULA Br. *(Connexa Bkh.)*	E.	Not common: Scoonieburn (*W. Herd*).
GEMINA	... E. ... ... P. ... ... R.	Not very common: Crieff, Stanley.
UNAMINIS	... ... G.	Not common: Kinnoull (*Jas. Stewart*).
DIDYMA Esp. *(Oculea Gn.)*	F. E. ... G. P.	Common.

MIANA.

STRIGILIS	... E. ... G.	Common.
FASCIUNCULA	... E. ... G. P.	Common.
LITEROSA	... E. ... G. P.	Not uncommon: Moncrieffe, Stanley, Stormontfield.
BICOLORIA Vill. *(Furuncula S. V.)*	... E. ... G.	Not very common: Stormontfield, Dupplin, Longforgan.

CELÆNA.

HAWORTHII	... E. ... ... P. ... ... R.	Not common: Methven, Amulree, Earn.

STILBIA.

ANOMALA	... E. ... ... R.	Local: Moncrieffe *(W. Herd)*; Rannoch. From Western Europe.

CARADRINA.

MORPHEUS	... ... G.	Longforgan (*A. Guthrie*).
ALSINES	... ... G.	Longforgan (*A. Guthrie*).
BLANDA	... ... G. P.	Local: Stanley, Longforgan. In Dr. Knaggs' "Cabinet List" this species is referred, doubtfully, to *superstes* Tr., a species, according to Staudinger, not ranging so far west as Britain. I would be inclined to refer it to *taraxaci* H., (of which *blanda* Tr. is a synonym) a species of Central Europe, as my specimens agree with Herrich Schäfer's figure. In the meantime, however, I have retained the name *blanda* of British authors.
QUADRIPUNCTATA F. (*Cubicularis S. V.*)	F. E. ... G. P. ... ... R.	Abundant.

RUSINA.

TENEBROSA	... E. ... G. P. ... ... R.	Common, especially in the Highlands: Moncrieffe, Kinnoull, Methven.

AGROTIS.

YPSILON Rott. (*Suffusa S. V.*)	... E. ... G. P. ... ... R.	Common.
SAUCIA	... E. ... G. ... ... R.	Not common: Moncrieffe, Kinnoull, Rannoch.
SEGETUM	... E. ... G. P. ... ... R.	Common, less so in the Highlands.
EXCLAMATIONIS	F. E. ... G. P. ... ... R.	Abundant.
NIGRICANS	... E.	Not common: Moncrieffe.
TRITICI	... E. ... ... P.	Not common: Stanley.
AGATHINA	F.	Near Bridge of Allan (*Wingate*): should be looked for on Birnam, &c. From the south.
STRIGULA Thnb. (*Porphyrea S. V.*)	... E. ... G. P. B. A. R.	Common on all Moors.
PRÆCOX	... ... G.	Rare: Stormontfield (*T. Marshall.*)
LUCERNEA	... ... R.	*(J. B. Blackburn)*: should be looked for on Dunsinane and Callerfountain Hills. I have a specimen of *simulans* Hufn. (*pyrophila* S.V.) that may perhaps have been taken in Perthshire.

TRIPHÆNA.

IANTHINA	F. E. ... G. P. ... ... R.	Common.
FIMBRIA	F. E. ... G. P. ... ... R.	Not uncommon: Kinnoull, Moncrieffe, Methven, Stanley.
COMES, H. (*Orbona F.*)	F. E. ... G. P. ... ... R.	Abundant. The ab. (or species according to Mr. Newman,) *Curtisii* occurs, but not abundantly.
PRONUBA	F. E. ... G. P. ... ... R.	Abundant.

NOCTUA.

GLAREOSA	F. E. ... G. P.	Not uncommon: Kinnoull, Moncrieffe, Dupplin.

DEPUNCTA	... ... G. P. ... ... R.	Stanley, common *(T. Marshall)*; Scone *(J. Stewart)*; Rannoch *(T. Hutchinson)*.
AUGUR	... E. ... G. P. ... ... R.	Not uncommon: Stanley, Stormontfield, Methven.
PLECTA	F. E. ... G. P. ... ... R.	Common.
TRIANGULUM	F.	Near Bridge of Allan (*Wingate*).
C-NIGRUM	... E. ... G. P. ... ... R.	Common.
BRUNNEA	... E. ... G. P. ... ... R.	Not uncommon: Kinnoull, Moncrieffe.
FESTIVA	... E. ... ... R.	Apparently local: Crieff, Dupplin; common in Rannoch.
CONFLUA	F. E. ... ... R.	Local: Dupplin, Balquhidder, Rannoch. From the north: perhaps a boreal and alpine var. of *festiva*, or a Darwinian species.
DAHLII	... E. ... G. P. ... ... R.	Not uncommon: Moncrieffe, Kinnoull, Stanley, Methven.
RUBI	... E. ... G. ... ... R.	Not uncommon: Moncrieffe, Crieff.
UMBROSA	... E. ... G. P. ... ... R.	Not uncommon.
BAIA	... E. ... G. P. ... ... R.	Common.
SOBRINA	... ... R.	Rare. Discovered by Mr Cooper, near L. Rannoch, in 1853, and again found by him in 1854. About 15 specimens in all taken by Mr Cooper, and one by Mr Weaver. Not taken again, I believe, till 1870, when Mr T. Hutchinson took 4 specimens in the same locality where it was originally captured. What is the form found in this locality —the type or the var. *Gruneri* (large and greyish)? The first form occurs in Germany, Switzerland, and Russia; the second is alpine and boreal, and our insect is probably derived from it.
CASTANEA Esp. (*Neglecta H.*)	... ... P. ... A. R.	Local: Stanley, Dunkeld. Both the typical form (reddish brown) and the var. (? ab.) *neglecta* H., occur, as well as intermediate forms. In Europe the typical form has a smaller range (Germany only) than the var.
XANTHOGRAPHA	... E. ... G. P. ... ... R.	Common.
TRACHEA.		
PINIPERDA	... E. ... G. P. ... A. R.	Common in pine woods.
PACHNOBIA.		
ALPINA	... ... A. R.	Rare. Discovered by Mr. Douglas on Cairn Gower, in 1839; a second was taken (probably in Rannoch) by the late James Foxcroft in 1854; and a third, on Schiehallion, (about half way up) by T. Eedle in 1870. In recent British lists this species is referred to *carnica* Hr., (a variety, according to Staudinger, of *hyperborea* Zett.) which is figured by Herrich Schäffer (Noct. Eur. 421-424). Dr. Staudinger does not give "*alpina*" as a synonym, and mentions "*Scotia*" as a doubtful habitat. For my own part, not being able to reconcile the descriptions of the British specimens, (I have not seen one), with Herrich Schäffer's figures and the descriptions of exotic specimens, I prefer retaining, in the meantime, Westwood's name *alpina*. The range of *hyperborea* includes Lapland, Norway, Switzerland, &c.

TÆNIOCAMPA.

GOTHICA	... E. ... G. P. .. ... R.	Common.
RUBRICOSA	F. E. ... G. P. ... ... R.	Not uncommon.
INCERTA Hufn. (*Instabilis S. V.*)	... E. ... G. P. ... ... R.	Common. The ab. *fuscata* Hw. occurs.
POPULETI	... ... G.	Stormontfield (*T. Marshall*), 1871.
STABILIS	... E. ... G. P. ... ... R.	Abundant.
PULVERULENTA Esp. (*Cruda S. V.*)	E. ... G. P.	Common.

ORTHOSIA.

SUSPECTA	... E. ... G. P. ... ... R.	Not common: Kinnoull, Scone, Methven, Dupplin.
YPSILON	... ... R.	(*E. Birchall.*)
LOTA	... E. ... G. P.	Scarce: Moncrieffe, Cherrybank, Stanley. Commoner at Longforgan.
MACILENTA	... E. ... G. P. ... ... R.	Common.

ANCHOCELIS.

HELVOLA L. (*Rufina L.*)	... E. ... G. P. ... A. R.	Common. The ab. *rufa* mihi (f.w. nearly unicolorous, bright rufous) has occurred on Kinnoull.
PISTACINA	... E. ... G.	Moncrieffe, rare (*W. Herd*); Longforgan, not uncommon, (*A. Guthrie*).
LITURA	... E. ... G. P. ... ... R.	Common.
LUNOSA	... ... G.	Longforgan, not uncommon (*A. Guthrie*).

CERASTIS.

VACCINII	... E. ... G. P. ... ... R.	Abundant.*

SCOPELOSOMA.

SATELLITIA	... E. ... G. P. ... ... R.	Common.

XANTHIA.

FULVAGO L. (*Cerago S. V.*)	F. E. ... G. P. ... ... R.	Common. The ab. *flavescens* Esp. occurs.
FLAVAGO F. (*Silago H.*)	... E. ... G. P. ... ... R.	Not so common as *fulvago*.
CIRCELLARIS Hfn. (*Ferruginea S. V.*)	F. E. ... G. P. ... ... R.	Abundant.

* The varieties of this species and its ally *spadicea* (species ?) are so confusing that many collectors are puzzled as to what species certain specimens should be referred. Herrich Schäffer makes but one species, *vaccinii*: Staudinger two species,—1st, *vaccinii* L., form nearly unicolorous, with two aberrations (a. *spadicea* H., more or less banded with black; b. *mixta* Stgr., f.w. exteriorly, and in the middle, more dilutely banded); 2nd, *ligula* Esp., *subnigra* Hw., form blackish, exteriorly banded with whitish, also with two aberrations (a. *polita* H., *brigensis* B., blackish, more or less marbled with cinereous; b. *subspadicea* Stgr., *polita* D., *spadicea* Hw., Gn., rufous or brown, more often reticulated with whitish). In Stainton's Manual (and in all British lists) two species—*vaccinii* L. and *spadicea* Gn.—are given, the latter being distinguished from the former by its more indistinct markings, and by the absence of a pale-band on the hind-wing,—neither of which characters holds good in all cases. In Perthshire three, or perhaps four, forms may be found:—[1] The commonest has a reddish-brown ground-colour – varying in intensity in different individuals—three bands of a darker reddish-brown, and the outlines of the stigmata and the veins paler, (? *mixta*). [2] Resembling [1], and connected with it by intermediate forms, but with two black or bluish bands; the central shade as in [1]. (? *spadicea* H.). [3] Is also connected by intermediate forms with [1]; bright reddish-brown, with scarcely any perceptible markings, except the lower end of the reniform stigma, which is filled with black, (? *vaccinii* L.). [4] Very dark reddish-brown, the outlines of the stigmata, and some fine lines in the central area of the front-wing, blue; f.-w. rather broader than usual, (? *brigensis*).

CIRRŒDIA.

XERAMPELINA	... E. ... G. P.	Not common: South Inch, Kinnoull, Moncrieffe, Scone, Methven.

TETHEA.

SUBTUSA	... ... P.	Stanley *(T. Marshall.)*

EUPERIA.

PALEACEA Esp. (*Fulvago S. V.*)	... E.	Moncrieffe *(W. Herd).*

COSMIA.

TRAPEZINA	... E. ... G. P. ... ... R.	Common.

DIANTHŒCIA.

CARPOPHAGA	... E. ... ... P.	Banks of Almond and Earn.
CAPSINCOLA	... E. ... G. P.	Common: Banks of Almond, Bonhard.
CUCUBALI	... E. ... G. P.	Less common than *capsincola*: Bonhard, Stanley, Glen Farg.
NANA Hufn. (*Conspersa S. V.*)	... E. ... ... P.	Not very common: Moncrieffe, Banks of Almond.

HECATERA.

SERENA	... E.	A few specimens at Scoonie Burn *(W. Herd).*

POLIA.

FLAVICINCTA	... ... R.	*(J. B. Hodgkinson, 1847.)*
CHI	F. E. ... G. P. ... A. R.	Common; only the typical form.

EPUNDA.

LUTULENTA	... ... R.	*(J. B. Hodgkinson.)*
NIGRA	... E. ... ... P. ... ... R.	Not common: Moncrieffe, Cherrybank, Rannoch.
VIMINALIS	... E. ... G. P. ... ... R.	Local: Moncrieffe, Cherrybank, Longforgan. The var. *obscurior* Hw. occurs.

MISELIA.

OXYACANTHÆ	... E. ... G. P. ... ... R.	Common; only the typical form.

AGRIOPIS.

APRILINA	... E. ... G. P. ... ... R.	Common.

PHLOGOPHORA.

METICULOSA	F. E. ... G. P. ... ... R.	Sometimes common.

EUPLEXIA.

LUCIPARA	... E. ... G. ... ... R.	Local and not very common: Stormontfield, Crieff, Rannoch.

APLECTA.

PRASINA F. (*Herbida S. V.*)	... E. ... G. ... ... A. R.?	Not common: Annate Burn, Crieff, Bridge of Earn, Glen Tilt.
OCCULTA	... ... G. P. ... .. R.	Common in Rannoch; rare in other places: Scone *(J. Stewart)*, Stanley *(T. Marshall)*. Rannoch specimens are dark; Scone and Stanley, are light, and resemble southern examples.
NEBULOSA	... ... G. P. ... ... R.	Not common: Kinnoull, Methven.
TINCTA	... E. ... ... R.	Moncrieffe *(W. Herd).* Common in Rannoch.
ADVENA	... E. ... ... P.	Not common: Craigie, Crieff.

HADENA.

ADUSTA	F. E. ... ... P. ... ...R.	Not uncommon: Crieff, Methven.
PROTEA	F. E. ... G. P. ... ... R.	Common.
GLAUCA	F. E. ... ... P. ... A. R.	Not common: Dunkeld *(J. Bruce)*, Amulree *(J. Stewart)*, Crieff *(G. Norman)*, Balquhidder *(W. Cameron)*, Rannoch.
DENTINA	... E. ... G. P. ... ... R.	Common.
OLERACEA	F. E. ... G. P. ... ... R.	Very common.
PISI	F. E. ... G. P. ... ... R.	Not uncommon: Moncrieffe, Durdie.
THALASSINA	... E. ... G. P. ... ... R.	Common.
CONTIGUA	... ... R.	Local: Rannoch.
RECTILINEA	... E. ... ... P. ... ... R.	Local, and not very common: Perth *(J. Stewart)*, Crieff *(G. Norman)*, Rannoch.

CLOANTHA.

SOLIDAGINIS	... ... G. ... ... A. R.	Rare: Kinnoull *(M. Jamieson)*, Dunkeld *(T. Marshall)*, Rannoch.

CALOCAMPA.

VETUSTA	F. E. ... G. P. ... ... R.	Usually less common than the next species: Kinnoull, Moncrieffe.
EXOLETA	F. E. ... G. P. ... ... R.	Common.

ASTEROSCOPUS.

NUBECULOSUS	... ... R.	Near Loch Rannoch. First found in 1854, by Mr. J. Cooper. From the east. ?

CUCULLIA.

CHAMOMILLÆ	... E.	Rare: Bridge of Earn (*H. Laing*).
UMBRATICA	... E. ... G. P. B. A. ...	Not common: Kinnoul, Methven, Stormontfield.

HELIOTHIS.

UMBRA Hufn. *(Marginata F.)*	... ... G. P.	Stanley, Stormontfield *(T. Marshall)*.

ANARTA.

MELANOPA	... ... P. ... ... R.	On the mountains local: above the slate quarries at Glenalmond *(J. Trotter)*; Rannoch. From the north.
CORDIGERA	... ... R.	On the mountains, local: Rannoch. Alpine and boreal. A more widely distributed (in Europe) species than *Melanopa*.
MYRTILLI	F. ... ... P. ... ... R.	On moors, common: Birnam.

HABROSTOLA.

TRIPARTITA Hfn. *(Urticæ H.)*	F. E. ... G. ... B. ... R.	Common: Kinnoull, Moncrieffe.

PLUSIA.

CHRYSITIS	F. E. ... G. P.	Not very common: Kinnoull, Moncrieffe, Greyfriars Churchyard.
BRACTEA	F. E. ... G. P.	Not very common: Bonhard, Moncrieffe, Madderty, Stanley.
FESTUCÆ	F. E. ... G. P. ... ... R.	Not common: Banks of Almond, Durdie, Dron.
IOTA	... E. ... G. P. B.	Not rare: Scone, Moncrieffe.
V-AUREUM	F. E. ... G. P.	Not rare: Scone, Moncrieffe, Methven.

GAMMA F. E. ... G. P. ... ... Common.
INTERROGATIONIS ... ... P. ... ... R. Not rare where it occurs: Birnam, Rannoch.

GONOPTERA.

LIBATRIX F. E. ... G. P. ... ... Not uncommon: Perth, Woody Island, Banks of Tay, Earn, and Almond.

AMPHIPYRA.

TRAGOPOGINIS ... E. ... G. P. ... ... R. Common.

MANIA.

MAURA F. E. ... G. P. ... ... More common than it used to be: Annate Burn, Perth, Methven, Stormontfield.

NÆNIA.

TYPICA ... E. ... G. P. .. .. Common.

PHOTHEDES.

CAPTIUNCULA ... ... G. ... ... Rare: Longforgan (*A. Guthrie*). This appears to be a species of eastern rather than western Europe. It occurs also in Finland, and perhaps in Sweden and central France (mountains).

PROTHYMIA.

VIRIDARIA Cl. (*Ænea S. V.*) ... E. ... ... P. ... ... R. On the moors: Methven, Dupplin, Birnam.

EUCLIDIA.

MI ... E. ... G. P. ... ... Local and not very common: Banks of Almond, Methven Bog, Birnam, Moncrieffe. Staudinger distinguishes a south European race (*litterata* Cyr.) with white instead of ochreous markings. Some of our specimens have perfectly white markings.

GLYPHICA ... E. ... ... P. ... ... Local: Banks of Almond and Earn.

HYPENA.

PROBOSCIDALIS F. E. ... G. P. ... ... R. Common: Co-extensive with its food plant, *Urtica dioica*.

SHRANKIA.

TURFOSALIS ... ... R. Near Loch Rannoch (*J. B. Blackburn*).

BREPHOS.

PARTHENIAS ... ... P. ... ... R. Birnam, Pitlochrie, Rannoch.

GEOMETRÆ.

EPIONE.

APICIARIA F. ... ... Near Bridge of Allan, and Callander.

RUMIA.

LUTEOLATA L. (*Cratægata L.*) F. E. .. G. P. ... ... R. Common wherever hawthorn, or sloe, is found.

VENILIA.

MACULARIA F. E. ... G. P. ... A. ... Common, but local: Glen Farg, Dunkeld, Methven, Scone.

METROCAMPA.

MARGARITARIA F. E. ... G. P. ... ... R. Common in all woods.

ELLOPIA.

PROSAPIARIA L. ... E. ... G. P. ... A. R. Common in all large Scotch-fir woods: Moncrieffe, Dupplin.
(*Fasciaria S. V.*)

SELENIA.

BILUNARIA Esp. ... E. ... G. P. ... ... Common. Single-brooded here?
(*Illunaria H.*)

LUNARIA F. E. ... ... P. ... ... Not very common: Moncrieffe, Invermay.

TETRALUNARIA Hufn. ... . R. On the authority of Messrs. N. Cooke and J. B. Hodgkinson.
(*Illustraria H.*)

ODONTOPERA.

BIDENTATA F. E. ... G. P. ... ... R. Common.

CROCALLIS.

ELINGUARIA F. E. ... G. P. ... ... R. Common.

ENNOMOS.

ALNIARIA L. F. E. ... ... P. ... ... Not uncommon: Banks of Almond, Moncrieffe.
(*Tiliaria Bk.*)

EROSARIA ... ... P. ... ... Banks of Almond *(T. Anderson)*.

HIMERA.

PENNARIA ... E. ... G. P. ... ... Common.

PHIGALIA.

PEDARIA F. ... E. ... G. P. ... ... R. Common.
(*Pilosaria S. V.*)

NYSSIA.

LAPPONARIA B. ... ... R. Of this rare and interesting species, one male was taken in Rannoch, by Mr. John Warrington, on 4th April, 1871, and sent to Dr. Guard Knaggs (to whom I am indebted for the information) for determination.

N. Lapponaria may be thus described:—

Exp. al. 1″ 1‴ Smoky-brown, diaphanous, with the cilia, nervures, and four very obsolete transverse bands, darker; central dorsal line of the thorax and abdomen sprinkled with orange. It differs from *pomonaria* Esp., to which it is allied, by its shorter and broader wings, its unspotted fringes, by the orange dorsal line, &c. (From Herrich Schäffer.)

Dr. Knaggs tells me that the Perthshire specimen is somewhat larger than *pomonaria*, though Guenèe describes *Lapponaria* as less.

Dr. Staudinger suggests that *N. Lapponaria* is perhaps a boreal and alpine variety of *pomonaria*. It has only been hitherto found in Lapland and Switzerland (Upper Engadine).

BISTON.

HIRTARIA ... ... R. Near Loch Rannoch *(N. Cooke)*.

AMPHIDASIS.

BETULARIA ... E. ... G. P. ... ... Not very common: Scone, Invermay, Annate Burn, Methven.

CLEORA.

ANGULARIA Thnb. ... ... R. *(J. B. Hodgkinson).*
(Viduaria S. V.)

LICHENARIA ... E. ... G. P. ... ... Not common: Annate Burn, Moncrieffe, Stanley, Dupplin.

BOARMIA.

REPANDATA F. E. ... G. P. ... ... R. Common.

GEMMARIA Brahm. ... ... P. ... ... South Inch, fourteen years ago (*W. Herd*).
(Rhomboidaria S. V.)

ABIETARIA F. ... ... Balquhidder *(W. Cameron).*

TEPHROSIA.

CREPUSCULARIA ... E. ... G. P. ... ... R. Local: Moncrieffe, Kinnoull.

PUNCTULARIA ... ... R. Rannoch *(J. B. Hodgkinson).*

GNOPHOS.

OBSCURARIA ... E. ... G. ... ... Local: Moncrieffe, Kinnoull, Craigie, Scone.

DASYDIA.

OBFUSCARIA ... E. ... G. P. ... ... R. Local: Ochils, Moncrieffe, Kinnoull, Birnam, Rannoch. Alpine and boreal.

PSODOS.

CORACINA Esp. F. ... ... R. Head of Glen Buckie, in Balquhidder *(W. Cameron)*; Schiehallion, and other mountains near Loch Rannoch. Occurs both on the Alps and Pyrenees, and in the north of Europe.
(Trepidata Dup.)*

PSEUDOPTERPNA.

PRUINATA Hufn. F. ... ... G. P. ... A. ... Local, but probably occurs in all broom fields: Craigie, Stanley.
(Cythisaria S. V.)

GEOMETRA.

PAPILIONARIA F. E. ... ... P. ... ... R. Not common: beside the Earn, Dupplin, Birnam.

EPHYRA.

PUNCTARIA ... E. ... G. P. ... A. ... Not abundant: Banks of Almond, Kinnoull, Scone, Methven.

PENDULARIA ... E. ... ... R. Not common: Craigie, Moncrieffe.

ASTHENA.

LUTEATA ... ... G. P. ... ... Rare: Scone, Methven.

CANDIDATA ... E. ... ... Crieff Junction, Stanley.

VENUSIA.

CAMBRICA ... ... R. Near L. Rannoch *(T. Hutchinson).*

ACIDALIA.

DIMIDIATA Hufn. ... E. ... ... P. ... ... Not common: beside the Earn, Stanley, Crieff Junction.
(Scutulata S. V.)

BISETATA ... E. ... G. P. ... ... Common.

INCANARIA ... E. ... ... Moncrieffe *(W. Herd).*

FUMATA ... ... R. Common in Rannoch.

REMUTARIA ... ... A. ... Dunkeld *(J. C. Dale).*

AVERSATA ... E. ... G. P. ... ... Common. The banded variety (*Lividata* Gn.) is not common except near Longforgan.

* The true *trepidaria* H. is greenish, sprinkled with yellow.

INORNATA	... E.	Moncrieffe *(W. Herd).* Probably often passed over as *aversata.* Several more *Acidaliæ* ought to occur in Perthshire.
CABERA.		
PUSARIA	F. E. ... G. P.	Abundant. Ab. *rotundaria* Hw. occurs?
EXANTHEMATA	F. E. ... G. P.	Not uncommon.
MACARIA.		
NOTATA	... E.?... ... P.	Not common : Stanley *(T. Marshall).*
LITURATA	... E. ... G. P. ... ... R.	Common in pine woods : Moncrieffe, Methven, Stanley.
HALIA.		
WAVARIA	... E. ... G. P. ... ... R.	Common in gardens.
SCODIONA.		
BELGARIA	... E. ... ... R.	Var. *favillacearia* H. Not common : Dron, Rannoch. From the east?
FIDONIA.		
CARBONARIA	... ... R.	Hills in Rannoch. Alpine and boreal. First taken by Mr. Hodgkinson in 1847.
ATOMARIA	F. E. ... G. P. B. ... R.	Abundant on all moors.
PINIARIA	.. E. ... G. P. ... ... R.	Abundant in all pine woods.
BRUNNEATA	... ... R.	Common in the Blackwood. This species should be looked out for in Scone Woods near the station for *Moneses.* Occurs in central and northern Europe.
LIMBARIA	... E. ... G. ... ... A. ...	Bridge of Earn and Dunkeld *(Stainton's Manual);* three miles north-east of Perth *(J. Trotter).* Can no one rediscover this species in Perthshire? From the south.
STERRHA.		
SACRARIA	... ... R.	Near L. Rannoch *(J. B. Blackburn).* I had the pleasure of seeing the specimens (3 males) the day they were taken. From the south.
LYTHRIA.		
[PURPURARIA	... ... G.	Old Scone Road (*D. P. Morison*). Widely distributed in Europe.
ASPILATES.		
STRIGILLARIA	... ... P.	Apparently rare : Methven ; Stanley (*T. Marshall*).
ABRAXAS.		
GROSSULARIATA	... E. .. G. P.	Local : Errol and other places in the Carse of Gowrie ; Dunning. Formerly in Perth, but now apparently extinct.
LOMASPILIS.		
MARGINATA	F. E. ... G. P.	Common : Glen Farg, Scone, Methven.
HYBERNIA.		
RUPICAPRARIA	... E. ... G. P.	Abundant on hawthorn hedges.
LEUCOPHÆARIA	... E. ... G. P.	Not uncommon : Moncrieffe, Kinnoull, Methven.
AURANTIARIA	... E. ... G. ... ... R.	Scarce : Moncrieffe, Kinnoull.
MARGINARIA Bkh. *(Progemmaria H.)*	... E. ... G. P.	Common.
DEFOLIARIA	... E. ... ... P.	Not very common : Moncrieffe, Methven.

ANISOPTERYX.

ŒSCULARIA	... E. ... G.	Common in ash woods, and on privet hedges: Moncrieffe, Kinnoull.

CHEIMATOBIA.

BRUMATA	... E. ... G. P. ... ... R.	Abundant.
BOREATA	... ... G. ... ... R.	Kinnoull. Often passed over as *brumata*.

OPORABIA.

DILUTATA	F. E. ... G. P. ... ... R.	Abundant.
FILIGRAMMARIA	... ... R.	Rannoch. It is doubtful whether this occurs out of Britain. It is perhaps a var. or Darwinian species of *dilutata*.

LARENTIA.

DIDYMATA	F. E. ... G. P. B. ... R.	Abundant.
MULTISTRIGARIA	F. E. ... G. P.	Common: Moncrieffe, Kinnoull, Stanley, Methven.
CÆSIATA	F. E. .. G. P. ... ... R.	Abundant on all heaths.
FLAVICINCTATA	F. ... ... B. ... R.	Rocks, and sides of burns on high mountains. Balquhidder *(W. Cameron)*; Ben Lawers, Larig-an-Lochan, and Mael Ghyrdhy *(F. B. W.)*; Rannoch *(J. B. Hodgkinson)*. Boreal and alpine. *Ruficinctaria* Gn. is a southern race of *salicata* H.
SALICATA	... ... R.	Common in Rannoch. Alpine. From the south.
OLIVATA	F. E. ... G. P. B. ... R.	Not uncommon: Kinnoull, Stanley, Birnam.
VIRIDARIA F. (*Pectinitaria Kn.*)	F. E. ... G. P. ... ... R.	Common.

EMMELESIA.

AFFINITATA	... ... R.	Near L. Rannoch (*C. G. Barrett*).
ALCHEMILLATA	... ... G. ... ... A. R.	Not common: Annate Burn, Rannoch.
ALBULATA	F. E. ... ... P. ... A. R.	Common.
DECOLORATA	... E.	Near Crieff Junction *(J. Stewart)*.
MINORATA Tr. (*Ericetata C.*)	... ... B. ... R.	Ben Lawers; common in Rannoch. Boreal and alpine.
ADÆQUATA Bkh. (*Blandiata S.V.*)	... E. ... ... B. ... R.	In several localities near L. Rannoch; between L. Earn and Killin *(N. Cooke)*.

EUPITHECIA.

PULCHELLATA	F. E.	Ochils *(J. C. Dale)*; L. Katrine; Moncrieffe *(W. Herl)*; Balquhidder *(W. Cameron)*. Probably wherever foxglove grows—*i.e.*, throughout the county. "A Darwinian species of *linariata*?"—Staudinger.
SUCCENTURIATA	... E. ... G. ... ... R.	Kinnoull, Moncrieffe.
SUBFULVATA	... E. ... G. P.	Kinnoull, Moncrieffe, Stanley.
SCABIOSATA Bkh. (*Subumbrata S.V.*)	... ... A. ...	Dunkeld *(J. C. Dale)*.
PLUMBEOLATA	... ... R.	In Rannoch.
SATYRATA	... ... R.	The var. *callunaria*.
CASTIGATA	F. ... ... R.	Balquhidder *(W. Cameron)*; Rannoch *(J. B. Hodginson)*.
FRAXINATA	... ... R.	*(J. B. Hodgkinson)*.
INDIGATA	... ... R.	In the Blackwood *(J. B. Hodgkinson)*.

CONSTRICTATA	... ... R.	*(H. Jenner Fust, Jr.)* This has been, as yet, found in Britain only.
NANATA	... E. ... ... P. B. ... R.	Probably common on all moors.
SUBNOTATA	... ... G.	Scone *(J. Stewart)*.
VULGATA	... E. ... G. ... ... R.	Common.
ABSYNTHIATA	... E. ... G. P.	Scone, Stanley, Moncrieffe.
MINUTATA	... ... R.	Not uncommon in Rannoch. Probably on all the moors.
ASSIMILATA	... ... P. ... ... R.	Common in gardens.
TENUIATA	... E. ... G. P. ... ... R.	Kinnoull, Moncrieffe. Larvæ abundant in sallow catkins—probably throughout the county.
SOBRINATA	F.	Trossachs *(J. C. Dale)*; Balquhidder (*W. Cameron*).
TOGATA	... E.	Dupplin Woods *(J. Wilson)*. I have not seen any examples.
PUMILATA	... ... R.	*(H. Jenner Fust, Jr.* and *J. B. Hodgkinson)*.
RECTANGULATA	... ... G. P. ... ... R.	Kinnoull, Scone, Methven. Several other species should be found in the county, and no doubt will be, when collectors cease to neglect this genus.

LOBOPHORA.

CARPINATA Bkh. (*Lobulata H.*)	... E. ... ... R.	Local: Moncrieffe. *L. halterata* Hufn. (*hexapterata* Schiff.) should occur.

THERA.

JUNIPERATA	... ... P. ... A. R.	Common where juniper abounds, as at Dunkeld. Scottish specimens are much smaller and darker than English, but are apparently the same species (var. *Scotica mihi*).
SIMULATA	... ... A. R.	Dunkeld.
VARIATA	... E. ... G. P. B. ... R.	Common in every pine wood. The var. *obeliscata* H.
FIRMATA	F. ... ... R.	Balquhidder (*W. Cameron*); Rannoch (*J. B. Hodgkinson*).

HYPSIPETES.

RUBERATA	... ... R.	(*J. B. Hodgkinson*).
TRIFASCIATA Bkh. (*Impluviata S. V.*)	F. E. ... G. P. ... ... R.	Not uncommon: Craigie, Durdie. Some specimens closely resemble *ruberata*.
SORDIDATA F. (*Elutata H.*)	F. E. ... G. P. ... ... R.	Very common. The boreal var. *infuscata* occurs as an ab.

MELANTHIA.

BICOLORATA Hufn. (*Rubiginata S. V.*)	E. ... G. P. ... ... R.	Common: Annate Burn, Methven. The ab. *plumbata* is sometimes found.
OCELLATA	F. E. ... G. P. ... ... R.	Common.

MELANIPPE.

HASTATA	F. E. .. .. R.	Trossachs (*T. Chapman*); Glen Farg? (*W. Herd*); Rannoch (*H. Jenner Fust, Jr.*, and *J. B. Hodgkinson*).
TRISTATA	F. E. ... G. P. ... ... R.	Common: Kinnoull, Moncrieffe.
SOCIATA Bkh. (*Subtristata Hw.*)	F. E. ... G. P. ... ... R.	Very common.
MONTANATA	F. E. ... G. P. ... ... R.	Abundant.
FLUCTUATA	F. E. ... G. P. B. ... R.	Abundant in or near gardens. Scottish specimens are much suffused with grey.

ANTICLEA.

BADIATA	... E. ... G. P.	Common: Kinnoull, Moncrieffe.
NIGROFASCIARIA Gz. (*Derivata S. V.*)	E. ... G. P. ... A. ...	Not common: Annate Burn, Methven.

COREMIA.

MUNITATA	F. ... ... G. P. ... ... R.	Not uncommon, especially among the mountains: Longforgan, Annate Burn, Stanley, Methven. Alpine and boreal.
DESIGNATA Hufn. (*Propugnata S. V.*)	F. ... ... G. P.	Not common: Annate Burn, Longforgan, Stanley, Balquhidder.
FERRUGATA	F. E. ... G. ... ... R.	Local: Moncrieffe, Glen Farg.

CAMPTOGRAMMA.

BILINEATA	F. E. ... G. P. ... A. R.	Abundant.

PHIBALAPTERYX.

LAPIDATA	F. ... ... R.	Rare. Near Loch Lubnaig (*W. D. Paterson*); in Rannoch. Boreal?
VITTATA Bkh. (*Lignata H.*)	... ... R.	Rare: Rannoch (*C. G. Barrett*).

SCOTOSIA.

DUBITATA	... E. ... G.	Not common: Annate Burn (*J. M'Farlane*); Crieff (*A. Guthrie.*)

CIDARIA.

SITERATA Hufn. (*Psitticata S. V.*)	F. E. ... G. P. ... ... R.	Not very common: Kinnoull, Stanley.
MIATA	.. E. ... G. P. ... ... R.	Common: Kinnoull, Moncrieffe.
CORYLATA	F. E. ... G. P. ... ... R.	Common. The ab. *albocrenata* occurs at Taynege (*J. B. Hodgkinson*).
TRUNCATA Hufn. (*Russata S. V.*)	... E. ... G. P. ... ... R.	Common. Ab. *perfuscata* Hw., on Kinnoull (*J. C. Dale*), and elsewhere.
IMMANATA	... E. ... G. P. ... ... R.	Common.
SUFFUMATA	... E. ... G. P.	Local: Kinnoull, Moncrieffe.
SILACEATA	... ... G.	Local: Annate Burn.
PRUNATA	... E. ... G. P. ... ... R.	Common in gardens.
TESTATA	F. E. ... G. P. ... ... R.	Common on the hills: Stanley, Dupplin.
POPULATA	F. E. ... G. P. B. A. R.	Common: Kinnoull, Moncrieffe. A form of (apparently) this species, found on Kinnoull and elsewhere, differs from the type in having the central band scarcely darker than the rest of the wing, and in a tendency in the fringes to be spotted, thus approaching *dotata* of British lists.* Some nearly unicolorous dark brown aberrations (ab. *musauaria* Fr.) occur, especially in the Black Wood in Rannoch.
FULVATA	F. E. ... G. P. B.	Common.
DOTATA L.* (*Pyraliata S. V.*)	... E. ... G. P. B.	Not very common: Moncrieffe, Stanley, Stormontfield, Methven.

* *Dotata* of British lists is *associata* Bkh.

PELURGA.

COMITATA ... E. ... ... B. ... R. Not very common: Moncrieffe.

EUBOLIA.

CERVINARIA ... E. ... G. ... ... Rather scarce: Scoonie Burn (*W. Herd*); Stormontfield (*T. Marshall*).

LIMITATA Sc. ... E. ... G. P. ... ... Common.
(*Mensuraria S. V.*)

PLUMBARIA ... E. ... G. P. ... ... R. Common.

CARSIA.

PALUDATA Thnb. F. ... ... R. Var. *imbutata*. Not common: Trossachs, Rannoch. Boreal and alpine.
(*Imbutata H.*)

ANAITIS.

PLAGIATA F. E. ... G. P. B. ... R. Not uncommon: Glen Farg, Stanley, Methven, Stormontfield.

CHESIAS.

SPARTIATA ... E. ... G. P. ... ... Common in all broom fields.

RUFATA F. ... E. ... G. P. ... ... Less common, but probably occurs in all broom fields: Kinnoull, Scone, Craigie, Stanley, Methven, Glenalmond.
(Obliquaria S. V.)

TANAGRA.

ATRATA L. F. E. ... G. P. B. ... R. Common on river banks: Almond, Glen Farg.
(*Chærophyllata L.*)

PYRALIDES.

PYRALIS.

FARINALIS ... E. ... G. P. ... ... In or near houses, not very common.

AGLOSSA.

PINGUINALIS F. E. ... G. P. ... ... R. In similar situations to the last species, and sometimes abundant.

PYRAUSTA.

PURPURALIS ... E. ... ... R. Apparently local or overlooked: Glen Farg and Loch Rannoch.

OSTRINALIS ... ... R. Apparently local or overlooked: Loch Rannoch.

HERBULA.

CESPITALIS F. ... ... G. ... ... R. Not common: Kinnoull (*A. Simpson*).

ENNYCHIA.

CINGULATA F. E. ... G. ... ... Locally abundant: Moncrieffe and Kinnoull Hills.

CATACLYSTA.

LEMNATA ... ... P. ... ... Marsh near Craigie where *Lemna* abounds (*D. P. Morison*).

HYDROCAMPA.

NYMPHÆATA ... E. ... ... } Dead waters of the Earn, common. *Acentropus niveus* should be looked for; it occurs abundantly in Fifeshire, wherever (writes Dr Boswell Syme) *Potamogeton filiformis* is common.

STAGNATA ... E. ... ... }

BOTYS.

FUSCALIS ... E. ... ... P. ... ... R. Somewhat local: in marshy places.

[URTICATA ... E.?... ... ... Doubtful: should be looked out for.

PIONEA.

FORFICALIS	F. E. ... G. P. ... ... R.	Common in and near gardens.

SPILODES.

STICTICALIS	... ...	Specimens taken in Perthshire (but in what part I cannot remember) are in my cabinet.

SCOPULA.

ALPINALIS	F. ... ... B. ... R.	Not rare on the higher mountains. Alpine.
LUTEALIS *	F. E. ... G. P.	Common in the Lowlands.
PRUNALIS	... E. ... G. P.	Rare: Moncrieffe (*W. Herd*); Stanley (*T. Marshall*); Scone (*J. Stewart*).
DECREPITALIS	... ... L. ... ... R.	Near L. Rannoch (*J. B. Hodgkinson*, 1847); near the head of L. Lomond (*T. Chapman*). Boreal and alpine.

NOMOPHILA.

NOCTUELLA (*Hybridalis H.*)	... ... R.	Near Kinloch-Rannoch.

SCOPARIA.

AMBIGUALIS	F. E. ... G. P. ... ... R.	Very common.
CEMBRÆ	... E. ... G.	Not common: Moncrieffe, Kinnoull.
DUBITALIS	... E.	Apparently rare: Moncrieffe.
MURANA	... E. ... G. P. ... ... R.	Common. This species is alpine in South and Central Europe.
LINEOLA	... ... R.	Near L. Rannoch (*T. Blackburn*).
FREQUENTELLA Stt. (? *Mercuriella L.*)	E. ... ... P.	Common.
CRATÆGELLA	... E. ... ... P. ... ... R.	Common.
ATOMALIS	... ... R.	Common in Rannoch. Britain only?
GRACILALIS	... ... R.	(*Stainton's Manual*). Has been found only in Scotland and Norway.
ALPINA	... ... B. ... R.	Ben Lawers, and mountains near Loch Rannoch, always at the very summit. Not yet detected elsewhere.

CRAMBITES.

CRAMBUS.

PASCUELLUS	F. ... ... R.	Not common, or local.
ERICELLUS	... ... R.	Locally common in Rannoch. Central and northern Europe.
PRATELLUS	... E. ... G. P. ... ... R.	Very common.
DUMETELLUS	... ... R.	Near L. Rannoch (*J. B. Hodgkinson*, 1847).
HORTUELLUS	... E. ... G. ... ... R.	Not uncommon.
FALSELLUS	... E. ... ... A. ...	Local: Craigie and Moncrieffe; Killiecrankie.
PINELLUS L. (*Pinetella L.*)	... E. ... G. P.	Not uncommon: Craigie, Stanley, Methven.
MYELLUS	... ... A. ...	Blairathole (*W. C. Boyd*). Central Europe and Finland.

* In Staudinger's "Catalog" there appears to be some mistake as to the species known in Britain under this name: but *lutealis* H. 145, H. S. 64-66, is certainly our insect; and *elutalis* S. V., H. S. 16, to which Staudinger refers *lutealis* Hw., a different species. The only localities mentioned by Staudinger for *lutealis* H. are the Alps, Western Russia, and the Caucasus.

MARGARITELLUS	... ... R.	Common in Rannoch.
LATISTRIUS	... E.	Crieff (*A. Guthrie*).
FURCATELLUS	... ... B. ... R.	Ben Lawers (*J. B. Hodgkinson*); Grayvel (*T. Blackburn*). Boreal and alpine.
CULMELLUS	... F. G. P. ... ... R.	Very common, even in town gardens.
INQUINATELLUS	... E. ... ... R.	Moncrieffe, and near L. Rannoch.
GENICULEUS	... ...	Perthshire (*J. C. Dale*).
TRISTELLUS	F. E. ... G. P. ... ... R.	Very common.
PERLELLUS	... ... P. ... ... R.	Rare or overlooked: Perth; Rannoch (*E. Birchall*).

PHYCIS.

FUSCA	... E. ... ... R.	Moncrieffe.
SUBORNATELLA	... E.	Moncrieffe, abundant (*W. Herd*). Flies in the sunshine on the face of the rocks. From the south.
ABIETELLA	... ... R.	Rare. *Acrobasis tumidella* is probably a native of the county. I have seen a specimen that was very likely taken near Perth.

HYPOCHALCIA.

AHENELLA	... ...	Perthshire specimens (locality unknown) are in Mr. J. Lamb's and my own collections.

APHOMIA.

SOCIELLA	... E. ... G. P. ... ... R.	Common. The larvæ inhabit wasps' (not bees') nests, and live upon the substance of the nest.

ACHROEA.

GRISELLA	... E. ... G.	Rare: near Moncrieffe.

TORTRICES.

THE TORTRICES have been so much neglected in Perthshire (except in the district of Rannoch), that it was a matter for consideration, whether an enumeration of the county species should not be delayed for the present. As, however, our list numbers 107 species, I have thought it advisable to include the TORTRICES in this catalogue.

The nomenclature and arrangement are those of Mr. Doubleday.

TORTRIX pyrastrana, G.
xylosteana, E.
rosana, E.
heparana, E. G.
ribeana, F. E. G.

TORTRIX corylana, E. G. R.
viburnana, R.
icterana, E.
viridana, F. E. G. P. R.
ministrana, E. P.

Tortrix adjunctana, R.
Amphysa Gerningana, R.
Walkerana, R.
Leptogramma literana, P. G. R.
Treveriana, R.
Peronea favillaceana.
rufana, R.
mixtana, E. R.
Caledoniana, F. R.
variegana, F. E. R.
cristana, R.
hastiana, R.
maccana, R.
ferrugana, P. G. R.
Teras caudana, F. E. P. R.
contaminana, F. P. G.
Dictyopteryx Lœflingiana, E. G.
Holmiana, P.
Bergmanniana, E. G.
Argyrotoza Conwayana, E.
Ptycholoma Lecheana, E. R.
Penthina picana, E.
betulætana, E.
prælongana, E. G. R.
pruniana, R.
ochromelana, R.
carbonana, R.
Pardia tripunctana, F. E.
Sericoris cespitana, E. R.
conchana, R.
herbana, R.
lacunana, R.
urticana, E.
Daleana, R.
Mixodia Schulziana, G. P. R.
palustrana, E. P. G. R.
Ratzburghiana, R.
Roxana arcuana, P.
Euchromia flammeana, R.
arbutana, R.
Orthotænia antiquana, E. R.
Cnephasia lepidana, P.
musculana, E. G. R.
Sciaphila alternana, E.
sinuana, R.
Penziana, E. G.
Clepsis rusticana, R.
Bactra lanceolana, R.
Phoxopteryx unguicella, E. G.
uncana, E. G.
myrtillana, E. G. R.
Lundana, F.
ramana.
Grapholita Paykulliana.
nisana, E.
cinerana, R.
nigromaculana, E.
campoliliana, R.
trimaculana, E.
Penkleriana, P. R.
nævana, E.
geminana, R.
Phlæodes tetraquetrana, R.
Hypermecia augustana, R.
Pœdisca bilunana, R.
ophthalmicana, R.
solandriana, E. P. G. R.
Ephippiphora bimaculana, E.
cirsiana, E.
scutulana, E.
Coccyx cosmophorana, R.
strobilana, E. G.
tœdana, R.
Hyrciniana, E. G.
finimitana, R.
ustomaculana, R.
vacciniana, R.
Pamplusia monticolana, R.
Retinia resinana, R.
duplana, R.
Carpocapsa pomonana, P.
Stigmonota dorsana, A.
coniferana, R.
Dicrorampha saturnana, R.
plumbagana, E. G. R,
Catoptria ulicetana, P. G. R.
Scopoliana, E. R.
Trycheris mediana, P.
Xylopoda Fabriciana, F. E. R.
Eupœcilia dubitana? R.
angustana, E. R.
ciliella, E. R.

XANTHOSETIA zœgana, E. P. G. A.
hamana E. P. G. R.
COCHYLIS straminеana, E. G.
APHELIA pratana,, R.
TORTRICODES hyemana, G.

TINEÆ and PTEROPHORI.

Too little is known of the Perthshire species belonging to these groups, to make an attempt at enumeration worth while at present. Let us hope that this will not long remain the case.

CHRISTIE AND TAINSH, PRINTERS, PERTH.

THE

LEPIDOPTERA OF SCOT[illegible]

THE publication in the "*Scottish Naturalist*" of a List of the Scottish Lepidoptera [illegible] and the kind assistance of all persons acquainted with the subject is earnestly requested. For the purpose of ascertaining the distribution of the species throughout the country, it is proposed to divide Scotland into certain natural districts. The districts are as follows:—

1. **Tweed.**—Parts drained by the Tweed, and other rivers entering the sea as far north as Cockburnspath.
2. **Solway.**—Parts draining into the Solway Firth and North Channel as far north as Culzean Castle.
3. **Forth.**—Parts drained by the Forth and other rivers entering the North Sea between Cockburnspath [illegible]
4. **Clyde.**—Parts drained by the Clyde and other rivers between Culzean Castle and Loch Awe [illegible]
5. **Tay.**—Parts drained by the Tay and other rivers between Fifeness and Berwie
6. **Argyle.**—Parts drained by rivers between Lochs Awe and Aylort; includes Mull, Ti[illegible]
7. **Dee.**—Parts drained by the Dee and other rivers between Berwie and Fisligo.
8. **Moray.**—Parts drained by rivers entering the North Sea between Fisligo and Helmsdale, [illegible] west as Loch Oich.
9. **Sutherland.**—Parts drained by rivers between Helmsdale and Cape Wrath.
10. **West Ross.**—Parts drained by rivers between Cape Wrath and Loch Aylort; includes Skye.
11. **Hebrides.**
12. **Orkney.**
13. **Zetland.**

In addition to the District distribution, information is solicited on the following [illegible]

(a) The vertical range of each species.

(b) The relation between the range of a species and that of its food-plant.

(c) The relation between the range of a species and the geological formation of the district.

(d) The influence of the proximity of the sea. For some insects (as is the case with certain plants) appear to occur at a higher altitude on the sea-coast than they do inland.

(e) Local varieties or aberrations.

Entomologists willing to assist in the compilation of this List are requested to communicate with Mr. BUCHANAN WHITE, editor of the "*Scottish Naturalist*," who will be happy to afford any further information.

N.B.—The List will be illustrated by a map of Scotland. A limited number of copies of the List will be published in a separate form; early application for these should be made.