THE HISTORY OF THE SQUIRREL

IN

GREAT BRITAIN.

BY

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THE SQUIRREL IN GREAT BRITAIN.

PART I.

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GEOLOGICAL EVIDENCE.

We have no evidence of the occurrence of the squirrel in post-tertiary deposits. It is not, I believe, made mention of by Dr James Geikie as being found in post-tertiary deposits in Scotland in his "Great Ice Age." Mr A. Murray, in "The Geographical Distribution of Mammals," tells us: "The only fossil remains of squirrels are of recent date. ... Remains of the living species of squirrels have been found in bone caves, but nothing indicating its presence in Europe or indeed anywhere else at a more ancient date." Nor does it appear to be of common occurrence even in more recent remains. The only evidence of squirrels in the Pleistocene Shale of Britain is that afforded by gnawed fir-cones in the pre-glacial forest bed of Norfolk, which were recognised by Professor Heer and the late Rev. S. W. King, as I am informed by Professor Boyd Dawkins, who adds further, that he "does not know of any bones of squirrels in any prehistoric deposit, and I do not think that the nuts (found in marl, etc.) are proved to have been gnawed by them and not by Arvicola amphibia." I may add here that I have since collected gnawed nuts from various localities and compared them with recent ones, and it seems to me quite impossible to separate them by any evidence afforded by the tooth-marks. Those gnawed by smaller rodents (such as species, probably, of field-mice), are more easily distinguishable.

This apparent absence from recent deposits in Great Britain may, in some measure, perhaps be accounted for by its arborescent habits. If traces of it, however, are found in the pre-glacial beds of Norfolk, is its absence in other localities further north not without significance as regards its distribution in time?
In endeavouring to trace the early dispersal and distribution of the squirrel, we may find it useful to call to our aid a study of the various names of the animal—ancient and modern—and of the areas in which these names occur.

A very large number of provincial names of the species in use in Italy, Spain, Portugal, France, and in our own country, are directly traceable to their common origin in the name first used by Aristotle, viz., σκιόφος (skia—sh ade, and ουρός—tail) through the Latin diminutive sciuroidus.*

Our name squirrel occurs at a very early date, being used by St Hugh, dating A.D. 70-1200. Thereafter it occurs constantly in later works, through the fourteenth and fifteenth centuries, numerously in the seventeenth century, and continuing to the present time, with certain local variations and spellings. Thus we find it mentioned in the first English-Latin Dictionary in the East-Anglian dialect as "scord or scuir,"† and we find it again evinced in the local names skug and skoggie used in Hampshire at the present day, and reappearing as a Scotch word for shade or shelter in "skug=umbra, shade, skug—a shelter; to skug, to hide; to skoog a shower;"‡ while on the English border occurs scuggery—secrecy, along with other evidence.

Thus the name squirrel has come to us, along with the animal itself, northwards, and its use is distributed over many continental countries.

The distribution of the use of the name con for a squirrel appears to have been in North Lancashire, in the southern portions of Cumberland, and in Westmoreland on the English side of the border, and through the south of Scotland, but is unknown in the northern parts of Cumberland. If it was ever used in the Carlisle district, the use of it must have become extinct with the possible early extinction of the

† "Promptorium parvulorum sive clericorum, Dictionarius Anglo-Latinus Princps," autore Frator Galfrido, etc. Circa, A.D. MCCCXL.
‡ Jamieson's "Dictionary of the Scottish Language."
Mr Harvie-Brown on the Squirrel in Great Britain. 345

species itself in that district. At present the use of the name con is quite extinct in the south of Scotland, but was known in 1771 to the Gaelic bard Alastair M'Donald, as he includes it in his Gaelic Vocabulary thus: “Féarna: a squirrel or conn.”

Gaelic scholars are of the opinion that con or conn is a shortening of the Gaelic word coincein, a rabbit. Early Scottish writers however distinguished between rabbit and squirrel thus:

I saw the Hurcheon and the Hare,
The Con, the Cuninng, and the Cat.
—Cherrie and Slac, 3.

and again—

There was the pikit porcopie,
The Cuning, and the Con, all thrie.
—Watson's Collection, ii. 20.

And Ferguson in his “Dialect of Cumberland,” gives “con, a squirrel’s nest; in Lonsdale, the squirrel,” and refers it to the Welsh word cont, a tail.

The absence of the name altogether from a tract of country intervening between those localities where it is used in England, and those where it was used in Scotland, viz., around the neighbourhood of Carlisle and the northern portions of Cumberland, is curiously suggestive, and, when taken in conjunction with the facts of the probable disappearance of the species from these tracts at an early date as compared with other localities further south and further north, as I propose to show further on, may not prove altogether useless in assisting us to arrive at conclusions regarding the dispersal, ancient distribution, and subsequent disappearance of the species.

But it is well known to Erse and Gaelic scholars that often extraordinary confusion exists amongst the names of animals in these languages. Thus coinin, the Irish for a rabbit, is a diminutive of cà, a dog, and means literally a little dog. The use of the Gaelic coincein is almost if not quite extinct even in districts of Scotland where the Gaelic has been preserved longest in its purity, and the rabbit is only known as the rabhaid, which distinguishes it as an alien, in such localities where the latter word is used. Under these circumstances
the difficulties which surround the question of the identity of numerous Gaelic names, or by what process they came to be used and applied, seem almost impossible to unravel. In my original manuscript, of which this is an abstract, I go more fully into the subject, quoting and referring to all my authorities, having taken the various opinions of able Gaelic scholars; but, while the isolation of the use of the word con in England remains a fact, we are as yet unable to account for it, though we might easily advance theories founded upon our present information.

Of the presently used Gaelic word, feoray, it is probably of considerable antiquity, and the most probable interpretation seems to be “the little questioner,” from Gael. feoirich, to question; and ay, the endearing diminutive termination; but, as has been pointed out to me by Mr James Macpherson— whom I have been greatly indebted for assistance in these and similar researches—the name may have arisen from a much earlier root, viz, “a root-word, feo,* now lost sight of and not given in the dictionaries, meaning strictly, or in a general sense, bearded—feo, beard; earr, a tail; and ay, the diminutive termination of feminine nouns. Earrag is one of its actual Gaelic names.”

Thus also in the Erse occurs iora, but this is not found in the earliest dictionaries—as O’Brien’s, but only in the later ones of O’Reilly and M’Curtin’s, and in the works of authors which are of comparatively recent date.

In old Irish occurs the word iaronns,† which, as far as I know, has not yet been satisfactorily identified. Other old Irish names, as sesquirolos and cricharán occurring in the above-quoted poem, cannot be considered of value in this connection, but it would occupy too much space here to enter into a fuller attempt at the explanation of these. But upon the correct rendering of some of these old Irish names

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* Recurring in føsbag, a beard; føchadon, a corn-thistle; føcullan a polecat; and føoray, the word under discussion; and so perhaps føoir—grass (from feo, beard, and ar or ire, soil), gives beard of the soil (Scotteice, braird).

probably rests the fixing of interesting facts connected with the early dispersal of several of our British mammals.

It appears possible that the Irish words iora and iaronn may have intimate relation with the Gaelic feorag or fiodharag, of which latter I speak immediately.

In Argyleshire, alone of all the Scottish counties—except in Braemar in Aberdeenshire—so far as I have been able to learn, does any trace of the squirrel appear in topography, but in Argyleshire, curiously enough, it occurs no less than five times, viz., in Innis-na-Fheórag in Ardmunurchan; Glacl Fheórag in Appin; Ault Fheórag, Tom-nam-Fheórag, and Easan-Fheórag. Whether these names be correctly derived from the Gaelic name of the squirrel or not is a point about which there is a large amount of discussion and difference of opinion amongst our best Gaelic scholars. For the same reasons already given, viz., the great difficulties surrounding the identity of numerous Gaelic names, it does not seem desirable in this place to attempt to explain or unravel them, but it may be mentioned that whilst one side upholds the direct derivation from fheórag, a squirrel, another rather inclines to the belief that the name is derived from local features of the localities, such as is undoubtedly the commonest practice in Gaelic topography—thus; Ault Fiarag (pronounced slightly different from Feorag—genitive Fheórag) would be the crooked burnie. But if such came to be applied in one Gaelic-speaking district, why should it be so completely absent from others where many crooked burnies exist, and have not, like the squirrel, become nearly extinct?

To show the confusion existing amongst Gaelic names of animals, I will just make one quotation from the correspondence of Mr James Macpherson.

As already shown, Fheórag is supposed to be derived from feoirich, to question, and ag, the diminutive; or it may be from feo, an obsolete root-word, earr, a tail, and ag. But now to this Gaelic scholars add a third, viz., "possibly a corruption or softened pronunciation of Fiodhareag, which would mean, 'the wood or tree animal.'" If this is so, the name may have been applied by the early inhabitants not to the squirrel at all, but to the marten, whilst a later dispersal of
the squirrel may have obtained for that species, in early times, an erroneous name. And this appears none the less probable when we are aware of the fact that any amount of confusion, as I can easily show, exists even at the present day in the minds and conversation of country people in many parts of Scotland as to what a squirrel really is. Even in Argyle-shire itself I have myself heard a *ferret* called *feorag*, and in Aberdeenshire squirrels are constantly brought to Mr George Sim, the naturalist of that town, by uneducated country people as "foumarts," "futterets," or "ferrets."

It may well be asked, then, when did this awful confusion begin, and to what animal was the name originally applied? Mr Macpherson assures me that the two derivations of *feorag* given above are the most likely, meaning "the little questioner," and "the wood or tree animal."

In Scotland the marten is known by a distinctive Gaelic name, but in Ireland, though the marten is widely recognised, there are no names and no traditions now existing regarding the indigenous squirrel amongst the peasantry or older people of the country. As we will show further on in our paper, an introduction of the squirrel certainly took place in Ireland during the present century.

All these materials are intended to bear upon the question,—Did the squirrel extend its distribution into Ireland before the separation of Ireland from the south-west of Scotland? or, in other words, Was the squirrel indigenous to Ireland, and did it become extinct at an early period? But the result is still obscure. In a separate section of this paper I shall speak of the "Squirrel in Ireland."
PART II.

(Read 15th December 1880.)

MYTHOLOGICAL, HERALDIC, AND HISTORICAL EVIDENCE IN SCOTLAND.

Before proceeding to a new part of this paper, I wish to correct an error in my last. O'Brien's Dictionary is not the oldest of the three I mentioned, so the absence of the name iora in O'Brien's cannot be held as important evidence of the absence of the species in Ireland, when present in the other two.

I may add that Mr E. M. Barrington, in a paper read before the Royal Dublin Academy this year, and which I now hold in my hand, treats very fully of the species in Ireland, and will make it unnecessary for me to trouble you with further details. One point, however, I mention further on, in which I slightly differ from Mr Barrington as to one of his arguments used against the indigenosity of the squirrel, although I certainly am of the same opinion with him on the main issue.

MYTHOLOGICAL EVIDENCE IN SCOTLAND.

Now to continue:—It may be said that evidence of the occurrence of the squirrel in S. Scotland in early times is to be found in the valuable Italic scroll upon the monumental stone of Ruthwell, where a squirrel is depicted climbing a vine or other fruit-bearing tendril, and feeding upon the clusters of fruit. But I am inclined to think that, like the use of the name Con, this knowledge of the animal is an imported knowledge, and does not necessarily prove its presence in these early times. The Rev. Chas. Swainson is quite of opinion that the squirrel might appear upon such ancient monuments. "From its red colour," he writes to me, "it was always associated with the old Northern God Donar or Thor. And in the Edda we read of the great ash-tree Yggdrasil, whose branches embrace the world, on the crown of which sits an
Proceedings of the Royal Physical Society.

32

eagle; under its roots lurks the serpent Nidhögr; while between them the squirrel, ever running up and down, seeks to sow dissension."

In the Ruthwell Stone (of which there is an admirable representation in the "N. Stat. Acct." of Dumfriesshire, pp. 221, 227), the inscription round an Eagle at the top of the cross is altogether effaced unfortunately; but from other evidence upon the stone, it seems probable that this Runic scroll represented in symbolical language the struggle between good and evil, which idea is further carried out by the later carvings on the other sides of the monument, probably added about A.D. 680 by the early Christian Cædmon, representing the final triumph of Christianity.

It has also been suggested by writers that the widespread custom of hunting the squirrel,* which was sacred to Donar, the Lightning God, may be considered not only as the relic of a sacrificial rite, but also as a mark of Christian hatred to an animal believed to be dear to a heathen deity.

Further evidence is found in the very similar Runic stone at Bewcastle.† There are two squirrels very cleverly depicted on the east side of the "Bewcastle Stone;" but I doubt if their simple inscription there, or on the Ruthwell Stone, by any means establishes the fact of their former existence in these localities. At one time, no doubt, Cumberland was more wooded than it is now. Remains of a forest are visible a little below high-tide mark, which, as I am informed by Mr Jackson, is composed of "oak, alder, birch, fir, willow, hazel, and I think beech;" but, he adds, "a time impossible to estimate has elapsed since the forest flourished," as there has been a complete change of level.‡ There is, however, the tradition in Cumberland still as regards various districts, that at one time the squirrel could pass from tree to tree for many miles without descending to the ground, as will be found exemplified by the old rhyme—

* Simcock, "German Mythology."
‡ In this connection read an interesting abstract of a paper read at the annual meeting of the Cumberland and Westmoreland Antiq. Soc., given in their Transactions, Part II. (1876-77), p. 68.
so related of the old Wirral Forest in Cheshire.

The following question naturally arises, at least to me: Is it not possible that the Ruthwell Stone may have been the cause of the introduction of the name Con from Scandinavia into Cumberland, and from Cumberland into Scotland? Cons are depicted at Bewcastle, in Cumberland, and almost similarly at Ruthwell. The use of the name might become general when understood, though the animal itself was not native to the south of Scotland. The almost precisely similar representations of it in the two stones clearly point to the same origin.

HERALDIC EVIDENCE IN SCOTLAND.

Mr R. S. Ferguson also informs me that "there is a very old painted glass at Bowness, on Windermere, in Westmoreland, where a squirrel and a falcon are depicted one on either side of the Virgin Mary;" but it may be foreign. It is glass of the thirteenth century. Mr Ferguson, in his tract upon "Bowness Church and its Old Glass," p. 22,* is of opinion that "they are probably merely ornamental accessories, without meaning; but they may be heraldic." Hesitatingly I place this representation in close relationship with the Runic records and the myth of the Edda. If heraldic, it is at least a very early use of heraldic arms upon glass. The representation rather appears to me to be an idea borrowed from the Runic scrolls, in combination with the symbolism of the yet early Christianity.

May not the Virgin Mary, supported on either side by a falcon (query—an eagle-like bird?) and a squirrel, be held to symbolise the triumph of Good over Evil—a curious mixture of the myth of Ygdrasil and the Christianity of the early portion of the Christian era, first also exhibited in the two-dated Ruthwell Stone, the serpent (or Evil Influence) being now absent or laid aside?

Of the origin of the use of the squirrel in heraldry I have

* Separate. Kendal, 1879. (Reprint from Trans. Cumberland and Westmoreland Ant. and Archæ. Soc.)
been unable hitherto to glean anything positive; but it is worthy of remark that so many families in the north of England bear it upon their escutcheons, while, as will be seen further on, it is so rarely met with across the Border.

That its use spread rapidly after its first introduction is highly probable. It was in all likelihood first adopted by some one influential family, and its first use was probably as Supporters. The custom of introducing supporters took place somewhere about the middle of the fourteenth century, * i.e., long after the date of the stained glass window at Bowness.

Though many—and, indeed, most—recent writers on heraldry "pooh-pooh" the great antiquity of heraldry, and refuse to go further back than actual proofs take them, I venture to think that there is much well worthy of attention in Mr W. S. Ellis' "Plea for the Antiquity of Heraldry,"† which renders the ancient origin of the use of animals in many cases obvious, and by circumstantial evidence, traces their descent and use to modern heraldry—as well as in his later and more matured work on the same subject.‡

The Earl of Kilmarnock (surname of Boyd) carried two squirrels as supporters§ (Nesbit's "Heraldry," i., 53). Squirrels occur on the seal of Robert Boyd, Lord of Kilpont, in 1575 (Laing's "Scottish Seals," No. 128). This appears to be unique in Scottish heraldry, and, as the Boyds did not intermarry with other families across the border, the first

* Mr Seton, advocate, Edinburgh, informs me, in confirmation of this, that, as far as he is aware, "the earliest Scotch example of regular supporters (two lions) is furnished by the seal of David Lindsay, Lord of Crawford (1345); but towards the end of the thirteenth century there are a few instances of what may be termed Single Supporters, as on the seal of Alexander Stewart, Earl of Menteith, where the escutcheon is placed on the breast of a displayed eagle;" but he adds, "the middle of the fourteenth century may be regarded as an approximation to the period when they (i.e., supporters) began to be used."

† "A Plea for the Antiquity of Heraldry," by William Smith Ellis, Esq., of the Middle Temple, 1853. Specially, in this connection, I would recommend a perusal of his concluding remarks at page 20.

‡ "Antiquities of Heraldry."

§ Shield, couche a fess cheque. Crest on a helmet, with mantling issuing from a coronet, a dexter hand with the two last fingers turned down; Supporters, two squirrels (op. cit., p. 28).
use of the squirrel on their coat of arms probably originated in Scotland; but as the use of supporters in heraldry does not probably date back beyond the fourteenth century, this does not point to any very old actual use of the squirrel in Scottish heraldry; but the origin of its use may possibly be traced directly to the Runic scroll at Ruthwell, or to the similar ideas formed of the meaning of these Runic scrolls at that time on either side of the Borders, or to the meanings of similar representations on the stained glass of Bowness and elsewhere.*

At Selby, in Yorkshire, two of the lights in the east window have borders of brown squirrels cracking nuts on sprays of yellow hazel. Also at Dewsbury Church, in Yorkshire; also at Malmesbury Abbey, on encaustic tiles (Yorksh. Archœ. and Topogr. Journal, Part 19, pp. 333, 346).

With regard to the appearance of squirrels on sign-boards, Mr W. H. Bidwell of Norwich writes me, as follows: “The Three Squirrels” was the sign of an inn at Lambeth, mentioned by Taylor—the water poet—in 1636; and from a

* In the north of England, it also occurs in heraldry, as follows: Wharton (Beverley, Yorkshire), or, on a chev. az., a martlet between two pheons of the field; crest, on the stump of a tree, erased ppr. a squirrel; sejant, of the last collared—or, cracking a nut of the last (vide Berry’s “Encyc. Heraldica”).

The squirrel also occurs on the arms of the following families: Adott, Creswell-Cresswell, Grensted or Greenford, Hartford, Holt, Henfing, Lovell, Nutshall, Orton, Pace, Samuell or Samwell, Scobington, Squire, Stockwood, Stokes, Warren, Wood (op. cit.).

In Norfolk, the family of the Cresswells bear squirrels in heraldry, where it occurs both as a charge and crest. But this is originally a Northumbrian family.

In Cumberland, the family of Hasell of Dalemain bears three hazel slips; crest, a squirrel feeding on a hazel nut; but that family came to Cumberland from Cambridgeshire about 1660 (?) .

The family of Mounsey of Castleton, near Carlisle, bears a squirrel. But they may have assumed it, because the Roll of Caerlavock says, that “one Mounce” bore a squirrel (vide “The Roll”).

Lovell—A chevron between three squirrels.

Samwell—Two squirrels sejant, addorsed (sitting back to back).

I repeat:—It is curious to find such a massing together of families who use the squirrel on their arms in the north of England. It would, at least, appear that the earliest use of the squirrel in heraldry was thus made by some leading family in the north of England.
trades token, it appears that in the seventeenth century there was a similar sign in Fleet Street. Probably it was the same house which was occupied by Gosling, the banker, "over against Dunstan Church," where the triad of squirrels may still be seen in the ironwork of the window. Goslings and Sharpe still have three squirrels engraved on their cheques. "Cages with climbing squirrels and bells to them were formerly the indispensable appendages of the outside of a toymaker's shop, and were, in fact, the only live sign. One, we believe, still (1826) hangs out on Holborn; but they are fast vanishing with the good old modes of our ancestors."

The surname Squirrel, Mr Bidwell—who has paid much attention to place, and surnames in connection with animals—considers, has arisen from having been used as a heraldic badge. "It is so common a name" (i.e., in the south-east of England and the eastern counties,—J. A. H. B.), "that I think it must have arisen from several centres."

Our evidence of their prior existence at localities anywhere in Scotland south of the old Caledonian forest, or, at all events, south of the Firths of Forth and Clyde, rests upon very scanty materials. The use of the word Con, though admitted by Scottish authors, has every appearance of being a word introduced from South Cumberland, otherwise it seems difficult to account for the large extent of intermediate country where the name is not known in the north of Cumberland.

HISTORICAL EVIDENCE IN SCOTLAND.

There is very general silence regarding the species in old family and other records, both in Cumberland and in south of Scotland. It is not mentioned in Lord W. Howard's "Household" Books, just published by the Surtees Society—tempore Queen Elizabeth,—nor is there mention made of it by De Vallibus, Baron of Gilsland, amongst tithes given to the "Canons of Lanerwit," as I am informed by Mr Richd. S. Ferguson (in lit. 26, iii. 79). Mr Ferguson also tells me that he knows of no documentary evidence relating to squirrels in mediæval times. Heysham, in Hutchinson's "History
of Cumberland" (1794), says, they “are not common except in the neighbourhood of the lakes;” but they are now (1879) common everywhere in the county.

Returning to Scotland, we find in the “New Stat. Acct.” of Berwickshire, the statement, that “the red squirrel is also said to have been at one time a denizen of Dunglass woods in Cockburnspath Parish,* which is the northernmost parish in the county. Again, we are told, that “amongst the animals which have disappeared” from Hounam Parish in Roxburghshire—which parish lies close to the base of the Cheviots—“are Lutra vulgaris and Sciurus vulgaris;”† but when we come to search for other records upon which these could have been based, we find nothing of sufficient reliability to be forthcoming.

It certainly is curious to find so little of positive evidence of its occurrence recorded. Mr Tate, who has already given us a paper upon the species,‡ considers it doubtful “whether squirrels are indigenous to the Borders, or existed there in former times. There is not,” he says, “sufficient evidence that they were exterminated, although the climate is evidently not unsuited to them; and it is possible that the extensive destruction of forests and woods, from the period of the Norman Conquest till the accession of James I. to the English throne, may have caused extirpation of the original breed.” Mr Tate believes “that there is not evidence upon the grounds, that, although the skins of squirrels, as well as of cats, foxes, hares, rabbits, kids, lambs, were articles of commerce in the district in 1377, when, according to a charter for pontage, one hundred of them—i.e., squirrels—was charged a toll of one halfpenny on passing over Alnwick Bridge;” still, he says, “such skins may not have been grown in the district;” and I think it can be shown that he has very good ground, indeed, for his expressed doubt, at least as regards the squirrels' skins;§ because, in the accounts

§ The following is an extract from “Folio Scots Acts,” vol. i., p. 667 (new pagination), being export duties levied in the time of King David,
of the Chamberlain, for moneys laid out by him at the marriage of David II. to the King of England’s sister in 1328, occur the items: “Et in lxxiij supertunicis (‘surcoats’) de strandlyn, et vij supertunicis de squirrelles,” which appear to have been brought from Flanders to Scotland by one Peter Machenar, who is paid his expenses, and who is afterwards called “a Flanders merchant.”* Later in the accounts of John of Dunfermline, in 1329, similar items appear—e.g., for fourscore “surcoats” of squirrels (de scorcella), and of strandlings, “xxxij et xiiijs,” and, “iiiijx supertunicis scorrellorum et de strandelings, supernis per empcionem. Et de iiiijx supertunicis de scorrellis et de strandelings per empcionem in compoto precedentii,” all of which also appear to be foreign merchandise.†

The Rev. M. G. Watkins sends me the following further interesting note in this connection: “It is curious that a cursory inspection of the Ledger of Andrew Halyburton, Conservator of the Privileges of the Scotch Nation in the Netherlands, 1492-1503, together with the Book of Customs and Valuation of Merchantises in Scotland, 1612,” shows no mention of squirrels, though skins of all other Scotch animals (seemingly) are frequently named and priced.” [This is part of the same series, published 1867.]

But Professor Newton’s opinion—in lit.—that “our squirrels could never have had a pelt comparable to that of the animal in cold countries” is sufficient, perhaps, to explain the omission, so that it would be arguing on insufficient evidence if we concluded from these omissions, or from these notices of imported squirrel skins, that squirrels did not then exist in the south of Scotland.

amongst others: “Of peloure of a tymyr of skynnis of todlis, quhytredys, mertrikis, cattis, beveris, sable, ferrettis, or swylik uthyr of ilk tymyr at pe, outpassing iiijd; of pe tymyr of skurel, dycht, and letherty, viii; of ilk otyr skin a halfpenny.” The company in which the “skurel” here finds itself, viz. that of “beveris,” points to Scandinavian or Russian origin, and to the grey squirrel pelt of commerce.

* Vide Chamberlain’s “Rolls of Scotland,” vol. i., p. 30.
† Op. cit. (“Exchequer Rolls of Scotland”), Edw. Stuart and Burnet, published by the Lords Commissioners of Her Majesty’s Treasury, 1878. The item “iiiijx” = fourscore. I have been unable to discover what animal the name strandelings was applied to.
It is true, that even of late years, our red squirrel skins have been a good deal worn in this country in articles of ladies' dress; but there is no evidence to show that they were ever valuable articles of commerce.

On the other hand, there is no evidence of a satisfactory kind that proves the existence of the squirrel in the south of Scotland, beyond the unsupported statements in the "Statistical Account" above quoted.

Again, in 1642, we find an export duty paid upon squirrel skins of £2, 5s. per 1000 from England. These, there can be little doubt, were also grey squirrels' skins, which, obtained originally in Scandinavia or Russia, passed through Flanders, became items of merchandise between Flanders and Scotland, paid a toll when passing over Alnwick Bridge—payable to the Scotch king ("Folio Acts," vol. i., p. 667), and were finally exported again from England, and charged an export duty as above.

Regarding the nature of the timber growth which covered the south of Scotland, I believe we do not require to go far out of our way for evidence. We know that it was composed to a large extent of birch and hazel, as shown by the deposits in our bogs and mosses, as well as by recorded historic evidence, and by still existing remains, such as those at Ferniehirst in Roxburghshire, and other localities. That conifers also existed there can be no doubt; but we are not aware that there is sufficient evidence of any large tracts of country in the south of Scotland having been clothed densely enough to have afforded shelter to the squirrel at the early period at which we suppose them to have travelled along the coast lines.†

* "A SUBSIDIE, granted to the King, of Tonnage, Poundage, and other sums of money payable upon merchandise exported and imported. According to a Book of Rates, agreed upon by the Honourable House of Commons, and hereto annexed. London. Printed for L. Ritbluck and T. Hepner, and are to be sold near Temple Barre in Fleet Street, mid ill."


Professor Geikie writes me: "I do not think we have satisfactory proof either way"—i.e., for or against the densely wooded nature of the hill-sides in the south of Scotland.
We know that at the present time squirrels migrate from the higher, more exposed, and smaller woods and coppices, to the lower, more sheltered, and larger coverts, on the approach of severe weather.

All our earlier authors on Scottish natural history are silent as regards the species occurring in the south of Scotland. Sibbald wrote in 1684, but only mentions the species as occurring “in meridionalis Plage Scotiae Sylvīs.”

Sir Robert Gordon also mentions them at a still earlier date—1630—as inhabiting Sutherlandshire;* but we can find no authorities for its occurring in the south of Scotland beyond the two vague records—already alluded to—of the authors of the “New Statistical Account.”

The first mention of the species, even by its Gaelic name, dates about the middle of the seventeenth century.†

I cannot find any earlier record of their skins becoming fashionable as articles of dress than those quoted above from the Chamberlain Rolls of 1328.

This is, no doubt, a curious blank in the animal’s family records; but, as I will proceed to point out, is not perhaps so very difficult to account for as at first sight may appear. Our only records, vague and uncertain as they are, and, for reasons already shown, not of great value in tracing the earlier movements of the species, still point, by their localisation, to a northward migration along the coast lines, at a period when the interior of the country presented a less genial climate, and when the northern parts of Great Britain were still “struggling into a warmer state of existence,” and escaping from a sub-arctic into a more temperate climate.

The only conclusion we can arrive at is, that if ever indigenous to the south of Scotland, the squirrel must have disappeared from it at a very early period, advancing northward to the shelter of the denser forests north of the Firths of Forth and Clyde.

It is, perhaps, not insignificant in this connection to note the local migrations of the species, which, without doubt, took place during the severe winter of 1878-79. They

* “Hist. of Earldom of Sutherland,” 1630.
† Vide “The Lament for Macgregor of Ruaro.”
became scarce in Dumfriesshire at many localities, and elsewhere in the south of Scotland; whereas, in Perthshire, "never had they been so abundant as they were in the winter of 1879-80." They have fled the more exposed places, and sought the shelter of the larger tracts of forest and of larger food supply. I have many correspondents' letters remarking upon these facts; so the severe effects of the winter of 1878-79 produced their mark on the squirrel population of 1879-80.

These considerations certainly lead up to the same results which have been so clearly pointed out by my friend Mr E. R. Alston, in his admirable account of the "Mammalia of Scotland," and from which I quote, as follows:

"A consideration of the relative depths of the channels which respectively divide Ireland and the islands from the mainland of Scotland, would lead us to the conclusion that the severance of the former took place first, and that the Orkneys remained longest un-insulated. An upheaval of about 240 to 270 feet would bring the latter again into communication with Caithness, while it would require a rise of about 300 to 320 feet to reunite the Hebrides with Skye, and of 700 to 900 feet to restore land communication between the various parts of South-Western Scotland and North-Eastern Ireland. Nor does the distribution of mammal life seem to me to contradict such a hypothesis. The absence from the known fossil fauna of Scotland and Ireland of most of the characteristic post-pliocene English animals shows that the northward migration of these forms was slow, gradually advancing as the glacial conditions of the northern parts of our islands decreased in intensity. Thus it is not difficult to suppose that the hedgehog, small shrew, ermine, badger, squirrel,* and mountain hare may have found their way through Southern Scotland into Ireland, long before they were able to penetrate into the still sub-arctic regions of the Highlands. Subsequently, when the continued depression of the land had isolated Ireland, and the improvement of the climate had continued, the shrews and voles may well

have found their way northwards along the comparatively genial coasts, before the larger beasts of prey could find a sufficient stock of game. . . . Such a hypothesis of the dispersal of English mammals through Scotland and Ireland appears to me to be the only one which explains the peculiarities of their present distribution, and is likewise in accord with the facts of physical geography."

As far as our present knowledge shows, the squirrel was not indigenous to the central portions of Scotland south of the Firths of Forth and Clyde. If they were indigenous in the south of Scotland at all, they probably passed up along the more "genial coast line" till they reached more thickly and warmly wooded tracts.

As we proceed further north, however, and approach nearer to the southern limits of the old Caledonian forest, circumstances under which we must consider the prior distribution of the squirrel materially alter. It is always easier to prove a positive than a negative; and, I believe, there can be little doubt regarding the fact that the squirrel was indigenous to nearly the whole mainland of Scotland north of the Firths of Forth and Clyde.* We have abundant testimony, which will all be brought forward in due course. But before plunging at once into its positive history, there is still a stripe of debatable ground which is worthy of our attention: I mean what may be called the central portion of Scotland, or, in other words, that part of Scotland lying between the Firths of Forth and Clyde, north of the line of the old wall of Antoninus, and between the latter and the Vale of Menteith—in fact, the county of Stirlingshire—a comparatively small area, yet worthy of a short notice in connection with the prior distribution of the squirrel in Scotland.

Mr John Young of the Hunterian Museum, Glasgow, has further informed me, that he "found some years ago a quantity of hazel nuts, all well-grown, and many of them having a neat round hole gnawed on one side, so as to get at the kernels." These nuts, Mr Young tells me, were filling

* Or, in other words, that, in the first instance, a natural dispersal of the species took place, populating these tracts from a much more southern—or, possibly, eastern—centre in Europe before the separation of Great Britain.
the fissures in the limestone strata at Campsie, and "had been brought into that position by water, entering the rock from the higher portions of the hill. The most interesting point about these nuts, however, is, that there are now no hazel bushes on that part of the hill, nor has been in the memory of the oldest inhabitant. In the neighbouring glens where hazel bushes are still found, we find no nuts so large or well grown as those filling the limestone fissures."

Having admitted that other rodents besides squirrels gnaw nuts, of course, we must also admit the possibility here; but it is only right also to consider the circumstances.

First, we may admit, I think, that these large well-grown nuts, larger than those upon bushes growing at the present day in the neighbouring ravines, belonged to a bygone era of hazel growth, and may have been gnawed at a very early date before the juicy kernel had wizened or dried up. But we must also remember the wonderful antiseptic properties of peat, and allow for the possibility that these nuts may have been preserved in the higher peat; and, in comparatively recent times, during floods and rains, have been washed out of their beds and brought into the position in which Mr Young found them; and the further possibility that some other rodents may, in their wanderings in search of food, have found them out, and had a good meal, like Peregrine Pickle, "after the manner of the Ancients." Here is a possibility which only shows, I think, how impossible it is, according to our present lights, to place any real importance upon discovered stores of gnawed hazel nuts as tending to prove a former distribution of the squirrel, or decide as to the species which fed upon them and gnawed the holes. Such a question opens up many other points of interest.

However, it may just be worth passing notice to mention that there is some shade of reason for believing that the species may have populated as far south as this limit. There is good reason to believe, that for a considerable distance south of the southern limit of the old Caledonian pine forests, a country clothed with oak groves extended. We have abundant evidence of this in the peat-mosses of the Vale of Menteith, which, it is believed, were contiguous to the pines,
and we find unmistakable traces of oak stumps over many parts of the central Stirlingshire hills. Topography even is not without its teaching in this connection, for we have, above the present town of Denny, a range of hill called at the present time "The Darrach," signifying "a place full of oaks," and forming a continuation with the Campsie Fells. The probability is—nay, almost the certainty is—that a continuous great oak forest stretched south from the edge of the Caledonian pines to the Campsie Fells. This is no great distance either in a direct line as the crow flies, or, shall we say, as the squirrel travels. If so, what more likely than that our little friend should sometimes find a change of diet desirable; and, as indeed he does at the present day, make annual migrations to feed on the plenteous supply of what he loves so well—the acorn and the hazel nut, or beech-mast? It may be said, "but this is mere hypothesis." Granted at once; but still I hold it is one worth advancing, and not without its points of interest connected with the former distribution of the squirrel in Scotland.

To sum up: My present idea is, that squirrels following the coast districts as they advanced northward, avoided the colder interior of the south of Scotland, but spread more generally over the interior north of Forth and Clyde, where they found better shelter, and pine forests to protect them from the weather. That, in the time of harvest and the ripening of hazel and other food, local migrations took place, but to no great distance south of their winter home; to what exact distance, we cannot now say with certainty. We have evidence of similar local migrations at the present day influenced by change of seasons and food supplies.

We now begin to tread on firmer ground, however, and in bringing forward all the evidence I have been able to collect, I believe the most satisfactory arrangement is to enter the various items chronologically under each county. Beginning, then, with Dumbartonshire—having already disposed of Stirlingshire—we can, I think, dismiss it in a very few words.

_Dumbartonshire._

Squirrels must have been extinct in this county long prior
to 1791, if indeed they ever were indigenous, as no mention is made of them in a very full and careful list of the animals of Luss Parish, in the “Old Statistical Account.”* 

We must not be misled, either, by the passage in the “New Statistical Account” of the parish of Row, which states that “amongst the animals which have become less common in many places, there are occasionally found the roe and the squirrel,” etc. These do not indicate the former distribution, but are no doubt fresh arrivals, as squirrels reappeared in Dumbartonshire at Luss in 1831, as I am informed by John Colquhoun, Esq.

Argyleshire.

It is well known that the district about Glenorchy and eastward, as well as much of the country around the north end of Loch Awe, and probably an even more extensive district, was covered with extensive woods of pine and oak,† which were subsequently burned down by order of the Government, in order to rid the country of wolves.‡ There was an extensive forest also in Glen Etive, continuous with that

* This list is one of the fullest given in any of the numerous accounts of the parishes by the clergymen, and, from internal evidence, appears to be singularly correct and reliable. The author was the Rev. John Stuart, minister of Luss, a very eminent Gaelic scholar, who translated the Scriptures into the Gaelic language, and also a learned botanist and naturalist, of whom we find honourable mention made in Lightfoot’s “Flora Scotica,” and who accompanied Lightfoot in his tour, and who is the authority for the Gaelic names in Pennant’s “Caledonian Zoology.” A connection informs me that people of kindred tastes came great distances to visit him at Luss. He was a native of Breadalbane.

† See also Stuart’s “Lays of the Deer Forest,” vol. ii., pp. 231, 232.

‡ In the district there appears to be a belief current that the reason of the destruction of the woods was not really so much to get rid of wolves and wild beasts as to prevent an over-drug of timber in the market. The company which is understood to have purchased the timber, after cutting and floating away, via Loch Awe and the river Awe, all that they required or found it profitable to cut and remove, set fire to the remainder, to prevent other later comers from overcrowding the market. This tradition was related to me by a very intelligent boatman on Loch Awe; and he further told me that his great-grandfather “remembered when all the country around Loch Awe was covered with pine woods. This,” he continued, “would be quite two hundred years ago.” Some remains of this old pine wood may still be seen upon the slope of Ben Cruachan, above the Pass of Brander, and upon the islets of Loch Awe.
above referred to. Appin and Lismore were always well wooded tracts, so it will be seen that Argyleshire was at an early period suitable for the safe harbourage of the squirrel, as well as of other wild animals. It is not surprising, therefore, to find an unusually perfect chronological chain of evidence regarding the squirrel in Argyleshire.

Sibbald wrote in 1684—"Sciurus... in meridionalis Plagas Scotiae Sylvis reperitur." *

Alastair MacDonald, the famous Jacobite bard of Argyleshire, thus speaks of the squirrel in his poem of "The Bark of Clanranald," which is justly considered his masterpiece:†

"xx. Six [men] were chosen as a reserve, in case any of those named should fail or be carried overboard by a sea, so that one of these might take his place.

"Let six rise now, quick and ready,
Handy, lively,
Who will go, and come, and leap
Up and down her,
Like a hare on mountain top,
Dogs pursuing,
Who can climb the tight, hard shrouds
Of slender hemp,
Nimbly as the May-time squirrel
Up a tree trunk."‡

In 1741 MacDonald also notices the Gaelic name of the squirrel—Feòraig—in his "Gaelic Vocabulary," and is the second author who does so.

1760-1780.—"MacIntyre, another Gaelic bard of note," as Rev. A. Stewart informs me, "who lived in Glenorchy,

† A. MacDonald composed his descriptive poems between 1725 and 1745, about which time he was resident "on the farm of Corrie-Vullin, at the base of Ben Hiant, adjacent to Castle Mingary," in Ardnamurchan. He was buried with his kindred on Eilan Feoinaim, in Loch Shiel. I am indebted to Rev. Alexander Stewart and Mr James Macpherson for information and references in this connection, and to the latter gentleman for the above translation by Sheriff Nicholson. The title of the poem here quoted is "Boennacha Luinge," i.e., "The Blessing of the Galley or Bark [of Clanranald]."
‡ Literally, "Nimbly as squirrels of the May-time (can climb) up a tree trunk of the dense wood," c.f., "Cho grad ri feòraig Cailleach: Ri Crann ro-choiill," no as a prefix meaning very, exceedingly: ro-choill, a very wood, a true wood.
speaks of squirrels, as if he were familiar with them, in a satirical poem on a tailor that had offended him. MacIntyre died in 1812. His poem on the tailor was composed long before his death—say 1760 or 1780.'

1790.—The "Old Statistical Account" records that, "The squirrel is now become very rare, if not totally extinct, in Lismore and Appin;" * but Dr Fleming, writing in 1819, informs us that "squirrels were rare in Argyleshire, in these woods where they had abounded some years before," referring to about the same date—about thirty years previous, viz., 1790.†

1812.—Their presence is still testified to at this date by Professor Walker, who writes: "Habitat sylvis presertim coryletis. In sylva Lornæ superioris, antehac copioso, nunc rarior." ‡

1809-19.—And the Rev. A. Stewart, Nether Lochaber, informs me, that "an old man, only lately deceased, told me that in his younger days—say sixty or seventy years ago (1809-19), the squirrel was not uncommon in the woods about Appin House." §

1839.—The Rev. A. Stewart also writes to me, that "about twenty-five years ago I saw more than once a rudely-stuffed squirrel in the inn at Shean Ferry, then occupied by one Ewen Cameron, who, I think, is still in life; and this specimen was said to have been shot or captured some ten or twelve years previously—say about forty years ago (1839), in the woods about Appin House."

In 1842, in the "New Statistical Account" of Argyleshire, squirrels are spoken of as formerly existing and abounding, "but now extinct."

We have here excellent reason for believing, from the chronological sequence of the records, that the species lingered till a very late period in Argyleshire. Indeed, so closely related are the records of Dr Walker in 1802—his "nunc rarior" in the district of Lorn—with the "not un-

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† Edinburgh Magazine, iv., p. 507, June 1819.
‡ "Essays on Nat. Hist.," 1812, p. 498.
§ In lit. || Ibid.
Proceedings of the Royal Physical Society.

common" in the more northern district of Appin, and more restricted area of "the woods around Appin House" of the old man, interviewed by the Rev. A. Stewart, that we may safely, I think, consider that they lingered at least till 1839 or 1840, when Ewen Cameron of Shean Ferry captured or killed his specimen which the Rev. A. Stewart saw at the inn—and this conclusion, perhaps, in the face of the evidence offered by the "Old Statistical Account," with its "now rare, if not totally extinct, in Lismore and Appin" in 1793. We cannot, however, I think, put aside the evidence of the "New Statistical Account" with its "but now extinct" in 1842. It is a positive statement, and we have no other later dates which will confute it. Our next date evidently belongs to the history of the extension from centres of introduction, as will be shown in the second part of this essay (vide under Argyleshire, next part, infra).

Perthshire.

The squirrel is referred to in our oldest and most popular Gaelic song, viz.—"The Lament for MacGregor of Ruaroi," which may safely be dated as before 1650, or the middle of the seventeenth century. Mr James MacPherson, to whom I am indebted for calling my attention to this, states: "That the 'Lament' was composed during the proscription of the hapless Clan Gregor, is proved beyond dispute by the words of the 'Lament' itself; and their proscription dated from 1603; but we know, moreover, from other sources, that the MacGregors of Ruaroi, commemorated in the song, have been extinct for at least two centuries, so that the date of its composition may be pretty confidently set down as before 1650, or the middle of the seventeenth century." The bard says:

"Ge ralahm an fheórag,
Gheobharr seol air a faotainn."

Tho' nimble the squirrel,
It may be captured with patience.

lines composed, be it remembered, a century before there was a thought of the artificial planting of trees on a large scale;
Mr Harvie-Brown on the Squirrel in Great Britain.

and it follows, as a conclusion from which there is no escape, that the squirrel must have been a denizen of the native woods in the country of the MacGregors, which then comprehended the districts of Menteith, Breadalbaine, Strath Tay, and Rannoch, all in Perthshire. Ruaro is in Breadalbaine; and in Rannoch was, and, I suppose, still is, the famous "Coille dubh Raineach," one of the remnants of the old Caledonian forest, which had often, doubtless, proved a safe hiding-place in times of danger.*

These forests formed an almost continuous stretch of old wood, with those mentioned under Argyleshire.

Aberdeenshire.

There is no mention of the species whatever in the "New Statistical Account" of Aberdeenshire (1843); and even the "Old Statistical Account" is perfectly silent on the subject. If present at that date at all, it must have been surely next to unknown— one would have thought—or some mention of it would have been made by some one of the Old Statistical writers. On the other hand, it is quite possible, though, I think, hardly probable, that it might have lingered on without any notice of it being taken by the writers of either of these accounts. In the same year that the "New Statistical Account" was published, Macgillivray wrote in the "Naturalists' Library," after indicating its general distribution in Scotland at the time, as follows: "In many districts is of rare occurrence. . . . In the northern districts it appears

* Other references to its mention are as follows:

"Dh' Thas mo chridhe cho eibliinn
Sgùn leaman mar an fheorag."

So joyful grew my heart,
That like the squirrel I could leap.

(Second general collection of old Gaelic "Poems and Songs," published at Perth in 1786.)

"Struagh nach robb un mar an fhaoilim,
'Na cho caol ris an fheorag."

Would I were like the sea-gull,
Or the squirrel so slender.

(Old and unpublished song "Mairi Nigh'n Domhnull," Mary, the daughter of Donald taken down by Mr MacPherson from recitation of a native of Badenoch.)
to be unknown," which statement was published without comment by Sir William Jardine.*

In 1853 Macgillivray visited Braemar, and there he could find no trace of it, though he "not only looked for it, but made inquiries respecting it of various persons qualified to give correct information. Mr Cuming had never seen or heard of it; nor had any other individual of whom I asked;" but he adds: "Sir William Jardine says it also occurs on the Don."† This statement of Sir W. Jardine's may very likely have been called forth, owing to the statement in the "Naturalists' Library" above quoted, and have been the result of further inquiry since that time; but I have failed to find it recorded anywhere amongst Sir William's writings, so probably it was orally supplied.‡

Mr George Sim of Aberdeen, who has supplied me with much useful and interesting material for this county, writes to me as follows: "I, of course, cannot say when the squirrel first made its appearance on Deeside, yet I am satisfied it must have been prior to 1853, and I think Macgillivray not having heard of it may be accounted for in this way: Until lately it was scarcely known by the name of squirrel, being usually called ferret, foumart, or futteret, by the country people. Even now, when it is much more common, it is often so called. And since Macgillivray did not see it himself, any inquiry respecting it under its proper name would not have been understood." In reply to further inquiry, Mr Sim assures me that these erroneous names are often (indeed commonly) applied to the squirrel by country people who bring him specimens for stuffing at the present day.

This argument, however, I can hardly bring myself to accept, because Macgillivray distinctly says he "made inquiries respecting it of various persons qualified to give correct information. Mr Cuming had never seen or heard of it, nor

† "Deeside and Braemar," p. 390.
‡ Very probably had Macgillivray had the opportunity of revising his own proofs, which he had not, as the work was a posthumous publication, he would have supplied further information as to this record.
had any other individual of whom I asked.” And, even though the most correct are liable to err, I can hardly conceive that had the species been present in those portions of Braemar and Deeside which Macgillivray traversed, that such a prominent, easily described and identified species would have escaped the notice of all; nor do I think would such a careful naturalist as Macgillivray be likely to be led from his inquiries, merely by these erroneous local names.

As will be seen further on, however, there is some reason to believe that the squirrel may have lingered in the higher parts of Don, as the records of its lingering in Strathspey, though not actually continuous, very nearly approach to being so; but the evidence otherwise is decidedly against its continuous presence in Upper Don. A correspondent on Don-side informs me that “the oldest inhabitants have no traditions regarding it. I am sure it was extinct in this district until about twenty years ago; they came up Don-side. There is no place in the neighbourhood of the name of Feorag.”

That the country must have been eminently suited to its requirements in past times there can be scarcely any doubt, for even at the present day we find very abundant indications of the native pine forest reaching far up the hill sides, almost, in one place, to the immediate base of Ben Muic-dhu; and, perhaps, nowhere in Scotland will we find such extensive traces of the old Caledonian forest as we do among the hills which cluster round the valleys of the Dee and Don. The Gaelic topography of the district, which has retained its purity of pronunciation almost intact in the Upper parts of Dee, also teaches us something of the limits of the old forest in past ages, for we find the “Glen of the fir-trees”—Glen Guithsach—far away on the shoulder of Cairn Toul, and stretching away beyond, over the ridge, the great forest of Rothiemurchus extends into Strathspey.

The occurrence of a locality called Carn Feòrag cannot, perhaps, alone be accepted as evidence of its early presence with any degree of certainty. The name Feòrag, however, was well enough understood by the Highlanders of Braemar, where topography is believed to have descended in its Gaelic purity.
Proceedings of the Royal Physical Society.

Macgillivray informs us that in the interval between 1811 and 1853, "the greater, and by far the finest, parts of the Braemar pines were sold and cut down."* It is, therefore, perhaps all the less probable that the species would linger here unnoticed. A large portion of the forest in Glen Tanar appears to have still existed about 1813. At that time it contained "almost innumerable trees of such magnitude as would be fit for masts of the largest size," etc.†

Inverness, Nairn, Elgin.

The Rev. Lachlan Shaw,‡ in his "History of the Province of Moray" (1775),§ was the last to chronicle the squirrel as lingering in that district. He says—"There are still in this province foxes, badgers, and squirrels, weasels, etc.;" and he tells us further,—"The squirrel is a pretty, sportive, harmless creature; it is a kind of wood wesel—haunts the fir-trees. If you toss chips or sticks at it, it will toss pieces of the bark back again, and thus sports with you. If it is driven out of a tree, and skipping into another, finds the distance too great, it turns back to its former lodge, its bushy tail serving as a sail or wing to it."

Pennant also mentions it as occurring on the Spey,† more than a hundred years ago. He says it is "scarce in Scotland; a few in the woods of Strathspey."¶

On Speyside, or the lower reaches of the river, there certainly is every reason to believe it became extinct. The Rev. Geo. Gordon says—"Squirrels were undoubtedly known at an early period in Strathspey, where it is said their num-

* "Deeside and Braemar," p. 136. See also under "Extension in Aberdeenshire," next part, infra.
‡ The Rev. Lachlan Shaw was minister of Kingussie, and resided near the primeval forests of Glenmore and Abernethy, in Strathspey.
¶ Lightfoot's "Flora Scotiae" Sketch of Caledonian Zoology (1777).
* Mr Gordon informs me of the following recognised divisions of the valley of the Spey. "From the mouth to Lower Craigellachie it is called Speyside, between lower and Upper Craigellachie it is called Strathspey (Abernethy lies in this portion), and what lies above Upper Craigellachie goes by the general name of Badenoch."
bers were much diminished by a series of severe winters.* I am certain," he continues, "that squirrels were not known in the lower or northern part of Elginshire, or on Speyside, at least, from 1810, until the recent immigration from the west;† and I do not find any record of them being here after Shaw's day. They were not met with on the lower reaches of the river until after they had spread eastward from Cawdor (in Nairn), and Altyre (Moray) to the neighbourhood of Elgin."‡ He further remarks—"It is certainly remark¬ able that these animals should have disappeared for so long from a district" (referring to Moray and Inverness) "where there must always have been sufficient wood to shelter them,§ and where of late years they have spread so vigorously and extensively."

* After passing through a winter of unusual severity, 1878-79, our thoughts are not unnaturally turned to consider some of those severe winters which have occurred before. It is not long since a writer in one of our Scottish daily papers gave a résumé of these; and it is not, perhaps, without some significance in this connection, that two of the most terrible occurred just about the times between which it may be supposed the squirrel became scarcer or extinct. One was in 1740, and it continued for five months, and "destroyed vegetation of all kinds over wide districts of country." The next occurred in January 1795, when thousands of sheep were lost, and a number of shepherds perished. In 1788-89, 1794-95, 1797-98, the mean temperature was equally low with that of 1878-79. It is this succession of hard winters which one of my correspondents alludes to. Various reports have also reached me of the decrease of late of squirrels at many localities in Scotland, which decrease is usually ascribed to the severe winter of 1878-79. Some of these will be found recorded in this essay under Dunfriesshire, and also in a paper by me, "Ornithological Journal of the Winter of 1878-79, etc.," in the Proc. Nat. Hist. Soc., Glasgow, 1879, p. 142. The decrease here, however, is often counterbalanced by as rapid an increase in other districts, pointing to migration as the result and not deaths, outlets for migration being now more numerous than they were before planting became general in Scotland.

† Referring to the extension of range eastward from Beaufort Castle centre subsequent to 1844 see under "Extension from Beaufort centre," next part, infra.

‡ In lit.

§ On the banks of the Spey "so late as the year 1728, masts of fifty and seventy feet in length were procured for the navy," as we are informed in Campbell's "A Journey from Edinburgh through North Britain," 1811 (the first edition was issued in 1802), vol. i., p. 42. At a later date, according to Dick Lauder ("Account of the Great Floods of 1829," p. 203), viz., 1736-37,—the York Building Company purchased a portion of the forest of Abernethy for £7000, and worked it till as late as 1737. The ancient forest
Mr Knox, speaking of their disappearance and the causes of it, suggests that “martens (which, it is well known, was an abundant species of during the first half of the present century) may have assisted in their extinction; and the rapid increase of the squirrel during the past thirty years,” Mr Knox, writing in 1872, considers, “supports this supposition, martens being now more kept under, and gamekeeping being more general.” *

But while it appears evident enough that the squirrel became extinct on Speyside, it is not quite so clear that it did so in Badenoch and Strathspey. Macgillivray seems to have had some suspicion of their lingering there, and in the valley of the Don in Aberdeenshire; but it does not appear that he was aware of the introduction at Beaufort in 1844. Writing in 1853, he says, “it occurs even on the Spey;”† the fact of his not alluding to the introduction almost conclusively shows that he did not know of it.

Mr James MacPherson gives me satisfactory evidence of the very early appearance in Strathspey and Badenoch. He has taken much interest in the subject, and been at great pains to obtain for me the most accurate information. He writes as follows: “Malcolm MacDonald, master mason, aged about seventy, born in the parish of Alvie, and now residing on the Belleville estate, says, that he first saw the squirrel at Belleville in 1828 or 1829. Remembers the occasion very well, and is quite sure of the date. An animal, at first supposed to be a polecat, was observed by some of the workpeople in a tree at the mill-dam between Belleville

reached into Badenoch as far as Kingussie, as may be gathered from the Gaelic origin of the word Kingussie, i.e., Ceann–quithsoch, or “The head or extremity of the Fir-wood” (vide Robertson’s “Gaelic Topography,” etc., p. 405); and much information regarding the old Caledonian forest will be found in the notes to “The Lays of the Deer Forest,” vol. ii., p. 219, et seq., which it would be well to consult in this connection.

* Vide “Autumns on the Spey.” Gisborne appears to have been impressed by a similar conviction as regards the wild cat:

“The tawny wild cat, fiercest of the beasts That roam in Britain’s forests, went on high To seize the rapid squirrel.”


† Op cit., p. 390.
Mr Harvie-Brown on the Squirrel in Great Britain.

House and the Mains. A gun was fetched, and the animal shot. This, he believes, was the first squirrel seen in the Belleville woods, although, after that date, they became familiar, and increased very rapidly." The same person "believes the patch of wood at Dalwhinnie to be about sixty or seventy years old. He stayed at Dalwhinnie for some time in 1824, but never saw or heard of a squirrel in the plantation."

Mr James MacPherson himself states his opinion, that squirrels did not become extinct in Inverness-shire, and he remembers them as numerous about Belleville "thirty-five years ago," say 1844—i.e., the same year that they were re-introduced at Beaufort; and, he adds, "and I do not recollect having ever heard of them spoken of by old people as strangers, although I am certain it cannot always have been so in that precise locality. The Craighbuie was planted with fir, I should suppose, about 1790 or 1795, and twenty years later would afford an eligible settlement for prospecting colonists from Rothiemurchus. . . . About the same time, immediately beneath the Craighbuie, the more ornamental spruce and larch were also introduced;" and other strips and plantations of different kinds of woods formed "an almost unbroken woodland communication with the forest of Rothiemurchus and Glenmore, and so on down Strathspey."

The fact of their being present so early as 1829, and numerous so early as 1844 at Belleville, certainly points either to one of two alternatives either, as he suggests, they did never become actually extinct, and were resuscitated by the new planting which took place under the directions of, and on the extensive property of, Sir J. Grant of Strathspey—which, we are told, along with those of the Duke of Athole and Lord Breadalbane, "would far overbalance in extent those of any other private proprietor perhaps in Britain," all of which plantations were performed betwixt the years 1777 and 1817;—or, the squirrels had reached north from the Dunkeld Restoration, via Kingussie and Glen Truim, and by Dalwhinnie, in an incredibly short space of time, taking the bare and elevated nature of the country into consideration, and the great extent of unsheltered moor over which they would require to travel.
But it would appear to be quite against this line of approach, that the earliest squirrels we can hear of in Aberdeenshire came into Braemar from Forfarshire at Glen Tanar and Invercauld in 1857, and very soon after appeared at Old Marr Lodge, near the Linn of Dee, and about the same time in Glen Muick.* Having been long before this at Blair-Athole, it seems scarcely credible that they would not have passed through Glen Tilt, over only ten miles of open moor, sooner than they would have reached Aviemore, a distance, via Struan, Dalwhinnie, and Glen Truim, more than four times that distance, over equally barren ground. We have quite failed to obtain any data whatever which can in any way be said to favour this line of advance.

The Rev. Lachlan Shaw's record in 1775, and Pennant's, 1777,† dating close to that of the commencement of the planting in Strathspey, certainly seem strongly to support the opinion that they were continuous in the district, and did not become extinct; and further in evidence of this, we find the general impression of others,—amongst whom Mr George Sim of Aberdeen,—that the squirrel occurred around the head waters of the Don in Aberdeenshire at an even earlier date than it did at Braemar, following the published statements given on the authority of Sir William Jardine.‡

On the other hand, Macgillivray, writing in 1843, says—
"In many districts is of rare occurrence; . . . in the northern districts it appears to be unknown."§ At that time Sir W. Jardine, at all events, did not appear to be in a position to testify to its presence, although afterwards, when Macgillivray wrote his "Deeside and Braemar," in 1853, he (Macgillivray) said, as before quoted: "Sir William Jardine says it also occurs on the Don." |

Under Extension of the Species in this district will be found a passage quoted at length, which appears to argue for

* See under "Extension in Aberdeen," next part, infra.
† Lightfoot collected his materials in 1772. Pennant probably collected his in 1769, the date of his first tour, and there is every reason to believe that his informant was the Rev. Lachlan Shaw.
‡ V. antea, p. 50, foot-note.
§ V. antea, p. 50, foot-note.
the extension from Perthshire, *via* Glen Truim, but it does not prove that the squirrels which first appeared about Aviemore were not indigenous, or were not *resuscitated* by the fresh planting. [The passage is quoted from the *Elgin Courant* in the "Scottish Naturalist," vol. i., p. 49, and will be found in full in the next part.* I believe it expresses the opinion of Captain Dunbar Brander of Pitgaveny.]

Old people still alive in Strathspey speak of the squirrels as old acquaintances, and never heard of them as strangers, and there seems to be abundant evidence in favour of the supposition of their continuance and subsequent resuscitation in Badenoch and Strathspey.†

Malcolm Clark, the fox-hunter in Glenfeshie, on being interrogated by his son on behalf of Mr James Macpherson, depones that he is eighty-five years of age. He saw the first squirrel he ever remembers to have seen in the natural pine-woods of Rothiemurchus. His son writes: "My father is now eighty-five years of age, and has been acquainted with the *Fè dorag* since his boyhood. He has never heard them spoken of as strangers in this country."

The Rev. W. Gordon of Braemar supplies the following: "An elderly man (sixty-nine), Mr Robert Grant, a native of Rothiemurchus, but who has been resident here for about forty years, informs me that some of his earliest recollections are associated with squirrels, which were abundant in his native woods of Rothiemurchus."

Mr D. MacDonald, writing to a friend from Glenfeshie under date of 3d March 1879, has the following very interesting note: "I have also observed that the few to be seen on my own side of the Feshie are larger and lighter in colour than those I have seen in the woods skirting Loch Insh. The former woods, you know, are natural forest, whereas round

* * *
Loch Insh they are all planted. My inference is that squirrels feed chiefly upon cones in natural woods, and on bark in plantations; that the cone-fed squirrel is better off than his bark-fed brother.” *

We may, I think, then, safely conclude that the squirrel did not become extinct in Strathspey, and that, although the young planting was too late to save the indigenous capercaillies, it was in time to save the indigenous squirrels, and that they rapidly revived, and had already become very numerous by the year 1844 or earlier. The woods on Spey at Belleville would be in a fit state to receive and support them probably as early as 1815 or 1820.

I cannot learn that they lingered in Strathglass or the north of the county, any persons whom I have interrogated, or who have given evidence, saying that “they do not remember them as ever inhabiting Strathglass before the restoration at Beaufort.”

**Ross-shire and Cromarty.**

In Ross-shire we find trace of the squirrel in Glen Ainaig, a wooded glen running down from the wild mountains of the Balnagown and Frevater deer forests to Oykel Bridge, in the parish of Kincardine, which is partly in Ross and partly in West Cromarty, and marches with Assynt in West Sutherland. The Rev. Andrew Gallic thus records the fact: “Squirrels are also found in Glen Ainaig.”†

* A similar statement is made regarding the squirrels of Roxburghshire, their unusually large size being specially taken notice of; and the very small size of squirrels north of Loch Ness is also noted.

This record is quoted again in the “New Statistical Account,” word for word (op. cit., Ross and Cromarty, p. 404), in a somewhat pretentious list of the animals of the parish; but though we must accord credit to the earlier account, I hardly think it credible that they would survive till 1842. The Rev. Hector Allan, however, in the “New Stat. Account,” gives us the following particulars of his predecessor’s life, which will prove useful in this connection: “Mr Andrew Gallic, who succeeded, was ordained at Nigg by Mr John Sutherland of Tain, 27th July 1756, to the mission of ———. On the 6th September 1758, he was admitted to the parish of Laggan, in the Presbytery of Abertarff, and transported to Kincardine 11th October 1774. Mr Gallic died on the 15th May 1803, in the twenty-ninth year of his ministry here.”

It is, therefore, probable that the squirrel survived in this part of Scotland until a comparatively late date. Possibly the last remnant may have had their dissolution hastened by the severe winter of 1795.
Sutherlandshire.

Concerning the squirrel in Sutherland we find mention of it in the quaint, useful, oft-quoted passage in Sir Robert Gordon's "Earldom of Sutherland,"* where he enumerates the wild animals of the north-west of the county, and includes "Skuyrells." It is not necessary here to quote the full passage again, but it may not prove uninteresting to add an extract from his description of the county as it appeared in those days. "There are thrie principall forests in Southerland besides Scottarie, which lyeth in Strathborray; Tivarie, which is in Strathvely; Glean shin, which lyeth upon the river Shin; Leag-Lamd, which lyeth in Strathborray; Shletadell, which is in the parish of Loth, and divers other particular schases and hunting-places full of wood and deir. To witt, the forest of Diri-Chat, which is of the parish of Kildonan, wherein are conteyned the tuc hills, called Bin Ormin; the forest of Diri-Mramigh, which is within the parish of Lairg, wherein is conteyned Bin-hie and the great hill Tain Bamd. All these forrests and schases are very profitable, etc." [Here read former quotation, loc. cit., p. 19]. . . . "Ther is not one strype in all these forrests that wants trout and other sorts of fishes. . . . In Durines, west and north-west from the Diri-more, there is ane excellent and delectable place for hunting, called Parwe, where they hunt the reid-deir in abundance; and sometymes they dryve them into the ocean sea at the Pharo-head, wher they doe tak them in boats as they list. There is another pairt in Southerland, in the parish of Loth, called Shletadell wher ther are reid deir, a pleasant place for hunting with grew hounds. Heir also sometymes they dryve the deir into the South Sea, and soe doe kill them" (Sir Robert Gordon's "Earldom of Sutherland," 1813, p. 314).

Mr J. Crawford of Tongue also informs me that during the progress of the recent reclamation of land in the Tongue dis-

strict, by the Duke of Sutherland, large trees were dug out from a depth of 3 feet in the mosses, which were charred with fire from 10 to 15 feet of their length—some of these even now measuring 3 feet in diameter and very fresh. "Some of them are cored out with fire for several feet in length as if they had been burned down" (In lit., 13th Jan. 1879).*

We have been assured by Mr Thomas Mackenzie that there is not a tree standing in Sutherland that is one hundred years old.

Ireland.

I intended to have treated of the past and present distribution in Ireland, as mentioned in my former portion of this essay, but I now find it quite unnecessary to do so, my friend Mr R. M. Barrington having fully exhausted the subject in an able paper read before the Royal Irish Academy, which paper I now hand round for examination; and I would particularly direct attention to the map.

The only point in which I differ from Mr Barrington is in respect to what he says on page 4 of the said tract, viz., that "its present remarkable distribution, and its rapid increase of late years," is an "argument against its being indigenous." My reasons for disagreeing in this respect will, I trust, be made plain to you later, when I come to treat of its restoration and increase in Scotland. Meanwhile, it is, perhaps, sufficient to say that the squirrel lingered longest in Scotland where the largest tracts of wood remained, and probably did not become extinct in the forest of Rothiemurchus, and that it only increased and spread in directions where fresh young plantations were formed, affording natural outlets: that we have proof also of the keen winters affecting them severely, and causing migrations, and their abandoning small and non-continuous coverts of hard wood, overcrowding the denser wooded districts, both in past and in later seasons.

* At the present day, in Transylvania, it is a custom of the gypsies, and travellers, and huntsmen, and even the woodmen, to kindle fires for cooking and warming themselves inside of the hollow boles of the old oak trees (vide Ibis, 1875, p. 190, and Journal of Forestry, 1879, p. 477). None of these, however, which we saw standing were charred outside, and nearly all were vigorous and green.
Shorty summarising the foregoing evidence, we have seen that the squirrel occurred at an early date, and had a wide distribution in the pine woods and country—perhaps, all the country—north of the Firths of Forth and Clyde (as shown by the records of Sir Robert Gordon and the “Old Statistical Account” of Kincardine Parish, Ross-shire, not to speak of the other evidence I have given). We have seen also that there is every reason to believe that it did not become absolutely extinct in Scotland, but lingered in the great old forest of Rothiemurchus until resuscitated by the new growth of suitable woods; and that it remained in Argyleshire up to an unusually late date, probably surviving up to about the year 1839 or 1840, when Ewen Cameron, as related above, probably killed the last, and had it stuffed. Further, that our record from Ross-shire, in the “Old Statistical Account,” makes it probable that it survived to a comparatively late date—towards the close of the last century—in the wooded glens of Ainaig. Like native races of men at the present day, which are fast approaching towards extinction, the squirrel lingered longest in the more inaccessible and wilder wooded parts of the country—in the “Meridionalis Plaga Scotiae” of Sibbald, and the “Sylvæ Lornæ Superioris” of Dr Walker, and the forest of Rothiemurchus. In Ireland our data are not sufficiently full to place beyond doubt its former occurrence there. Upon a correct reading, perhaps, of the poem above mentioned, and a right interpretation of many of the animals’ names mentioned therein, will depend the decision on this part of its former distribution, as well as upon the comparison of the minutiae of early distribution of various other species, with geological changes as pointed out by Mr Alston (vide nota, p. 41).

I believe that a minute study of any single species, or group of species, which has become extinct or nearly so, will develop new facts regarding variations in population, depending upon changes of condition. In the case of the squirrel, several factors seem to have been at work in bringing about its decrease or extinction. In some parts of Scotland, the extinction may have been due to one only of these factors, viz.—
the destruction of forests; * in others—and this, I believe, to be the most general—to a combination of these factors. Two of these may be best expressed by quoting the following passage in Murray's "Distribution of Mammals:" "If man or carnivorous animals were amongst them, their extinction would only be the more rapid. If none but herbivorous animals took refuge there, the food would be insufficient for numbers, and they would drop off by inanition." The scarcity of food might be occasioned by the great age of the forests, or by destruction of forests either by fire or by cutting down; and another factor, working in unison with these, may have been the severity of the winters as hinted at by one of my correspondents. The super-abundance also of carnivorous animals would hasten their extinction.

Nor can we account for the curious migratory habits of many species,—more especially noticeable in virgin forests, but also distinctly and constantly brought before our notice even in this country at the present day,—otherwise than by applying the well-known natural law, which enforces a natural extension of species. I do not speak of the seasonal migrations of birds which pass along our shores, halting only to rest for a brief period ere they resume their long flights to and from the far north; but of the local migrations, which, if we may use the phrase, sway backwards and forwards from one part of a limited area to another, and are occasioned by, and regulated by, the food supply or the capabilities of a district. If these safety valves were closed, the consequence would be poverty of blood, starvation, disease, helplessness before a natural foe, death, annihilation; and much goes to prove the unfavourable general character of the comparatively limited area of North Britain at the time of the decline of the squirrel, and the extinction of the Capercaillie and other animals. We have seen that, at least in Strathspey, the

* It was the custom to fell trees in ancient times for several reasons: when the farm-houses were built on the hill slopes the valleys were great forests, and the people burned great portions to rid them of wolves, and lest enemies should also find shelter. Later, when the country became more peaceful, the inhabitants descended to the valleys and destroyed the forests, in order to make clearings for agricultural purposes, and on which to build their houses.
Mr Harvie-Brown on the Squirrel in Great Britain.

probability is that this safety-valve was re-opened by the planting there, just in time to save the remnant. No more forcible illustration, perhaps, of the natural law that a given area will only support a limited number of individuals can be found, than in the abnormal increase of the Pallais sandgrouse, and consequent "irruption" of the species into Europe in 1863 (vide Ibis, 1864).

In this connection Sir Dudley Marjoribanks, Bart, of Guisachan, Inverness-shire, writes (in lit.) as follows: "In 1862, I saw a dead squirrel on the bridle path at Ardnamulloch, fourteen miles west of Guisachan, and at the end of the district of natural pine and birch. It was at the end of the stalking season, and the squirrel appeared to me to have died from stress of weather and not from violence. I heard of another the same year being found dead at Aultbeith, ten miles further west, and where there is not a tree within miles." Thus it will be seen that they had distributed themselves almost to the very far upper end of Glen Grivie, almost to the base of the backbone of mountains which form the natural boundary between the faunal districts of Moray and West Ross (vide Map). Significant is the further statement by Sir Dudley Marjoribanks, that "The squirrel here is a shabby little animal in comparison with his southern brother. I doubt whether he would weigh half as much in the scales—and he is not nearly so rich in colour."

Therefore, feeding principally upon natural growth, being of an inferior and smaller type, wandering far in search of better food, they would in all probability succumb all the more easily to severe weather such as was experienced in the winter of 1860-61 and 1861-62.*

*I have elsewhere in this essay more fully pointed out also that the severity of the winter of 1878-79 banished the species from many localities, whilst the sudden increase again of the species, later in the year 1879, pointed to an emigration caused, in the first instance, by the intense cold. At the time when they became extinct, or nearly so in Scotland, the forest ground was much curtailed, and the loopholes of escape were not so numerous. Failing a natural migration, as already explained, they would die (vide Proc. Glasg. N. H. Soc., 1879).
PART III.

(Read 16th February 1881.)

RESTORATION, RESUSCITATION, AND DISPERSAL OF THE SPECIES THROUGH SCOTLAND: WITH A MAP. [PLATE IV.]

THE MAP.

The accompanying map is not intended to show with minute accuracy the present distribution of the squirrel in Scotland, nor the exact extent of the areas populated from each centre. It is merely intended to give a general idea of the Faunal divisions of Scotland, and show the approximate areas populated from the different centres. The small scale of the map forbade any attempt at precise and exact colouring, nor indeed can our data, as given in the text, admit of any hard and fast line being drawn, showing the limit of the influence of the outward waves of distribution from the different centres, nor the points at which waves from different centres coalesce. The map, it is hoped, however, will assist in a general way, to explain what amount of influence each centre has had in repopulating Scotland.

CENTRES OF RESTORATION IN THE SOUTH OF SCOTLAND, AND ACCOUNT OF EXTENSION OF RANGE IN COUNTIES SOUTH OF THE FORTH AND CLYDE.*

In the latter half of the eighteenth century, the squirrel was introduced from England to the menagerie at Dalkeith, by Elizabeth, Duchess of Buccleuch. This introduction must have taken place, as will be seen in the foot-note, not prior to

* Excluding Dumbartonshire, Stirlingshire, and northward, which districts come to be treated of later.

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1767, and probably between that date and 1772, or 1778.*

Mr Dunn writes to me as follows:

"I have consulted everybody about here [i.e., at Dalkeith], from His Grace downwards, who are likely to know anything about the matter, and the general opinion of those who know best is, that the squirrel must have been introduced to the menagerie here early in the 17-'seventies.' . . . I think

* A writer in the *Former's Magazine* (1802), vol. iii., p. 447, informs us that it was not known in the Lothions of Scotland till within the last thirty years (say 1772), when it was said to have been introduced by the "benevolent Duchess of Buccleuch." The general belief at the present day, in the neighbourhood of Dalkeith, is that "Elizabeth, Duchess of Buccleuch, the present Duke's grandmother," introduced the squirrel to the menagerie then kept in the park, "about 100 years ago" (say 1778); and Mr Malcolm Dunn, of Dalkeith Gardens, informs me that this is probably correct, as the menagerie was established by "Duke Henry" (her husband) soon after his marriage (in 1707), and after he had settled at Dalkeith. A correspondent J. Mitchell, Esq. of Morepark, a native of Dalkeith—tells me *(in lit., Jan. 8, 1879)* that—"When a boy, eighty-five years ago, and then seven years of age, and when going through the woods around Dalkeith, the squirrel was quite a common sight;" and adds "it did not excite my surprise, as if it had been newly introduced." This date would therefore be fixed at 1794. The "Old Statistical Account of Scotland" bears evidence of its comparative abundance, and of its subsequent increase and extension of range in the county, and elsewhere, at that date (1791 to 1795), as will be seen further on in the text.

We must put aside as confessedly imperfect—and consequently inaccurate the evidence of the Earl of Home, who, writing in 1868 to Mr Tate, says: "I cannot tell the year, but to the best of my recollection, it was more than sixty-six years ago" *(vide Tate on the Squirrel, *Proc. Berw. Nat. Club*, 1868, p. 441)*, which, taking sixty-six years previous, would put the date of introduction as late as 1802 *(vide text under 1802, p. 117)*. Nor can we accept his repetition of the same statement as recorded by Mr Knox when writing in 1872 (*Autumns on the Spey,* 1872), that "squirrels were unknown there seventy years ago," again assigning 1802 as the date of introduction. I think we have abundant testimony—published and otherwise—to show that it must have taken place at a very much earlier date. That the memory of—or rather the importance of the fact of—its introduction must have passed away by the year 1845, is perhaps partially shown by all absence of record of it in the "New Statistical Account" of Edinburgh or Mid-Lothian *(vol. i.)*. Fleming, writing in 1819, tells us: "The squirrel is common in the wooded districts of the middle and south of Scotland;" but curiously, he makes no mention of the introduction at Dalkeith, although several contemporary writers do so, as we have shown above *(vide Constable's *Edinburgh Magazine*, iv., p. 507, June 1819).*

*Note.—There appear to be three articles on Scottish zoology by Professor Fleming in the *Edinburgh Magazine*, viz., in numbers for May 1818 and June 1819.*
you will be very near the date of introduction by saying about 1772, but it is possible that this may yet be definitely fixed.”

Its progress thence can be traced with some amount of exactness, until in 1802, it had spread through most of the forests of Mid-Lothian and East Lothian.* Professor J. Walker, of Edinburgh, writing in 1795, tells us that—“The red squirrel has become extremely common of late years. In this neighbourhood—Glencorse parish—the woods abound with them, and they are pretty numerous at Woodhouselee.”† Dating a little further back (1791) we find that it “has lately arrived at Penicuik, from the menagerie of the Duke of Buccleuch,”‡ and in the “Beauties of Scotland”§ (1805) it is further mentioned that “the red squirrel has become extremely common of late years on the banks of the Esk.”

Tate also puts on record that it spread “to Arniston, about twelve miles from Dacreith, and thence to Selkirkshire.”]

The next notice of it in the county which I can find is not till 1845, when it is stated that “squirrels gambol in all the trees of the larger woods” of Borthwick parish.**

The “New Stat. Account” is meagre in the extreme in its records of the animal in this county, the short-lived wonder having ceased.

Of the counties marching with Mid-Lothian, or influenced in the population of squirrels, we may here mention, first:—East Lothian, which, as we have already seen, was well populated by the species by the date of 1802.††

Then proceeding to counties southward (in which direction the waves of advance of this species appear always, and from whatever centre in the south of Scotland, to be weakest, as we hope to prove as we proceed), westward, eastward, north-westward, and north-eastward (being those

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†† Farmer’s Magazine, 1802, l. c.
directions in which the strongest waves press forward), we
find that in Peeblesshire they were "rather rare" in the
county in 1841, though apparently believed to have come
from Dalkeith, at which place the introduction is noticed;
and again of the parish of Newlands, which is one of the
parishes nearest to Mid-Lothian, we are told that—"within
thirty or forty years the brown squirrel has found its way
hither from Dalkeith."† The date of this volume of the
"New Stat. Account" being 1841, and putting the earliest
date at which the squirrel is by this account recorded as
reaching the north of Peeblesshire, we find it fixed at about
1801, by which time, as we have seen, it had populated most
of Mid and East Lothian, showing the tardy advance in a
southerly direction, as compared with that in westerly and
easterly directions.

Continuing our examination of districts southward of Dal¬
keith, I do not consider that Dalkeith introduction exercised
much influence on the extension of range anywhere in a
south-easterly direction beyond the confines of the county;
indeed, I am not at all clear that even within the county some
of the localities do not owe their population to the more
southerly introductions at Minto, and at The Haining, near
Selkirk. We find the statement, significant in its appropriateness
to our argument, that "squirrels have appeared (in
Galashiels parish), but do not seem to have gained a resi¬
dence; which, for the sake of game and singing birds, is little
desirable."§ Now, at that time (1841), there was no lack of
timber-clad ground in the parish of Galashiels itself, and later,
when the young plantations got up about Abbotsford, squirrels
began to be more abundant, as I am informed by Dr J. A.
Smith, on the authority of John Swanston—Sir Walter Scott's
forester and gamekeeper. There can be little doubt that these
came from the south, either direct from the Minto Centre, or
resulted from a few which were sent to The Haining, near
Selkirk.||

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|| See under Minto Centre, further on, p. 120.
Further, we find that Berwickshire owes nothing to Dalkeith for its squirrels,* and nothing was known of them in Roxburghshire, until their restoration—in 1827—at Minto.

In a south-westerly direction, I believe the waves of advance *may* have been more considerable than in a south and south-easterly direction, but I am inclined to believe that the source of the population of the Lanark districts is only traceable, *in part*, to the Dalkeith influence. We cannot admit that the latter reached so far south into Lanark as the parishes of Crawfordjohn,† nor even so far as Lamington,‡ and I even consider it doubtful if Walston parish § owes its stock to Dalkeith, because we have already seen that squirrels had failed to establish themselves at much nearer localities—such as Peebles and Galashiels. The Vale of Lower Clydesdale—*i.e.*, from about Lanark and northwards and north-westwards,—I believe to have been populated from Dalkeith; but any locality south of Lanark and Walston I consider to hold squirrels of Minto origin, and we have already seen that they were comparatively long in reaching Newlands parish—a much nearer locality to Dalkeith, and upon the same general line from that centre.¶

About this point, at all events,—Walston in Lanark,—we may fairly expect to find that the two stream-waves of Dalkeith and Minto *met*, the vanguard of the Minto overtaking the rearguard of the Dalkeith, and *together*, assisting in populating the country north of the Firths of Forth and Clyde.

Westward and north-westward from Dalkeith, we find the record that they abounded in the parish of Abercorn, in Linlithgow,** and Mr J. Colquhoun, in 1831, found them

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* See under Minto Centre, further on.
¶ See further on, p. 125.
** “New Stat. Actt.,” Linlithgow, p. 20. In one district of Linlithgow, however, they have become all but extinct. Ten years ago they were very numerous and constantly bred; now they are not to be seen. Captain N. H. Leckie is unable to say if they decreased gradually or suddenly, having been much abroad of late years. The keeper who has been there for two years has...
everywhere in large numbers both here and beyond the Firths in Stirlingshire *(q.v.)*.

In North Lanarkshire, we find that, "though formerly a stranger in these parts, it has become of late common throughout all the wooded districts of Clydesdale." It had reached into Calder, Cambuslang,§ and Cambusnethan,|| where it had established itself throughout the whole of the district."

Of its occurrence in Lanarkshire, we find no mention in the wonderfully exact work of David Ure—"The History of Rutherglen and East Kilbride," published in 1793.

Before tracing their advance further northwards, we must cry back and pick up a dropped loop in our chain of evidence, and recount the interesting particulars of the Minto restoration in Roxburghshire, which, as I will show, must be considered as the centre for another tract of country. Thereafter, an examination of the Map (Plate IV.) will assist in making the areas populated from each centre more easily understood.

**Minto Centre—Roxburgh.**

Regarding the former occurrence of the squirrel on the Borders, see remarks on "Historical Evidence in Scotland" (Part II., *ante*, p. 37).

Squirrels were unknown in the county when the present century began, and it was a rare sight fifty years ago,—say 1830.† Tate** states that it was "not resident so much as half a century in Wolfiee woods, near Hawick." Tate, writing in 1868, would place this date within 1830. There were "none in 1820, when Sir Walter Elliott left his home:

only seen one or at most two in that time. Captain Leckie is quite sure there has been no organised destruction of them on the adjoining properties nor there, and he suggests the possibility that the smoke from neighbouring paraffin works may have driven them away. This is quite possible, I believe, if the trees are affected by the smoke (Letter from Captain N. H. Leckie, The Thorns, Uphall, Linlithgow).

* J. C., *in lit.*
¶ Mr R. Smail, *in lit.*, 12th December 1878.
** Loc. cit.
but, in 1835, his father offered rewards for every squirrel killed."* Clearly, then, the Dalkeith introduction had no natural and direct influence here.

I am glad to be able to record, with considerable exactness, the date of the introduction at Minto, through the kindness of my valued correspondent, Mr Malcolm Dunn, of The Gardens, Dalkeith. He writes to me under date of 23d December 1878, and I give here his communication in full:

"I believe," writes Mr Dunn, "I have been fortunate in getting exact data in reference to its introduction to Minto, and that part of the South of Scotland. . . . A Mr Thomas Inglis, who has been on this estate since 1826, and whose father was a gamekeeper in Roxburghshire in the beginning of the century, where Thomas was born in 1805, remembers distinctly that there were no squirrels in that part of Scotland until about two years previous to his coming to Dalkeith (say 1824). Before leaving the south, he was acquainted with the gardener at Minto—a Mr Goodall, an old Dalkeith man;—and when Inglis came to Dalkeith, Goodall asked him as a personal favour to send him 'some squirrels,' which he knew were plentiful here some years before, when he was serving as a journeyman in the Gardens. This Inglis was enabled to do easily, as he was then employed as underkeeper; and, he tells me, he climbed the trees and took the young squirrels out of the nests, and after rearing them for a short time, he sent some of them to Mr Goodall at Minto, and the rest to his own father, who let them loose at The Haining, near Selkirk.† This he confidently assures me he did in the end of the summer (probably July or August of 1827), and that, previous to this, the squirrel was unknown in the south-east counties of Scotland. At Minto they were kept for a year or two by Mr Goodall confined in a large cage or small house, situated in the old orchard attached to the gardens there, but 'somebody' left the door of the cage open,

* Loc. cit.
† Making it still more unlikely that the Galashields record (antea, p. 118) was applicable to pioneers from Dalkeith. Two pairs, i.e. two males and two females, were sent to each place—Minto and The Haining.
or opened it on purpose,* and the squirrels quickly escaped to the woods, to the no small vexation of Mr Goodall. That," continues Mr Dunn, "is the history of the introduction of the squirrel to the south, as given to me last Saturday by Mr Inglis, and I have no reason to doubt his statements. In fact he told me all about this some three years ago, when I happened to be talking to him about the injury done by squirrels to some trees in the park (Dalkeith), and when I asked him on Saturday, he repeated the whole, in, I believe, almost the same words as when he first told me."

As we have seen, they became so abundant by 1835, that orders went forth for their destruction at Wolfelee, near Hawick; but there is no record of their reaching southward at all, until we find that in 1841, "squirrels latterly have been seen in the woods" of Hobkirk parish,† a few miles south of Minto.‡

There is no mention of squirrels in Wallis' "Nat. History of Northumberland," written in 1768 (p. 405), and even, as late as 1868, Tate (op. cit.) mentions that it had not then reached into East Northumberland.

No doubt the range of the Cheviots would, together with the natural disinclination of the species to travel southwards, deter them from a rapid extension into Northumberland. Mr A. Brotherston, of Kelso, considers that the most likely routes they followed from Minto into Northumberland was down the Teviot (north-east) to Jed-foot; then up the Jed valley,—most of which is wooded,—less or more; across the border by the road over Carter Fell to the head of Rede Water in

* Corroborative of this, curiously enough, I have another account from quite another source, which states: "It the introduction—was due to a gardener at Minto of the name of Crichton, who let go two pairs from a cage" (Mr Small enclosing a letter from Mr John Steele, factor at Minto, dated 24th December 1878), and I have other corroborative evidence besides.


‡ Unless indeed we accept Mr Jerdon's record ("Zoologist," 1843, p. 348), as applying to the south of the county also. He says (op. cit.), "Not common in Roxburgh until lately. Within the last ten years (say since 1833) or so, its numbers have much increased, and it is now spread over nearly the whole county." In 1845, a few are reported to have existed in the county, "but not plentiful," which remark probably applies to some of the outlying districts of the county.
Mr Harvie-Brown on the Squirrel in Great Britain.

Northumberland; or by descending still further to the Tweed at Carham, they would reach Northumberland and spread over the county without requiring to cross any bare hilly parts. This latter route, I think, is the most probable one.

Since this paper was first written out and communicated, Professor Duns has informed me of an earlier extension from the Minto Centre, reporting the squirrel to have been “not rare at Langton and Dunse Castle a year or two before 1832.” Professor Duns also takes notice of having seen one himself there about that time “with a tail almost white and the rest of the body very light coloured,” a variety which I have frequently myself observed in the Loch Ard and south-west of Perthshire district. Speaking of varieties, I can distinctly remember chasing a black squirrel in a hedge-row not far from Dreghorn Castle, near Edinburgh, in or about the year 1860, along with a schoolfellow.

Professor Duns’ earlier date, I consider, comes still under the Minto introduction, and since this paper was read, and Mr Scot-Skirving and Professor Duns wrote to me on the subject, I have received additional evidence, which to my mind clearly shows that, to the Minto Centre belongs the extension through the whole south east of Scotland up to the Kirkcudbrightshire March, and that North-east Northumberland also owes its squirrels to the same source.

Eastward, however, they reached the Rutherford estates, about the year 1831, when the first seen was chased for half a day by all the woodmen employed on the estate, which is about ten miles east of Minto. They were protected for a time, and increased in numbers. The first raid upon them was in 1837. Between that date and 1843, thirty-two days were devoted to killing squirrels by from two to five men. In 1844, forty-one were killed in six days. In 1845, two men in seven days killed 117. In 1846, eighty-eight were killed in seven days. From 1847 to 1855, thirteen days were employed by from three to six woodmen in killing squirrels. Since 1855, the keeper and forester, Maclean, who is my informant, keeps them down by his own exertions. He has never shot more than ten in a day. His terrier is trained to “tree” them.
Towards the north, the first squirrel was seen in Lauderdale in 1838 or 1839. About ten years afterwards they had increased to a considerable extent, not having been interfered with. Orders were, however, then given to kill them down. This route up Lauderdale appears to me to indicate that the squirrels which appeared at Galashiels in the parallel valley of the Gala also came northward, and cannot be assigned to Dalkeith origin.

Berwickshire.

They appeared in Pennimensiel wood, as I am informed by Mr James Hardy, somewhere about 1830-31. This is the largest collection of wood in the neighbourhood of Cockburnspath, being aboriginal wood planted over. It was noted for its abundance of hazel bushes, but they were cut down and other trees planted. A nest found was the first intimation of their presence. They are not, however, numerous even now.

But at the Hirsle, near Coldstream, in Berwickshire, they appeared not until about 1841, “to the great astonishment of the people in the neighbourhood, who had never seen one before.”* At Dunse they were present in 1847, and shortly afterwards at Chirnside.

Of the former occurrence of the species in Berwickshire see under remarks on “Historical Evidence in Scotland.”† Mr Tate notes that one had been seen at Akeldene “about seventeen years ago” (i.e., previous to 1868) say 1851, which probably was the beginning of them in Northumberland;‡ then that they were first seen at Coupland woods about 1858 (“ten years previous”); and Mr J. C. Langlands reported their appearance at Old Berwick in 1868.§

* Tate, loc. cit.
† Part II., ante, p. 37.
‡ Mr Hardy writes to me, however, that with regard to the introduction of the squirrel into Glendale in Northumberland, bordering the Tweed, he had been told by people at Wooler “that a vehicle carrying squirrels from one part of the country to another had broken down on the public road on Milfield Plain, and some of the imprisoned inmates escaped;” but Mr Hardy appears to consider that there may be some invention in this report to account for their sudden appearance.
§ Tate, op. cit.
Peebles—Selkirk.

Northward and north-westward, we find that they rapidly pushed as far as Galashiels.*

Lanark.

More westward, we find them stretching to the confines of Lanarkshire at the Culter Plantations, on the eastern borders of Lamington parish, prior to or about 1841,† and Biggar, ‡ and also reaching Crawfordjohn parish at the same time, where, however, it was "seldom" seen; § Walston parish ||— "seen occasionally," and included in Douglas parish, ¶ in the west of the county. By 1868, we find they had become plentiful at this locality,** but it was not till 1870 that they were observed in the adjoining parts of South Ayrshire (q.v.). If Ayrshire was indebted to the overflow from this centre, I believe this to have been a likely avenue of advance into Ayr Water. But if due to a more southern centre—as Cumberland,†† then we must look for it from Dumfriesshire. But again I will show that it is more than

* As we have seen under Dalkeith Centre (antea, p. 118). In further support of this, Mr James Smail has favoured me with the following: "From a little below Selkirk there are almost continuous woods on the south side of the Ettrick, and thereafter on the Tweed, down to below Abbotsford, opposite to Galashiels, and about a mile from that town. All these woods would be excellent harbours for squirrels at that time (between 1827 and 1841). The country between Selkirk and Minto is much better wooded now than formerly, but between 1827 and 1841, there were very considerable woods here and there between the two places, which would afford suitable refuge for squirrels. The woods in the Lilliesleaf district on the old woods below Abbotsford lead, more or less, to Melrose Bridge, by which squirrels could cross into the woods between this (Galashiels) and Melrose."

|| In a letter before quoted, written about that time (1868) by the Earl of Home to Mr Tate (vide Proc. Berw. Nat. Soc., ut sup.).
†† Infra, p. 126.
probable it was not indebted to either, but to an independent restoration. (See under Ayrshire.)

There is no mention of squirrels in North Lanarkshire made by Ure in his account of the animals of East Kilbride;* nor in the "Old Statistical Account" is any notice taken of the species in the county.

**North-west of England:**

*Dumfriesshire and South-west of Scotland.†*

There was an early introduction of the squirrel at Southwick, in Wigtownshire, about fifty years ago (but the exact time is uncertain), as I am informed by Mr Service. Mr Stewart, of Southwick, brought a number of squirrels from some part of England, and turned them out at Southwick. It seems that in that part of the country, they became dispersed for a time, but ultimately died out, no doubt from a

* "History of Rutherglen and East Kilbride." Glasgow, 1798.
† Since this paper was read, Professor Duns, of Edinburgh, has informed me of an earlier date for Dumfriesshire. He writes: "In 1843, I saw one cross the road near Springkell, Dumfriesshire. An incident occurred which makes this quite sure."

On the other hand, Mr Scot-Skirving assures me that he "knows there were no squirrels in Kirkcudbrightshire when he was a boy," which would date about the same time as Professor Duns' note above in the adjoining county.

If, as Professor Duns considers, "the Cheviots could be no bar to its spread from Roxburghshire or Berwickshire, by the banks of the Tweed from the one county, or by the woods at the top of the Merse in the other, it could easily find its way by Coldstream, Wooler, etc., into Northumberland; then there seems an equal probability that it would press its way westwards into Kirkcudbright and Dumfriesshire, but I have shown that these are the points of greatest resistance to waves of distribution from Minto, and that, according to natural laws, in my opinion, the strongest waves would flow more to the north-west.

I am borne out in this view by Mr Robert Service, than whom I believe there is no better authority for the south-west of Scotland. He writes (Feb. 22, 1880): "I am still of opinion that most of the Dumfriesshire squirrels originated from Cumberland. Springkell is only about ten miles north west of Houghton House" (elsewhere mentioned in this essay), "in Cumberland, where I told you they were abundant in 1855, and had been so for, at all events, a good many years previously. Once on the move, there is nothing to prevent squirrels spreading all over Dumfriesshire, from north-west Cumberland, and, of course, the Kirkcudbrightshire squirrels could only come naturally from Dumfriesshire."
want of sufficient shelter, and scarcity of wood. A nest containing young was found at Mabie, which were probably descendants of the Southwick squirrels, as Mabie is ten miles from Southwick in a direct line, and Mabie is a locality in Kirkcudbright, about five miles south-west of Dumfries, and until the last ten years densely wooded.

These appear to be the only items we can glean of its appearance there until a very much later date. All the old people consulted by Mr Service—to whom I am entirely indebted for all data from the south-west of Scotland—do not remember ever seeing squirrels until within the last sixteen to twenty years. Mr John Heysham, M.D., of Carlisle, in "A Catalogue of Cumberland Animals," contained in "The History of the County of Cumberland" (1794), says: "The squirrel: this is a lively, active, and provident animal, but not very frequent, except in the neighbourhood of the lakes. In Cumberland and Westmoreland they are called conns." This shows their rarity in the north of England and south of Scotland at that date.

Mr Service says further: "I have no doubt that the Dumfriesshire squirrels [i.e., of the present time], though supplemented by introductions, had their origin in Cumberland. They have increased much more rapidly than they could possibly have done were the several introductions the first of the race." I quite agree here with Mr Service, and I think the following data collected by him go to prove that Dumfriesshire and Kirkcudbrightshire owe their squirrel population to the combined dispersal naturally from the north of England, along with that from several small introductions.

However, in the south of Dumfries, Mr James Telford gives evidence of their appearing in Canobie parish, in 1837, in Liddleside. They then increased rapidly until last spring [1879], when they suffered sadly from the storms of winter, and a great many died. Mr Telford adds that a man in Langholm parish relates that he had hunted squirrels in Dean Banks about 1833. Another correspondent of Mr Service's puts the date much later for Canobie, and says that it was not till 1847; but of course we must accept the earlier positive date. It is quite the general impression that they came from
the south, and were seen in Canobie before they were known in Langholm to the north of Canobie. But Mr George Johnstone, forester, Castlemilk, Lockerbie, informs Mr Service that in 1854 there were a few in the Lockerbie woods, possibly a dozen. He was told by the older inhabitants that about ten years before that, a pair had been brought and let off—say 1844.* Mr Johnstone adds that they perceptibly increased every year up to 1878. “Their numbers might be about four times that of 1854. This year their numbers are much less, which I attribute to the long and severe winter.”

Mr Dalziel, forester and gamekeeper at Hoddam Castle, says there were none there till 1850. “In that year a pair made their appearance. The old woods of Hoddam are very extensive, and abound with hazel, oak, and beech, which give the principal food of the species.” Mr Dalziel thinks there may be 400 or 500 squirrels now upon the same number of acres of woodland. Mr Dalziel came to Hoddam in 1848 from Raehills estate. He says there were no squirrels on that estate or anywhere in the neighbourhood of Moffat† at that time.

Mr Robert Service—to whom I am entirely indebted for my data from Dumfriesshire—writes me as follows: “James Service (my father) never saw a squirrel alive until he went to Houghton House, near Carlisle, in 1854. He had been previously in Argyleshire, Bute, and twenty years in Ayrshire. My mother always resided in the neighbourhood of Dumfries, and never saw squirrels until she went to Houghton. They were strictly preserved there, and in winter were fed in front of the mansion.” In the same year Mr John Croll reports having seen squirrels “when coming on the coach by the Langholm and Langtown road across by Gretna to Dumfries.”

In the neighbourhood of Dumfries they seem to have appeared for the first time about 1860, according to evidence collected by Mr Service. Mr W. Lennon, Crichton Royal Institution, Dumfries, who was born and has resided in Dumfriesshire all his life (aged now sixty-five), says the first

* If an actual and successful introduction took place then, it is quite possible that even Carlisle owes its population to this centre.
† In the north of the county.
Mr Harvie-Brown on the Squirrel in Great Britain. 129

squirrel he ever saw alive was in 1860, in some trees at Mountain Hall, near Dumfries. It was also the first seen in the district by the late Thomas Aird, the Poet, who was with him at the time. In 1862, Mr Lennon saw his second squirrel on a tree near Bruce’s Castle, at Lochmaben.

Mr James Graham, gardener, Marchbankwood, near Moffat, says: “The first squirrel I ever saw was at Symington, Lanarkshire, in October 1854. I came to this parish—Moffat—the following spring, and I am certain there were none here then. I entered on my services at Marchbankwood in April 1858, and I cannot be positive of ever seeing a squirrel earlier than 1862 in this place.” He adds, “They have never been abundant here, and I have only seen one this summer. I think the past winter has had a severe effect upon them.” *

“In 1867,” Mr John Maxwell, Inspector of poor, Maxwell-town, Dumfries, says, “that he was at a funeral which was going to Morton Churchyard (in Upper Nithsdale), from Dumfries. When passing Ellisland (Burns’ farm) a squirrel jumped from one tree to another across the road, and over the hearse, and so scarce were squirrels then that few of those present knew what it was.” †

By 1870 we trace them into Tynron parish, in the west of the county, where they had not appeared before on the authority of Mr James Shaw, parish schoolmaster there, for seven years or so previous to that date.

In the south of the county they had become abundant, however, before this time. Mr David Gram informed me that in November 1861, he and a friend saw and counted seventy-one squirrels within a quarter of a mile of road lined with oak trees, in the middle of a wood in Canobie parish, at Langholm, Dumfries. In Dumfriesshire squirrels were “becoming very common in the neighbourhood of Dalscone wood, and are rapidly spreading over the county.” ‡ They are still (1879) quite rare on the western side of the Stewartry, and in Wig-

* On the other hand, never have squirrels been so numerous in Perthshire as they are this season 1879—local migrations causing a crowding to the best sheltered places.
† Oral information supplied to Mr Robert Service.
‡ Newspaper slip: “Dumfries, Sept. 5, 1876.”
townshire almost unknown. There are now, however, plenty of squirrels in the Camlougan woods (Earl of Mansfield's), and Mr Service thinks they probably made their first appearance about the same time that they appeared elsewhere in the county—i.e., about 1862 or 1863.

**Kirkcudbright.**

Squirrels did not arrive in Kirkcudbright before 1860 or 1861. My correspondent, Robert Service, Esq. (Secretary, Dumfries and Galloway Naturalists' Club), tells me he did not see them commonly before 1868, and he is of opinion that they came "from Cumberland through Dumfriesshire," which, if it is the case—and I see good reason for the belief—points to a further exemplification of the strong north-westerly pressure, and the comparatively weak south-westerly.

Arriving in the south of Lanark as early as 1841, of course there appears the possibility that they might come southwards to Kirkcudbright by 1864; but I hold that this is contrary to all our experience of their pioneering movements, especially through an unwooded country, and when there was freer exit in more northerly directions, in better timbered tracts.

In 1861, they are reported as seen for the first time in Buittle parish;* and, in 1862, squirrels are reported as numerous in Carruchan, Dalscairth, and Hillswood, in Troqueer parish, in the east of the county.

In 1865-66, they were first observed in Parton parish, at Corsock, by Mr John Croll, and it is Mr Croll's impression that they came up the river Urr, as they were seen a twelvemonth before at Glenlair. Mr Croll further writes, regarding the direction from whence they came: "When I was in the Hawick district, or Teviotdale, they were very abundant, and larger than here, and it is said they went from there to the district of Langholm, and from there to the Annan, and from that again to Nithsdale, and round the Solway shore by Dalbeattie, and up to this quarter. Some years ago one was seen with a piece of stick drawing it to Urr. It then wrought it into the water, then leaped on it and crossed the Urr on it to

* Auct. James Matheson, Dalbeattie.
the other side, and when near the side leaped off the stick on to the bank."

The above seems possible, but I take the parallel dispersals from other centres, and I think we are bound also to consider the natural barriers in the mountainous tract intervening and the natural faunal divisions. If introduced at Castlemilk, in Dumfriesshire, then the spread westward is easily understood; but we can hardly at present admit that they crossed naturally over from Roxburgh.

In 1875, the first squirrels were seen at Dildawn, in Kelton parish, but they are reported to have been seen at Argrennan a few years previous to that date. Argrennan is an estate on the opposite bank of the Dee from Dildawn, or west bank. Since then they have become numerous.

Mr Hugh Aitken writes from St Mary's Isle, parish of Kirkcudbright: "It is not more than four years since squirrels were seen here,"—say 1874 or 1875,—and he adds under Dumfriesshire, "There were none at Closeburn Hall, Closeburn parish, West Dumfriesshire, when I was there sixteen years ago."

The gamekeeper on Glenlee, Kells parish, states that squirrels first made their appearance there in 1867, but the keeper at Kenmure, adjoining, says, it is only about four or five years since they were first seen there. The latter informant thinks they came from Hensol,—another property in Kells parish, where they were seen fifteen years ago—say 1864.

In 1869, squirrels had reached the south of the county, one having been seen by the gardener,† at Arbigland, parish of Kirkbean, in that year. Since then it has become very numerous, and orders for their destruction have gone forth.

Mr Service, however, believes that a pair of squirrels from Perthshire were turned out in a Kirkbean wood in 1867, and that these may have produced young.

* I am quite unable to give any thoroughly reliable evidence, from an actual eye-witness, of this method of crossing rivers as reported by several correspondents. Many similar reports have reached me. I have, however, received undoubted evidence of their crossing water by swimming (vide infra, p. 169; also vide tailpiece at conclusion of this paper).

† Mr Charles Black, a well-known naturalist and botanist (vide "Good Words," April and May 1878).
In the neighbouring parish of Colvend no notice is taken of squirrels in a list of the animals in a history of the parish, published in 1870, but they are reported as having been observed there, "about eight years ago, and then only a single pair,"—say 1872. These were in Barnbarroch woods, and were supposed to come from the adjacent and larger woods of Munches. It has been conjectured that they came there from the woods of Chambellie, in New Abbey (auct. James Frazer). To this Mr Service adds: "Munches is in Urr, Chambellie is in New Abbey, the next parish to Troqueer, and if the Colvend squirrels came from Chambellie they may have gone by way of a wooded glen in the Criffel range of hills, which is almost in a direct line to Colvend."

In Ererrick parish we have no accurate record of their first appearance, but it being a sea-board one, the squirrel would have to come over a range of bare hills from the eastward, or down the valley from Galston or Dalbeattie direction by north or north-east.

About six years ago—say 1873—squirrels were first seen at Cardoness in Anworth parish, near Gatehouse, in the south-west of the county.

Another of Mr Service's correspondents, however, claims to have turned out an old squirrel and some young ones about fourteen or fifteen years ago—say 1867-68—at Cally, near Gatehouse.* Yet another informant agrees with the latter statement, saying that "I think it was about fifteen years since the first was seen at Cally." The latter adds, "I believe there was one killed at Bargaly. There was also one seen as far west as Cumloden Cottage about a year ago." Mr Service adds to this note: "Bargaly and Cumloden are away near the borders of the Stewartry with Wigtownshire, and indicate the western limits of the distribution of the squirrel, I think, at the present time."

It will be seen from the above that considerable difficulty attends a minute investigation of the lines of dispersal in the south-west of Scotland, owing to various minor introductions; but the district so populated, can, with sufficient accuracy, be mapped out.

* Auct. Thomas Millar, late gardener at Cally, now at Strathallan Castle.
Mr Harvie-Brown on the Squirrel in Great Britain. 133

Wigtownshire.

I have received, up to date of 1879, abundance of negative evidence from this county. The squirrel as yet is unknown, or next to unknown, in the county.

In 1873 also, they are reported to have reached to the Wigtown Border on the banks of the Cree, as a few were seen that year in Cumloeden wood, parish of Minigaff, opposite to Penninghame, in Wigtown.

Bute.

An unsuccessful introduction was made in Bute, about seven years ago, by Lord Bute. Mr John Wilson informs me that it is believed they are all dead.

Ayrshire Centres.

INTRODUCTION AND EXTENSION IN AYRSHIRE.

The history of the squirrel in Ayrshire, as far as I am able to learn, is as follows.

There is no mention of it in the "Statistical Account" of the county (1845). In 1867 it is said not to be found in Ayrshire.*

I am able exactly to place the introduction of the squirrel in North Ayrshire. Mr David Landsborough informs me that Mr Taylor, factor at Barskimming, Mauchline, brought a pair of them from Dumfriesshire thirteen years ago—say 1866. One soon made its escape (presumably the female), and afterwards, Mr Taylor began to hear of the squirrel being seen in Barskimming woods, where before long they became abundant. Now they are abundant in Barskimming woods, and prove a great nuisance. They are also abundant in Dun-donald and Eglinton woods.

In the Hunterian Museum there is a squirrel which was presented by Mr Allan Walker, Kilbirnie, Ayrshire, in 1869; and Mr John Young informs me that Mr A. Walker was a medical student, and his father was then medical practitioner at Kilbirnie. The ticket states that it is in its autumn coat,

* "Zoologist," 1867, p. 668.
so it was probably killed in the autumn of that or the previous year.

"They first made their appearance in South Ayrshire up the Water of Ayr, about eight or nine years ago (i.e., 1870). Next at Martinham estate, between Joppa and Dalrymple. Next at Cassilis estate, and about the same time at Culzean, where the first seen was caught in a rabbit stamp about seven years ago (i.e., 1872). They are numerous on Cassilis now (1878-79). They have increased greatly within the last three years (1876-79), and the keepers kill lots of them now, and they are seen daily. My opinion is, they come from Dumfriesshire."*

Further, another correspondent writes: "There are none at Moneath or neighbourhood as yet (1878-79). This is conclusive," says the writer, "they must have come in from the east side of the county." A Mr Mc'Crerich, however, rather upsets all this by the statement that "they were introduced by navvies who came to work at a viaduct on the Water of Ayr some eight or nine years ago (i.e., about 1870). They brought them as pets, and they escaped." Mr Mc'Crerich says also: "The first squirrel seen in Ayrshire was at Gadgirth, about seven years ago (say 1871), and was brought into my shop to be stuffed. Then they spread to Ochiltree, and every year, becoming more and more common, have now reached as far as Muirkirk (1878)."† This lumping of localities all south of Ayr Water certainly is puzzling, unless, as Mr Mc'Crerich says, they were introduced by the navvies, in which case the one got in 1870 "up the Water of Ayr," probably came up the river, and they "now have reached as far as Muirkirk" (1878), which locality lies still further up the Ayr Water, not far from the boundary of the county, and not far distant from Douglas Castle, in Lanark. It is thus more than probable that Ayrshire is indebted to two separate introductions for its population. They have also been seen on Bargany estate, adjoining Kilkerran (1878-79), and Dalgarroch on the Stinchar, and once on Glendoun, near Girvan, in 1880.

* Letter from Mr J. Cox to Mr J. G. K. Young, 19th Dec. 1878.
† Letter from Mr J. Cairns to J. G. K. Young, Esq., 21st Dec. 1878.
An account gleaned on the spot by Mr Robert Gray, however, differs somewhat from any of the above accounts, in so far that the introduction is believed to have been made, in the first instance, by a butler in the service of the Marquis of Ailsa about 1872. The dates given above, however, prove an earlier presence of the species.

FURTHER EXTENSION FROM DALKEITH AND MINTO CENTRES TO THE COUNTIES NORTH OF THE FIRTHS OF FORTH AND CLYDE.

Stirlingshire.

Following the combined armies from Dalkeith and Minto, we find them pressing northward through the isolated portion of Dumbartonshire into Stirlingshire. Seeing, however, that squirrels had reached as far north as Kincardine parish in the south of Perth, by 1821, and only got westward to Campsie about 1827—the year of the introduction at Minto—it is perhaps more correct to assign the population of the following counties direct to the earlier restoration at Dalkeith, only assisted by the later fresh blood and vigour of Minto.

The earliest negative evidence of the squirrel in Stirlingshire, which I have been able to get is from an old woman still alive, who relates that when she was young she had heard of the "strange beast;" and who, in her ignorance, had pursued and captured a weasel, believing it to be a squirrel, which latter she was desirous to have, because she had heard that they made fine pets. She got well bitten, and found she had caught a Tartar. This was somewhere about the year 1810. Somewhat later than this, another person was bitten by a tamed squirrel, and bears the mark to this day, which mark I have seen. This would be about the year 1820 or 1825.

Squirrels are well remembered to have entered the county in the beginning of this century, according to various accounts sometime between 1810 and 1815. One was seen crossing the Forth and Clyde Canal going north, and coming from the isolated part of Dumbartonshire. It was sitting upon a chip
of wood, according to my informant.* Mr William Rennie, Tipit Craig, was born in 1793, and he never remembers the squirrel as absent from the south of the county. Smidy Hill, where he was born, is in the parish of Kilsyth. In 1809, squirrels were plentiful at Burnhouse, in Skiperton Glen, and Castlecary woods. Mrs Spiers says her father used to tell the family at home that he saw a squirrel on a piece of wood crossing the Forth and Clyde Canal towards the north.† Burnhouse is in Falkirk parish, and Bendomina, Mr Spiers' father's farm, is in the parish of Cumbernauld, in the isolated portion of Dumbartonshire. I am particularly indebted to Mr David Cram, Bonnybridge, for assistance in the above, and much other information he has collected. Others likewise testify to their abundance seventy years ago in the south of Stirlingshire.

I have evidence of the occurrence of the squirrel at Duni-pace as early as 1822, and my father shot one there in 1835. Westward they did not reach Campsie till 1827, and had populated that district by 1842.‡ Thus the Dalkeith army had reached Campsie about the same time that the Minto army was being marshalled, and this date, as will be seen, serves for a stepping-stone to West Dumbartonshire, and Killearn parish, in the west of Stirlingshire, where they first appeared in 1830. Here the apparition caused much excitement at the time, as I am informed by Mr Blackburn of Killearn.

Northwards they had reached to the confines of the county and penetrated to Kincardine parish, in the south of Perthshire, by about 1821 (see under South Perthshire, infra, p. 138), from the Dalkeith and Minto Centres. We then find that Buchanan parish, in the north-west of the county, was reached in 1830.§ A correspondent writes to me: “When I came to live at Plean” [which is between Denny and Stirling, —J. A. H. B.] “in 1828, squirrels were not very numerous.

* I have heard the same related several times by others as actually happening at the present time, but no instances can be said to be authentic.
† See further on p. 169.
‡ “New Stat. Acct.,” Stirlingshire (1842), p. 238. The writer says : “Are now abundant. They were first observed in this district about fifteen years ago”—i.e., about 1827.
It was reported then that their headquarters was at Plean Bank. At that time the gamekeeper had orders not to kill them. Later, when the Plean woods increased in size, they became more plentiful, coming from Auchenbowie woods, adjoining."

In 1842, we find them plentiful in Polmont parish in the east.* Thence through Gargunnock,† St Ninians,‡ Logie,§ and Fintry.||

Thus it appears that one branch—or the left Stirlingshire wing of the army—pushed north-westwards via Campsie, and rounded the western end of the central range of Stirlingshire hills, reaching Killearn in 1830, and even Luss in Dumbarton at the same time, and also Buchanan in Stirlingshire; and the right wing took a more due northerly course at first, towards Stirling, and rounded the eastern end of the same central range of hills, joining forces again probably about Buchanan.

**Dumbartonshire.**

An isolated part of Dumbartonshire lies to the south of Stirlingshire, and between it and Lanarkshire, squirrels passing from Lanark to Stirlingshire would therefore find their most direct route through it.

No mention is made of the species in a very full and able list of the Mammals and Birds of the Parish of Luss, in the "Old Stat. Account" (1796).¶

From the account under Stirlingshire it will be seen that squirrels were far from uncommon in this isolated part of Dumbartonshire as early as 1809 to 1815. The "New Stat. Account" also speaks of them as common in 1841. Thus they abounded in 1841 in Kirkintilloch,** parish, and they were also found in Cumbernauld†† and Castlecary‡‡ [but read also under Stirlingshire].

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63
According to J. Colquhoun, Esq., they were first seen in the western and major part of the county in 1830.* In 1863, in consequence of damage done to larch trees, orders were given to destroy them on Sir James Colquhoun's estates—Rossdhu parish—and many hundreds were killed.† In 1864 they were still abundant there, and in 1877, Mr James Lumsden reports that "they were still extending their distribution."‡

We thus find that another flank movement is made into Dumbarton, and we find them recorded from localities on either side of Loch Lomond, almost opposite one another; in Luss and Buchanan about the same time—viz., 1830.

From Stirlingshire we now follow the more widely spreading army; First, eastwards and north-eastwards, populating Clackmannan, and Fife, and Kinross, and rounding the north-east end of the Ochils, or penetrating across them by the various valleys.

We will then, so far as practicable, trace their advance through the southern parts of Perthshire until they meet the army from another centre at Dunkeld (vide under Dunkeld Centre, p. 142).

We will find them also pushing their way through the mountain passes of the Trossachs and Aberfoyle, reaching the head of Loch Lomond and here joining forces with the Dumbartonshire wing, and with the westerly extension of the Dunkeld army,—yet to be spoken of,—meeting also an extension in all probability from an introduction at Minard, in Argyleshire (q.v.).

Clackmannan and South Part of Perth.

In Clackmannan a squirrel was killed on the coronation day of her Majesty—June 20, 1837—by one of a party of some twenty bark-peelers, in the Dollar district; and James

* In lit.
† R. Gray, "Quadrupeds, Birds, and Fishes of Loch Lomond, etc. ;" Maclure & MacDonald's "Guide to the Trossachs, etc.," 1864, p. 2.
‡ J. Lumsden, "Zool.," 1877, p. 225.
Syme found a nest the year before in Comrie Dean, Perthshire, adjoining.

In Clackmannan, we find that, while unknown around Alloa, when the "Old Stat. Account" was written, it had become numerous by 1841.* The Rev. P. Brotherston,† who writes a somewhat able article on the natural history of the parish of Alloa, takes occasion to notice the service done by the squirrel in planting acorns, thus supplying future oak trees for the British Navy.‡

I have been unable to obtain, as yet, any other statistics from Clackmannan to enable me to fix an earlier date for their arrival, but if numerous in 1841, it is reasonable to suppose that they arrived sometime sooner say 1837. We have before seen that in the space of three or four years they increase largely.§ Very probably, however, it arrived even earlier than this.

Fife.

No mention of the species is made in the "New Stat. Account" of the county. The earliest date I have is 1825, when they appeared upon the estate of Lord Rosslyn, near Dysart. The species at this time, and even for some years later, must, however, have been far from generally known in any of the country north of the Firth of Forth.

Another correspondent assigns the date of the first appearance of the squirrel in Fifeshire to 1834, remembering in connection therewith a very animated discussion which took place concerning it. He saw the squirrel himself, but the

† The Rev. P. Brotherston, later, was Mr A. G. More's authority for the county, while the latter gentleman was compiling his paper "On the Distribution of Birds of Great Britain during the Nesting Season" (vide Ibis, 1865).
‡ This reference to the planting of acorns was no doubt called forth by Lord Melville's remarks on the subject of the British Navy supply of timber, written in 1810, and referred to and quoted by Sir Walter Scott in 1836 (see "Misc. Prose Works of Sir W. Scott, Bart.,” vol. xxii., p. 4).
§ Vide under Roxburgh Mr Jerdon's note and other evidence (antra, p. 122).
Proceedings of the Royal Physical Society.

fact was hardly credited by the rest of the party who were shooting in the neighbourhood of Markinch, and who considered "that no such animal as a squirrel existed in Fife." Before the following spring, however, another squirrel was killed at Falkland, and since then they have constantly increased, and are now—1880—very numerous.

Captain H. W. Feilden writes, under date of 15th December 1878, and gives me the following account of the species in the county.

"Thirty years ago there were no squirrels in the East Neuk of Fife—(i.e., say 1848). They had not extended so far as Kinglassie wood, a large fir and spruce-covered area which lay between St Andrews and Crail. I understand this wood has been felled.* Neither were there any squirrels in Airdrie wood, not far from Crail. The absence of these animals in the East Neuk, thirty years ago, was impressed on my mind by my father bringing a couple of dead ones from beyond Cupar. These were stuffed and cased in the hall of Cambo House, Sir Thomas Erskine's residence, where we then lived.

"Five-and-twenty years ago (say 1854), squirrels were very numerous in the Howe of Fife (i.e., the fertile Strath drained by the Eden) to the eastward of Cupar. They were abundant amongst the timber of Rankeilour Park, and the large woods which clothed the Mount-Hill, an eminence in the parish of Monimail, on which the Hopetoun Monument stands. They were common in a large wood near Springfield, at Lower Rankeilour (Creighton-M'Cull's), in the woods around Ladybank Junction, and at Melville (Lady Elizabeth Cartwright's). I never remember seeing them at Wemyss Hall (my uncle's, now my cousin's). I cannot help thinking that squirrels were found at Birkhill (Wedderburn's) near Taymouth; but, remember, it is five-and-twenty years since I lived in Fife."

"Twenty years ago," writes Dr Mackintosh of Murthly

* Kinglassie wood was cut down in 1848-49, as I am informed by Mr W. J. Kerr. Mr Kerr has been told that squirrels had reached Kinglassie wood, and were numerous there before it was cut down; but we have Captain Feilden's record to the contrary.
(in lit.), "They were common all over the county of Fife,"—
say 1839.

At present there appear to be no squirrels in the East
Neuk of Fife. Doubtless the plantations are too small, and
not continuous enough.

They have, however, arrived near Newburgh-on-Tay, as I
am informed by Alexander Laing, Esq.

Perthshire.

EXTENSION FROM DALKEITH AND MINTO CENTRES.

The route which would most easily lead them from Stirling¬
shire into Perthshire, by the date of 1821, would be across
the Old Bridge of Frew,* which connects Kippen and
Gargunnock parishes with Kilmadock and Kincardine, in
which latter parish we find the first record of them in the
south of Perthshire.† The uniformly deep, ditch-like river
Forth would offer a natural barrier to their advance, except
where the Bridge and Ford of Frew, and Bridge of Drip, near
Stirling, afforded them a means of crossing,‡ but I have no
data showing their advance over the latter, except that of
their arrival in Clackmannan. To reach Clackmannan they
must have crossed the Forth.

The whole of the south of Perthshire no doubt owes its
squirrel population to the southern centres at Dalkeith and
Minto.

From Kincardine parish, in lack of more continuous data,
we go on till we arrive at Crieff, where its occurrence is men¬
tioned, and its rarity indicated by being classed as a "foreign
animal," along with the pheasant and woodcock,§ and thence
we may, perhaps, follow them, as still coming from Dalkeith

* The Bridge of Frew was built over the old Ford of Frew in 1876. The
only other bridge between that and Stirling—the Bridge of Drip—was built
carly in the present century.

† "New Stat. Aec.," Perthshire, p. 125. The passage is: "Although the
squirrel was unknown in this parish till about twenty years ago, yet it now
abounds in almost all our plantations."

‡ See remarks under "Laws regulating the Extension of Range of the
Species," further on, p. 165.

and Minto, as far as Monzie parish.* Though indeed it is somewhat uncertain whether this record and the Crieff one are not due to the overflow from an increase at Methven.†

The occurrence, as early as 1821, in St Madoe's parish, in the Carse of Gowrie, is due, I believe, to the pressure from Dunkeld, as will be further pointed out on p. 147.‡

RESTORATION AND INCREASE.

Perthshire—Continued.—From the Dunkeld Centre.

We are told that an early introduction took place at Dunkeld some time prior to 1793, for we find it thus recorded in the "Old Stat. Account:" "It was introduced at Dunkeld by the late Duke of Athole, and has unfortunately done much harm to the singing birds;" § and all the data at my command certainly go far to prove that the Rev. William M'Ritchie of Clunie—the only person, as far as I can discover, who recorded the fact—was correct in his statement. He also adds, that it was beginning to breed in the woods at Clunie, || and in 1798 we find it again recorded that squirrels were numerous in the plantations around Dunkeld.¶ Mr Duncan Dewar,**—my correspondent for the Taymouth district—assures me they were never introduced at Taymouth nor in Breadalbane, and that an old man, still alive, and who was born at Taymouth, corroborates this, but distinctly remembers the first squirrel he had ever seen, which was at Dunkeld; and the first ever seen at Breadalbane was in 1828.††

Mr John Macgregor, at Ladywell, informs me that he has heard from old people that the squirrel was introduced at Dunkeld by the fourth Duke of Athole, who succeeded to the

† See "Perthshire—from the Dunkeld Centre" (infra).
** Mr Dewar has a fine collection of birds and animals shot in the neighbourhood, and is an intelligent, able, and careful observer and recorder.
†† It is only right to notice in this place, that in a somewhat full list of animals of Dunkeld in Campbell's "Journey from Edinburgh to North Britain" (vol. i., p. 270) in 1811, no mention is made of the squirrel.
Mr Harvie-Brown on the Squirrel in Great Britain. 143

dukedom in 1774, and died in 1830. Colonel Drummond Hay suggests what seems extremely probable, viz., that the growth of the larch plantations, some time prior to 1820, caused their rapid increase around Dunkeld, which was the first locality where he had seen a squirrel in a wild state; and Colonel Drummond Hay has never known that district to be without them.

They were introduced to Perthshire, according to the account of an old man still living upon the Moncrieffe property, by a young nobleman of the Athole family—Lord Glenlyon—who was an invalid, and who brought them from Sweden about the beginning of this century. Here our informant's memory is doubtless a little at fault, as we know of their earlier introduction from the "Old Stat. Account" (vid supra).

In a letter, signed John Robertson, Calvine, Struan, occurs the passage: "Charlie Don (a wood-forester, aged about sixty) was in just now, and he says that squirrels do not claim their origin in Great Britain, and that they came from Norway." This is happily corroborative of the other statement as proving their actual introduction,* and doing away in great measure with the idea that they lingered in the remnant of the Blackwood of Rannoch, which is entertained by some of my correspondents.

In a southerly direction from Dunkeld, they appear to have come further from this centre, than from any of the other centres of restoration (as will be seen further on); which phenomenon, however, I think, can be perfectly explained by the mountainous country shutting them in and retarding their progress in the north and north-west, combined, to some extent, with the scarcity of suitable plantations for some time after the date of their restoration at Dunkeld.† Increasing rapidly at the centre, and at Clunie, and the population becoming too great, the pressure outwards exerted itself, in a direction contrary to that exercised by the populations of the southern centres; and the consequence was, an unusually

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* In lit. to Mr James Macpherson, 24th March 1878.
† I have elsewhere quoted a passage from Mr Brown's standard work on Forestry, showing the dates of plantations on the Breadalbane property (vide "The Capercailie in Scotland," p. 33, Edinb., 1879).
large wave rolled to the southward, and finally flooded the Carse of Gowrie, and all east of the Tay; and passing eastward through Strathmore and Forfar, again pursued a northerly course. But before following them in this direction, we will first show the slowness of their advance north-westward by Dunkeld, and westward.

It was not till a comparatively late date that they reached into Logierait * and Moulin † parishes, as we find them abundant only in 1841; not till the same year that they became established in Blair Athole; ‡ and in Forthingall parish they had only "lately made their appearance in our woods and plantations." §

In 1827, the Rev. George Gordon of Birnie, Elgin, when returning to Inverness from Edinburgh, "saw a squirrel in the woods north of Dunkeld, from the top of the Highland coach." || In 1836, John Colquhoun, Esq., rented the shootings of Kinnaird, and he tells me that squirrels were then most abundant; and he adds: "Some ten or fifteen years after, I saw a large table-cover which contained skins of some 200 squirrels shot at Taymouth." ¶ My Taymouth correspondent — Mr Dewar — corroborates this. After telling me that the first seen at Breadalbane was in 1828 (vide antea, p. 142), he goes on to say: "They began to kill them down at Taymouth in 1848, but more so in 1849. There was a bazaar in Perth about that time, and the Marchioness was there, and had a stall. She had about 500 skins for sale." ** In 1852, it was numerous at Dunkeld. †† Now—1879—there is not one for a hundred formerly. ‡‡

On Stobhall about 100 were killed annually, some years ago. They were killed regularly for eighteen years, and sixpence per tail was paid.

By this time they had reached Glendochart; as my informant, now living at Luib, assures me that he has "known

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|| Extract from Mr Gordon's Note Book.
¶ J. C., in lit.
** D. Dewar, in lit.
‡‡ D. Dewar, in lit.
Mr Harvie-Brown on the Squirrel in Great Britain. 145

them to be in the Glen for the last forty years *at least,*”—say as early as 1839,—and he adds: “Ten or twelve years ago I was on the hill between Balquhidder and Glendochart, and came upon one on the very top of the hill, where there was neither house nor tree of any kind within miles.” This leads up to the treatment of the subject under Argyleshire (q.v.).

This appearance, so early, indicates a westward movement from Dunkeld and Taymouth. At this time they must have been still rare at Crieff and Monzie (see further on, p. 146), and we have seen that they had become abundant at Taymouth.

In evidence of their slow advance into the districts west of Methven (i.e., Crieff and Monzie), the late Sir Thomas Moncrieffe’s head gamekeeper, who is a very observant man, and has a capital memory, and who takes great interest in natural history objects, was born at Logiealmond Lodge in 1828. “The only old wood then existing in the district was composed of three small patches of old Scotch fir, two of them lying between Logiealmond Lodge and the river Almond to the south and east, the other about two miles to the westward, near the Bridge of Buchanty.” The keeper, when six years old, viz., in 1834, remembers his father killing a squirrel in one of the woods called the Craigend. There, they were not uncommon, but appear to have been rare elsewhere in the neighbourhood. The late Sir Thomas Moncrieffe’s gamekeeper also relates that a tailor, when going to his work at his father’s house, about the year 1832 or 1833, lost a day’s work by chasing and trying to catch a squirrel, believing it to be a fox, for which he naturally got well laughed at. The late Sir Thomas Moncrieffe gives me the further information: “That his keeper tells him there was no wood on the range of hills between Birnam, near Dunkeld, and Crieff, except some very young larch plantations about Glenalmond. These,” continues the late Sir Thomas, “were probably planted subsequent to 1825. It must be remembered, however, that squirrels often travel across country far from wood.” One seen by him, more than a mile from any wood, took refuge in a cairn, and like most squirrels found upon open moors, and far from wood, was travelling in a northward direction.
It is worthy of notice in this connection that, with scarcely an exception, when squirrels are thus found on moorland, they are travelling in a northerly direction; in this matter my correspondents' observations coincide in every case which I have been able to inquire into.

We have evidence also that planting to any great extent did not take place around Crieff until the end of last century. Torlum Hill, now said to be the highest hill in Scotland, which is covered with wood to its summit, was, before being planted, a singularly bare hill, as indeed its name signifies. All the woods for some distance eastwards are of comparatively young growth, and the country was not nearly so well wooded as it is now.

The above would, in some measure, appear to indicate that Crieff and Monzie parishes owe their population to the southern army; but it is almost impossible to decide whether —taking 1821 as the date of their first appearance in the south of Perthshire, and 1812 as that of their first appearance at Methven (vide infra)—they would take longer to press northward and eastward to Crieff from Kincardine, or southward and westward from Methven. The distance between Frew Bridge and Crieff is eighteen miles as the crow flies; that between Methven and Crieff about twelve. We know that they abounded in the woods of Kincardine in 1821, and so, probably, arrived there some years earlier; and we also know that the first seen at Methven was in 1812, and that they were rare in Crieff and Monzie even as late as 1841, and were only locally distributed,—as proved by the late Sir Thomas Moncrieffe's notes on the specimen chased by the tailor in 1832 or 1833, and the one shot by his gamekeeper's father in 1834, near Logiealmond.

My idea at present is, that the southerly wave from Dunkeld had not passed much beyond Methven between 1812 and 1845 in the directions of Crieff and Monzie, but had rolled on in greatest force in a more south-easterly direction; and that these Crieff and Monzie records apply really to a northern offshoot of the southern army, indicating, perhaps, the furthest north point the Dalkeith and Minto army had reached before mingling with the Dunkeld southern division.
The first squirrel seen about Moncrieffe was in the year 1818, and the person who now records the fact has lived on the property for eighty years, and was born there, as I was informed by the late Sir Thomas Moncrieffe. He writes that that year was a memorable one, because "this [referring to the severe winter of 1878-79] is the longest storm since that time." A companion when chasing the said squirrel had his thumb nail bitten through, and had good cause to remember it for some time afterwards, as he was off work.

About 1852, squirrels had become abundant at Abercairney, for in three months nearly 100 were killed, so that they must have increased rapidly in the Crieff district between 1841 and that time, as I am informed by Mr Duncan Dewar, who was there during that year. This was undoubtedly owing to the growth of wood and increase of shelter; but I believe the Crieff and Monzie districts to have been primarily populated from the south.

Having thus indicated the rate of increase and extension of range around Dunkeld, and to the northward and westward, we must take up the loop to the south, and then proceed towards the Forfar march and the Vale of Strathmore.

Mr P. D. Maloch, of Perth, to whom I am indebted for many useful notes in this and other matters, informs me that the first squirrel killed at Methven was in 1812, and as this is an important record I am able to give the following particulars through Mr Maloch's carefulness. "It was shot by a Mr Alexander M'Lean, Lochend Cottage, Almond Bank. People came a great distance to see it. Since then it has increased very rapidly. Nowhere more common than on Methven. Any day thirty could be shot." * Then we find them occurring in St Madoe's parish,—part of the southerly wave which broke and rolled back at Methven—going on down the Tay on the left or east bank.

The late Sir Thomas Moncrieffe also considered that squirrels populated his district—Moncrieffe House and neighbourhood—from the north and west, because there are no plantations of any age between Perth and Stirling along the range of the Ochils.

* I have every reason to believe that this record is strictly and exactly accurate.
Colonel Drummond Hay writes to me that he can recollect when the first squirrel that had been seen in the Carse of Gowrie was killed at Megginch, in the autumn of 1822, or at latest, the following year. They were present in the woods of Dunsinane in 1836, but had not then become plentiful in the low carse. Soon after this, however, there must have been a large irruption of them. They have been numerous for the last twenty years (1859-79). Every one speaks as to its marvellous increase in all parts where it existed, within the last fifty or sixty years. *

Our next available date is 1838 in Bendochy parish, in the east of the county, where one was found "plundering a spotted flycatcher’s nest." 

This leads us up to the Forfarshire march.

Forfarshire.

In 1813, Don makes no mention of the species as occurring in the county. 

In 1817, Captain Mackenzie, of Arbroath, remembers that some of his crew brought over eight or nine squirrels from Riga in small cages, and he is sure that some of these were let away or escaped into the woods about Arbroath. Another correspondent tells me that—"about fifty years ago, a brother of my wife remembers them coming in boxes from Riga to Arbroath. He and others attempted to catch some which had escaped in Guymel plantation." §

* In lit.
§ There appears to have been a demand about this time for squirrels as pets, as we are told that there was a great sale of them in London: "As many as 20,000 being annually sold for the menus plaisirs of cockneys, a great part of which are brought in by labourers to Newgate and Leadenhall Markets, where any morning during the season 400 or 500 may be bought. Once in seven years the breed of squirrels entirely fails" (Hon. and Rev. W. Herbert in White's "Selbourne," 8vo, London, 1832 quoted in Rennie's "Field Naturalist," 1833, p. 129). My friend—Mr Howard Saunders—however, consulted Messrs Jamrach and Castang, well-known importers of live animals, and they assure him that no such immense sales of squirrels ever took place in London as the quoted account says.
We have no sufficiently accurate data available to show, however, that any increase of the species in Forfarshire was due to any of the above introductions; indeed we have, I think, sufficient proof that the population of the county was due to a natural extension from the Duke of Athole's plantations, and most of my correspondents appear to be of this opinion. In 1833, we find they had reached Glamis, but were rare then, and by 1843, they were plentiful, and are reported from parishes of Ruthven† and Airlie‡ ["where they have made their appearance within the last twenty years, and are now very common"]; also in Kinnettles, "though seldom to be seen in some adjoining parishes." § Eastwards it had reached Inverarity, of which locality the authors write: "The small squirrel not mentioned in the former account ('Old Stat. Account'), is found on Fotheringham Hill." North-eastward we find record of them in Careston parish, but nowhere else in the county at this date. In a very full list of the quadrupeds of Kirriemuir parish by Mr Kinloch of Kilry, it is not included. **

No doubt in some cases they have been overlooked by the writers of the "New Stat. Account." Still, the lines of advance indicated by these records are those which it would be most natural for them to follow, and they would not penetrate so rapidly northward through the hilly country, and the glens, which have only been planted with wood in comparatively recent years. Thus, I am informed, there was no wood in Glenshee till within the last fifty or sixty years. Mr Paterson of Dalmaglar considers that even now the winters are too severe for the squirrels, "and that they leave Glenshee when winter sets in, and retire down to the lower districts, at least they are not seen till May, except in very early seasons."

I lack accurate records from the northern parts of Forfarshire, but under Aberdeenshire it will be seen that they entered that county, coming from Perth and Forfarshire about 1856 or so.

Proceedings of the Royal Physical Society.

We have record of them, however, as early as 1844 in the Forebank wood—Kinnaird, Brechin district—as I am informed by the head gamekeeper to the Earl of Dalhousie. We are thus able to trace their advance with some degree of accuracy in this direction, and from evidence given under Aberdeen, it appears likely that they came thus far before entering Aberdeen.

Aberdeen and Kincardine.

In order rightly to understand the influx and increase and spread of the squirrel in this county, it may be well if the reader would consult the useful little map given in the first volume of the Transactions of the Nat. Hist. Soc. of Aberdeen, and the description of Deeside and Braemar which accompanies it.* The author thus describes the district of Deeside, which is marked 3 on this map: “The 3d district is sub-alpine and alpine in character, and no part of it is under 600 feet above the sea-level, while several of the hills exceed 4000 feet in height above the sea-level. It is characterised by very extensive moors, with forests of birch and fir along the slopes of the hills, and narrow strips of cultivation in the glens. Here and there also—e.g., in Glen Callater, on Little Craigandal, on Lochnagar, etc.—occur patches of alpine flora, etc.”

Any one looking at this map of the natural divisions of Dee, cannot fail to be struck with the precipitous nature of the hills which surround the sources of the river—as indicated by the narrowness of the river-basin; and will in great measure cease to wonder that the squirrel took a long time to surmount such a barrier. The main avenues of advance from Perthshire and Forfar are as follows: Through

* “Sketch Map, showing the Divisions of ‘Dee’” (Trans. Nat. Hist. Soc., Aberdeen, 1878, vol. i.). It becomes necessary to explain here the term “Dee,” which can best be done in the author’s own words. He says: “In the following lists I have restricted myself to the district between the basin of the North Esk on the south, and the basin of the Spey (including the Deveron) on the north and west. This tract was first defined as one of the zoological provinces of Scotland, in the ‘Scottish Naturalist’ (vol. i., p. 161) by the name of ‘Dee,’ alike for brevity, and to distinguish it from the county of Aberdeen, with which it is not equivalent” (op. cit., p. 24).
the Forest of Athole, by Glen Tilt, and Pol Tarff, and down the Bynack Water. By this route there are fully ten miles of open moor between Forest Lodge, and near to Linn of Dee. The next route is by Glenshee, and this appears to be a feasible route, as the distance of open moor is considerably less. In Glenshee, the furthest wood is not quite so far up as the Spittall of Glenshee, and between that and the woods on the north side, about twelve miles intervene of moorland road 1200 feet above the sea.* Another advance is by Glen Isla, on the Forfar side, into the same valley on the Aberdeenshire side, by a pass of about the same height, but with a longer stretch of moorland. The next line of advance is by Glen Clova, descending into Glen Muick; the next by Glen Esk into Glen Tanar; and the last—and most easterly—along the lower wooded country of Kincardine descending into Glen Dye, or spreading more widely over the foothills through Kincardine into Aberdeenshire.

Perhaps, nowhere in Scotland do the pine forests reach so far up the glens and along the hill sides, or attain such an elevation as they do in Aberdeenshire, even at the present day; and as already seen under "Early Chapters," we have abundant evidence of what a richly clothed valley the Dee must once have been.

I will now proceed to record all that I can gather regarding the early appearance of the squirrel in Aberdeenshire.

I have in the meantime refused to credit their appearance so early as 1853,† in the absence of distinct data, and with Macgillivray's observations as a guide (see Part II., ante, p. 49).

I am again obliged to Mr George Sim for the following remarks. He writes: "It is now (1879) much more widely distributed over the country than it was twelve or fifteen years ago (say 1864). At that time it was confined to the upper parts of Dee and Don. ‡ In the Aberdeen Herald of Jan. 20th, 1873,

* The squirrel is known to occur at an altitude of 1100 feet in Aberdeen (Dr Dickie's "Botanist's Guide to Aberdeen, Banff, and Kincardine," 1860), and perhaps at even greater altitudes.
† In the "New Statistical Account" of Aberdeen the squirrel is not once mentioned.
‡ I cannot obtain any satisfactory evidence of its occurrence at so early a date on Don.
there appeared a paragraph, in which it was stated that the first and only squirrels—a pair—were introduced into the woods of Braemar only half-a-dozen years before that date (say 1866), "when only very faint hopes were entertained that they would survive." Replying to this statement, the following week, Mr George Sim stated that he "had seen squirrels in the woods of Aboyne, more than twelve years ago (i.e., prior to 1872; say 1860, or before that date), and all up the valley of the Dee to the woods named by the writer (at sup.); and from a period prior to that named in the paragraph (1866) they have been comparatively common all along Deeside down to the neighbourhood of Aberdeen. In Strathdon they have been for a like period, probably much longer, but I only speak 'within my own ken.' That squirrels have increased very much on Deeside within these few years is very true, but the increase certainly is not the progeny of the one pair spoken of."

The squirrel appeared in Glen Tanar Forest, Aboyne, for the first time in 1857 (i.e., "about twenty-two years ago"), "and was seen on the Black Craig." Mr John Milne writes to me: "I think the squirrel crossed from Forfarshire into Deeside considerably lower in the valley than Glen Tanar, because the distance between the woods on each side of the hills there is too long. I think the most likely place is at the lower end of Durris and Maryculter parishes, there being continuous woods all the way from Deeside to the plantations of Kincardine." Mr Milne, who has been for many years forester at Glen Tanar, adds: "In Glen Callater they have never been found, as there are no woods there. In Glen Muick they appeared about the same time as in Glen Tanar. In Glen Feugh, or the woods of Banchory, they appeared several years earlier, and they were first seen in the woods of Invercauld in the year 1857, and very soon after at Old Mar Lodge, near the Linn of Dee."

My obliging correspondent in Braemar—Rev. W. Gordon—sends me the following notes from Upper Dee: "By a pretty general consensus of opinion, the squirrel was not seen or known in this district (i.e., Upper Braemar) till

* But to this, as above stated, I take exception.
about fifteen or sixteen years ago—say 1863. The first seen in Invercauld was in 1864:* it was shot by John M'Hardy, and was given to Dr Marshall for the purpose of stuffing. It is true that one of the very oldest natives of this place—Mr John Lamont, long forester upon the Invercauld property—informes me that squirrels were seen in the woods about Clunie and Mar Lodge in 1858,—‘the year,’ he adds, ‘the new Bridge of Dee was built.’ A gamekeeper—a keen observer—informs me that he saw one—the first he had ever seen—near “The Lion’s Face,” in 1862. The old man Lamont, to whom I have referred, says, that during his professional duties as forester in the Blelloch and Cromar woods, he had seen squirrels some years previous to 1858; also in the Birkhall woods, Glen Muick. It may be safely asserted that previous to 1862, no squirrels have been seen on the upper reaches of the Dee, and while almost all are agreed as to the time of the first appearance of the squirrel, all are also pretty equally agreed that the line of advance was up the Dee. As will be seen, this on the whole agrees with the evidence given me by Mr Milne from Glen Tanar, and the opinion expressed by him that they came up the Dee. My own belief is that they entered Aberdeen via Kincardine, the same route by which capercaillies arrived,† and that others reached in at Glens Tanar and Muick, and that thence they spread both up and down the valley of the Dee. There seems to me nothing improbable in their reaching over even by the direct route from Athole to Braemar, beyond the fact that, by the date of 1844, they had reached Brechin in Forfar, and from Brechin would, at that time, find a continuously-wooded avenue of approach into Aberdeen via Kincardine, which they would not find via Glen Tilt, or via Glenshee. By this, I do not mean to say that mountains will deter them, but I certainly believe that they will not cross deserts if they find more suit-

* But Mr Milne says they appeared “in the woods of Invercauld in the year 1857, and very soon after, at Old Mar Lodge, near the Linn of Dee;” and Mr George Sim was accustomed to see them commonly in 1859 and 1860 in all the woods between Aboyne and Invercauld.

able avenues of advance. In other words, I believe the pressure was strong enough to force a few over the mountain passes between the rivers Esk and Muick, also between Glen Muick and Glen Tanar, while the wave rolled onward into Kincardine; but I doubt if the pressure was sufficient to make them encounter the longer journeys via Glen Tilt and Glenshee. The comparative absence of wood in the northern glens of Forfar at an early date caused the strongest wave to set more to the eastward.

At the same time, it is right to mention one of the most striking instances of the species surmounting difficulties with which I am acquainted. The Rev. W. Gordon relates as follows: "Some years ago, probably ten or twelve—say 1867—Lord Sandys, then the guest of Lord Holmesdale at Old Mar Lodge, was out shooting, accompanied by his Lordship's head gamekeeper and two young men who are now gamekeepers in the district. While they were crossing one of the highest peaks of Ben-y-Bhrotan, they were surprised to come upon a squirrel. Being unable to catch it, they unleashed two staghounds, one of which speedily arrested the squirrel's progress by putting his paw gently upon it. One of the men was severely bitten by it." This squirrel was taken to Mar Lodge, but a terrier scraping open the box, the squirrel escaped into the woods. The nearest tree to the peak of Ben-y-Bhrotan, on which it was found, was at least nine miles distant—viz., in Glen Derry—and the height of Ben-y-Bhrotan is 3825 feet (vide remarks under Strathdon, next page).

Mr James A. Haldane's keeper at Keith Lodge, Banff, who was born on Crathes estate on Deeside, killed a squirrel there when he was underkeeper about twenty years ago—say 1859. He had never seen squirrels before, and shot one for a weasel, for which he was reprimanded, as only two (both of which he saw) were known on the place; but before he left, about three years later, there was any amount to be seen. Thus it would appear that an almost simultaneous advance was made into Aberdeenshire at various points along the range of hills between Aberdeenshire and Forfar, and through Kincardineshine. The natural advance from these points would probably
be either up or down the valley of the Dee, or both. There seems, at any rate, to be scarcely a doubt that the entry took place in the south of the county.

The advance of the species up the valleys is supported by evidence of their arrival and dispersal in Strathdon. Mr George Sim, with his usual care in such investigations, has obtained for me much information from Strathdon, most of which I give here. Mr Sim writes: "Let us begin at Kintore, on the estate of Shainstone, which is beside Kintore. Squirrels were first seen there on May 16th, 1862, heading up the Don. They were first seen on the estate of Monar, July 1868. In the Vale of Alford, in the summer of 1859, one was killed by a dog on the farm of Hylogs, parish of Tough. Shortly after this, another was taken alive on the same farm by the farmer—Mr Reid—and given by him to Mr W. Beveridge, who kept it a long time as a pet. The latter gentleman was at that time living in the parish above mentioned, and was making a collection of objects of natural history. Now, link this with the information you received from Mr Robb, gamekeeper, Kildrummy, 'that squirrels arrived there about twenty years ago.' They were seen at Glenkindie—Inverkindie, Strathdon—about seventeen years ago, as I am informed by the proprietor." It will thus be seen that the species has steadily travelled up the Don valley.

It is believed that the squirrel came from Dee to Don, coming across what is known as "the Red Hill." They were known by Mr Beveridge—curator of the museum in the Free Church College, Aberdeen—to have been in Dee some years before that date. Yet 1859 appears to me to be a somewhat early arrival for Donside. The possibility exists that the influence of the Rothiemurchus resuscitation (vide p. 157) may have extended as far south as the head waters of Don by this date, but absence of sufficient data makes it impossible to determine this with any certainty at present.

Argyllshire Minard Centre.

I have to record the introduction of the squirrel at Minard. My obliging correspondent—the Rev. M. MacPherson, of
Inverary—informs me that the squirrel was introduced from England to the woods of Minard by a Mr Askew, who resided at Minard Castle a long time ago. He brought the squirrel and the rabbit there about thirty-two years ago—say 1847. Mr MacPherson has been told—and believes—that the squirrels dispersed from Minard woods as their centre. In about six years—say 1855 [another account says 1853] they reached Inverary. Fourteen years ago (1865) three were seen in Glenorchy at Stronmealachair, north of the Orchy River, and about the same time one was seen at Coillenach-Eirriden, south of Port-nach-Errich on the east side of Loch Awe.

It was some time before they were found in the country lying between Loch Etive on the north, and the lower end of Loch Awe. They appear only to have reached the woods of Glenmore, near Kilmel fort, this spring (1879). I have, however, a record of one squirrel having been seen at Barbreck in the spring of 1870.

The Rev. A. Stewart of Ballachulish informs me that he has a note to the effect that "the late Campbell of Monzie shot two squirrels in the woods of Inverawe between Loch Etive and Loch Awe about 1860. The exact date he probably could not tell me, for otherwise it would almost of a certainty be found in my jottings at that time, which it is not."

The dispersal appears to have followed the lines thus indicated, pushing northwards most rapidly, via Cladich, to the localities in Glenorchy, and thence descending the Pass of Brander,—a branch stream turning southward at Cladich—whilst another army more slowly advanced westward from Minard, and rounded the lower end of Loch Awe, reaching Barbreck in 1870, and Glenmore woods not till 1879. The squirrels which descended the Pass of Brander appear to have detached colonists at the Bridge of Awe at a late date, which, turning back along the south side of the Awe, reached the woods of New Inverawe in the year 1870, when I learned that the first one was seen. When staying at Taycreggan this spring (1879) I had this route confirmed by the general impression in the district, that squirrels at New Inverawe and Haymount came up from the Bridge of Awe.
I believe that as yet the two armies have not quite succeeded in again joining forces in the extreme west, although squirrels are now pretty continuous along all the west shore of Loch Awe. This winter they appeared within six miles of Oban, and—as I am informed by Mr Carmichael, Duncreagan, Oban—some have been seen in Baggcaldine woods within the last few years, while I also hear of two having been killed at Dunolly, and more having been seen. These are doubtless extensions from the Brander Pass army. Squirrels also occur at Dunâch, and at Glen Feóchan, which they reached about 1878 or 1879, but they do not occur yet—1879—at Gallanach, which is over the hill from Dunách and nearer to Oban. It is difficult to say whence these Glen Feóchan and Dunách squirrels came, but I think probably via Taynuilt and Glen Lonnan. We may, I think, safely accept the almost straight line of the footpath over the moor, between Taycreggan and the head of Glen Feóchan, as the probable limit of both armies before they again coalesce.*

Their advance in a southward direction from Minard has been comparatively slow, as Sir John Campbcll Orde, Bart., tells me that in 1877-78 one or two only are seen at Kilmory in the season.

Their present distribution in the Cowal country is confined to the east shore of Loch Fyne from Ardkinglas to the woods of Ballemore, south of Otter. The principal intervening stations between these points are Strachur woods and the woods around Castle Lachlan in Strathlachlan.

RESUSCITATION IN INVERNESS-SHIRE BORRIEMURCHUS. Inverness.

Captain Dunbar-Brander is of the opinion that Ross-shire obtained its squirrels from Beaufort Castle restoration, but Inverness and Speyside (i.e., the lower reaches of Speyside, as well as Strathspey and Badenoch) received them from Perthshire. I have, however, I think, shown with sufficient clearness in a former part of this paper;† that no extension

* Vide Black’s "Large Map of Scotland."
† It may be well here to read this consecutively with the last part under Inverness-shire (Part II., ante, p. 58).
took place into Inverness from Perthshire. Another writer
(or the same) in the *Elgin Courant* appears to be of this
opinion also. The passage is quoted in the "Scottish
Naturalist" (vol. i., p. 49), and I give it again here:

"Squirrels, we believe, first appeared north of Spey some
twenty years ago"* [referring to the lower reaches of the
river, not to Badenoch or Strathspey,—J. A. H. B.]. "Writers
of Natural Histories, not so long ago as that, tell us that
squirrels were unknown in the north, and they certainly were
very few. Half a century has, however, elapsed since there
were squirrels in Roxburghshire, into which a nobleman is
said to have introduced them.† In that county, as also in
Perthshire, they are now a great pest, and hunted down with¬
out mercy. The squirrel is a creature known to have a pro¬
pensity to migrate, persistently pursuing its course over river,
mountain, and moor. They came here from Perthshire, by
the way of Glen Truim, getting to the top of that glen, we
know not how, through the wilderness on both sides of Dal¬
whinnie. At all events that was the route of the squirrel
invasion, for they made their first appearance amongst the
trees about Invereshie and Aviemore, and the woods of
Rothiemurchus. From Badenoch, or rather Strathspey, they
crossed into Nairn and Morayshire, and their multiplication
has been so rapid, that now scarcely a wood in the two
counties is free from their ravages. In the woods of Cawdor,
Darnaway, and Altyre, they were numerous fifteen years ago,
but it is not more than five years since they came to the
woods on Heldon Hill, and the Oak Wood, near Elgin.
From Elgin they have gone to the woods about Gordon Castle,
and the extensive plantations about Cullen House will soon
receive a visit from them."

The above seems to be the view taken of the dispersal and
lines of advance by Captain Dunbar-Brander and others
(putting aside, as already disposed of, the erroneous source,

* i.e., Twenty years previous to 1871—1870 being the date of vol. i.,
"Scot. Nat."

† Dalkeith introduction is no doubt intended. Squirrels did not appear in
Roxburgh till 1827, as has already been shown; or it is possible also that
Minto is intended, and that the date is not accurately given.
and accepting the resuscitation: and not the restoration at Dunkeld). In support of this view of the advance we find that thousands of acres of young wood have been planted between Perth and Forres—for our present purpose between Kingussie and Forres is more correct—and a specimen of the squirrel was killed at Dulnan Bridge in 1855, on 13th October, which probably came down the Spey. The Rev. Wm. Gordon saw a squirrel shot in the neighbourhood of Grant town on the Spey, in 1855 or 1856 (in lit.), and as early as 1844 the Rev. George Gordon writes that it was “occasionally seen in the woods of Strathspey” (i.e., between lower and upper Craigellachie). This last date is the important one, as it was upon this date also that the restoration took place at Beaufort.

The Rev. George Gordon, however, produces a very clear and consecutive record of dates going to prove an advance through the northern parts of Nairn, Elgin, and Banff, from Beaufort, which it is hard to put aside, so perfectly chronological do they appear to be;* and this record would be still more difficult to set aside, were it not for the above important date of 1844, which makes it appear extremely unlikely and improbable that squirrels “occasionally seen in the woods of Strathspey” could have come from Beaufort, where they were only introduced in the same year. Notwithstanding the consecutive nature of the data stretching eastward from Inverness, and the absence of more complete chronological data along the valley of the Spey, I am almost inclined to accept the dispersal from Rothiemurchus as populating the whole of the country east of Inverness, and along the south shore of the Moray Firth. There is much in our evidence to favour such a dispersal. If we compare the areas populated from other centres, and the time taken in each case in doing so, we find that the four oldest restorations—natural and artificial—viz., Dunkeld, Dalkeith, Minto, and Rothiemurchus, with equal—or nearly equal—advantages of fresh young wood, and available avenues of advance, should populate about equal areas, while the younger or more recent restorations of Beaufort Castle (1844), and Minard, Argyleshire (1847), ought in

* “Zoologist” 1844, p. 423.
like manner to populate lesser areas, and areas of similar magnitude with one another; and the still more recent restoration in Ayrshire ought, on the same principle, to populate a still smaller area than any of the above. If we, therefore, refused to credit Beaufort Castle with any share in populating any of the country east of Inverness, and added that to the Rothiemurchus area, the above condition of things would be more nearly carried out. Yet it is extremely difficult to lay aside the data which I will give under the Beaufort Centre. I feel bound to admit that my opinions, after going carefully over the evidence, weigh almost equally for either side of the question.

Whether the dispersal from Rothiemurchus also reaches as far east as the heads of Don, and there mingles with the advancing armies from Dee and up the Don, I cannot say; but I have not succeeded in obtaining any information from Upper Donside which would lead me to think that it had.

**Beaufort Castle Centre.**

Of the former distribution and resuscitation of the squirrel in this county, I have treated as fully as I am able with the materials in hand. It now remains to record its restoration to the northern parts, and follow its tracks outward from Beaufort Castle Centre until, towards the east, they meet with the northern extension of the Rothiemurchus indigenous army, and towards the north, they reach into Sutherland in 1869.

They were introduced at Beaufort Castle in 1844. The Rev. George Gordon, writing in Knox's "Autumns on the Spey," says: "Squirrels, which now (1872) abound on both sides of the Moray Firth, were introduced into this district of Scotland in 1844, when Lady Lovat turned out a few at Beaufort Castle west of Inverness."* Mr Gordon has since seen no reason to alter his opinion that Beaufort has been the centre of restoration of the Nairn and Elgin squirrels.†

In 1845 they had not yet reached into Kiltarlity parish,‡ but in 1848 Mr Archibald Hepburn found them common in many

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† *In lit.*  
parts of the north of Inverness-shire,* and evidence of it in Ross-shire and Cromarty shows that it had travelled steadily northward from the centre. But the richly cultivated, level, and well-wooded country east of Inverness, and along the south side of the Moray Firth, seemed to invite a more rapid extension, as we find them arriving at the confines of the county as early as 1851, and passing into

*Nairn*

"at Kilravock, and at Cawdor in 1855." By 1862, it became necessary to destroy them on several estates, notwithstanding which they appeared still to increase in numbers, if we judge of the numbers killed at Cawdor plantations by shooting alone. As pointed out, however, "the numbers killed depend a good deal upon the qualifications of the men employed, and on the price paid for each tail." † Nor can we trust implicitly such records, because, as Captain J. Dunbar-Brander of Pitgaveny assures me, "on the estate of Cawdor many thousands of tails were paid for, supposed to have been killed in the district. One day the factor saw a bunch of squirrels' tails arrive at the station addressed to one of the keepers; a day or two afterwards they were presented to be paid for." ‡

Having passed through Nairn, still travelling eastwards, "they spread so far into Elginshire in 1860 as to have been observed at Birchfield in the Glen of Rothes."

*Banff and North Aberdeenshires.*

After their appearance at Kilravock (Nairn) and Cawdor, "they were seen to move eastward to Forres in Elgin, and to Gordon Castle, and other parts of Banffshire." They "crossed the Spey a few years previous to 1872, and were met with on the banks of the Doveran in the east of the county." §

Mr George Sim, of Aberdeen, here takes up the thread with

* "Zoologist," 1848, p. 2910.
† The above account of the squirrel in Nairn is taken almost entirely from Knox's "Autumns on the Spey," p. 50, et seq.
‡ For list of squirrels killed in seventeen years at Cawdor see further on, p. 175.
great exactness, enabling me to trace their further eastward progress. Around Huntly, at Dunblade, they appeared "about fifteen years ago"—say 1864; and on the estate of Haddo, parish of Forgue, south side of the river Doveran, and in parish of Inverkeithnie, about the same time. Then at Lathers, parish of Turriff, and Netherdale, parish of Marwick, "about thirteen or fourteen years ago"—say 1865-66. In about the year 1867 ("about twelve years ago") they appeared at Fyvie and Delgaty, in the parishes of Turriff and Fyvie (Aberdeenshire), which "are the most easterly localities where they at present (1879) occur."* In about the same year, they also appeared in Auchterless parish, at Ardmiddle, and on the estates of Forglen and Carnoustie (Banffshire). Here the Rev. W. Gregor gives me the further note, that "some sixteen years ago they were not seen at Duff House, near Banff, but are now said to be there." And, subsequently, he adds, that he has found the squirrel in Deer parish.

We will now cry back again, and in order to trace their advance to districts south-west of Beaufort on both sides of Loch Ness, I give the record supplied to me by Mr Morrison, factor on the Dochfour estates, that "about the year 1848, it was first seen on Loch Ness side [north side] in the hazel plantations belonging to Lord Seafield, about four miles west of Dochfour, and it was supposed to have crossed the hill from the plantations near Beaufort. It, of course, speedily increased in numbers, and in course of twelve months later it was first met with on the south side of Loch Ness, in the plantations of the late Sheriff Tytler of Aldourie, and in 1850 it had spread over the Ness Castle plantations east of Aldourie; and by this time it was discovered that its introduction into the north was likely to prove seriously injurious to plantations generally."

The above, I think, goes to prove its eastward advance

* Since the above was written, I have learned that two squirrels were killed upon the Aberdour portion of the Brucklay estates, in a deep wooded glen called the Den of Glasslaw, three or four years ago—say 1875 or 1876. They have not as yet been seen at Brucklay. The Aberdour part is close to the sea, and about twelve miles from Brucklay Castle, and adjoins the estate of Troup, where there are also a few reported to have appeared. I am indebted to my friend, Mr W. Horn, for this additional note.
from Beaufort,* and also indicates its advance southward along the south side of Loch Ness. One was taken on board the sloop "Maithe Dhu," of Peel, in the spring of 1850, at Dochgarroch Lock. They can easily pass across the canal locks.

Following up the valley of Strathglass (i.e., in a south-westerly direction), Sir Dudley Marjoribanks supplies the following information: "The squirrel was unknown here [at Guisachan] previous to 1857, when a few were observed. They were supposed to have come from the east (i.e., Beauly), it being generally reported that Lady Lovat had, a few years previously, turned out three or four pairs at Beaufort. . . . Squirrels became very numerous and troublesome at Guisachan in 1862, and were destroyed in considerable numbers. In that year from twelve to twenty could be shot in an afternoon, within a mile of the house. They have now either left this district, or have died out. Though one or two can be seen at any time in their more favourite haunts, they are no longer destructive."

South-west from Beaufort along the north side of Loch Ness, I have abundance of evidence of their progress. Mr P. Burgess, factor for Glen Morriston, writes: "It is supposed—indeed almost certain—that squirrels came from Glen Urquhart into Glen Morriston (i.e., from the north-east). I am informed that it is about thirty-five years since squirrels were first seen in Glen Morriston" [say 1844, a very early date.—J. A. H. B.]. "For the first five years or so, few of them were to be seen, until about fifteen years ago (1864), when they became very numerous. Steps were then taken to destroy them, and now there are not many to be met with."

Mr Alexander Frazer, who has been forty years gamekeeper at Fort Augustus to Lord Lovat, whose lands extend southward from Glen Morriston, and round the southern end of the loch, writes further in reply to a letter from Mr W. A. Stables, who has given me much assistance in working this district, that he "was not aware of any squirrels being

* Taken in conjunction with their having reached the eastern confines of the county in 1861, before passing into N. i.e. as already related.
around Fort Augustus in 1848. Two or three years after, to my knowledge, they first made their appearance. I find they were seen about the same time on the south side of Loch Ness, and were supposed to be seen in Invergarry woods to the west of this about twenty-four years ago [say 1855]. They are not so numerous as they were twelve years ago.”

My thanks are due to my friend Mr Stirling of Garden, for obtaining for me further particulars regarding their extension along Loch Ness on the north side. In Glengarry, squirrels first appeared between 1853 and 1855, and are believed to have spread from Beaufort. The woods in Glengarry are so extensive that attempts to keep their numbers in check have not been very successful, the rough nature of the ground also acting as their safeguard. They rapidly became very numerous soon after their appearance in the district. The severe winter of 1878-79, it is reported, does not appear to have diminished them in Glengarry.

It now occurs also near the head of Glen Grivie and Glen Urquhart, as I am informed by Mr J. M'Gregor, Ladywell, Dunkeld.

Ross-shire and Cromarty.

The first date I have for Ross and Cromarty is a somewhat late one—1858—at Kilmuir Castle and Tarbert House about the same time, having come round along the shores of the Firth.

Sutherland and Caithness.

The squirrel reappeared in the county of Sutherland in 1859, at Clashmore, on the authority of Mr Thomas Mackenzie,* and he believes that the first squirrels entered the county across Bonar Bridge. It was not, however, until after the railway bridge was built at Invershin, in 1869, that squirrels became plentiful in the east of Sutherland. Squirrels are particularly fond of running along roads or rides in forests,—or even in open country,—or along rails or stone walls; and I have often met with squirrels far from wood in the low-lying carse lands

of Stirling; so that bridges, roads, rails, and "dykes" may be considered as great aids in the extension of their range.*

This concludes my account of the extension of range of the squirrel throughout Scotland, and it will be observed that I have treated the subject on a plan almost uniform with my account of the Capercaillie in Scotland.† I would have preferred to indicate upon the map accompanying this portion, the dates of the "steps of advance," as I have done in the map of the Capercaillie, but the scale of this map scarcely admits of a sufficiently minute treatment in this way.

GENERAL REMARKS ON THE LAWS REGULATING THE EXTENSION OF RANGE OF THE SPECIES.

It has been pointed out in the foregoing pages, First, The localities where the squirrel is supposed to have become extinct, where it lingered longest before it became extinct, and those where it lingered and revived again; and, Second, The lines of advance, and the areas at present occupied by the species. The history of the species is almost identical with that of many others whose natural habitat is a forest-clad country. It is found to have lingered longest where the forest remained longest, and to have revived most rapidly (or spread most rapidly after restoration) where forest trees had been planted. The lines of their advance have been influenced principally by the various barren chains of mountains adverse to their conditions of life, and by the growth and increase of wood, favourable to their increase and extension of range. Where trees have lingered, amidst the Highland glens, they lingered too; and where trees have led them of late years they have reached considerable altitudes. "The recesses of the Highlands have ever proved the shelter and protection of the descendants of the older tribes of the country, and the limit to the advance of a stranger population." These words, applied to the human races that inhabited the several kingdoms of "Ancient Alban," are equally applicable to many races of animals which have

* And see also under General Remarks on Extension of Range, infra.
† David Douglas, Edinburgh.
become extinct in Scotland, or are approaching extinction at the present day.

I have already pointed out the causes which I believe brought about their decline or extinction. The circumstances which have attended their increase present almost the converse state of things.

They have pressed forward in a general northerly direction from all their various centres of restoration; and I believe this northward tendency in their advance is due to the combined physical features of the country as explained above; ranges of mountains checking their advance south of the earlier centres in the south of Scotland, and easier outlets being found towards the north. As the wave gained impetus and strength, obstacles which would, perhaps at first, seem insurmountable, became easier from the increasing inward pressure, and even mountain passes of some altitude were threaded, and the first ripplings of the pioneer waves consequently overflowed into the valleys beyond. We have proof that the squirrel is not unfrequently found far away from wood, and upon the open heaths. One was seen in 1830 on the moor between Kenmore and Glenqueich, four miles away from wood, as I am informed by Mr D. Dewar. Mr Dewar saw one “about sixteen years ago, between Killin and Glenlyon, half-way across, where there were ten miles of moor. It was going north: when pursued it took to a hole.” We have also the anecdote related by Mr Knox, when a Highlander, who had never seen a squirrel before, discovered one out upon an open moor, and the animal, mistaking him for a tree, mounted rapidly to the top of his head, to the no small fear of the native, who believed it to be “a thing wi' horns.”

Nor is it unusual to find squirrels down in the flat “carses” far from trees, having followed a road or a hedgerow perhaps for miles. Roads assist them; for, as is well known, they are fond of running along rides in forests, or rail tops; and if roads be made into a wild mountainous country, there can be

† “Carses,” the name given to the rich level tracts of country below Falkirk and Stirling and along the Tay viz., Curse of Falkirk, Curse of Stirling, and Curse of Gowrie.
little doubt they will act as aids to their advance.* Upon Quarter estate, near this, there is a dyke or wall which, it is well known, constitutes the squirrel's highway between the Quarter covers, and those of Daleswood on the adjoining property of Denovan. They are seen constantly passing from the one cover to the other along the top of this dyke, which forms the march wall between Quarter and West Plean on the north. Other more extraordinary instances are given of their curious wandering propensities. Mr Clark, jun., Glenfeshie, relates how one once came down a chimney in his house, “and alighted on a girdle that was on the fire for baking purposes, and eventually, not relishing its position, landed with one bound in the window, only to meet a worse fate, being speedily torn to pieces by the terriers.” Another squirrel which got shut up in a new house that was being built in the same glen, made its exit and escape by the same route that the other made its entry.

It is worthy of record that, as far as I have been able to ascertain, in all instances in which squirrels have been found on open moors, at long distances from wood, they have been travelling in a northerly direction at the time when discovered. This apparently inborn tendency to press northward may be traced from early (i.e., Geological) times, and is common to many animals and birds.

The Rev. W. Gordon, Braemar, relates another instance of the peculiar habit the squirrel seems to have of getting into and out of scrapes. In this case Mr Robert Grant captured a squirrel when a lad, but on its escape immediately after, it suddenly climbed up the inside of the legs of its captor's trousers, which, having been “made down,” were unusually wide.

Rivers do not invariably deter them. Long ago this was known to the writer of the curious metrical emblems; for he says:

The squirrel, when she must goe secke her food
By making passage through the angry flood,

* And we find it recorded of the common brown hare, that it appeared in the mountainous districts of Liornore and Appin “not until after roads were made, which opened communication with the low country” ("New Stat. Acct.," Argyleshire, p. 233).
But our author, though aware of the fact that they cross streams, here awards too much credit to the squirrel's sagacity. It will travel miles to find a bridge, and prefer that mode of crossing to risking being "devoured by the streame."

Broader kyles or arms of the sea, or deep sluggish streams, without shallow fords or bridges, appear almost always to afford a barrier to their progress, or the larger rivers, with a great body of water. Nearly all quadrupeds can swim if put to it, but it is remarkable that I have never yet met with any person who can say that he has seen a squirrel voluntarily enter

* This old tale has descended from a very early date, even to the present time, as there are still people living whom I have heard relate it as an existing fact in the natural history of the squirrel, even to the detail given by the early writers, of its carrying a supply of food in its mouth, "to prevent famine whatsoever befall them." Olaus Magnus describes it in his description of Scandinavia, and the tale is taken up by Gesner ("Nat. Hist.," Zurich, 1820). It is repeated in the above emblem (1634). Translated from Gesner by Topsell ("Hist. of Four-footed Beasts," 1658). Quoted again by the author of "The Gentleman's Recreation," 4th edition, 1697.

I here quote Topsell's account, which fairly represents the legend:

"If they (i.e., squirrels) be driven to the ground from the trees to creep into hedges, it is a token of their weariness, for such is the stately mind of this little beast, that while her limbs and strength lasteth, she tarryeth and saveth herself in the tops of tall trees, then being descended, she falleth into the mouth of every cur. The admirable wit of this beast appeareth in her swimming or passing over the waters, for when hunger or some convenient prey of meat constraineth her to pass over a river, she seeketh out some rinde or small bark of a tree which she setteth upon the water, and then goeth into it, and holding up her tail like a sail, lettesth the wind drive her to the other side, and this is witnessed by Olaus Magnus in his description of Scandinavia, where this is ordinary among squirrels by reason of many rivers, that otherwise they cannot passe over, also they carry meat in their mouth to prevent famine whatsoever befall them, and as peacocks cover themselves with their tails in hot summer, from the rage of the sun as under a shadow, with the same disposition doth the squirrel cover her body against heat and cold" (op. cit., pp. 509, 510).
deep water and swim,* nor have I been able satisfactorily to authenticate any of the related occurrences of the squirrel crossing canals or rivers upon blocks or chips of wood, although many of these are related with minuteness of detail, having an apparent genuineness and authenticity. My strong conviction is, that all these instances only illustrate a popular superstition, acquired originally by the earlier writers, who were puzzled to account for the crossing of rivers by the species, and who forgetting or ignoring the fords or rocks left bare in time of drought by which they crossed, thus accounted for it. These accounts, quoted and re-quoted, we find even adhered to at the present time.

I find that rivers in some localities have been most effectual in barring their advance, whilst others have not in any way affected it, and an examination into the circumstances in many of these instances has shown that only where the rivers are deep and unfordable have the squirrels failed to

* Since writing the above, however, I have received satisfactory proof of the squirrel swimming. On August 12th, 1880, a very hot, still day, three ladies and a collie were idling in a boat on Loch Voil. The loch was glassy calm, and their attention was attracted by a ripple in the water about 200 yards off, as of some small animal swimming across towards them. They rowed towards it, and found it to be a squirrel steadily making its way to the opposite shore. They rowed so that it might pass as close as possible, and kept quite still—so close that it clambered up the bow and sat panting and chattering on the gunwale, evidently tired with its swim. The collie began to get excited, and was with some difficulty kept quiet; however, the squirrel evidently suspected some evil, for after sitting about three minutes it dropped over the side, holding on to the gunwale, so that only its head showed. The ladies then began to row gently towards the shore it had been making for, but it dropped off, and again steadily swam for the point it had at first been making for, and which they had slightly passed. They saw it safely land on a rock and scramble up. The loch is about a quarter of a mile broad, and the squirrel was about three-parts of the way across when first seen swimming from north to south. It appeared like a strip of fur on the water; head very erect, the tail being most noticeable; the straightness of its course marked by its wake being remarkable. This is the only instance, which I consider perfectly authentic of the British squirrel having been seen swimming; and it is the only instance I have come across of the squirrel migrating over a large extent of surface in a southerly direction. The note, originally published by Mr Godwin Austen, in "Nature," 1881, is therefore most interesting. We find, however, a perfect parallel in the habit of other species of Sciurus, as it is well known that certain species of American Sciuridæ swim freely across rivers and lakes.
make their crossing, or if they have crossed, it has been by means of a bridge. I am able, in many instances, to trace the exact path by which squirrels advanced through this country, and that, in some instances, as long as fifty years ago. The crossing from Stirlingshire into Perthshire by the Bridge of Frew, over the Forth, as shown before, and the entrance of Sutherland by the bridges over the Kyle, instance the above remarks.

The extensive planting of wood which took place in the south of Scotland at Tynninghame, where large areas of ground were planted in 1707—towards the end of last century and beginning of the present century—was no doubt a most important factor in aiding the increase of the squirrel; and we have evidence in the foregoing pages that, in many localities, to the new feeding grounds thus opened up, the squirrel is indebted for its increase and prosperity.

Large tracts of country were also planted in Perthshire by the Duke of Athole and Lord Breadalbane, which would afford abundant feeding grounds for the species. We have seen already that the exception to the general rule of the northerly waves being the strongest, is exemplified at Dunkeld Centre, high mountains and scarcity of wood, at that early date, combined, checking their advance to the northward, and forcing them to roll southward, until the force of the pressure being exhausted, they recovered, and again advanced north-eastward through Strathmore and Forfar.

Similar planting took place on the Spey, and favoured their northward advance, when at last they revived in the old forests of Rothiemurchus.

Finally a comparison of the boundaries of the several areas populated from the Centres of Dalkeith and Minto, Dunkeld and Beaufort, and other minor tracts, with the map in Skene's "Celtic Scotland" "showing mountain chains," will result in very approximate results; showing that to a considerable extent the advances of the species have been checked and delayed, regulated or influenced, more or less, by the various ranges of hills, though a continued pressure has in many places, as already explained, caused an overflow, and the surmounting of unusual difficulties. It may be well also in this
place to read pp. 7-13 of the Introduction to Mr Skene’s work (op. cit.), descriptive of the great natural features of Scotland. I would also recommend an examination of the county maps published in the “New Statistical Account,” to those who desire to follow, as I have done, the minute details of their advance. In these maps the parishes are all distinctly shown.*

Every one agrees apparently in the marvellous rapidity with which the species increased in various parts of Scotland, especially within the last fifty or sixty years. The planting of wood, as we have already seen, was the chief factor in their advance, which advance resulted from the increase of their numbers, influenced and brought about by the increased area of suitable food. It is only necessary further to say as regards their increase, that statistics will be found in the preceding pages, which it is unnecessary here to repeat.

We have discussed already the effects of severe winters upon their numbers under Part II. (antea, p. 40). A succession of such, doubtless, would decrease their numbers to quite an appreciable extent, or, at all events, drive them by local migration to seek the warmer shelter of the great pine forests.

FOOD AND DAMAGE DONE TO TREES AND FORESTS.

Perhaps the earliest notice taken of the destructive habits of the squirrel in Scotland is in a letter to the Editor of the Farmer’s Magazine (vol. iii., p. 14, 1802), in which the necessity of “destroying, instead of fostering,” squirrels is pointed out; and, as already noticed, the restoration of the species at Dalkeith is mentioned. Since that time innumerable complaints have been made, and letters written, and means taken for their destruction. Unanimously, my correspondents condemn the squirrel as one of the most destructive animals which frequent our forests. Scarcely one has a good word to say for it in this respect, and it would, I imagine, be very difficult to undertake, with any chance of success, a case in defence of it. So abundant, indeed, is the proof given of its destructiveness, and, I may add, so patent is the destruction

* For a short account of the planting which took place between 1750 and 1806, see “Notes and Sketches of Northern Rural Life,” pp. 102, 103.
done, to any one accustomed to travel in the woods, that it might hardly be considered worth while to give these proofs in detail. Nor shall I bring forward more than a very small portion of the evidence at my command.

Perhaps all that can be brought forward in its defence is that, to some extent, it may act as a nature's-pruner of the trees, but I believe any forester, or person who has been in daily and yearly observation of their habits, would gladly dispense with their services in this respect. True, also, one correspondent writes as follows: "The squirrel is now very numerous in this county (Dumbartonshire), and is sometimes very destructive to firs. It is only, however, when firs are planted too thickly, and when there is a lack of branches, that they are so, from nipping off the shoots. If the branches were allowed to spread as they ought to, they will find food enough without mounting up for the top shoot." But judging from a large mass of correspondence, this is not always the case, or if so, only to such a very infinitesimal extent, that the good done by nature's-pruners is swamped by the much greater amount of harm.* Of course it is needless to point out that if large extents of young wood are planted for profit, in a country inhabited by the species whose food consists of these woods, or their cones, and bark, and shoots, an increase in the numbers of these animals must be expected. One does not hear much of damages done to natural forests, as those of Norway, Sweden, or Russia, by birds or animals. As nature's-pruners, the squirrels usually lop off the cones, which, on discovering that they contain no seeds, they drop to the ground; this does no harm to the tree, if it does no good; and, as believed by more than one of my correspondents, the seeds of the cones form the natural food of the species, and the saccharine inner bark is an acquired taste.

In this connection it may be also well to consider if, in some cases at all events, the damage done to shoots and bark does not result from the fondness of squirrels for certain

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* Several others of my correspondents share this opinion—that as a rule the tops are not injured to any appreciable extent; but, as stated in the text, by far the larger number—quite eight-tenths of my correspondents—hold a very decidedly different opinion.
minute and superficial fungi, which grow closely upon the said shoots and bark, and which, as has been pointed out to me by the late Sir Thomas Moncrieffe, Bart., is a favourite part of the food of the squirrel (see also further on, p. 177).

Mr C. Y. Michie, forester, Curr Bridge, Morayshire, wrote a prize essay in 1865 upon "Diseases of Forest Trees," and as he treats fully of the damage done by squirrels, I quote at length his remarks: "The greatest of all enemies to the Scotch pine, and by which more real injury is inflicted upon the tree than by any other agency with which I am acquainted, is the squirrel. The injuries are at once incurable, and the extent to which they are committed in Scotland is indeed alarming. About the month of April, the squirrel, in order to reach its desired food, peels off the bark from the trunk of the tree generally within a few feet of the top. The bark is peeled off with the teeth of the squirrels in shreds about half an inch broad, and generally from 3 to 4 inches long.* The part upon the tree where the bark is peeled off frequently goes right round; in other cases a square piece is neatly peeled off, as if performed with a sharp knife. The squirrel does not devour the bark, but peels it off that it may regale itself with the saccharine matter contained between the last-formed wood and the bark. It is most active in hot dry weather, and usually in the morning a little after sunrise, or after a warm shower of rain. The age of the tree which the squirrel prefers for peeling is usually from fifteen to twenty-five years; it prefers the smooth clean part of the trunk after it has shed its leaves, and selects the most healthy and vigorous growing trees, and will seldom attack trees of sluggish or stunted

* Another correspondent writes: "I have seen hundreds of larch trees in Athole, of forty to sixty years of age, with their tops entirely barked, as completely as could be done by rabbits to deciduous trees within a foot of the ground." He adds: "This occurs, I think, when cones are scarce. They also nip off small branches of spruce trees, though I have not noticed any spruce trees peeled by them. They feed on the cones of all the pine tribe."

—John M'Gregor, Ladywell, Dunkeld. Spruce is attacked by them to quite a small extent. Though fond of the cones, or rather the seeds of the spruce fir, they have in some localities, at all events, scarcely been known to touch its bark. But larch in some places suffers exceedingly. I have seen scores of larch trees with the tops broken down, and lying at right angles with the stems, having been broken over by the wind after having been peeled by the squirrels.
growth, or in any way diseased, unless pinched with hunger. The bark, on being peeled off the pine-tree, does not again close up, nor the wound heal as in hardwoods, in consequence of which the sap, though allowed to ascend in the inner layers of the wood, and thus reach the extreme top of the tree, is nevertheless entirely obstructed in its descent, hence, that portion of the tree below where the bark is peeled off, from that time ceases to enlarge, except what is elaborated by the few remaining branches below the wounded part. Though the Scotch pine is undoubtedly the squirrel's favourite food, yet in dry warm seasons it attacks indiscriminately the larch, silver fir, spruce, and even poplars. The greatest amount of damage done to trees is by peeling off the bark during spring and early in summer, but in districts where the pine sows itself, the loss sustained by the squirrel devouring the seed is very considerable. The squirrel also destroys the young shoots, which causes double tops on trees. . . . When we consider the enormous amount of property annually destroyed in Britain by squirrels, and the rapidity with which they are increasing in numbers, it is certainly the interest and duty of every proprietor of woods in Scotland to adopt means for their extirpation."

So much for Mr Michie's report, which may be taken as fully illustrating in a general way the damage done.

I have not obtained many actual estimates of damages done on different estates simply because of the difficulty of making such calculations, but the following is one I have received from a forester of experience—Mr T. Milne, Forest of Glen Tanar, Aberdeenshire. He writes to me as follows: "In 1874, the year in which we commenced to kill them, I considered that they destroyed 1000 trees. I would put it down at a loss of £500 upon the woods of Glen Tanar." Mr Milne then adds: "About 1000 squirrels have been killed from 1874 until now—1879." It may be imagined what destruction must have taken place upon the Cawdor estates, where as many as 1100 or 1200 have been killed in one season, and where 14,123 were killed and paid for during seventeen years.

Adjoined is a list of the squirrels killed and paid for on the
Mr Harvie-Brown on the Squirrel in Great Britain. 175

Cawdor estates between 1862 and 1878, for which I am indebted to Mr W. A. Stables, factor at Cawdor.

SQUIRRELS KILLED IN THE CAWDOR PLANTATIONS.

<table>
<thead>
<tr>
<th>Year</th>
<th>Squirrels</th>
<th>Rate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1862</td>
<td>469</td>
<td>3d.</td>
<td>£5 17 3</td>
</tr>
<tr>
<td>1863</td>
<td>617</td>
<td>3d.</td>
<td>7 14 3</td>
</tr>
<tr>
<td>1864</td>
<td>620</td>
<td>3d.</td>
<td>7 15 0</td>
</tr>
<tr>
<td>1865</td>
<td>609</td>
<td>4d.</td>
<td>10 3 0</td>
</tr>
<tr>
<td>1866</td>
<td>256</td>
<td>4d.</td>
<td>15 18 8</td>
</tr>
<tr>
<td>1867</td>
<td>1164</td>
<td>4d.</td>
<td>19 8 0</td>
</tr>
<tr>
<td>1868</td>
<td>1095</td>
<td>various rates</td>
<td>23 8 0</td>
</tr>
<tr>
<td>1869</td>
<td>503</td>
<td></td>
<td>7 1 4</td>
</tr>
<tr>
<td>1870</td>
<td>1045</td>
<td></td>
<td>21 13 10</td>
</tr>
<tr>
<td>1871</td>
<td>1026</td>
<td></td>
<td>13 2 2</td>
</tr>
<tr>
<td>1872</td>
<td>1223</td>
<td></td>
<td>18 18 11</td>
</tr>
<tr>
<td>1873</td>
<td>1013</td>
<td></td>
<td>13 15 1</td>
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<tr>
<td>1874</td>
<td>1171</td>
<td></td>
<td>14 16 7</td>
</tr>
<tr>
<td>1875</td>
<td>492</td>
<td></td>
<td>6 1 6</td>
</tr>
<tr>
<td>1876</td>
<td>175</td>
<td></td>
<td>2 2 6</td>
</tr>
<tr>
<td>1877</td>
<td>884</td>
<td></td>
<td>12 10 0</td>
</tr>
<tr>
<td>1878</td>
<td>1062</td>
<td></td>
<td>13 7 1</td>
</tr>
<tr>
<td>Total</td>
<td>14,123*</td>
<td></td>
<td>£213 13 2</td>
</tr>
</tbody>
</table>

About the year 1856, the order went out to kill down the squirrels on Thirlstane Castle estates, in Lauderdale. In the autumn of the same year, over 100 were killed, and since then, thirty or forty yearly. They first appeared there about 1838 or 1839, and had increased and become plentiful by 1849.

I have, in another place, given a list of squirrels killed, as illustrating the rapidity with which they increase. These numbers will give some idea also of the amount of damage done, and of the necessity arising for their destruction. A plantation near Kingussie had to be cut down, owing, it is said, to damage done by squirrels. On Kildrummy estate, Aberdeenshire, about five years ago, great damage was done by squirrels to Scotch fir plantations. The average killed since then per annum, by shooting alone, has been 100.

* To the excellence of the squirrel as an article of food I can myself testify. The flesh is pinky-white, like young rabbit, and sweet. The epicure has only once to taste them, and if he possesses a squirrel-haunted wood, he won't grudge the squirrels a fair share of his filberts, hazel-nuts, or cherrie-stones. They can afterwards be cooked in as many ways as a rabbit, and are wholesome and excellent food.

101
During the severe winter of 1878-79, squirrels were observed for the first time on Donside, feeding upon the buds of spruce trees. Cones, or the seeds of the cones, seems to be favourite food when they can obtain them. In the winter of 1878-79, during the severe frost they were busy with the cones in the Asylum grounds at Murthly, where, as Dr MacIntosh of Murthly informs me, they have just arrived, the trees having only lately attained a suitable age and size.

Nor do squirrels confine their attacks to the pines and firs. Many of the hardwoods suffer. Mr Malcolm Dunn, of Dalkeith Gardens, writes to me: “We have plenty of evidence in the Park here of the injury done by them to trees. Just now (December 1878), in this severe storm, you will find one in almost every plane tree; and if you stand quietly and observe his movements for a little while, you will see the nimble little rogue leaping from twig to twig and biting off the buds by the hundred—I may safely say hundreds daily, as the snow below is thickly strewn with the débris. He appears to eat only the tender heart of the buds, and to discard the outer envelopes.”

A writer in The Field (November 20th, 1878), speaking of the food of the squirrel, includes the young shoots of horse-chestnut trees. He says also that in Nairn, twenty-year old firs are attacked, and every third or fourth tree “ringed” round by them where the branches radiate. Effect described: The tree-tops rot and the wind breaks them over, but the writer does not think much damage is done to old fir, that is, fir over fifty years’ growth, as in them they seem to “shred down the cones and extract the seed.” Trees under 5 feet, damaged, he considers the work of roe or red-deer. If a 20-feet fir or spruce, it is probably done by a wood-pigeon perching on it. But this opens out a wide field for discussion, which I think is hardly necessary in this place.*

In the pages of the “Journal of Forestry”† much informa-

* I mean,—if the trees be weakened by the squirrels nibbling the circumference of the bark near the top, wood-pigeons alighting thereon afterwards will the more easily break them down by their weight.
† Vide Journal of Forestry, June 1879, p. 88—quotes Live-Stock Journal; also July 1879, p. 209, chestnut trees.
tion is given regarding the destructive powers of the squirrel, and nowhere can I find anything said in its favour. Amongst the food-stuffs of the squirrel I may instance the following. It might prove interesting to make the list as complete as possible.

Various kinds of mushrooms and agarics, * including truffles, for which they scrape in the earth below trees.† It is not yet known how many species of fungi are used by the squirrel as food, nor all the names of them. Some, however, and especially the red agarics, appear to be rejected as food, and only carried by the animals and placed in clefts of the trees. “They are placed in the fork of a branch with the stalk down, like an umbrella set up to dry.”‡

This is probably simply exhibiting an inherent curiosity common to most animals (see further on, p. 179). The smaller fungi which cover the bark of trees are also eaten by squirrels, as has been pointed out to me by the late Sir Thomas Moncrieffe, Bart., who, in one of his last letters to me, stated that he intended further to investigate this matter, with a view to discovering whether or not any of the damage done to trees did not result from this fondness for these minute fungi. In nibbling at these close-growing superficial fungi on the branches and shoots of trees, the squirrels’ teeth might reasonably be supposed to penetrate deeper till it affected the bark itself. Mr R. M. Barrington has also witnessed the squirrel descend a larch tree, and picking up a mushroom (species not noticed) run up and eat it leisurely on a branch. Mr Barrington also notes, “they eat many of the toadstools in our pleasure grounds.”§

Of seeds and nuts and kernels of stone fruits, a large variety occurs, amongst which I may mention the following:

Seeds of apples, fir-cones, burr-thistle, agermony, horehound,

† Von Tschudi, “Thier. der Alpenwelt,” and “Zoologist,” 1865, p. 9560.
§ Further vide Science Gossip (1865), p. 40; 1866, p. 138 (squirrels eating toadstools).
‖ F. Norgate, in lit.
haws, the seeds of caraway-sweets in confinement—the sugar being rejected and the seeds eaten,—hazel-nuts and filberts, etc.; acorns, beech-nuts (or beechmast), kernels of apricot,* plum, etc.; walnuts, etc.†

Of berries, fruits, etc., amongst others—blackberries, strawberries, bilberries, briar, juniper.‡

Shoots and buds of fir, larch, spruce (not so commonly), chestnut, sycamore.

Inner bark of fir, larch, young birch, silver fir, poplar.§

Besides the above they are apparently fond of a few other odds and ends. Mr T. Milne, forester in Glen Tanar, writes me that he has “often trapped squirrels with a piece of fried bacon, which they appeared to relish.” They are accused of eating birds’ eggs and young birds, and having other carnivorous inclinations, but that will be now fully discussed.

DAMAGE TO GAME, BIRDS’ EGGS, ETC.

The question of to what extent the squirrel is destructive to birds’ eggs has several times before now come up for discussion. The results of my correspondence and search into the subject is, that by far the larger number of individuals who have had ample opportunities of observing the squirrel in Scotland, either deny that the damage so done is appreciable, or state that no instance of the squirrel eating eggs has ever been witnessed by them. Mr Robert Mackintosh, gamekeeper, Grandtully Castle, never knew them to do any harm to game, or destroy eggs, but he says: “I have seen them play with the empty shells of wood-pigeons’ eggs, but never was certain that they broke them. Never saw them touch pheasants’ eggs.” On the other hand, there cannot be a shadow of a doubt that eggs are destroyed and eaten by squirrels occasionally. My friend Mr A. Burn-Murdoch gives

* Auct. Captain Dunbar-Brander.
‡ Journal of Agriculture, 1865, p. 471.
me a well-authenticated instance of its doing so—carrying away partridges' eggs. The person who saw the squirrel carrying an egg in its mouth "gave chase, and made it drop its burden, which proved to be a partridge's egg. He found the nest from which it had been taken in the hedgerow root, and on the other side of the road he found the two eggs which had been removed on the two previous journeys which he had witnessed. The eggs were all punctured by the squirrel's front teeth, but merely enough to afford a catch for carriage."

Mr Frank Norgate, of Norwich, also sends me a note as follows: "At Hethersett, Norfolk, I saw a squirrel sitting on a blackbird's nest with its head hidden in the nest, and the blackbird flying at it and making much noise; one egg in the nest had two holes in the shell, and the white was oozing out. Fresh remains of one or more other eggs were in the nest."

There is no doubt a deep-rooted prejudice against the squirrel and its oological tendencies, as we find, as early as the date of the "Old Stat. Account" that it received censure for "doing much harm amongst singing birds," and taking pheasants' eggs;* and every now and then, no doubt, we do meet with instances in which they are guilty of misdemeanours. But I cannot admit that the damages done are appreciable. If it were so, far more observers would be found to record these damages. I agree entirely with Captain Dunbar-Brander of Pitgaveny, that "some few squirrels have learned that eggs are good, and will destroy them; the great majority do not. One dog in ten will eat an unbroken egg; one cat in fifty has found out that eggs can be broken. There is nothing a cat likes better than an egg, but it must be broken for her. If an unbroken egg be put in a ferrets' cage, they won't meddle with it, but, break the egg, and they will fight for the contents. Egg-eating does not come naturally to the squirrel any more than to the cat or ferret, but they may be educated to it. Perhaps one squirrel in thirty eats eggs. Though often trapped with an egg, that proves nothing. They are inquisitive. Just now, as the snow lies, one might trap every quadruped, and a good many birds besides, with an old boot as bait! I think

the birds themselves bear me out in my opinion, that squirrels are harmless to eggs or young. A blackbird takes no more notice of a squirrel than it does of a rabbit, but if it sees a cat, weasel, or rat, it begins swearing" (in lit.).

Many correspondents, in some form or other, bear out the above remarks by their experience; only a very few instance cases of damage done. One of the latter is as follows: In Lauderdale squirrels appeared for the first time about 1838 or 1839, and were ordered to be destroyed about 1849, which was done by the gamekeepers. At that time there was nothing against them as game-destroyers, and consequently they were not killed down very assiduously. About the year 1856, when stories were told of their fighting with birds, and taking their eggs, they got a little more attention, and it was found to be true: they will take eggs. I am obliged to Mr Peter Scott, gamekeeper, Thirlstane Castle, Lauderdale, for the above (see also further on what is said of their carnivorous propensities, p. 182).

Mr C. Y. Michie, in his prize essay already quoted, makes some startling statements regarding the carnivorous propensities of the squirrel. The fact that squirrels do eat birds' eggs occasionally is well known, and we have abundant proof of the fact; but I cannot, with all the evidence, negative and positive, at my command, conclude that this is a common practice, nor that the habit of devouring young birds is freely indulged in by the species. I quote here Mr Michie's observations on this head. He says: "Where squirrels are most numerous, woodpeckers are most scarce. In conversation with a sawyer, a man of observation, a few days ago, he told me that near to a sawpit where he was at work, a woodpecker hatched its eggs, and when the young ones were nearly full-fledged, he observed one morning a squirrel enter the nest and carry off a young bird; this was again and again repeated by the squirrel till the whole brood was destroyed. It is now," continues Mr Michie, "pretty generally known that squirrels eat the eggs of wood-pigeons, from which it may pretty safely be inferred that the eggs of the woodpecker and other insect-devourers will share a similar fate." Mr Michie also makes the further
statement that "where squirrels abound the ravages committed by this (a certain) insect are greatest, and at the same time where squirrels are most numerous, woodpeckers are most scarce." Mr Michie then tells us: "In Strathspey, about twenty years ago, woodpeckers were very numerous; the holes which they burrowed in the trunks of old trees may be seen at the present day in hundreds, whilst now not a single woodpecker is to be seen in the whole forest. About the year 1840, the first squirrels were seen in Duthel Forest, and now they are seen in hundreds, and appear on a rapid increase."

Further inquiry certainly brings out the fact that this is the general belief amongst the old people of Inverness-shire and the northern forests of Scotland. Sir Dudley Marjoribanks writes (in lit.): "The old people say the squirrel drove away the red-headed woodpecker [i.e., Picus Major, L.] from Guisachan. Certainly," continues Sir Dudley, "its holes in the trees are very numerous, and yet I have never seen a single specimen. I heard of one being seen in 1869, in the spring."

It seems quite unnecessary to criticise this at length. If the first squirrel appeared in the neighbourhood only about the year 1840, and Mr Michie wrote his paper in 1865, and if woodpeckers were very numerous in Strathspey about twenty years before, but "now are extinct, or nearly so," surely he cannot mean to say that the extinction of the woodpeckers took place by the squirrel's agency in such a short time. Even supposing squirrels could always gain easy access to a woodpecker's nest, I don't believe such could have taken place. The great spotted woodpecker does not make a hole, however, large enough to admit a squirrel's body. However correct Mr Michie no doubt is as regards the damage done to forests, and in relating the evidences of his own senses, I cannot, in absence of fuller data, and the testimony to the contrary by many others, agree that the scarcity of woodpeckers is owing to the abundance of squirrels. He states the two facts of the scarcity of the one and abundance of the other, and arrives at the somewhat hasty conclusion that the latter has produced the former state of things; while all his proof
rests upon a single statement of a single instance by a single individual.

It is only just, however, here to relate what additional evidence I have of the carnivorous propensities of the species, at the same time repeating that such records are rare and decidedly exceptional, going to prove—I consider—that the taste for eggs and young birds is not a natural, but only an acquired and very exceptional one. Mr Peter Scott, already mentioned in this paper, writes to me as follows: "As to their taking game or eating carrion I am not sure, only I have known of ugly things being found in their nests, such as a pheasant's head, rabbits' and other kinds of bones." This evidence appears to me in no way whatever to prove a carnivorous desire, but simply the gratification of that inherent curiosity, mentioned above by Captain Dunbar-Brander. Much more likely that a weasel, or stoat, or other carnivorous animal slew the pheasant, and left the head lying, and that our little friend, happening to pass that way, or having watched the weasel or stoat at its meal, descended afterwards from its arboreal perch, and pouncing on the pheasant's head, bore it away to its "dray." Mr Duncan Dewar, gamekeeper at Remony, Perthshire, during the severe winter of 1878-79, found two cole tits in a squirrel's nest, which had crept in for warmth and died there; their flesh was quite dried up and preserved by the frost, and left untouched by squirrels, which were also in straits during the winter.

It would be almost endless to multiply the evidence relating to this part of our subject, or at least to go into minute detail concerning it. Below, however, I give a list of references in one journal alone—Science Gossip—if only to show how voluminous is the literature.*

* "Carnivorous Propensities, and Egg-eating and Nest-robbing," Science Gossip (1871), pp. 131, 189, 214 (H. C. Sargent, Penkeith, near Warrington); 237, 238 (Rev. J. G. Wood); 256, 257 (seen to attack a young rabbit); 278 (R. M. Barrington; C. Kingsley, Eversby, Hants; Grantly F. Berkeley, Alderney Manor, Poole).

Parallel Propensities of the grey squirrel of the United States, given in Science Gossip (1872), p. 199 (Charles C. Abbott, Trenton, New Jersey, U.S.); 261 (reply to C. A.'s letter); Waterton quoted by H. C. Sargent against carnal propensities of the squirrel in a wild state.
Mr Harvie-Brown on the Squirrel in Great Britain.

Science Gossip (1874), p. 118 (Elizabeth Edwards); thirty squirrels semi-dormant in an old oak, at Cudham, Kent, on Feb. 7th, p. 143; (same commented upon by W. H. Warner, Kingston, Abingdon).

Science Gossip (1867), p. 69, disease called “rot” in squirrels.

Science Gossip (1867), p. 141, a remark on Tate’s paper in Popular Science Review (April 1867), criticised by Fras. Bucknell, M.R.C.S. Mr Tate’s paper is on the “Flint-Flakes of Devon,” and the remark made is “perforations in the nuts demonstrates that squirrels skipped among the branches of the trees that grew there.” Fras. Bucknell states he has kept both dormice and squirrels, and states the differences in the mode of extracting the kernels. Thinks nuts alluded to by Mr Tate were attacked by dormice.

Science Gossip, p. 165, Mr Bucknell’s remarks confirmed by Helen Watney.

Science Gossip (1869), p. 235, an observation by W. Hambrough Worthing rather in favour of squirrel being an oophagist.

Starboard hard

[In Memoriam.]