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THE SCOTTISH NATURALIST

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A Journal of Scottish Natural History

Editorial Committee:

J.A. Gibson

John Hamilton

John C. Smyth

A. Rodger Waterston

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THE SCOTTISH NATURALIST

A Journal of Scottish Natural History

With which is incorporated *The Annals of Scottish Natural History*
and *The Western Naturalist*

95th Year

1983

CONTENTS

Editorial	3
Ruffe <i>Gymnocephalus cernua</i> (L.), New to Scotland, in Loch Lomond Dr. P.S. Maitland, Mr. K. East and Mr. K.H. Morris	7
Tropical Drift Fruits and Seeds on Coasts in the British Isles and Western Europe II. History (1560-c.1860) and Folk-Lore Dr. E. Charles Nelson	11
On the Breeding of the North American Wild Turkey in the Clyde Faunal Area Dr. J.A. Gibson	65
The Ruby-Crowned Kinglet at Loch Lomond A sift through the evidence relating to the almost forgotten 19th century record Mr. John Mitchell	81
The Salmincola (Crustacea: Copepoda) of the Trout: Recent observations and some gleanings from the notes of the late G.F. Friend Dr. Geoffrey Fryer	91
Additional Notes on the Birds of Mid-Argyll Mrs Ida Rainier	103
The 1982 Census of Gannets on Ailsa Craig Dr. J.A. Gibson	109
Review	113
Request for Information	117

EDITORS

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EDITORIAL

As was briefly mentioned in the 1981 editorial, when we started the *Western Naturalist* in 1972 it was an open secret to many interested naturalists that what we were actually trying to do was to restart the *Scottish Naturalist*. Indeed the sub-title 'A Journal of Scottish Natural History', lifted virtually straight from the earliest volumes of the *Scottish Naturalist*, served as a good indication of our real intentions.

In the early 1960s the much-loved *Scottish Naturalist* was again in serious difficulties. Publication problems with the *Scottish Naturalist* were indeed nothing new, in fact as early as 1874, the fourth year of publication, an editorial was emphasising the financial difficulties and need for more subscribers, but by the late 1950s it did seem as though the end was genuinely near. In the early 1960s confidential negotiations by one of the present Editors failed to ensure continued publication, even in conjunction with another recently ceased natural history journal, and in 1964 publication finally ceased. Despite constant difficulties, in a near-century of outstanding natural history achievements only once previously had genuine continuity of publication been significantly broken, after the outbreak of the second world war in 1939 until recommencement in 1948.

Almost at once it was clear that this had left a considerable gap, and over the succeeding years it became more and more obvious that the lack of a recognised national journal of general Scottish natural history presented a serious problem. Hence the reason for starting the *Western Naturalist* in 1972.

The original idea had been quite simply to restart the *Scottish Naturalist*, and to use the original name at once, but the main worry here was that if the resuscitation was not a success then the journal could well be lost for ever, since even the *Scottish Naturalist*, with its long and honourable history, might possibly not survive two crashes in such a short time. The name of *Western Naturalist*, therefore, was chosen more or less as a safeguard until the market had been properly tested.

In the event the *Western Naturalist* has actually been an outstanding success, with a steady flow of splendid papers for publication, an increasing list of subscribers, and many plaudits on all sides, so that we now feel confident in restoring the original name and wish that we had taken the chance of using the highly respected title of *Scottish Naturalist* right from the start. Modifications of name, however, are nothing new in the history of the journal, and already there have been at least three previous titles. With the ready agreement, and in-

deed the active encouragement, of the previous Editors and Publishers, Professor V.C. Wynne-Edwards of Aberdeen University and Mr. Douglas Grant of Messrs Oliver and Boyd, we are therefore glad to restore the original name, in the full confidence that the journal will continue to go from strength to strength.

Warmest thanks are now due to the old-established Renfrewshire Natural History Society, who in 1972, in recognition of the Society's 125th anniversary, shouldered the risk of restarting the journal. Indeed the entire history of the *Scottish Naturalist* is the story of several inspired and public-spirited organisations or individuals, who over the years have taken similar risks to start or support the journal: Dr. F. Buchanan White and the Perthshire Society of Natural Science, Dr. J.A. Harvie-Brown, the Royal Scottish Museum and Messrs Oliver and Boyd, again Messrs Oliver and Boyd - this time with the Scottish Ornithologists' Club (plus a small group of anonymous guarantors), Aberdeen University, and the Renfrewshire Natural History Society in association with the Department of Biology of Paisley College.

Responsibility for publication is now being assumed by the Scottish Natural History Library which, as the accepted national collection of Scottish natural history books and journals, also seems the fitting organisation to publish the national journal. Moreover, apparently for the very first time in the journal's history, quite separate financial arrangements have been made. With the ready help of many national Foundations and Trusts, Scottish businesses, and learned societies, an endowment fund has been established which should most adequately ensure the journal's independence, viability and security far into the foreseeable future. This will also permit the continuation of the reduced subscription for individual naturalists, first introduced by the Renfrewshire Society, which has done so much to encourage the steadily increasing list of subscribers and thus to stimulate increasing interest in all branches of Scottish natural history.

Since 1972 the journal, although conspicuously successful in the academic sense, has had to battle against a long series of entirely unforeseeable production problems, and the Editors' attempts to achieve smooth and regular production have not always been as easy or as successful as they would have liked. Difficulties have included the sudden and unexpected death of the original printer, the disastrous fire in which an entire issue of the journal was destroyed and had to be reprinted, with many papers in hand also being destroyed and having to be reworked, and at the near-hilarious end, an industrial dispute in which the journal got accidentally caught in the middle and

was temporarily 'blacked' by a trade union. The wonder was possibly that the journal actually kept going at all.

Happily, however, all that should now be behind us, and new guaranteed printing arrangements, plus the cushion of the independent endowed financial support, should ensure regular publication. We thank all our contributors and subscribers for their support and patience over the past decade. The supply of suitable papers for publication continues steadily, so it is clear that the existence of the *Scottish Naturalist* fills an obvious gap felt by many workers.

The present Editors are delighted to announce that the editorial board has been joined by A. Rodger Waterston, Emeritus-Keeper of the Department of Natural History at the Royal Scottish Museum, and one of our country's most distinguished naturalists. Rodger Waterston's connection with the *Scottish Naturalist* goes back to before the second world war, as Assistant Editor from 1936, so his connection with the editing of our national journal now covers two periods nearly half a century apart, and will certainly add lustre to its future.

This issue of the journal is devoted almost entirely to a number of important papers which have been in the Editors' hands for some time. Future issues, however, should include, as previously, short notes, book reviews, notices and announcements, and comment, and hopefully a new section devoted to the publications of local Scottish natural history societies, a collected survey of which has been badly needed for some time.

The history of the publication of the *Scottish Naturalist*, our national journal, plays an important part in the bibliography and history of Scottish natural science, and is certainly worth placing on separate permanent record. An account of this is therefore being prepared, and hopefully should appear in the next volume of the journal.

We trust that the *Scottish Naturalist* will continue to prove worthy of the confidence of its many supporters.

RUFFE *GYMNOCEPHALUS CERNUA* (L.), NEW TO SCOTLAND, IN LOCH LOMOND

By P.S. MAITLAND, K. EAST and K.H. MORRIS
Institute of Terrestrial Ecology, Edinburgh

The Ruffe *Gymnocephalus cernua* (Linnaeus 1758) is a small percid fish which is indigenous to south-east England and is also found now in the English midlands and eastern parts of Wales (Maitland 1972a). Though relatively local, the species is quite common in these areas, in canals and the lower reaches of rivers. It grows to an adult length of 10-18 cm, and breeds between March and May when the whitish-yellow eggs are laid in clumps among weeds in slow-flowing water. It feeds mainly on invertebrates.

The most northerly record of the Ruffe in Great Britain appears to be from Teeside (Maitland 1972a) and the species never seems to have been recorded from Scotland. Nor does it ever appear, from the published literature at any rate, to have been introduced to Scotland (Maitland 1977).

During routine netting for Powan *Coregonus lavaretus* in Loch Lomond two specimens of Ruffe were collected on 14th July 1982. They were both caught in the fine (c. 10mm) meshes of a mixed-mesh survey gill net fished overnight in a bay east of Camas an Losgainn (NS 376957). Also in the same net were several Perch *Perca fluviatilis*, and many Powan. The Ruffe were caught near the bottom, in about 5m of water. The two specimens measured 76mm and 93mm respectively. In addition, another specimen (94mm) was caught by gill net in Camas an Losgainn (NS 373956) itself on 25th August 1982. A fourth Ruffe (72mm) was collected on the same date on the screening system for the water abstracted at Ross Priory (NS 407874), near the south end of the loch.

The Ruffe is certainly quite a new species to Loch Lomond, but could already be established there. None has ever been seen in gill nets set regularly in these areas (and other parts of Loch Lomond) in previous years, but the capture of four fish at three places in a water with an area of over 71 square kilometres seems an unlikely coincidence if the species is not already relatively common, at least in the southern basin of the loch. The origin of the fish is obscure, but it seems likely that stock has been introduced recently somewhere in the Loch Lomond catchment area. This is certainly the case with Gudgeon *Gobio gobio*, which was introduced to a small loch in the Endrick valley

(D. Burkel, *personal communication*). Several specimens of Gudgeon were found in 1981 by the authors in the lower reaches of the River Endrick, where it is now certainly established and breeding.

Maitland (1972b) reviewed historical aspects of the fish populations in Loch Lomond and showed that despite the introduction of several new (mostly foreign) fish species to the loch over the previous 200 years, none had ever become established. The fish community there (which has fifteen species - more than any other Scottish loch) appeared to have changed remarkably little in historic time. However, in recent years there have been some apparent major changes. Disease has caused massive mortalities among the Salmon *Salmo salar*, Powan (Roberts *et al* 1970), and Perch at various times. The increase of various pressures - especially from recreational activities - has been considerable.

Indiscriminate stocking of new fish species (or even new stocks of existing species) can only accelerate changes and be harmful to a largely salmonid dominated fish community. The experiences in Lago Maggiore (Grimaldi 1972) and other major European lakes emphasise this point. The recent formation of the Wild Salmonid Watch (Maitland *et al* 1981) is an attempt to safeguard salmonid populations internationally, but this can only be successful if action is taken at a local level. The prevention of the introduction of new species such as the Ruffe is one such measure which should be taken. Even if there is no legislation available to prevent such introductions, social pressures should be brought to bear on those concerned to prevent indiscriminate stocking.

Acknowledgements

We are grateful to Ms E.R. Maitland for her help with gill netting. The manuscript was typed by Mrs M.S. Wilson.

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*Dr. P.S. Maitland, Mr. K. East and Mr. K.H. Morris
Institute of Terrestrial Ecology, 78 Craighall Road,
Edinburgh EH6 4RQ.*

TROPICAL DRIFT FRUITS AND SEEDS ON COASTS IN THE
BRITISH ISLES AND WESTERN EUROPE

II. HISTORY (1560-c.1860) and FOLK-LORE

By E. Charles Nelson
National Botanic Gardens, Dublin

Introduction

The surface currents of the North Atlantic Ocean transport floating objects such as wrecked ships (Scott 1951) and other artefacts (Carruthers 1956, Mackay 1964, Whitaker 1954), fishing floats sometimes encrusted with molluscs and barnacles (Turk & Dennis 1980), pumice (Scott & Scott, inpress), turtles (O'Riordan 1972, Penhallurick 1972, 1973, Turk 1966, Wilson 1953), jellyfish and the disseminules (i.e. seeds and fruits, commonly called drift-seeds) of tropical plants (Colgan 1919, Guppy 1917, Nelson 1978) from the Americas to the coasts of Western Europe. These currents are produced by the combined effects of the prevailing winds, the earth's rotation (Coriolis Effect), and the temperature and salinity gradients in the oceans. The records of tropical drift-seeds from Irish coasts have been discussed elsewhere (Colgan 1919, Nelson 1978) and papers are in preparation on British and European records. In this paper, the early records of drift-seeds (to c.1860) and their folk-lore are reviewed, with particular reference to the Outer Hebrides and the western coasts of Scotland and Ireland.

The disseminules of over 30 species of tropical plants have been recorded from coasts in western Europe (Nelson & Dennis, unpubl.data). Some of these arrive on beaches as a result of human activities (see discussion in Nelson 1978), but about 20 species are capable of staying afloat in salt-water for at least fifteen months, which is the shortest time needed for a small object to float across the Atlantic in surface currents. Many of the parent plants of these 'peregrine' drift-seeds grow naturally in the West Indies or in adjacent areas of mainland America (Guppy 1917, Gunn & Dennis 1976).

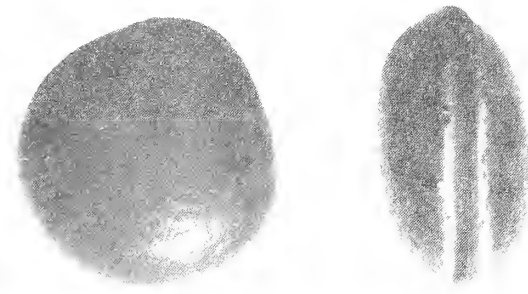
About seven species can be identified both in the early reports and in folk-lore; these are *Caesalpinia* spp. (mainly *C. bonduc* (L.) Roxb. but some may be *C. major* (Medic.) Dandy & Exell), *Dioclea reflexa* Hook. f., *Entada gigas* (L.) Fawc. & Rendl., *Erythrine variegata* L., *Merremia discoidesperma* (Donn.S.) O'Donnell and *Mucuna* spp. (mainly *M. sloanei* Fawc. & Rendl.). Other drift-seeds are mentioned in the text, as required.

Figure 1.

Tropical drift seeds which are mentioned in early accounts or are associated with folk-lore. *Merremia discoidesperma* is not shown. All seeds natural size.

- | | | |
|--------|---|--|
| Row 1. | <i>Caesalpinia bonduc</i> (2 seeds)
(lateral views) | <i>Erythrina</i> sp. (3 seeds)
(lateral and hilar views) |
| Row 2. | <i>Dioclea reflexa</i> (2 seeds)
(lateral and hilar views) | |
| Row 3. | <i>Mucuna</i> sp.* (2 seeds)
(lateral and hilar views) | <i>Mucuna sloanei</i> (2 seeds)
(hilar and lateral views) |
| Row 4. | <i>Entada gigas</i> (3 seeds)
(lateral views) | |

* This species is listed by Gunn and Dennis (1976) as *Mucuna fawcettii*, which is a rare Jamaican montane endemic, and most unlikely to be found in European beach drift. At present it cannot be identified beyond the generic level.



The seeds of *Caesalpinia bonduc* are acorn-like, light grey and conspicuously marked with hair-like concentric cracks on the hard seed-coat; those referred to *C. major* are similar in shape and size, but are yellow-brown and have less prominent hair-cracks. *Entada gigas* seeds are large (c. 5cm in diameter), usually heart or kidney shaped with a very hard, dark brown, shiny seed-coat. *Dioclea reflexa* and *Mucuna* seeds are similar in appearance; they are round, often compressed laterally with a black linear hilum which extends about three-quarters of the way around the circumference. In *Mucuna* species the hilum is over 2mm broad and the seeds are generally dark brown, while in *Dioclea* the hilum is less than 2mm broad and the seeds can be mottled black and tan in colour. The seeds of *Merremia discoidesperma* are similar in size to a Horse-Chestnut *Aesculus hippocastanum* L.; they are dark black/brown, and bear a 'C' shaped hilum on one surface and crossed grooves on the other. *Erythrina variegata* seeds are about the same size and shape as those of garden 'runner-beans' and reddish-brown in colour.

All these seeds have tough impermeable coats which have to be ruptured, to permit the absorption of water, before germination takes place. If the seed coat remains intact, seeds will stay afloat for many months or years. To stimulate germination, the hard coat of an *Entada* seed has to be split with a hacksaw or ground down on a sanding machine. The tough seed coat means that the seeds are durable - they can be polished in a lapidarist's tumbling machine without being damaged.

I. HISTORY OF DRIFT-SEEDS

EARLY RECORDS OF DRIFT-SEEDS AND IDEAS ABOUT THEIR PROVENANCE.

As a strict chronological account of reports of drift seeds from western Europe would be geographically chaotic, I have chosen to discuss the early records on a regional basis.

1. Great Britain

The first report of tropical seeds washed ashore on beaches in Europe was published by Pierre Pena and Matthias de L'Obel (1570), who stated that they had received from Dame Catherine Killigrew "many ... very rare beans which are said to be found in great plenty on the shores of Cornwall". To Pena and L'Obel these seeds were remarkable, especially as "no-one remembered any vessels being cast ashore in that quarter, nor any shipwreck there ...". They reported that the seeds were found regularly, "some floating, others ... dug up from where they lay buried in the sands by the shore, as if they had been drifted from the New World by favouring southerly or westerly winds...". Pena and L'Obel stated that the idea that

the seeds had drifted from the Americas was "the faith of the Cornish folk that dwell by the English sea"* (see Colgan 1919).

It is not clear whether those authors accepted this belief, though they had seen similar seeds brought back from the New World by mariners. There was a steady inflow of certain seeds for medicinal purposes into Europe at this time; *Entada* was listed among the '*Fabae purgatrices*' (purgative beans) in sixteenth century herbals (e.g. Monardes 1569). Charles de L'Ecluse (1574) figured and described this seed in his Latin translation of Monardes book (see also Worm 1650). L'Ecluse (1605) later remarked that hardly a ship returned from Africa, America or other tropical lands without bringing seeds of tropical plants to Europe. Therefore natural historians and physicians, like Pena and L'Obel, knew about such seeds and their provenance. Indeed, the knowledge that seeds were imported may explain Pena's and L'Obel's puzzlement about the absence of shipwrecks. The ideas of their Cornish informants, that these seeds may have drifted from the New World, are remarkable for their accuracy at a time when ocean currents were hardly understood.

However, it is clear from later writings that more fanciful ideas about the nature and provenance of drift seeds were also held by people in Cornwall, just as in other parts of the British Isles and northern Europe. In 1602 Richard Carew wrote that in Cornwall "the sea strand is also strowed with sundry fashioned & coloured shels, of so diversified and pretty workmanship, as if nature were for her pastime disposed to shew her skill in trifles. With these are found, moreover, certaine Nuts, somewhat resembling a sheepes kidney, save that they are flatter [*Entada gigas*] : the inner part, of a kernell voyd of any taste, but not so of vertue ... if at least, old wives tales may deserve any credit" (Carew 1602, see below). Carew's account is the only published report of drift seeds from beaches in England or Wales until the mid-nineteenth century, as far as can be ascertained. However there are some unpublished records. For example, entry number 8735, in Sir Hans Sloane's catalogue of "Vegetable and Vegetable Substances" contained in his collections, reads "... found on the shores near the Lizard in Cornwall. Woodward." (Ms. British Museum (Natural History)). Alas, the seed cannot be traced in the remnants of Sloane's collection, so it is impossible to say which species Dr. John Woodward collected.

There are numerous published records of drift seeds from Scotland, dating from the seventeenth and eighteenth centuries. The earliest is that of Sir George MacKenzie who noted that "... 'tis very ordinary to find Molucco Beans [see below] on the shoar

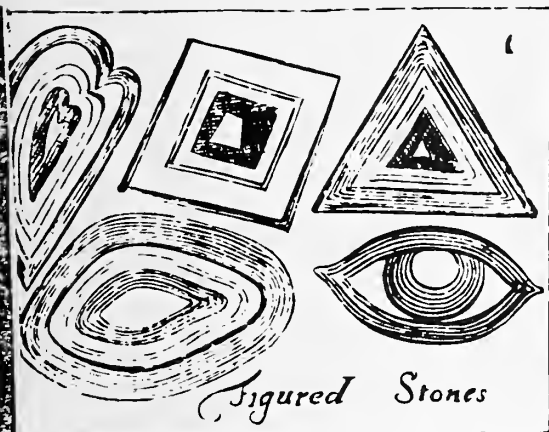
* "quasi ut putant Cornubiensis maris Anglice accolae..." (Pena & L'Obel, p. 395).

Figure 2.

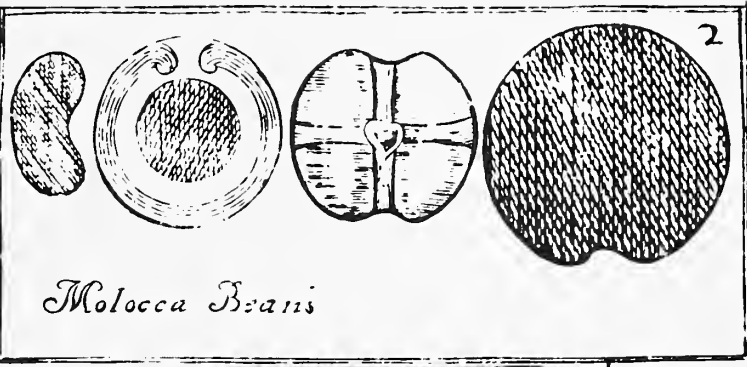
Illustration from Wallace (1693),
showing stylised drift-seeds at the top right.

From left to right:

Erythrina, *Mucuna*, *Merremia*, *Entada*.



Figured Stones

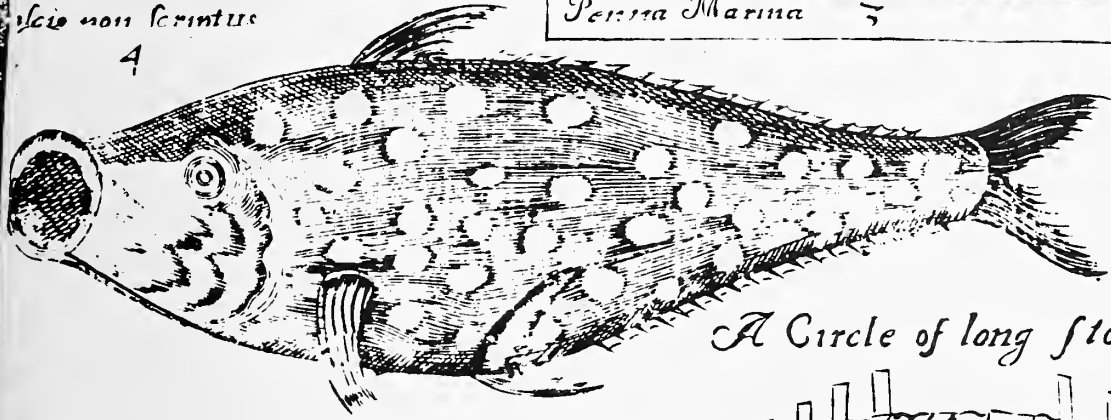


Molucca Beans



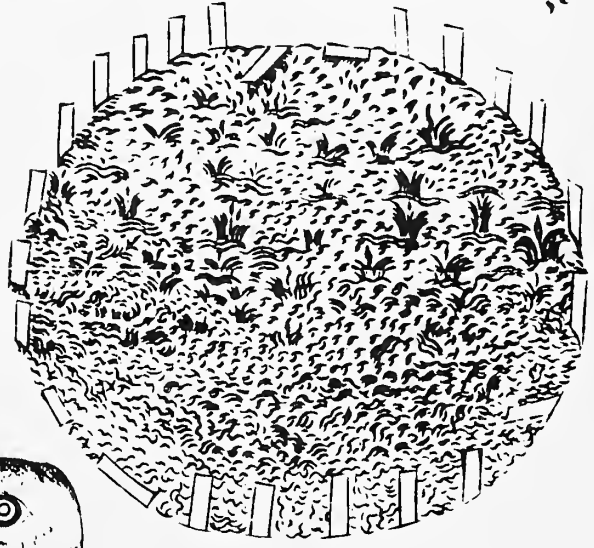
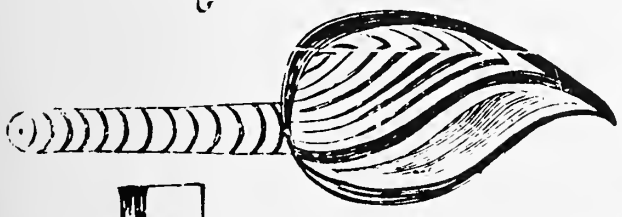
Perina Marina

Sci non scriptus
4

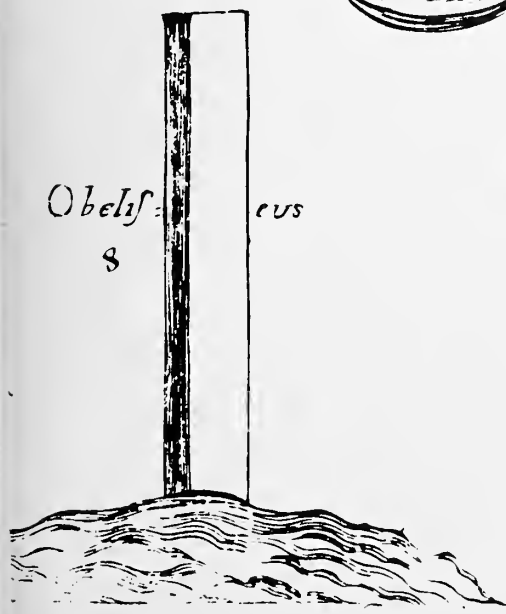


A Circle of long stones

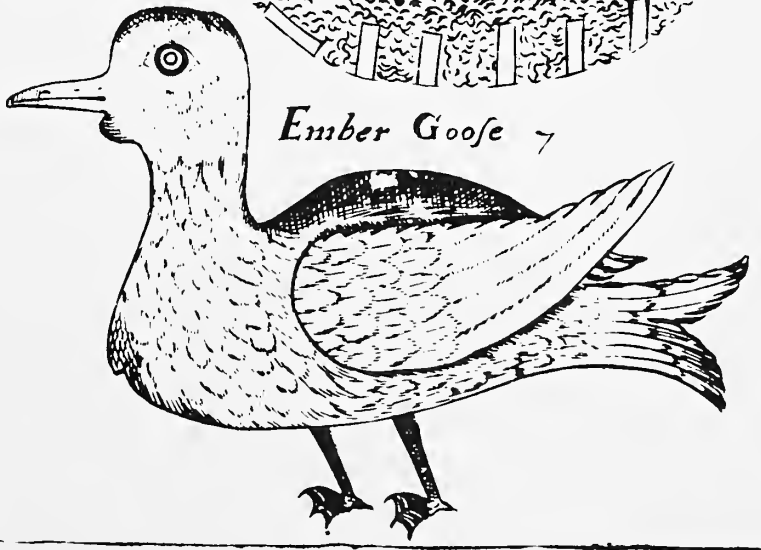
Concha Anatifera



Obeliscus
8



Ember Goose



of Lewes or other of our Western Isles", and that the seeds washed ashore were still attached to "stalks which the Common People supposed to be Sea-Tangles [i.e. seaweed]" (MacKenzie 1675). He was ridiculed when he tried to explain that the seeds were not "sea beans" but came from land plants. MacKenzie wrote to the "Earl of Seafort whilst he lived in the Lewes, that he supposed these apparent tangles were the ham [i.e. haulm or stalk] of the Beans which by long lying in the sea might acquire the likeness. His lordship examined the matter and found it so ...". Thus the Hebridean people seemed to adhere to the belief that the drift-seeds were seeds of seaweed, as did the Irish and Scandinavians.

MacKenzie's account is of interest as he noted that seeds were washed ashore attached to other vegetable material. There could be confusion in his report between seeds and Goose Barnacles *Lepas anatifera* which are found attached to floating logs and other material. However, a similar report came recently from Tory Island, Donegal, off the north-west coast of Ireland (see Nelson 1978).

Sometime between 1678 and 1688 John Morisone (n.d.), who lived on Lewis, Outer Hebrides, wrote that "the sea casteth on shore [of Lewis] some times a sort of nutts growing upon tangles, round and flat, sad broun or black coullered, of the breadth of a doller, some more, some less [*Entada*]". He also reported that "ane other sort of nutt is found in the same manner, of less syze, of a broun colour, flat and round, with a black circle [*Mucuna*]. There are other lesser yet, of a whitish colour and round [*Caesalpinia bonduc*]...".

Sibbald (1684) listed '*Phaseoli Molucani*' and '*Nux Indica*' in a catalogue of marine plants found with sea-weeds on the shores of Orkney and the Hebrides. '*Nux Indica*' is probably *Entada*, though it was a name more usually applied to *Cocos nucifera* L. (Coconut) at that time. '*Phaseoli Molucani*' or 'Molucca Beans' could be any of the smaller seeds (see page 38).

The Rev. James Wallace (1693) figured four sorts of 'Molucca Beans' which were "very oft" washed ashore on Orkney. These first pictures of seeds certainly collected from beaches included *Entada*, *Erythrina*, *Merremia* and *Mucuna* (see Fig. 2); it is interesting that the stylised drawings clearly show that the *Merremia* seed has been chased with metal bands bearing a heart at their intersection (see below).

The true nature and provenance of these seeds was recognised by Hans Sloane (1696a) who had the advantage over previous writers of an eighteenth month sojourn in Jamaica, where he studied the island's natural history (see Brooks 1953). He later published a botanical account of Jamaica (Sloane 1725). Sloane (1696a), in a

paper read to the Royal Society, noted Sibbald's and Wallace's records and described in detail four drift-seeds which had been gathered on beaches in Orkney and sent to him by Dr. George Garden of Aberdeen. He said the drift-seeds were "very fresh and little injured by the sea; Three of these Beans grow in Jamaica where I gathered them, and have mentioned them in my Catalogue [Sloane 1696b] of the Plants of that Island". He named them as "*Phaseolus maximus perennis* ..." (*Entada*), which Sloane said was also recorded from Irish beaches, "Horse-eye bean" (*Mucuna*) and "Ash-coloured nicker" (*Caesalpinia bonduc*). The fourth seed, which he could not identify as he had never seen the parent plants, was *Merremia*; he had seen several specimens of the seed in collections of "rare fruits". Sloane's own collection of "Vegetable and Vegetable Substances" (British Museum (Natural History)) contains several drift-seeds. The manuscript catalogue of the collection includes twelve entries relevant to this paper (see Table 1). Of particular interest is no. 1631 which records the four seeds sent by Garden and which were those noted in Sloane's paper (1696a) read to the Royal Society; the specimens are not extant.

It appears that Sloane had been trying to get specimens of drift-seeds for some time. On 11th September 1696, after receiving the Scottish specimens from Dr. Garden, Sloane wrote to John Ray:

"I have received, after much search, three sorts of beans from the north-western islands of Scotland, which are thrown up by the sea from the north-west great ocean, and gathered in plenty on those north-western shores, and are such as grow in Jamaica, viz. the bean called there cocoons, that called horse-eye bean, and the ash-coloured nickar, or bonduch. You will find them all in my Catalogue [Sloane 1696b], under these vulgar names, by the index; there is also a fourth sent me thence, which is, I think, the *Avellana quadrifida* J.B. [*Merremia discoidesperma* (see Gunn 1977)] where its natural place is I know not; but the others you may find their countries by the authors which speak of them, for they must come to Scotland by the currents of the sea. I have heard of some thrown up in England, and should be glad to hear from you on this matter..." (Ray 1845: 306).

Ray was sceptical about Sloane's explanation, and replied on 17th September 1696:

"What you write concerning the fruits gathered in plenty on the shores of the north-west islands of Scotland is very strange; I have formerly read something of it in the 'Philosophical Transactions' [probably MacKenzie 1676], I think, but have no great heed to it, but now I see there was truth in it. It is very unlikely to me that they should be brought so far by any current of the sea. I should rather think they came from vessels cast

Table 1: Entries relating to drift seeds in Sir Hans Sloane's collections of 'Vegetable and Vegetable substances'. Entries transcribed from the contemporary manuscript catalogue in British Museum (Natural History).

295	Yellow bonduch from the North of Scotland [<i>Caesalpinia major</i>] (1)
404	Fructus exoticum One of those thrown on the shore in Scotland/ from the Bahama Island [not extant]
448	Several Bonduchs of a yellowish colour of Dr. Walraven [<i>Caesalpinia major</i>] (2)
676	Molucco bean from the Isles (3)
947	Cacoons or Molucco beans from Orkney from Dr. Preston [<i>Entada gigas</i>] (4)
948	Gray bonduck from the same [not extant, <i>Caesalpinia bonduc</i>]
950	A sort of horse eye bean from the same [<i>Dioclea relexa</i>] (5)
951	A fruit from a siliqua ? from the same [not extant].
1631	Molucco beans, sorts from Scotland [not extant] viz. cocoons [<i>Entada</i>], nickers [<i>Caesalpinia</i>], horse eye bean [<i>Mucuna</i>] from Jamaica and another in Clus. exotic. [<i>Merremia</i>] vid. phil.Trans.
8735 found on the shores near the Lizard in Cornwall Woodward. [not extant].
8759	An Indian bean found frequently on our coast. It differs from all the four kinds which Dr. Sloane mentions on the Orkney shore. We find two or three other sorts on our shores Dr. Woodward [<i>Erythrina</i>] (6)

Notes:

- (1) The seed is pale brown and has a hole in it.
- (2) About 45 seeds, mainly yellow or rich brown, probably not drift.
- (3) Damaged dark brown, oval seed, unidentified; not seen by the author.
- (4) Four seeds, including one small one split open.
- (5) A black, markedly swollen seed, with a hole bored in it.
- (6) About 30 seeds, probably not drift.

away by shipwreck near those parts. But it is a thing very well deserves to be further and more diligently inquired into, with the matter of fact is certain..." (Ray 1845: 307).

It is interesting that John Ray later became convinced about ocean transport, and even used it to explain the presence of fossil Ammonites (see Raven 1950: 440). Ray noted that Ammonites "though altogether strangers to our seas they might as well be brought hither by force of winds or stress of weather...especially if we consider that several East-India [sic] fruits have been brought over the vast Ocean and cast upon the Western Isles of Scotland..." (Raven 1950).

Though not the first to recognise that the seeds found washed up on European coasts were identical with seeds of West Indian plants (cf. the writings of Ole Worm, below) Sloane (1696a) was the first to attempt to explain "how these several beans came to the Scotch Isles, and one of them to Ireland", saying that "it is very easie to conceive that growing in Jamaica in the woods, they may fall from the Trees into the Rivers, or be any other way conveyed by them into the Sea; it is likewise easie to believe, that being got to Sea, and floating in it in the neighbourhood of that Island, they may be carried from thence by the Wind and Current, which meeting with a stop on the main Continent of Am[erica] is forced through the Gulph of Florida, or Canal of Bahamas, going there constantly E[ast] and into the N. American sea ... But how they should come the rest of their voyage I cannot tell, unless it be thought reasonable, that as Ships when they go south expect a trade Easterly Wind, so when they come North they expect and generally find a Westerly wind, for at least two parts of three of the Whole Year, so that the Beans being brought North by the Currents from the Gulf of Florida, are put into these Westerly Winds way, and may be supported by this means at last to arrive in Scotland".

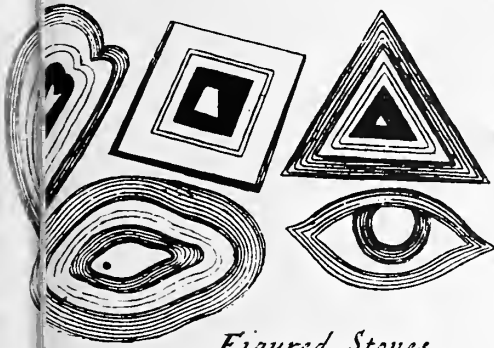
Sloane's tentative description of the surface currents in the North Atlantic is remarkably accurate, although written when the current patterns of the oceans were scarcely understood. Some speculative charts had been published in the seventeenth century, for example by Kircher in 1678 (see Vorseley 1976), but the first widely distributed chart does not seem to have appeared until about 1786 (see Vorseley 1976 - a chart is said to have been engraved and distributed in 1768 by Benjamin Franklin but no copy is extant according to Vorseley.).

In a revised edition of his father's book, James Wallace (1700) noted the "ingenious Doctor Sloan's... very satisfactory account, how from the West-Indies, where they commonly grow.... these *Phaseoli*, that ... go under the Name of Molucca Beans.... may be thrown in on Ireland, the Western parts of Scotland and

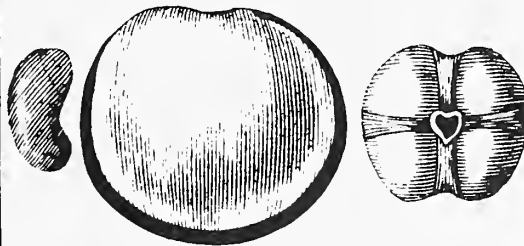
Figure 3.

Illustration from Wallace (1700).

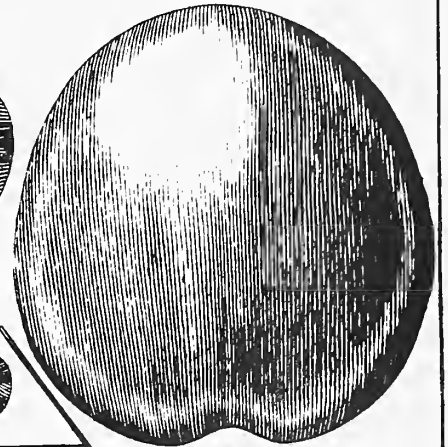
The drift-seeds *Caesalpinia* are shown in top right and on lower right. The drawings are not as stylised as in Wallace (1693) - Compare Figure 2.



Figured Stones

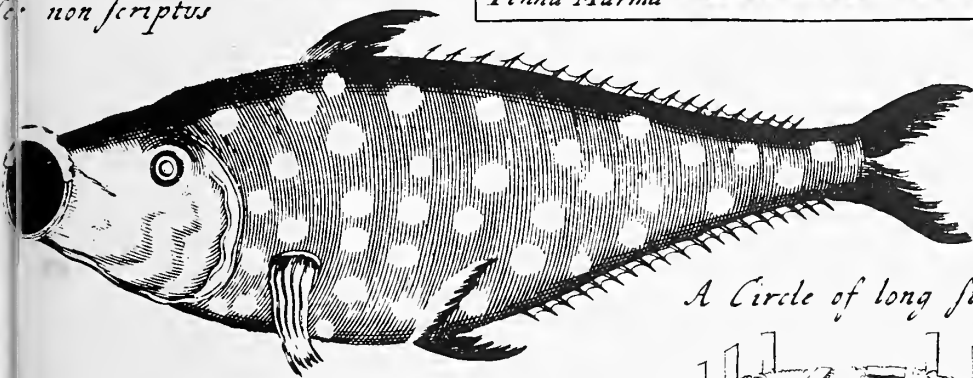


Molucca Beans



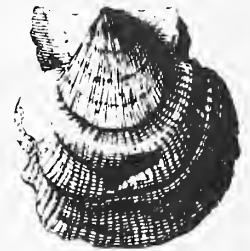
Penna Marma

Life non scriptus

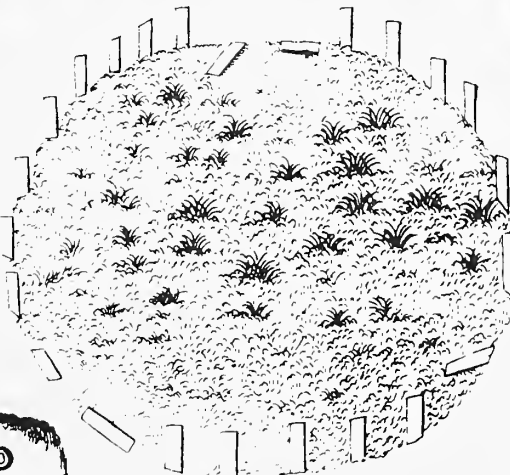


A Circle of long stones

pecten vide pag: 44.



Concha Anatifera



Another molucca bean



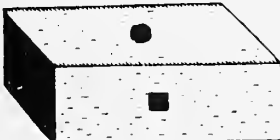
patella articulata cymbiformis

Fern Sepulchralis

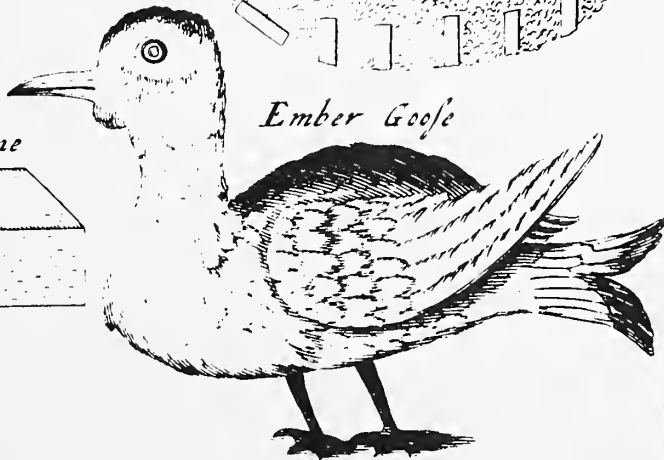


bolcus

Dwarfie Stone



Ember Goose



Fibula

Orkney". The drawings published in this edition are excellent and show five drift seeds; *Caesalpinia bonduc* had been added and the drawing of *Mucuna* is much improved (see Fig. 3). Wallace noted that the seeds were found "after Storms of Westerly Wind, amongst the sea-weed ... commonly in places expos'd to the Western Ocean". This book was reissued in 1703 without amendment.

In the same year, a native Hebridean, Martin Martin (1703) mentioned drift seeds found in the Western Isles and also described their uses (see below). Sloane (1725) recorded the finding of *Caesalpinia bonduc* seeds amongst debris on Scottish beaches. Thomas Pennant (1809) visited the Hebrides in 1772 where he was presented with "several of the nuts, commonly called Molucca beans, which are frequently found on the western shores of this (Ilay) and others of the Hebrides. They are the seeds of *Dolichos urens* [*Mucuna sloanei*], *Guilandina bonduc* [*Caesalpinia bonduc*], *G. bonducetta* [*sic*; *Caesalpinia* cf. *major*] and *mimosa scandens* of Linnaeus [*Entada gigas*] natives of Jamaica. The fifth is a seed called by Bauhin, *fructus exot; orbicularis sulcis nervisque quatuor* [*Merremia*], whose place is unknown. The four first grow in quantities on the steep banks of rivers in Jamaica, and are generally supposed to drop into the water, and to be carried into the sea; from thence by tides and currents and the predominancy of the east [*sic*] wind to be forced through the Gulf of Florida into the North American Ocean ... When arrived in that part of the Atlantic, they fall in with the westerly winds... Which may help to convey them to the shores of the Hebrides and Orkneys. I was for resolving this phenomenon into shipwrecks, and supposing that they might have been flung on these coasts out of some unhappy vessels; but this solution of mine is absolutely denied, from the frequency and regularity of the appearance of these seeds". Pennant (1809) also noted the stranding of turtles on the coasts of the Hebrides, which Wallace (1693) had reported eighty years previously on beaches in Orkney.

Patrick Neill (1806) published reports of "large exotic nuts or seeds which, in Orkney, are known by the name of Molucca Beans ... occasionally found among the rejectments of the sea especially after westerly winds". He had been given seeds of *Entada* and *Mucuna* by friends, and he suggested that "the currents of the ocean, and particularly the great current which issues from the Gulf of Florida, and is hence denominated the Gulf Stream, aid very much in transporting across the mighty Atlantic these American products".

2. Ireland

The first report of drift-seeds from Irish beaches was the passing reference made by Sir Hans Sloane (1696a) to "*Phaseolus*

maximus perennis ..." (*Entada*) which he was informed was "cast up on the Coast of Kerry in Ireland". His hypothesis (quoted above) that the seeds were conveyed by ocean currents and wind to Scotland also applied to Irish records. Some years later, Sloane (1725) reported that *Caesalpinia bonduca* was "often cast ashore by the sea on the north-west coast of Ireland".

Robert Brown (1818) noted that Sir Joseph Banks has received a drawing of a plant grown from an Irish drift-seed, which Banks identified as *Caesalpinia major*. As Brown gave no other details, the drawing could not be located until the present author noted a reference to "Bonduca" in a letter from General Charles Vallancey to Sir Joseph Banks (Dawson 1958). In this previously unpublished correspondence Vallancey, Vice-President of the Dublin Society, wrote from Dublin on 23rd April 1802:

"... You may have read in Smith's history of Kerry*, that foreign seeds are usually cast on that Coast. Martyn [sic; 1703] says the same of the Orkneys. A Kerry Lady gave me some seeds two years ago, that she had picked up on that shore; they were of a grey blue colour, except one that was yellow: they were about the size of marbles, and globular, highly varnished, and the kernels or seeds rattled within. Of these grey, I gave a gentleman some, & sowed some in our hothouse; they prove to be runners, our Gardiner thinks from Africa. My runners finished this winter by snow getting through a broken glass; but the yellow seed, proved to be a shrub, unknown to all our Irish botanists: it is in full vigour, and about twice the size of the drawing enclosed. This sketch I made about a month since, and I find the sharp thorns have now dropped off, about half way up from the earth of the pot, the stem is of a light brown: the leaves, some pointed, some rounded, which shows they are not come to full size or shape: - probably you will know this shrub and give me a name for it..." (Ms. D.T.C. 13,73-75; British Museum (Natural History), London).

A rather inaccurate drawing (Fig. 4) is scribbled on the bottom of the final page of the letter. From the descriptions quoted the seeds Vallancey received from Kerry were *Caesalpinia bonduca* ("grey blue... the size of marbles") and *C. major* ("yellow ... the size of marbles").

In a later letter, dated 10th November 1802, Vallancey wrote:

"The Bonduca, from the seed found on the Coast of Kerry, is in a very flourishing state, beginning to grow bushy; the seed of Bonducella (we think) was picked up last week on the coast of

* There is no reference to tropical drift-seeds in Smith's *History of Kerry* (1756).



Bondue

Figure 4.

General Vallancey's drawing of the *Caesalpinia* bush grown in the Glasnevin Botanic Garden, Dublin, from a drift-seed collected in County Kerry (enlarged). From Ms. D.T.C.13.73-75, reproduced by permission of Librarian, British Museum (Natural History), London.

Londonderry; it is planted & I hope will succeed ..." (Ms. D.T.C. 13: 292-297; British Museum (Natural History) London).

As a Vice-President of the Dublin Society (Berry 1915), Vallancey took an interest in the Society's newly established botanic garden at Glasnevin, near Dublin (Nelson 1981). It is obvious from an appendix to the first catalogue of the botanic garden (Wade 1802, see Nelson 1981 for bibliographic details), that Vallancey's references to "our hothouse" and "our Gardiner" mean the glasshouses in the Glasnevin Botanic Garden and the head gardener, John Underwood. The appendix included the note that "Our Bonduc was raised from seed picked up on the coast of Ireland, and sent to the garden by General VALLANCEY, 1801" (Underwood 1803: 122); the plant was listed as "*Melastoma Bonduc* Yellow-seeded *Melastoma*".

Thus, about 1802 Vallancey and the Glasnevin Botanic Garden succeeded in germinating and cultivating, for a short time at least, two species of *Caesalpinia*, an achievement which has not been repeated, as far as is known.

Drift seeds were reported from the coast of Connemara in 1825 (Blake 1825) and the whole subject of Irish drift seeds was reviewed by Colgan (1919) and Nelson (1978).

3. Scandinavia, Iceland and the Faeroe Islands

The French botanist, Charles de L'Ecluse (see above also) was the first to report drift-seeds from Scandinavia. He was a diligent botanist who collected foreign seeds from sailors - he even sought specimens from Sir Francis Drake on his return from circumnavigating the globe (Arber 1912). From L'Ecluse's writings it is apparent that he tested the bouyancy of some seeds, for he noted that grey-coloured seeds of *Caesalpinia bonduc* were as hard as stone yet floated - "*cineracei coloris, et saxea duritie praeditus, licet in aquam coniectus supernatant*" (L'Ecluse 1605: 58). He also mentioned another seed which, though the same colour and light, sank - "*color alioqui similis alteri, et tamesti levis, in awua nihilomnius subsidens ...*" (L'Ecluse, 1605: 58). Colgan (1919) considered that L'Ecluse "could not have had in mind a possible dispersal of seeds by ocean currents" when he did his flotation experiments. Though L'Ecluse seems to have been unaware of Pena's and L'Obel's statement about drift-seeds from Cornish beaches, he reported that these objects occurred on Norwegian coasts. He wrote that "a most learned friend of mine wrote to me to say that the Norwegians are altogether persuaded that these seeds are sea beans and that they grew up from the deep water amongst seaweeds on the Islands of the Faroes ..." L'Ecluse (as noted above) was familiar with the tropical seeds imported for medicinal purposes.

In the succeeding decades, records of drift-seeds from Scandinavia are relatively numerous. Peder Claussen (1632) referred to seeds of *Entada* as "stones floated onto the coast of Norway".

Icelandic records may be gleaned from the correspondence of the Danish naturalist Ole Worm (see Scheppelern 1965). In 1626, Thorlak Skulason of Holar in Iceland sent Worm "a female eaglestone"* Worm responded saying:

"I am most grateful, my dear Thorlak, for the stone you sent me thereby adding considerably to my natural history collections. The one you forwarded under the name "aetite" [eaglestone] is however, not an eaglestone, but a sort of sea-bean [*fabae marinae* genus]; I have often heard that people will sell this as eaglestone; it is softer than a stone and, like other beans, can even be ground into flour. I have in my possession some pods containing these seeds..".

Worm's letter confirms that specimens of these seeds were readily available to natural historians in Europe in 1625, including whole pods which could only have come from native habitats. In another letter (dated 24th August 1639) written to Arngrim Johnsson of Melstadir, Iceland, Worm again corrected the confusion of drift-seeds with eaglestones, saying that:

"What you call eaglestone ... is anything but eaglestone; it is a sort of sea bean called St. Thomas' Heart, since they are found in abundance around the Island of St. Thomas, it is shaped like a heart and is like a peeled chestnut in colour".

Jonsson obviously was not convinced by this, for in 1644, Worm again wrote after Jonsson had sent "two eaglestone", saying that the objects were not stones. Worm continued:

"I have seen two kinds of Indian beans of which the larger is called 'Saint Thomas' Heart' because it grows abundantly around the island known under that name"

In the descriptive catalogue of his natural history collection, Worm (1650) noted that he had various "Indian Beans" ("*Fabae Indicae*"). These included "the very broad '*Faba purgatrix*' from the Island of St. Thomas ... called St. Thomas' Heart, which is found on the Island of St. Thomas, and is reminiscent of a heart in shape... It is generally circular in shape but flat on both sides and slightly swollen, one inch thick, and two inches or indeed more in length, ... The outer coat is thick and woody, smooth, reddish black, the kernal is white ..." This description fits *Entada*; Worm stated that he had four specimens of different size.

* For discussion of eaglestone and drift-seeds, see page 39.

The next Scandinavian writer to note drift-seeds was Debes (1673) who wrote an account of the Faeroe Islands in which he said:

"Concerning the stone [Peder Clausson (1632)] ... also reports as being collected here [Faeroe Is.] at the beach, shaped like a heart or kidney ... it is not a stone but a West Indian bean, which has been told me by knowledgeable men. It has a hard covering, on the surface maroon, inside a red kernel. In other places it is bound to drop into rivers or the ocean from its stems, and drift hither [i.e. to the Faeroes] by the Water". Guppy (1917) had translated the final phrase as "brought hither by the Stream" which he said was a "striking early reference to the Gulf Stream". However the original Danish phrase - "*oc driftvis her hid aff Vandet*" - can only be translated as "and drift hither by the water"; this passage does not indicate any knowledge of the Gulf Stream (Hansen, pers. comm.).

In his book on the natural history of Norway, the Bishop of Bergen, Eric Pontopiddan (1755) wrote at length on sea-beans; he discussed their possible origins, including the idea that they might be the seeds of seaweeds. Referring to the larger forms of seaweeds he commented:

"If it is asked, whether these sea-trees bear any thing, which may properly be called a fruit or seed, though nothing like it has occurred to me or any of my correspondents, yet along our sea-coasts one meets sometimes with substances which favour the affirmative. Among these I particularly reckon one, to which I shall take the liberty of giving the appellation of *Faba-marina*, a sea bean. It is of the size of a chestnut, orbicular, yet flat, or as it were compressed at both sides. Its colour is a dark brown yet in the middle, at the junction of the shells [sic], it is variegated with a circle of a shining-black, and close by that another of a lively red, which have a very pretty effect. The inside of the shell is entirely black, but the kernel is of a pale yellow, and in taste, when dried, not unlike a French-bean, so that could they be had in great quantities, a very good use might be made of them". Pontoppidan thus had been sent a specimen of *Mucuna*, and considered it to be the fruit of a seaweed. He remarked that "Mr. Frederic Arentz, superintendent in Syndfiord, who lately sent me a sample of them, says, that they were found among the Tang, and other sea-weeds which had been thrown up, and driven ashore by the wind and waves, from whence they might be concluded to belong to the sea..." He continued, pointing out that the seed might "pass for an Indian vegetable of the tribe called *Pediculus Elephantinus*; which, by the loss of some ship, was, in the course of time, brought to this coast. But having received some of these beans from another virtuoso, who lives some miles from hence, the arrival of them on this coast, is more usual, than agrees with any

such opinion". While he rejected, as had Pena and L'Obel, the theory that these seeds were stranded after the wreck of a ship, Pontoppidan knew that timber and other flotsam could drift from America, for he commented: "as to bringing this vegetable from the opposite coasts of America, whence wood and the like are known to be driven towards Iceland, this is so long a voyage, that the beans would infallibly putrify, or at least be damaged before their arrival, which however is not the case, the taste being, as is already observed, exactly that of the French-bean, without the least mixture of the saline property". He did not appreciate that the hard seed-coat prevented the seeds absorbing water, and thereby allowed them to remain afloat and viable.

Another Norwegian bishop, Johan Ernst Gunner (1765) wrote a paper on foreign fruits and seed found on Norwegian beaches. He also noted the possibility that the presence of some of these seeds might be due to shipwrecks but seemed to favour long-distance drift. Gunner (1765) reported fruits of *Cocos nucifera* (Coconut), *Anacardium* (Cashew) and *Cassia*, as well as '*Cucurbita lagenaria*' which was probably *Crescentia cujete* (Gunn & Dennis 1976). He also noted *Entada* and *Mucuna*.

Gunner reported that "one often finds on the beaches here [Trondheim] as well as in other places in Norway several foreign fruits. None of these is found in greater quantities than the kind of fruit with a hard shell, like a bean or nut, which fruit in this country is called "losningssteiner" [see below]... Many consider it a fruit growing on the bottom of the ocean, belonging to corals or ocean-trees, and it is sometimes called '*Faba marina frutes*' ... One would in vain seek these fruits on terrestrial or marine plants here. They are a kind of American bean, as described and illustrated by Clusius [L'Ecluse, see above] under the name '*Phaseolus major, fabae purgatricis nomine nissus*'. Clusius mentioned further that the bean is called by some 'St. Thomas' Heart' [*Entada*]..." Gunner also noted "another kind of West Indian bean is also often collected on our beaches ... They are called by Pontoppidan '*Faba marina*' or sea-beans. They are smaller than the former, not so flat either, yellowish or red-brown with a coal-black smooth ring round the edge except for a distance of half an inch approximately. There is often a yellowish ring at both sides of the black ring ... They are a kind of West Indian Bean..." The yellowish seeds with the black hilum are probably *Dioclea reflexa*, while the red-brown seeds are *Mucuna*. It is interesting that Gunner recorded coconuts with and without husks; the latter probably coming from wrecked ships.

Gunner's account was used later by Linnaeus to demonstrate that seeds could be distributed by ocean currents. Contrary to Guppy's statements (1917), Linnaeus was responsible for the dis-

sertations published in *Amoenitates academicae* (see Stafleu 1972; 143-145). Both the discussion of plant colonies (attributed to Flygare) and that of Norwegian rarities (attributed to Tønning) which refer to Gunner's paper, were largely the work of Linnaeus, and it is clearly incorrect to say that the subject did not attract the "special attention" (Guppy 1917: 22) of Linnaeus, as he supplied the scientific content of these academic dissertations (see Stafleu 1972). In Flygare's thesis, Linnaeus remarked that the ocean, "by a method not as yet understood by anyone", carried the seeds of *Entada*, *Cocos*, *Cassia fistula* and *Anacardium occidentale* to Norwegian coasts, where they germinated and grew when planted (Linnaeus 1768a). *Cassia fistula* pods, containing seeds, are capable of long distance drift as they can float for up to five years (Dennis, pers. comm.).

In the second dissertation, attributed to Tønning, Linnaeus (1768b) noted, in addition to the species mentioned above, that *Erythrina* seeds were stranded. About *Cocos* he commented that it was difficult to understand how these seeds could be transported to Norway as they could not float - "*cum non natent*" - but yet arrived capable of germination. While some coconuts found on European beaches are refuse (see Nelson 1978), others probably have floated from the Americas. Linnaeus was incorrect in saying that they could not float, but he did not write that the other species also could not float as suggested by Colgan (1919: 39) - Linnaeus' footnote (1768b: 478) clearly refers to *Cocos* alone (see also discussion in Dennis & Gunn 1971).

Later Scandinavian records of drift-seeds are comprehensively reviewed by Sernander (1901) and Guppy (1917).

DRIFT-SEEDS AND CHARLES DARWIN

By the end of the eighteenth century, the most commonly encountered drift-seeds had all been recorded, and the theory of ocean transport proposed, if not accepted.

In the middle of the nineteenth century Charles Darwin took some interest in tropical drift-seeds. About 1855 he conducted a series of experiments on "the effects of immersion in sea-water on the germinating power of seeds, in the hope of being able to throw a little light on the distribution of plants, more especially in regard to the same species being found in many cases in far outlying islands and on the mainland". (Darwin, 1855a). He reported his first results in the *Gardeners' Chronicle* on 26th May 1855 (Darwin 1855b), and M.J. Berkeley later contributed results on the same subject (Berkeley 1855). Throughout the time he was working on the effects of salt-water, Darwin was in correspondence with his friend, Joseph Hooker, who shared Darwin's interest in plant distribution patterns.

On 10th October 1855, Darwin wrote to Hooker:

"I was going to have written to you to send 2 grand seeds which I have received from Norway, cast up by the Gulf-Stream; but since enquiring about your return I have changed my mind and determined to soak them in salt water for 10 days to see if they continue to float, and then I will send them you to name (if you can) and have them planted". (Ms. Royal Botanic Gardens, Kew: Copies of correspondence to J.D. Hooker, 1843-1856; f.250).

On the evening of Thursday 18th October,* Darwin despatched the seeds to Hooker.

"My dear Hooker

The two enclosed seeds came the smaller from Loffoden Island and the larger from Atten. They have now floated for 10 days on salt-water. Will you be so kind as to endeavour to name them: I presume the most that you can do will be to give me the generic names: perhaps if you do not know them, Sir William [Hooker] or Mr. [George] Bentham might do so. Professor Blyth** [sic] is anxious to know and I am bound to oblige him. I should be glad to hear pretty soon. Will you also have them immediately planted in whatever way is thought best for Tropical seeds. As they float, I do not care much about them myself, as the floating is certainly exceptional. I believe I shall have others sent: I hope that you will think it worth while to have them fairly and well tried ...Yours ever, C. Darwin"

(Ms. R.B.G., Kew: Copies of correspondence to J.D. Hooker, 1843-1856; f.240).

Hooker did not respond, for on 6th November Darwin wrote:

"...Will you be so kind as to let me have the names of the two seeds (distinguishing them as the smaller and larger) as soon as you can, for the sender [Blytt] will think me either very ungrateful or that his seeds have never come to hand..."

(Ms. R.G.B., Kew: Copies of correspondence to J.D. Hooker, 1843-1856; f.252).

In a post-script to his letter, dated 8th November 1855, Darwin thanked Hooker for "your note just received with the name of the seeds", but at the beginning of this letter Darwin apparently refers to drift-seed, saying:

* This letter bears no month or year, but clearly belongs to October 1855. It is out of sequence in the copied series.

** probably Matthias Numsen Blytt (1789-1862) Professor of Botany, Christiania (Oslo).

"Thank you for the seed, and am sorry that you should have had the trouble of sending it. I suppose (but have forgotten) that I directed it to be sent direct to you to be planted immediately, when I was full of rather foolish zeal. I presume you do not think it worth planting, or know by the rattling of its contents that it is dead. I shall write to desire no more to be sent of this kind..." (Ms. R.B.G., Kew. Copies of correspondence to J.D. Hooker, 1843-1845; f. 253).

It is probable that Darwin had received drift-seeds from another person too, for in a letter simply dated '15'*, Darwin wrote

"I had intended to have asked you whether the *Mimosa scandens* [*Entada gigas*] and *Guilandina Bonduc* [*Caesalpinia*] grows at Kew to try fresh seeds. R[obert] Brown tells me he believes 4 W. Indian seeds have been washed on shores of Europe. I was assured at Keeling Island [Indian Ocean] that seeds were not rarely washed on shore: so float they must and shall!...If you have several of the Lofoden seeds do soak some in tepid water and get planted with utmost care: this is experiment after my own heart with chances 1000 to 1 against its success. Are they of the so called *Mimosa scandens*?" (Ms. R.B.G., Kew. Copies of correspondence to J.D. Hooker, 1843-1856: ff.241-242).

Darwin's experiments showed that sea-water did not kill seeds, but he discovered that few of the seeds he tried were capable of floating in salt water (Darwin 1855b, 1857)**; as most seeds sank, Darwin concluded that "this seems at first a fatal obstacle to the dissemination of plants by sea currents" (Darwin 1855b). However, he recognised that the seeds of some tropical species were exceptions.

The outcome of Darwin's request to Hooker to plant drift-seeds is unknown. Hooker himself made a contribution to the literature on seeds transported by the Gulf Stream, when on 18th December 1855 he read a paper to the Linnean Society in London, titled "Notes on some West Indian seeds washed up on the coast of Wales". I

* This letter is almost impossible to date, even by using its internal contents. It is probably written before September 1855, for there is reference in it to "fish at the Zoolog. Soc [eating] up lots of soaked seeds" - this may be the "unfortunate accident" referred to by Berkeley on 1st September 1855 in the *Gardener's Chronicle* (Berkeley 1855). (For a discussion of the problems associated with the Darwin-Hooker letters, see Browne 1978).

** Similar experiments were conducted by R.L. Praeger (1913) on plants native to the British Isles.

cannot find any published version of the full paper, nor a manuscript of it, but the *Gardeners' Chronicle* did publish the following short abstract:

"The principal interest attaching to these seeds was said to be derived from the extension of the area over which they proved the Gulf Stream to be capable of transporting foreign bodies, it having been hitherto generally supposed that cross currents or other causes prevented any of these floating seeds from being carried into the Irish Sea" (Hooker 1855).

Drift-seeds do enter the Irish Sea (see Nelson 1978) but this was the first occasion on which tropical seeds (alas, unnamed) gathered on Welsh coasts had been recorded; Hooker's paper was apparently unknown to Guppy (1917) and subsequent writers.

As early as 27th May 1855, Darwin had expressed an interest in getting seeds of the native plants of the Azores, in order to make experiments on their ability to float and withstand the toxic effects of salt water, so that he could better understand how these islands in the middle of the Atlantic were populated by plants. He wrote to Hooker:

"All I want to show, or even in most sanguine moments expected to show, is the possibility in a long course of ages of a few plants being transported by currents. The real interesting thing would be to get a list of the Azores plants, and try and get the seeds of as many as I could and test them; and by Jove I will!" (Ms. R.B.G., Kew: Copies of correspondence to J.D. Hooker, 1834-1856: ff.222,223).

On 2nd June he relented - "I have had a sudden revulsion of feeling since I wrote to you, and cannot endure the thoughts of trying all the Azorean seeds which I could procure" (Ms. R.B.G., Kew: Copies of correspondence to J.D. Hooker, 1843-1856: f.224). However, at the time Darwin was suffering from stomach problems and he changed his mind yet again. On 15th [June 1855. Letter actually bears no month or year] he told Hooker that "I will next year try the Azorean seeds" (Ms. R.B.G., Kew: Copies of correspondence to J.D. Hooker; 1843-1856; f.230).

Darwin eventually obtained seeds of *Entada* and *Mucuna* from the Azores, which Hooker noted in a lecture to the British Association in 1866 (Hooker, 1867), but he does not seem to have conducted any work on the seeds of native Azorean plants.

Darwin's interest in tropical drift-seeds probably prompted him, in December 1857, while reading his grandfather's great poem *The Love of the Plants*, to underline in his own copy of the poem some of Erasmus Darwin's notes referring to drift-seeds, (King-Hele 1977: 313). Erasmus Darwin had noted the dissertation attributed

to Tonning (Linnaeus 1786b), as well as Hans Sloane's paper (1696a) and had used the record of *Cassia fistula* (Linnaeus 1786a) from Norway in one section of the poem; this surely is one of the strangest references to drift-seeds.

Where vast Ontario(1) rolls his brineless tides,
 And feeds the trackless forests on his sides,
 Fair Cassia trembling hears the howling woods,
 And trusts her tawny children (2) to the floods. -
 Cinctured with gold while ten fond brothers(3) stand,
 And guard the beauty on her native land,
 Soft breathes the gale, the current gently moves,
 And bears to Norway's coasts her infant-loves.

(This portion of *Love of the Plants* is followed by a bitter indictment of slavery which concluded - "He, who allows oppression, shares the crime".)

Charles Darwin continued to take a slight interest in drift-seeds, for in March 1859 wrote to Hooker, to report the finding of seeds in the crops of petrels.

"My dear Hooker,

Here is an odd, though very little fact. I think it would be hardly possible to name a bird which apparently could have less to do with distribution than a Petrel. Sir W. Milner, at St. Kilda, cut open some young nestling Petrels, and he found large, curious nuts in their crops; I suspect picked up by parent birds from the Gulf Stream. He seems to value these nuts excessively. I have asked him (but I doubt whether he will) to send a nut to Sir William Hooker (I gave this address for grand-eur sake) to see if any of you can name it and its native country. Will you please mention this to Sir William Hooker, and if the nut does arrive, will you oblige me by returning it to Sir W. Milner, Bart., ...Enclose clip of paper with the name and country if you can, and let me thereafter know. Forgive me asking you to take this much trouble: for it is a funny little fact after my own heart..." (Darwin 1896: 1,502-503).

On 5th March, Darwin wrote again to Hooker:

"Many thanks about the seed; but I daresay the grand gentleman will not send it; for why should he wish to oblige a mere

(1) Lake Ontario - this must be read as a general reference to America, as *Cassia fistula* is not a native of the Great Lakes area.

(2) i.e. seeds.

(3) Erasmus Darwin's oblique way of referring to stamens.

plebian. It is curious, petrels at St. Kilda apparently being fed by seeds raised in W. Indies. It sh[oul]d be noted whether it is a nut ever imported into England..." (Darwin 1896: 1,504 - this transcript is taken from the original ms, University of Cambridge).

Darwin added a postscript to his letter to Hooker dated 11th March 1859 which indicates that he still had not seen Milner's seed - "I suppose that the Baronet has not sent the Petrel seed; confound him". Guppy (1917:32) mentioned this correspondence but was unable to ascertain the identity of the seeds. In June 1883, Richard Barrington obtained a seed of *Caesalpinia bonduc* from the nest of a Fulmar Petrel on St. Kilda (specimen in National Botanic Gardens, Glasnevin).

Darwin used both his experimental work on the immersion of seeds in salt-water, and these miscellaneous notes on tropical seeds in arguments in his *Origin of Species* published in November 1859. In that classic work he wrote that several methods of plant dispersal, such as transport by ocean currents "... are sometimes called accidental... The currents, from their course would never bring seeds from North America to Britain, though they might and do bring seeds from the West Indies to our western shores, where, if not killed by so long an immersion in salt-water, they could not endure our climate" (Darwin 1859, Nelson 1978).

The scientific interest of drift-seeds is that they show, as Charles Darwin wrote, "the possibility in the long course of ages of a few plants being transported by currents" from island to island, or from continent to continent. The number of species dispersed in this way is very small, an insignificant proportion of known plant species, but drift-seeds are of more than passing interest when the folk-lore and folk associations are examined.

II. FOLK-LORE

VERNACULAR NAMES OF DRIFT SEEDS

In most countries of western Europe where they occur on beaches, drift-seeds have acquired common names. This reflects the fact that these seeds have been known to residents of coastal regions for many hundreds of years. Some of these names are discussed in detail in the next section.

In Ireland, *Entada* seeds are called *sliogan boilead* (see Nelson 1978) on the Dingle Peninsula, County Kerry. The word *sliogan* means mollusc (i.e. bivalve shell-fish) but the origin and meaning of *boilead* is obscure. *Boilead* is also found in the vernacular name for Sea-Anemone - *sine boilead* (*sine* - pap, teat) and it is possible that *boilead* is a corruption of the Latin word *boletus* (a mushroom or fungus) and therefore may signify 'fungus-

like'. Thus *sine boilead* would mean 'fungus-like pap', and *sliogan boilead* might be translated as 'fungus-like mollusc' (i.e. 'vegetable mollusc'). In this context it is interesting that Latin was recorded as being a second language to many inhabitants of the Dingle Peninsula in the eighteenth century (see Quane 1953).

On Tory Island, County Donegal, another name is used, but this has not been properly collected by linguists. D.J. O'Sullivan (pers. comm., see Nelson 1978) rendered it variously as *sceartaim*, *an scathain*, *an cartain* and *an cairteacha* and reported that the islanders "explained that the specimens were chiefly kidney-shaped - hence the Gaelic name ..." The Tory Island dialect is notoriously difficult to interpret so that until the name is correctly recorded, it would be unwise to discuss it.

Several Gaelic names have been recorded from the Outer Hebrides. These are *Arna Moire*, *Tearna Moire*, *Cno Moire* (which all are associated with the Virgin Mary (*Moire*)), as well as *suil an asail* (McGillivray, ms. label in drift seed collection, Dept. of Zoology, University of Aberdeen). The application of the various Marian names is complicated (see below). *Suil an asail* ('eye of an ass') was used on Barra for *Mucuna* seeds (McGillivray, ms.cit.); it is remarkably similar to the sobriquet 'horse-eye bean' used for these seeds and might be a simple Gaelic translation.

There is also a rich tradition of vernacular names in Scandinavia and Iceland. In the latter, the name *lausnarsteinn* (or *lausnasteinn*) (Blondal 1920, Arason 1914) meaning 'stone of release' (i.e. delivery, as in childbirth) is used for drift-seeds. The same name is found in Norway as *losningssteiner* (Gunner 1765). It is directly associated with superstitions about the use of these seeds as charms during childbirth (see below). On the Faeroe Islands the name *Vette-nyre* (Debes 1673), derived from *vette* (an invisible gigantic spirit of good, or evil) and *nyre* (a kidney) is used; it might be translated as 'giant's kidney'. Gunnerus (1765) noted several other names; he stated that "In Sundmor [Sunnmor], according to Mr. Strom ... [the local name is] Bue-steen (i.e. cattle-stone)" because it was used "for curing cattle". Guppy translated *buesteen* as 'bent-stone' and therefore considered it was a reference to *Erythrina* seed*. Gunner (1765) and Tønning (Linnaeus 1768b) clearly indicated that *losningssteiner* and *buesteen* were names for *Entada*. *Vette-nyre* also applied to *Entada*. Gunner noted that *Mucuna* seeds were usually called *orme-stene* (*orm* is Norwegian and Swedish for Viper) which may be translated as 'viper-stone' or 'snake-stone'.

In Scotland two other names have been recorded. 'Molucca

* Guppy's references to *buesteen* are often inaccurate.

Bean', which was noted by MacKenzie as early as 1675, appeared in the Latin form, *Phaseoli moluccani*, in Sibbald's book (1684). It seems to have originated in Scotland although its genesis is obscure; it is not possible to say if it arose from the idea that the seeds had drifted from the 'Spice Islands' (the East Indies including the Moluccas), or whether the name gave rise to this theory. Colgan (1919) has suggested that it may have derived from the Portuguese name *Faba de Malagua* (i.e. *Anacardium*) but this seems too remote a connection. The other name is *crospunk*, recorded by Martin (1703) in the Hebrides. Guppy (1917) suggested this might be derived from *spunk* (=tinder. This is used in 'spunk box', an archaic Scottish name for a match or tinder box), and the prefix *cro* (which signified witchcraft or scorcery); thus *crospunk* would mean 'magical matchbox'. However, in Irish, which is closely allied to Scottish Gaelic, the letters 'r' and 'n' are often interchangeable - therefore *cro* and *cno* both mean nut. This could provide a more logical meaning - 'tinder-nut', perhaps implying a tinder-box from a nut! Seeds of *Entada* were often used as snuff-boxes, and had certain superstitious properties (see below). Other vernacular names are recorded but these are generally translations of scientific epithets.

FOLK-LORE OF DRIFT-SEEDS

The folk-lore can be divided roughly into two sections; lore associated with the nature and provenance of the seeds, and that associated with their uses and powers. I suggest that certain beliefs, held in common by people of different ethnic backgrounds in widely separate parts of northwestern Europe, reflect close trade and cultural connections, in past centuries or millenia, which led to interchange of information and ideas.

It is probable that in areas where there is relatively little contact with the mainstream of scientific research, superstition rather than theory based on knowledge and experiment, will colour the interpretation of phenomena. This is shown by the difference between the recorded opinions, for example, of some of the inhabitants of Cornwall and the Hebrides about drift-seeds in the later sixteenth century and early seventeenth centuries. Cornwall was closer to main centres of trade and education, and its people could acquire information about distant lands, such as the Americas, from returned visitors, sailors or scholars. The Hebrides were isolated from the major European trade and research centres. Some Cornishmen thought that these exotic stranded objects were similar to seeds brought back from the Americas, whereas the Hebrideans fancied that they were the seeds of marine algae. The Icelandic people believed drift seeds were 'pregnant stones' formed from eagle's eggs!

DRIFT-SEEDS AND EAGLESTONES

The earliest recorded traditions concern the nature of drift-seeds, some of which confuse the seeds with stones. These beliefs seem to be confined to Iceland and Scandinavia, but possibly were more widespread, the apparent restriction resulting from the absence of written records outside the Nordic lands.

In Pliny's *Natural History* (Book X, ch. IV) there is a reference to four "kinds of eagles" which "have the stone called eaglestone (named by some *gagites*) built into their nests* which is useful for many cures, and loses none of its vitality by fire. The stone in question is big with another inside it, which rattles as if in a jar when you shake it". In Book XXXVI (ch. XXXIX) Pliny stated that "Eagle stones [*Aetitae lapides*] has acquired a reputation owing to the association aroused by the term. As I have already stated in Book X, they are found in eagle's nests. It is said that they are found in pairs, a male and a female, and that without them the eagles in question cannot produce young.... There are four kinds of eagle stone ... [for example] a kind that occurs in Arabia ... is hard, coloured like an oak gall or else reddish in appearance and containing a hard stone in its hollow centre ... A fourth kind ... is found as a white, round stone in streams. In its hollow centre is a stone known as '*callcius*' ... Eagle stones ... are worn as amulets by women or four-footed beasts during pregnancy so as to prevent a miscarriage. They must not be removed except at the moment of delivery; otherwise there will be a prolapse of the womb. On the other hand, if they were not removed during delivery no birth would take place..." (Pliny, 1944 edition).

These rattling stones probably gave rise to the idea of pregnant stones (*Lapides pregnantes*)** which surely heightened the superstitions relating to fertility and birth.

Thus traditions dating back over two thousand years tell of stones in eagles' nests which rattle when shaken and have magical properties; the associations between birds and myth in ancient Greece are noted by Pollard (1971). These ideas persisted in Europe into the seventeenth and eighteenth centuries, at least. For example, in *A Copious Dictionary* (Gouldman 1678), *aetites* is defined as "a precious stone found in an Eagle's nest ... without which it is thought that the Eagle cannot lay

* "*inaedificatur nido lapis aetites (quem aliqui dixere gagitem)...*".

** John Morisone (n.d.) recorded that "...*lapides pregnantes* of the whyt and blake kynds" were cast ashore on Tiree - these could be drift-seeds, the "whyt" being *Caesalpinia bonduc*.

her eggs. Of this stone it is reported that being laid on a woman's thigh, it causeth quick deliverance". The same source defined *gagites* as a "precious stone found in an Eagle's nest which being shaken seemeth to have another in it..." *Chamber's Cyclopaedia* (1807) defined "*aetites*, or eagle stone, [as] a flinty or crustated stone, hollow within, and containing a nucleus, which, on shaking rattles within. It was formerly in repute for several extraordinary magical as well as medicinal powers; such as preventing abortion, discovering thieves, and other ridiculous properties the popular tradition being that it is found in the eagle's nest, whither it is supposed to be carried, while the female sits, to prevent her eggs from being rotten also known as *echites*, *lapis aquilae* ... and *Lapis pregnans* ...".

It is clear that certain superstitions attached to *aetites* or eaglestones are similar to those associated with drift-seeds. For example, there is the Icelandic tradition recorded by Arnason (1914) concerning *lausnarsteinn* ('stone of release') which is identified as a drift-seed. By placing a piece of gold among the eggs in an eagle's nest, it was believed that one of the eggs would be turned into a *lausnarsteinn* and dragons would emerge from the other eggs; this superstition clearly derives from the ancient traditions recorded by Pliny. Other vivid Icelandic accounts which actually confuse eagle-stones and seeds come from the correspondence of Ole Worm, already noted (Scheppelern 1965).

Thorlak Skulasson wrote to Worm: "I am sending you a female eaglestone (for it is believed that in this variety of stone both sexes can be found); as yet I have not acquired the male. ~The eaglestone which I send is fertile and is supposed to be able to give birth if a male one is present; whether this is true must be dealt with later, but for me it is a fact that it somehow contains another, and smaller stone in its stomach; you can easily hear it if you shake it". Worm replied that the object was not an eaglestone but a drift seed.

Angrim Jonsson wrote of the eaglestone that "it has a round shape and a dark brown colour and weighs almost nothing and yet it sounds as if it is pregnant with another stone". Four years later he sent Worm "two eaglestones (presumably female): we consider them female, even fertile, since on shaking, they produce a sound indicating contents. And when they are not in the sea they cannot give birth which you, Sir, will realise through experience, but if this is so this secret of nature will be of great value to us as an example of conjugal life". Worm responded that "the stones which you call eaglestones are by no means eaglestones ...work [them] with a knife and you will find their hardness is not of a stone. When the kernel dries up and detaches itself from

the shell it will, on shaking, produce the sound people imagine comes from beans inside".

In an account of his natural history collections, Worm noted that "some people describe this bean [i.e. *Entada*] as a type of *aetite* because the kernel in dried beans make the same noise when shaken as ... in real *aetites* ..." Worm also related that "some people divide the beans into male and female, calling the bigger male and the smaller female; indeed if they are kept together, they believe that the female will give birth. But superstition has great influence with fools ..."

Of considerable significance in unravelling the *aetite*/drift seed confusion is Worm's discussion of *aetites*. He said that "*aetites*, or the eagle stone, derived its name from the eagle, either because it is tawney like the eagle, or because it is to be found in eagle's nests, for thither it is carried over from the ground, or (as Aelian thinks) it is like an amulet, against witchcraft, or in order that by it eagle's nests may be made more stable, or that by its force their eggs are brought to life, or that they bring on young in the eggs which during incubation get too warm because of the mother's womb ..." Worm described three types of *aetites* in his collection, but clearly none was a drift-seed as he catalogued drift-seeds correctly. Worm noted that Pliny and Galen "attest to the eaglestone being specially set apart for women in labour, and this is borne out by experience. For if it is tied to the left arm it keeps in the foetus in the case of women prone to miscarriage because of the slipperiness of the womb. At the time of delivery if tied to the left thigh it lessens the pains and hurrys on the birth". Worm stated that he had often tried this out and that "the good effect of which in desperate cases many honourable matrons have often seen but when the baby is born it must be taken away immediately ..." Worm also recounts how eaglestones may be used to catch thieves, calm paroxysms of epilepsy, cure the plague, drive out poison, "dispel unhealthy carbuncles", and produce "strength in the heart". It also "keeps off snakes, and it is on this account that some think it is put into an eagle's nest". Finally *aetites* are said to "bring about the increase of wealth and of love deeply felt and that this", Worm commented, "is something which fails not and is pleasing to all."

Pontoppidan (1755) also noted *aetites* saying that they were found in eagle's nest "who probably lay it there to moderate the violent heat exhaling from the breast of the dam, the eagle being a bird of extreme heat ... Of the several virtues ascribed to it, Ole Worm discourses more than becomes him, fancy and superstition having in my opinion the greatest share in them".

The association of drift-seeds and stones was also recorded in the Faeroe Islands by Clausson (1632) who said that "if kept for a long time, will give birth to another stone". Debes (1673) however refuted this, saying that the islanders have no superstitions about drift seeds. In Norway, the seeds are also confused with stones as the vernacular names *losningssteiner* (delivery stones), *ormesteen* (viper-stone), and *buesteen* (cattle-stone) suggest.

The common drift-seeds found on European beaches are all remarkable for their very hard seed coats which cannot easily be broken; it is necessary to use a hammer to crack the seeds open, or a saw. This characteristic explains the traditions about their stoney nature. Some seeds, especially of *Entada*, rattle when shaken, the kernel having shrunk and become detached from the testa. The cotyledons of *Entada* seeds are often cracked - Irish seeds examined by the author generally show this condition - and it is possible that in old seeds the cotyledons disintegrate accentuating the rattle. Thus arises the idea of rattling seeds (or stones), containing smaller seeds (or stones).

The geological structures called geodes, which may be identified as *aetites* or eaglestones, vary in size and structure; some are small pebble-like objects, consisting of a hollow outer shell of ironstone containing detached crystals or nodules. They are dark brown in colour and may rattle like some drift seeds. It is clear that drift-seeds and geodes were confused in Iceland at least, and as both objects are only very occasionally encountered in northern Europe, traditions which originally applied to geodes obviously became transferred to drift-seeds.

It is interesting that the Irish natural historian Philip O'Sullivan Beare in his unpublished *Zoilonastix* noted that pumice was washed ashore on Irish beaches. Pumice is a significant constituent of drift debris on beaches in north-western Europe, including Ireland (Scott & Scott, in press; Nelson 1978). As well as noting this drift material, O'Sullivan Beare wrote that "it has been traditionally held [in Ireland] that *aetites* are placed by eagles in their nests" and that "report has it that there are precious gems and stones [in Ireland] as for instance crystal, lichenite which gem is usually found in stork's nests and is carelessly called the carbuncle by man". Scott and Scott (in press) cannot identify the sources of either statement; geodes occur in Ireland but only in the Antrim area, and storks are, at the most, only very infrequent visitors. O'Sullivan Beare may have been using Spanish traditions - he wrote his manuscript about 1625 in Spain having left Ireland as a boy - but he may have been confusing geodes with drift seeds, as did the contemporary Icelandic correspondents of Ole Worm. As O'Sullivan Beare knew about

pumice drift, it is quite possible that he was also aware of drift seeds. While O'Sullivan Beare's writings may reflect a memory of Irish superstitions confusing drift seeds and geodes, there are no traditions of this type recorded from Scotland or its islands. All the Scottish records indicate that the vegetable nature of the drift seeds was understood.

OTHER THEORIES ABOUT THE ORIGIN OF DRIFT SEEDS:

The provenance of the seeds was speculated on by those who found them; the different opinions have been noted in the previous section. Firstly, it was correctly thought that they were American seeds as suggested by Pena and L'Obel. Secondly, they were thought to come from Molucca Islands (East Indies) as indicated by the name 'Molucca bean', applied enigmatically to drift-seeds in Scotland. Whatever its origins, this name was probably imported into the Hebrides and Orkney. Its use led MacKenzie to suggest that the seeds "came by the Northern passage ... their freshness in the kernel seems rather to have been kept in the cold conservatory than in the warm baths ..." Sloane (1696a) erroneously inverted this, saying that the islanders believed the seeds "to have come from these islands by an imaginary north-east passage" though there is no record of such a belief apart from Sloane's statement. Thirdly, in Iceland, Norway, the Outer Hebrides and Ireland, people thought that the seeds were produced by marine plants. The Irish tradition persists and recently associated these seeds with the Sargasso Sea (O'Sullivan (*in litt.*)), which again must be an imported idea. Clausson (1632) recorded that "the Norwegians were altogether persuaded that these were sea beans and that they grew up from deep water amongst seaweeds in the Islands of the Faeroes ..." Pontoppidan also accepted marine origin for these seeds.

FOLK USES OF DRIFT SEEDS

The uses of drift seeds can be divided into two categories; mundane uses without any associated superstitions, and uses in which beliefs and superstitions play a paramount role.

1. Mundane uses: Snuff Boxes and things

In the first category, the main recorded use was in the manufacture of snuff boxes. These were made from the seeds of *Entada*, often by cutting a hole in the seed near the hilum, removing the kernel, and plugging the hole with a cork (Fig. 5). Sometimes a quill was attached to the cork to prevent it being lost (MacDonald, *in mss.*, see Campbell 1972). Gunner (1765) noted that "snuff-boxes were made in two ways. A hole is drilled, through which the kernel is removed, and a silver foot and neck is made; or the

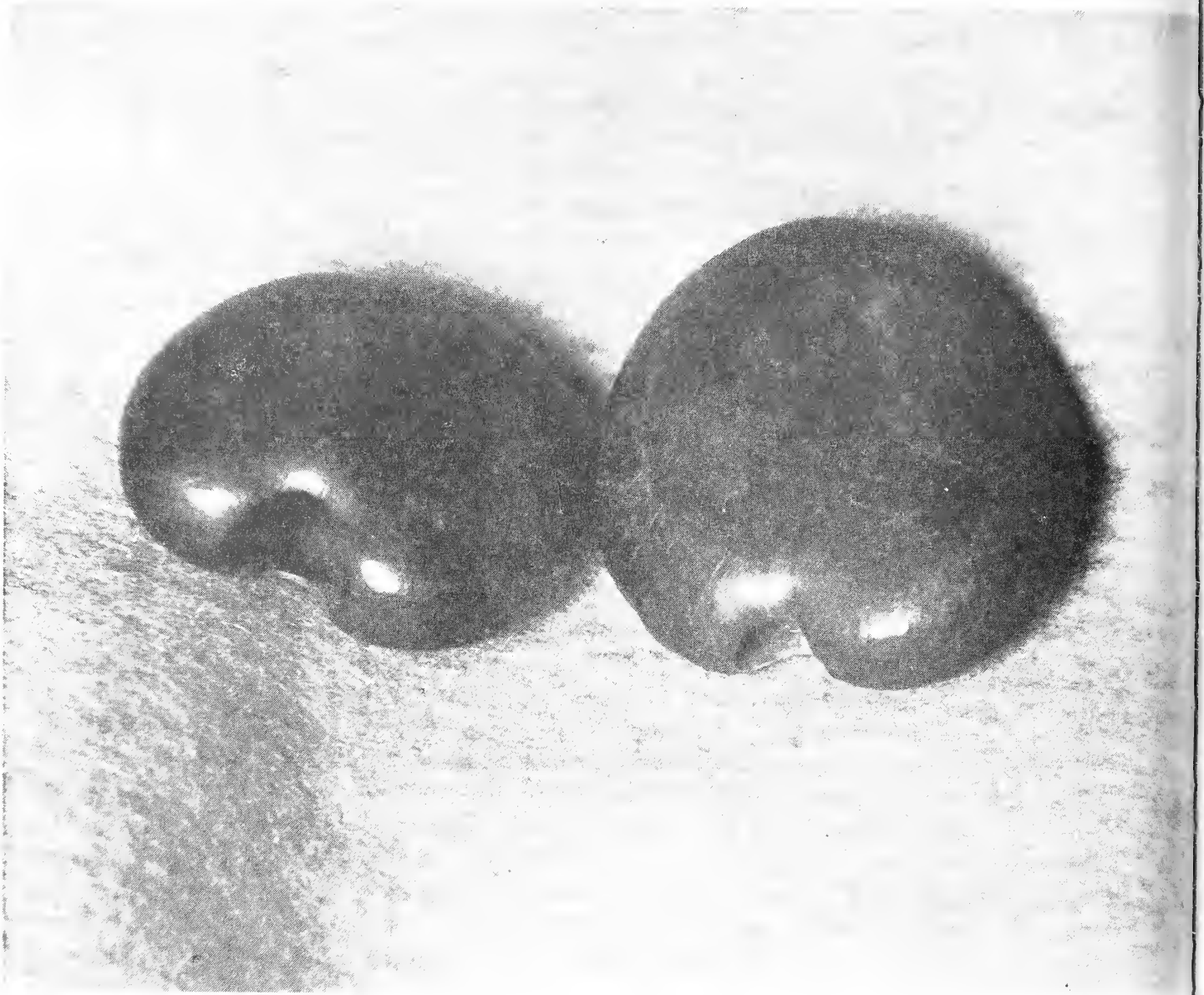


Figure 5.

Snuffboxes made from *Entada* seeds - the hole would have been plugged with a cork.

(Courtesy of the West Highland Museum, Fort William)

Also see Figure 10 and Postscript.

shell is cut in half, one part is used as a lid and the other as the bottom of a box of which the remaining part is made of silver". Colgan (1919) described a snuff-box made of an *Entada* seed split into two halves and chased with silver. Gunner (1755) reported that *Mucuna* seeds were employed by "the peasants" as snuff-boxes. The use of *Entada* seed snuff boxes was recorded by Debes, MacKenzie, Morisone, Sibbald and many other writers. They were also used to hold tobacco and vestas (matches). *Entada* seeds were used as baby rattles and teething-objects (Barrett 1974, Soper & Soper 1979); the seeds are large, very durable and tough so that they would be relatively safe as they could not be swallowed or broken. *Entada* seeds are large enough to be used as spoons, and heavy enough to be used as paper weights; they were also used as door-knockers (Brassey 1884). The smaller seeds, such as *Caesalpinia* and *Mucuna*, as well as *Entada*, were often strung together to form necklaces and rosaries; this is still done in Africa. Though in general these applications do not reflect any superstitions, the latter may arise from beliefs discussed below.

2. Superstitious uses: Amulets and Talismans

The use of drift-seeds as amulets and in folk-medicines was widespread in northern Europe and a substantial body of tradition is recorded. It is generally believed that drift-seeds are lucky objects - indeed to find a seed on a beach requires luck as they are most infrequent, at least on Irish coasts (Nelson 1978). The extremely low chance of finding these seeds seems to have influenced the large number of superstitions attached to them. Certain seeds are regarded as luckier than others, these tending to be the least frequently stranded ones, although special significance is placed on the cross-like indentations on *Merremia* seeds. Thus *Entada* and *Mucuna* seeds are relatively less valued than *Merremia* and *Caesalpinia*. According to Dr. Stewart (Black, 1893) the people of North and South Uist and Benbecula considered those seeds bearing "lines arranged in the form of a cross on one side [i.e. *Merremia*]" more valuable and sacred than unmarked seeds. He also claimed that "canary-coloured specimens and specimens of an almost white colour ... are the most highly prized" (i.e. *Caesalpinia major* and *C. bonduc* respectively).

In Ireland, drift seeds were mounted on chains and worn by girls around their necks in the Dingle area (O'Maoleoin, pers. comm.), probably because of the lucky associations. In Connemara, Blake (1825) recorded that the "unlearned natives ... have, however, found a fanciful use for these nuts, by laying them under the pillow of their straw bed, as a charm against the nocturnal visits of the fairies". On the islands of Achill and Tory drift seeds are still used as key-minders. Tory islanders bored a hole through a seed of *Entada* and threaded a string through with the

keys attached; this was done in the belief that the luck associated with the seed would prevent the loss of the keys (O'Sullivan, *in litt.*). Some seeds were mounted in bands of silver, brass or tin and worn on chains around the necks of women, and on watch-chains by men, for luck.

FERTILITY AND CHILDBIRTH

While these objects are generally associated with some form of good fortune, or protection against ill-fortune, more specific traditions link the seeds with fertility and child-birth. Perhaps these superstitions arose from the confusion of drift-seeds, and *aetites* or pregnant stones, or from the belief that if kept long enough these seeds would 'give birth' to offspring (see above).

In Tory Island, Donegal, O'Sullivan (*in litt.*) was told that childless couples took the contents of drift-seeds for the 'creation of fruitfulness'. He recorded that it was preferred to drink the 'milk' obtained by cracking open *Entada* seeds, though chewing the kernel would suffice but that was less efficacious - this tradition is confused as *Entada* seeds do not contain any liquid, like coconuts. The superstitious nature of this 'cure' for infertility is shown by contrasting it with the practice of the Australian aboriginal people (Kawadji) who used *Entada* as an oral contraceptive (Laszlo & Henshaw 1954). Kawadji women eat the kernel, either raw or roasted, in the early morning on an empty stomach, after which they lie down and refrain from drinking throughout the day. The success of this treatment is unrecorded; Laszlo and Henshaw (1954) suggested that such folk medicines may have real effects but noted that the active constituents had not been investigated. Carew (1602) said that the kernels of drift-seeds were 'void of any taste, but not so of vertue, especially for women travelling in childbirth, if at least, old wives tales may deserve any credit'.

Equally superstitious is the use of drift-seeds during pregnancy, and especially during child-birth to alleviate pain. In this application the seeds were most commonly used as 'worry-beads' to distract the mother, in which case they may have played a small role in relieving tension. The seeds or their contents were not eaten, and the seeds were generally preserved as family heirlooms. Carmichael was given such a seed as a mark of great favour (see below). Campbell (1860) noted that a woman from the Scottish Highlands had twice refused to part with a seed which she had "had from her mother", and Christison (1885) said that a husband "who had two, refused twenty shillings for one of them, saying that he would not part with it for love or money till his spouse be past childbearing".

Superstitions linking these 'pregnant stones' and child-birth

are also found in Scandinavia. In Iceland the *lausnarsteinn* (or *lausnasteinn*) are supposed to help women give birth easily (Blondal 1930). The Icelandic traditions associated with eaglestone (*aetites*) include the belief that the seeds, when placed unbroken in a drink later taken by a pregnant woman, or a woman already in labour, would relieve pain and assist delivery. In Norway the *losningssteiner* was believed to aid delivery when placed on the stomach of a pregnant woman.

Gunner (1765) recorded another tradition prevalent "in Nordland and Finmarken ...superstitious people believe it ['release-stone' or *losningssteiner*] is good for delivering or release of the afterbirth". In those places the women drank some beer or *aquavita* from the shell of an *Entada* seed (Gunner 1765). The richest traditions associated with these valued seeds are recorded from the Outer Hebrides and centre around those drift-seeds called, in English, Mary's Beans.

MARIAN TRADITIONS ABOUT DRIFT-SEEDS

Morisone (n.d.) seems to have been the first to record this sobriquet, from the Isle of Lewis, noting that the seed called "Sant Marie's Nutt" was "of a whitish colour and round...". Martin (1703) also reported that "the white nut was called the Virgin Marie's nut". Both Morisone and Martin described *Caesalpinia bonduca* seeds. Alexander Carmichael, who collected folk-lore in the Outer Hebrides, especially Barra, in the latter part of the nineteenth century, wrote that "*Arna Moire*, kidney of Mary; *tearna Moire*, saving of Mary ... is a square thick Atlantic nut, sometimes found indented along and across, the indentations forming a natural cross ..." (Carmichael 1900). This suggests that more than one type of seed was called 'Mary's bean', as the Gaelic names are usually translated: the seed is clearly *Merremia*. In the West Highland Museum, Fort William, there is a charm (Fig. 6) "received in 1869, as a particular mark of favour from Neill Macgilleonain the nearest living representative of the Old MacNeills of Barra" by Carmichael. It is made from a seed of *Caesalpinia* held in two encircling crossed bands of metal (cf. seed of *Merremia* shown in Figs. 3, 7 and 8), and was obviously intended to be hung on a chain. It is labelled "*Tearna Moire* - the Virgin's Charm of Deliverance". The contradiction between Carmichael's writings and the amulet he obtained, suggests that the sobriquet, in whatever form (*Arna Moire* or *Tearna Moire*) was not applied to a single species but was used, perhaps colloquially, for several seeds.

Father Allan MacDonald collected lore from South Uist and Eriskay (Campbell 1972), and his preserved manuscripts* record

*Ms. University of Edinburgh (Carmichael - Watson Ms. 58a ff.66, 151).

(entry 131) that "a nut found on the west coast of Uist driven in by the Atlantic Currents is called *Airne Moire* (kidney of Mary)... Those prized most have a cross indented on each side ...". None of the known drift-seeds has a cross on both sides, but the description doubtless indicates *Merremia*, though again more than one species is implicated. MacDonald's entry 347 reads "*Airne Moire* is a kidney shaped dark chestnut like nut found on the/west/coast of Uist. There is a /cross like/depression on the surface, and they are much prized by the people". This entry is more specific describing *Merremia* alone. Entry 348 refers to "*Cno Muire* which in colour resembles the *Airne Moire* but it is not so rounded nor so thick. It is heart like in shape ..."; this is *Entada*. MacDonald's notes, thus, indicate that *Cno Muire* was used for *Entada* in South Uist and Eriskay at least, and that *Airne Moire* was applied to several seeds including *Merremia*. Carmichael's information included *Caesalpinia* in *Airne Moire*, and entry 349 in MacDonald's manuscript refers to this species; "I have seen a smaller kind of nut from the sea not of a chestnut colour of the others, but grey with thick dark streaks upon it. It seemed equally hard, but too small to be ever very useful as a snuff box". A marginal gloss reading "Another kind is white" also indicates *Caesalpinia*.

William MacGillivray collected many drift seeds, mostly from the shores of Barra at the beginning of this century; his collection, preserved in the University of Aberdeen, is the most comprehensive collection of drift seeds obtained from beaches in western Europe. Some of his specimens are annotated with Gaelic vernacular names. *Caesalpinia* was labelled 'Virgin Mary's Nut or *Cno Muire*' by MacGillivray, and *Mucuna* was called *suil an assail* ('eye of the ass'). Margaret Shaw (1973) in a study of folk songs and lore from South Hist, stated that "there was a large glossy Mollucca bean called *Cno Mhuire* ... or Mary's Nut found in the sea-weed on the Atlantic shore ..." which she identified as *Entada gigas*. She also noted "another smaller bean ... found in the seaweed ... sometimes has a mark like a cross and is called *Airne Mhoire* or Mary's Kidney" which she identified as either *Mucuna urens* (*sic*) or *Dioclea reflexa*, though the seed marked with the cross is *Merremia*. MacNeill (1957) also said that *Airne Mhoire* had a faint cross discernable on it.

To summarise: *Cno Mhoire* was used for *Entada* (*fide* MacDonald, Shaw) and for *Caesalpinia* (*fide* MacGillivray), while *Airne Moire* appears to have been used for the smaller seeds (e.g. *Mucuna*, *Dioclea*, *Caesalpinia* and *Merremia*) indiscriminately. It does not seem correct to restrict the sobriquet 'Mary's Bean', or the more correct original Gaelic forms, to *Merremia discoidesperma* as is done elsewhere (Gunn 1977, Gunn & Dennis 1976, Nelson

1978). 'Mary's Bean' was a 'generic' name, not a 'specific' one, probably used for the smaller seeds that were used as amulets; *Cno Mhoire* (literally Mary's Nut) may have been restricted to *Entada* although MacGillivray's annotated specimen contradicts this. Both *Cno Mhoire* and *Airne Mhoire* are occasionally rendered as Virgin's Nut which is simply a shortened version of Virgin Mary's Nut.

Cno Moire, *Arna Moire* and *Tearna Moire* all refer to the Virgin Mary, an association which must be heightened by the occasional seed with indented cross. These Marian traditions recorded from the Outer Hebrides are probably linked to the predominance and persistence of Roman Catholicism on certain islands, especially Barra. Several writers noted that the use of drift seeds amulets was almost confined to Roman Catholics, though they do indicate that Protestants did sometimes use them (Campbell, 1860) despite the fact that the Protestant ethic (especially the Calvinist tradition, which is strong in Lewis and other parts of western Scotland) rejects idolatory and superstitions, and that these beliefs associated with these seeds would have been abhorrent to Protestants. The recorded Hebridean traditions clearly ascribe special significance to the cross-indented *Merremia* seeds, which are relatively rarer in beach drift than *Entada* or *Mucuna*; their less frequent appearance on our coasts may have intensified the mystical associations.

The "Virgin's Charm of Deliverance" (Fig. 6) obtained by Carmichael bears the legend

"A charm used by midwives and placed in the hand of the parturient woman, the midwife walking round her the while sunwise saying or chanting

Faic a Mhoire a bhean'us i eir fod a bhais

Faic fhein i Mhic oir's ann agad a tha

Comas a thoirst dh'a leanadh 'sa bhean a hhith slan

Behold Virgin the woman on the sod of death

Behold her thyself Son for thine is the power

To release the child and succour the woman."

Carmichael (1900) noted in *Carmina Gadelica* that the seed *Arna Moire* is "occasionally mounted in silver (Fig. 7) and hung round the neck as a talisman. Every nurse has one which she places in the hand of the woman to increase the faith and distract her attention. It was consecrated on the altar and much venerated". MacDonald (entry 347) also noted that the seeds "used to be blessed by the priest, and thereafter worn round the neck. I have seen one set in a silver band. They were put round the neck of a woman in travail". This tradition was first recorded by Morisone, who noted that *Mucuna* seeds "quhilk in old times woman wore about their necks both for ornament, and holding that it had the virtue

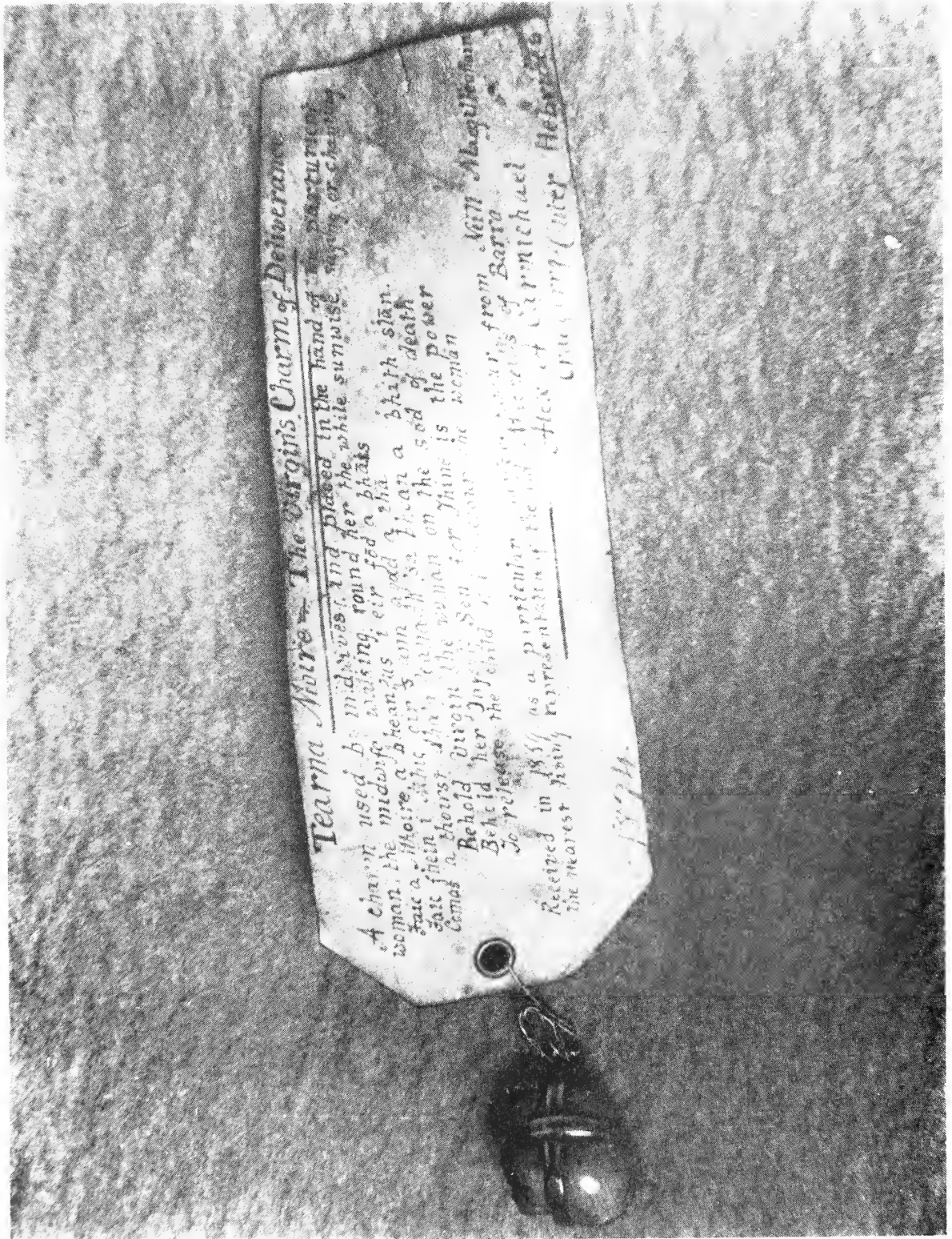


Figure 6.

The charm made from a seed of *Caesalpinia* given to Alexander Carmichael, with his annotated label. (Courtesy of the West Highland Museum, Fort William). For label details see page 49.

to make fortunate in cattle, and upon this account they were at the pains to bind them in silver, brass, or tinn, according to their abilities ..." (Morisone n.d.). Morisone also stated that "Sant Marie's Nutt, quhilk they did wear in the same manner, was held... to have the virtue to preserve women in child bearing". Shaw (1955) noted that "young women used to use it [*Airne Mhoire*] as a charm to guard virtue, and it was also held in the hand during childbirth". Marian MacNeill (1957) wrote that "a charm still used in the Hebrides is the *Airne Mhoire* (literally the Kidney of Mary) or the Virgin's Nut, on which the mark of a cross is faintly discernable. [*Merremia*]... Being very rare, they are highly prized. In the Roman Catholic islands they are often blest by the priest. The charm is used by women in childbed, the midwife placing it in the hand of the expectant mother, who clasps it tight in the belief that it will ease her pain and ensure a safe delivery". She also noted that a friend, a Roman Catholic, who lived in the Hebrides possessed a "Virgin's Nut on which a small silver cross had been mounted, and which had been blessed by a former bishop of the diocese". MacNeill (1957) related that in 1936, a young man arrived breathless at her friend's house and begged the loan of the seed. He explained that his wife was expecting their first child and was already in labour, and that the wife of one of his friends had died in childbirth; he was resolved to take no risks. The borrowed seed was safely returned with the news that the mother and baby were well.

One person who commented on the use of these charms to a midwife in the Outer Hebrides in the middle of this century, received the retort that "they were easier than bedknobs"!

As noted, there are no traditions like these recorded in Ireland, apart from the Tory Island superstition about barren couples. There is, however, a charm recorded from Connemara, which is similar to the Scottish one, but which is not associated with drift-seeds. It reads:

<i>"A Mhuire foir an bhean</i>	<i>"O Mary succour this woman</i>
<i>Ata in eagla an bhais</i>	<i>Who is in fear of death</i>
<i>Foir fein i a Mhic</i>	<i>Succour her thyself O Son</i>
<i>O is agat ata</i>	<i>Since it falls to thee</i>
<i>Baiste leis an ngein</i>	<i>Baptism for the birth</i>
<i>Agus tabhair an bhean slan"</i>	<i>And bring the woman safe".</i>
	(Hyde 1893).

OTHER MEDICINAL USES FOR HUMANS AND CATTLE

Other superstitions relate cures effected by drift seeds. Morisone (n.d.) said that the kernel of *Entada* was "an excellent remedie for the bloodie flux".

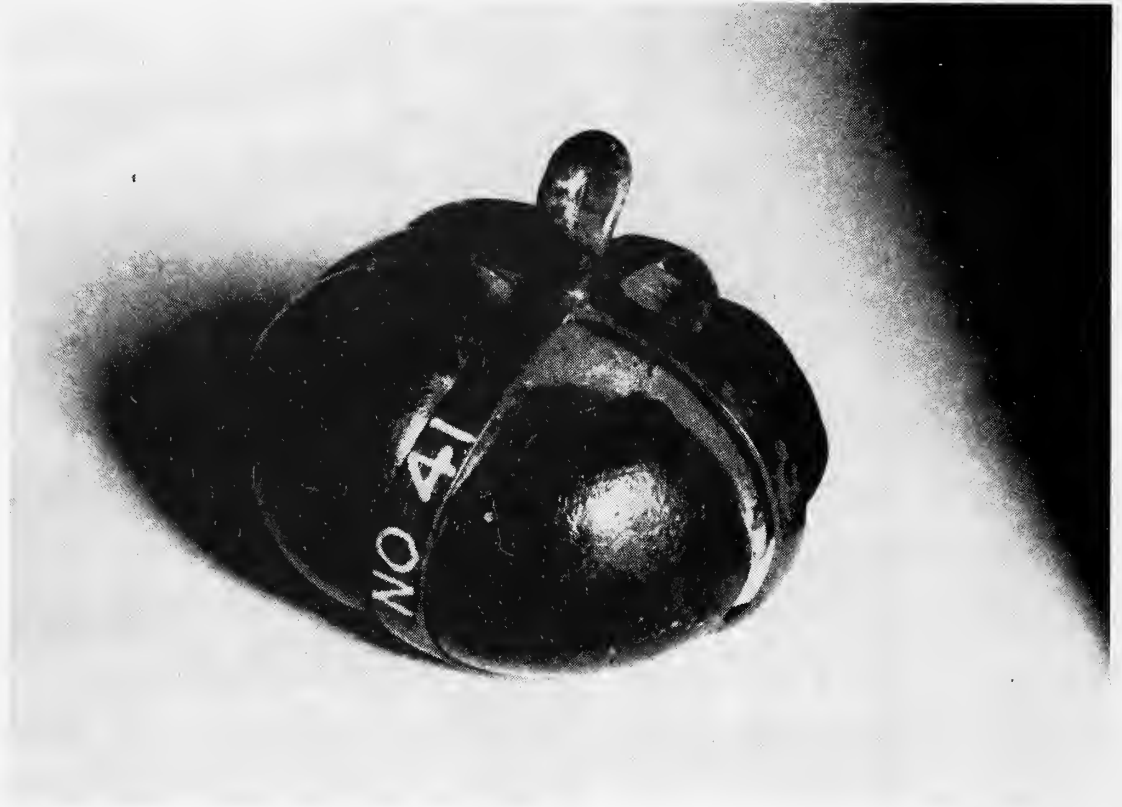
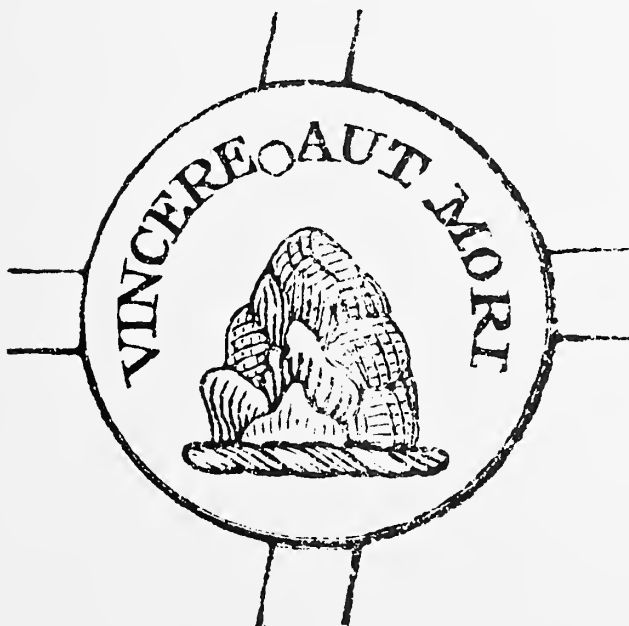
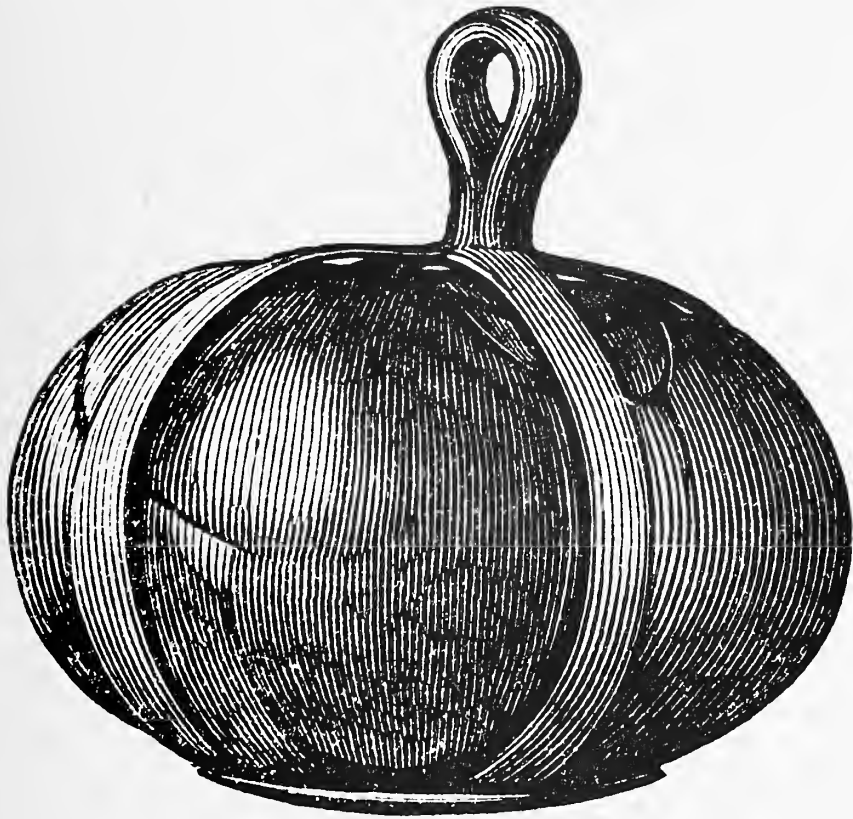


Figure 7.

Charm made from *Merremia* seed.
 (Courtesy of the Royal Scottish Museum, Edinburgh).
 (Also see Figure 8)

Figure 8. Charm made from *Merremia* seed, now in Royal Scottish Museum, Edinburgh. Engraving taken from Black (1893). "The silver mounting is probably of the last [i.e. 18th] century, and has engraved on it a Rock in the Sea, the cognisance of the family of Macneil of Barra, and the motto *Vincere aut mori*" (Black 1893). Other charms are illustrated in MacNeill (1957) and Close-Brooks and Maxwell (1975).

(Opposite)



Martin (1703) recorded that "Malcolm Campbell, Steward of Harries [sic] told me, that some weeks before my arrival there, all his cows gave blood instead of milk for several days together; one of the neighbours told his wife that this must be witchcraft, and it would be easy to remove it, if she would put the white nut, called the Virgin Mary's Nut, and lay it in the pail into which she was to milk the cows. This advice she presently followed, and having milked one cow into the pail with the nut in it, the milk was all blood, and the nut changed its colour to dark brown; she used the nut again, and all the cows gave pure good milk, which they ascribe to the virtue of the nut. This very nut, Mr. Campbell presented me with, and I keep it still by me". Drift-seeds are also supposed, in Scotland, toward off the "evil eye and prevent sickness" if hung above cattle in the byre. Gunner (1765) reported that *Entada* seeds were used "for curing cattle, hence the name bue-steen" (= cattle-stone).

In early botanical books, these seeds are listed as having various medicinal properties; *Entada* was one of the '*Fabae purgatrices*' noted by Monardes, and Oveido called *Merremia* 'Avellana purgativa'. These names indicate that early herbalists used the seeds as purgatives. In Nicaragua, *Merremia* seeds are used to cure snake bites and in Mexico to cure haemorrhoids (Gunn 1977). Most of the seeds have at some time been attributed with medicinal properties, including *Entada* (contraceptive and fertility stimulant). In South Africa, the powdered kernel of *Entada* taken in water was believed to cure cerebral haemorrhage and of *Caesalpinia* to relieve infantile convulsions (Muir 1929).

Dr. Stewart (Black 1893) noted that when seeds were used to remedy "infantile disorders, such as teething ... a small hole is drilled through either end, and the seed suspended round the child's neck by a cord".

Various correspondents in Ireland and Scotland recently volunteered to this author information relating to traditions about seeds changing shape and colour. Seeds as durable as these do not alter shape or colour, yet these correspondents felt obliged to point out that specimens in their possession had not changed their appearances.

Finally, Martin (1703) noted a tradition that "Molluka Beans ... were used as Amulets against Witchcraft, or an Evil Eye, particularly the white one [*Caesalpinia*]; and upon this account they are wore about Children's Necks, and if any Evil is intended to them, they say the Nut changes into a black colour. That they did change colour, I found true by my own observation, but cannot be positive as to the cause of it".

Today drift seeds have lost many of their associated superstitions, in western Europe at least. It is still felt it is lucky for a person to find a 'sea-bean' but the luck is now more a matter of chance as these seeds are so infrequent on our shores. Many correspondents in Ireland and Scotland commented to this author that the seeds were more common in beach debris in the past. It seems probable that this is due to reduction in the extent of their native habitats due to developments in the West Indian Islands, rather than to any change in ocean currents or beach-combing activities in Europe.

Tailpiece

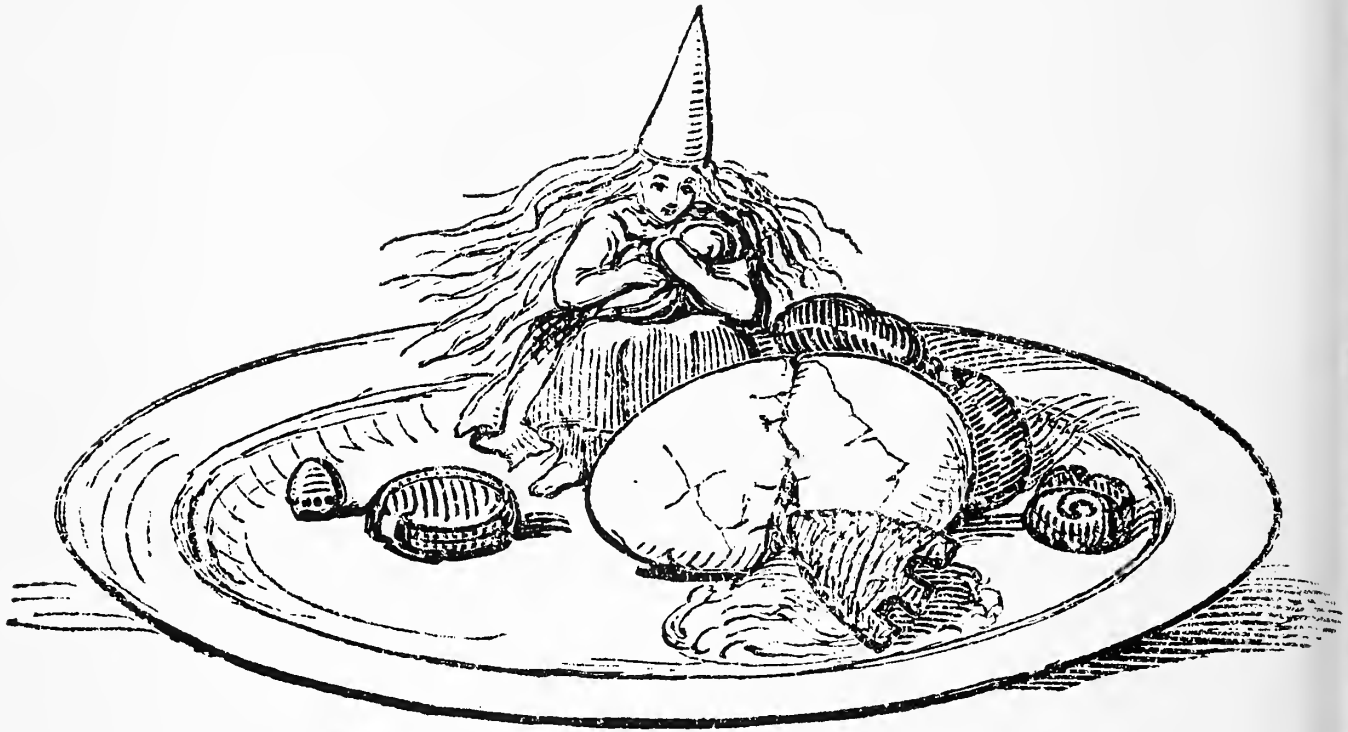
In 1860, J.F. Campbell published *Popular Tales from the West Highlands* in which he expounded, among other things, on "Fairy-Eggs";

"On the stormy coasts of the Hebrides, amongst sea-weed and shells, fishermen and kelp-burners often find certain hard light floating objects, somewhat like flat chestnuts, of various colours - grey, black and brown, which they call sea-nuts, strand-nuts and fairy-eggs. Where they are most common, they are used as snuff-boxes, but they are also worn and preserved as amulets, with a firm or sceptical belief in their mysterious virtues... Practical Highlandmen of the present day call the nuts trash, and brand those who wear them, like their ancestors a hundred and fifty years ago, as ignorant and superstitious; but learned botanists, too wise to overlook trifles, set themselves to study even fairy-eggs; and believing them to be West Indian seeds, stranded in Europe, they planted them, and some (from the Azores) grew. Philosophers, having discovered what they were, used them to demonstrate the existence of the Gulf Stream, and it is even said that they formed a part of one link in that chain of reasoning which led Columbus to the New World.

So within this century, men have gathered nursery tales ... they planted them in books, and at last the Brothers Grimm, their predecessors, and their followers, have raised up a pastime for children to be 'a study fit for the energies of grown men and to all the dignity of a science'.

[*Popular Tales from the West Highlands*] is intended to be a contribution to this new science of 'Storyology'. It is a museum of curious rubbish about to perish, given as it was gathered in the rough, for it seemed to me as barbarous to 'polish' a genuine popular tale, as it would be to adorn the bones of a Megatherium with tinsel, or gild a rare old copper coin... Practical men may despise the tales, earnest men condemn them as lies, some even consider them wicked;...my best friend says they are all 'blethers'. But one man's rubbish may be another's

FAIRY EGGS.



FAIRY. IV

Figure 9.

The fanciful tail-piece from Volume Four of J.F. Campbell's
Popular tales of the Highlands. It is said to show four
'fairy eggs' or drift-seeds!

(Enlarged)

treasure, and what is the standard of value in such a pursuit as this" (Campbell, 1860: Vol. 1, pp. ix-xi).

His fourth volume ended with a decorated tailpiece, showing "four fairy-eggs".

Acknowledgements

Over several years, many people have assisted with this research; to all who gave help I am most grateful. My special thanks are due to John Dennis whose interest in drift-seeds stimulated me, and who has continually encouraged and assisted me in my work. I am indebted to the Rev. Dr. A. Griffin and to Dr. Bertel Hansen for their translations of Latin and Danish texts, and to Donal Synnott for assistance with Gaelic language material.

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Postscript

Since completing this paper, I have been fortunate to obtain, through the kind co-operation of Dr. Ken Gosner (Newark, U.S.A.) and friends in Cornwall, a fine snuff box made from an *Entada* seed. It is unusual in having a silver lid. The box is shown in Figure 10 (overleaf). Also, Dr. Norman Hickin succeeded in purchasing several vesta cases made from *Entada* seeds. Those which I have seen have steel lids with a striking surface, and appear to date from the last half of the nineteenth century.

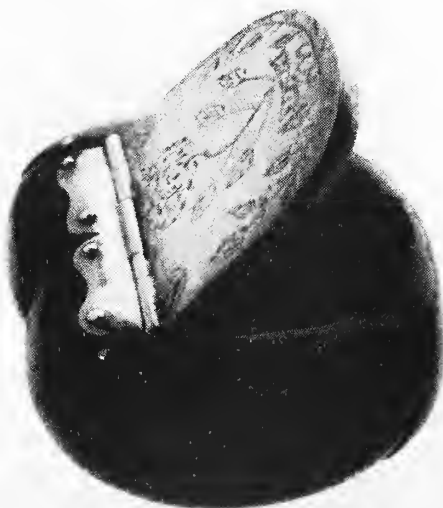


Figure 10.

Snuff box with silver lid, perhaps dating
from eighteenth century. (Author's collection).

Slightly enlarged,

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ON THE BREEDING OF THE NORTH AMERICAN WILD TURKEY IN THE CLYDE FAUNAL AREA

By J.A. GIBSON

Scottish Representative,

Society for the Bibliography of Natural History

Introduction

In the second volume of *The Birds of the Western Palearctic* (Cramp, Simmons *et al*), published in 1980, the North American Wild Turkey *Meleagris gallopavo* is briefly mentioned, with a note that there were "various attempts made in last 100 years to naturalize in Britain, West Germany, Austria, Czechoslovakia, and Latvia (Fitter 1959; Glutz *et al.* 1973)." An introduction to lower Austria is said to have "flourished ... from 1880 to 1940s, though soon declined when protection and artificial feeding ceased in Second World War (last record 1947)". The authors go on to say that "all other introduction attempts failed within much shorter periods".

It may therefore come as a considerable surprise to some ornithologists to discover that the Wild Turkey was introduced to the Clyde area around the middle of last century, and bred successfully for some three-quarters of a century before dying out in the early 1920s. Indeed, there is good reason to believe that the Wild Turkey bred in the Clyde area for longer than anywhere else in the world outside its natural home in North America. Birds were successfully introduced to estates in the Ardlamont, Poltalloch, and Inveraray districts of Argyll, to Rosneath in Dunbartonshire, and to Rosdhu estate on Loch Lomondside. In addition, Turkeys wandered widely and also established completely independent feral breeding populations in various other places.

Over the years it has been my experience that bird information from the West of Scotland has often been overlooked in national surveys, so it will probably be useful to place a summary of the salient facts on record.

Ardlamont

In volume two (1875) of the *Proceedings of the Natural History Society of Glasgow* Mr. John Gilmour gave a detailed account of the introduction of the Wild Turkey into his estate in Argyll from 1866 onwards. In his own published paper (read in January 1870) Gilmour himself did not actually specify by name the exact district of Argyll involved, presumably because it was

already well known to everyone interested that he owned the Ardlamont estate in Cowal (ownership recently corroborated by examination of contemporary Argyll county records), but Robert Gray, writing in 1871 before Gilmour's own account was actually published, was quite specific, and confirmed the district as Ardlamont. Gilmour's account is extremely interesting, which it is worth quoting virtually in full, as follows:

"The subject of acclimatization is one which interests nearly every one, but more especially the members of a Society such as this, and all the more when the object of that acclimatizing is one likely to prove useful as well as ornamental. I shall therefore take the liberty of reading a few remarks concerning 'The Wild Turkey of North America', as seen nearer home, namely, in Argyllshire.

In the summer of 1866, a friend sent us three Wild Turkeys, one male and two females, caught in the woods near Sarnia, at the most southerly extremity of Lake Huron in Canada. They had been captured when quite young, and would be a little over two years old when they arrived in this country. They came home in one of our own ships and arrived in splendid order, having apparently thriven well on the sea-voyage.

The different characters of the sexes were very marked, for while the cock tried all in his power to get a dab at you with his beak, or a dig at you with his long spur, the hens were of the most timid, shy, and retiring disposition; and while the cock strutted up and down behind the wooden bars of their house with feathers all set up and evidently in very irascible mood, the hens kept in the back ground, and by low chucks seemed to try to quiet their lord's excitement. Finding the cock too dangerous to trust with his liberty, we enclosed a run for them with wire, with a house for shelter at one end supplied with a roosting pole.

That season the hens laid well, but being late in the year we did not set any eggs. The eggs are a shade smaller than the Common Turkey's eggs, and generally more distinctly marked, although the colouring varies greatly. We then, after the fall of the leaves, when we thought we could better keep our eye on them, let the birds out of confinement; the cock behaved very well for a short time, but fell into bad ways, and after he had decapitated several fowls of one kind and another, we were compelled to put him once more under lock and key.

Next summer the hens laid splendidly, and we had a fine flock of about twenty young birds, brought out under common hens, of which seventeen reached maturity. These young birds, though thus domesticated, showed their wild nature thoroughly, and never

would go under a roof, always roosting on the trees. A pair of these young birds was given to a gentleman in Argyllshire [Colonel Malcolm of Poltalloch estate, near Crinan], with whom they have done very well, as he had seventeen young Wild Turkeys the first year. Another pair was given to a friend in Mid-Lothian, with whom they were not quite so successful, the situation not being so suitable and the birds more disturbed, but still I am glad to say they have done well enough to allow of the hope of some of their progeny being turned out next season in suitable coverts in Kinross-shire. A young cock of this flock (that of 1867), which we still have, and which has never been in confinement, rivals his parent in plumage, size, and almost in wildness; having a free run on the open, his magnificent bronzed feathers show in the sun to greater advantage even than those of the old bird.

With these exceptions the rest of these birds were used for table, for which purpose they had to be shot, that being the only way to get hold of them. On the table some hold them to be more delicate than the Common Turkey, though they do not differ much from it; this may be owing to some extent to their being fed on Indian corn and Indian meal, the same as the rest of the poultry, and not depending altogether on wild food as they do in their native woods, where their flesh naturally has a slightly gamey flavour.

A high precipitous rock, standing peculiarly on the level grounds beside the house, crowned on the summit with a dense growth of ivy and overshadowed by a tree, attracted the attention of one of the hens; and in the summer of 1868, the hens having been let out of confinement for a change, one of them nested in the very centre of this bunch of ivy. Her mode of getting upstairs was original, and displayed her wild cunning, for she first of all got into the tree, and going along a branch that overhung the rock, let herself drop on to her nest; when on her nest not a vestige of her could be seen, and it was some time before her hiding-place was discovered. When the young birds came out the difficulty was to get them on to 'terra firma', so the keeper climbed up and brought the little things safely down, but the old hen would not then look near them, and took off to the thicket like a wild thing; fearing the young birds would perish, the keeper managed to capture the hen and put the young birds in beside her, but she was so violent that she trampled several to death, and the covey was becoming beautifully less before she condescended to care for her reduced family.

Our experience has been that during hatching time, since these birds are very wild, their nests should not be approached or disturbed in any way, otherwise the chances are they will forsake

them. Besides the casualty above mentioned, the young birds seemed more difficult to rear, and our flock in 1868 was consequently a small one.

This last season (1869), the hens were also allowed to be at large, but their first eggs were taken from them and set under common hens, and the result of these settings is about eight young birds reached maturity; but the Wild Turkey hens, their feelings evidently outraged, disappeared for a long time, when one was discovered on her nest, but nothing was seen of the other till both hens appeared with about a dozen chickens each. Though late birds, luckily our fine summer favoured them, and with only two or three deaths in each brood these careful mothers have brought them all up safely, proving how much better nature manages these things than man even with all his appliances.

These broods have been objects of great interest to us all the season, for though coming daily near the house to get their accustomed pick, the hens have kept them almost exclusively in the woods, bringing them on to the small grass paddocks at the edges of the coverts to enjoy the sunshine and feed on the insects, etc. While the young birds were thus busily engaged, the old hen would stand like a sentinel in the midst, her neck stretched to its full extent and her head turned sharply from side to side, while with her quick keen eye she watched, not only her brood, but also for any approaching danger. If you approached near, and there was not sufficient cover for her to hide in, she crouched almost level with the ground with her head and neck stretched out straight in front of her, and, at a warning chuck from her, the young ones disappeared as if by magic, and were by no means easy to discover in the tufts of grass, etc., in which they had taken refuge. We have, in shooting, several times come across these birds on the heather hill above the coverts, and several times beat them out of the woods; and though the joke is becoming a little old, it is no unusual thing for the beaters, after their usual cautionary cry of 'mark', on any game rising, instead of the expected 'woodcock', 'hare', or 'rabbit', to call out 'wild turkey!' and it was only the other day that, infiring at a rabbit in the covert, it was found that I had shot a young Wild Turkey, so that if this goes on it will be necessary to get a new column added to the game-book.

Our coverts being chiefly natural wood, such as birch and hazel, and for the most part unenclosed, are not so well adapted for these birds; but in extensive enclosed woods I have no doubt they would do well, and I am happy to say that there is every chance of their being introduced into the fine old woods of Inveraray, where, if anywhere, they ought to succeed. I should consider that with very much the same feeding as given to Pheasants they should

thrive well, though I have been informed that Lord Ducie introduced them into his coverts in Gloucestershire, but found they drove off his Pheasants. If this be the case (and there is no doubt the cocks are very pugnacious) it will go greatly against their extensive introduction, more especially as, except as a mark for the pea-rifle, there can be but little sport got out of the Wild Turkey in our comparatively small woods.

In comparing this bird with our own breeds of Norfolk and Cambridgeshire Turkeys, we find it to be of much the same size as the average of these birds; it stands higher on its legs than the domesticated bird, and is of far finer, or, as we might call it, more 'gamey' shape; especially is this noticeable in the head, which is most symmetrical and very small, with a wonderful, bright, sharp eye. The legs are a dull red, and those of the males are furnished with most formidable spurs. The plumage of the cock is of the most perfect bronze colour, and when the sun shines on the bird his feathers fairly gleam again like a splendid coat of mail. From his breast hangs a handsome tassel of 'hair', or hair-like feathers. The only feathers in the bird approaching dulness are those of the wing and tail, which are of a mottled brown and white. The plumage of the female is duller than that of the male, but differs in no other respect. These birds lay sixteen to twenty eggs before sitting, and take thirty-one days to hatch their eggs. Formerly they were very plentiful in Canada, west of Toronto, but now are becoming extremely rare, and are met with in the greatest numbers in some of the least settled of the Western and Southern States.

.....The domesticated bird differs from the nearly allied wild species in having a largely developed dewlap extending from the base of the under mandible down the fore part of the neck to its base. It cannot yet be said to be a settled question as to the precise original stock from which the valuable barndoor breeds have descended".

As far as can be ascertained, the Ardlamont Turkeys appear to have spread quickly and widely throughout the Ardlamont peninsula of Cowal, from Ardlamont point to about as far north as Strachur, where there was ultimately a well known feral population (Duncan Colville, pers. comm.), although whether this arose primarily from the Ardlamont birds or, equally likely, from the Inveraray stock just across Loch Fyne, is not known.

Possibly surprisingly, however, in view of the Turkey's strong powers of flight when genuinely disturbed, there do not appear to have been any recorded instances of Turkeys moving from Ardlamont to the immediately adjacent Island of Bute (J.M. McWilliam, pers. comm.). Certainly the Bute estate records give no indication that any Wild Turkeys were ever actually introduced

to Bute (Marquess of Bute, pers. comm.). This also is a little surprising, in view of the Bute family's record of introducing various foreign species, including Beavers, Kangaroos, and several varieties of pheasants, to the island during the 1870s (Gibson 1970, McWilliam 1927).

Poltalloch

The young Turkeys given by Mr. Gilmour to Colonel Malcolm of Poltalloch in 1867 marked the start of a very successful introduction to the Poltalloch estate. In 1892 Harvie-Brown and Buckley documented the progress of the introduction as follows:

"American Wild Turkeys were introduced to Poltalloch in the seventies of the present century [actually 1867], as we are informed by Colonel C.W. Malcolm (*in litt.* 5th February 1892), and the following notes are quoted from his letters. Since their first introduction Colonel Malcolm has renewed the blood frequently - 'getting a pair last year and another pair this year, besides on other past occasions which I have no note of. I obtained them through General Hassard, C.B., R.E., who is a great authority on poultry, and who was long in Canada, and has trustworthy friends there, and who passes mine before they come to Scotland. At present they are for the most part drawn into a wood close to the keeper's house at Poltalloch, and you would find it a pretty sight if you paid them a visit. They will begin to scatter soon. Lord Lorne, after his tour in Canada, brought some Turkeys (wild) to Inveraray, but whether they have kept them pure or not I cannot say'.

About 200 of these birds prove the successful introduction to the Poltalloch woods, where there are now many acres of suitable wood for their necessities. About twenty or thirty are shot at Christmas-time in each year, and they are usually killed by stalking with a pea-rifle" (Harvie-Brown and Buckley 1892).

In his two well known books (1900, 1914) largely concerned with shooting and fishing around the Poltalloch estate in mid-Argyll, the Hon. A.E. Gathorne-Hardy (Colonel Malcolm's brother-in-law) gave several notes on the Wild Turkey, e.g.:

"Presently twelve black objects are seen crossing the field below in line, which I can recognise with the naked eye for a flock of the wild American turkeys which have been introduced into the locality and thriven fairly well. Fine handsome fellows they are, with their glossy metallic plumage, and cinnamon wings and tail, but disappointing from a sporting point of view. It is almost impossible to persuade them to fly; but when they do, they look grand, swooping over your head from some woody bank above you, with hardly a motion of their great wings. It is, however,

rather amusing sometimes to stalk them and shoot them, with a pea rifle, through the head or neck; to hit them anywhere else would be too easy for sport, besides spoiling the meat. Once fairly alarmed they seem to have discovered the secret of perpetual motion, and it is no easy matter to get a second tolerably easy shot. Their principal merits are that they are excellent birds for the table, and a great addition to the landscape.

This time I do not watch them for long, for I can study them at leisure at home from the window of my room. Never were there birds of more regular habits. The city clerk watching for his daily omnibus does not appear on the same place at the same time with more certainty. Unless something startling has happened to alarm them, you might safely set your watch by their movements, as they stroll along in line, morning and evening, picking the grass seeds as they go, with a rapid motion of head and neck which I have timed to take place a little more than a hundred times a minute" (Gathorne-Hardy 1900).

The period under discussion by Gathorne-Hardy ranged from around 1867 until shortly before the start of the second world war in 1914.

It is as well to state here that R.S.R. Fitter, in his otherwise excellent book *The Ark in our Midst* (1959), unfortunately confused the introductions to Ardlamont and Poltalloch, and mistakenly amalgamated (under Poltalloch) these two quite separate estates. The true facts are as given above.

Inveraray

In the early 1880s two quite separate introductions of the Wild Turkey were made by the Duke of Argyll, to his estates at Inveraray and also at Rosneath (Dunbartonshire). This was at the time when the Duke, as Marquess of Lorne, was Governor-General of Canada, and coincided with his introduction of other Canadian species, such as the Moose *Alces alces*, Beaver *Castor canadensis* and Canada Goose *Branta canadensis* to the Inveraray estate (Duke of Argyll, *in litt.*; Gibson 1976).

Earlier, Gilmour (1875) had indicated that introduction of the Wild Turkey to Inveraray was being considered around 1870, as follows: "I am happy to say that there is every chance of their being introduced into the fine old woods of Inveraray, where, if anywhere, they ought to succeed". I have been quite unable, however, to establish whether or not this proposed introduction ever took place. There appears to be no indication of this in the Argyll estate registers for the relevant period (Duke of Argyll, *in litt.*), so in the absence of any positive evidence to the contrary, the 1880s introduction must, at least in the mean-

time, be regarded as the first.

At any rate, the introduction to the Inveraray estate from the early 1880s onwards was certainly a very considerable success. Several quite distinct importations of fresh stock took place over a number of years, and birds were introduced to widely separated parts of the Inveraray estate (Anon. 1899, 1900, 1902; Dugald Macintyre, pers. comm.). By 1899 the Inveraray Turkeys were said to have "bred with remarkable rapidity and spread over almost a fourth of the county already. They are seen in hundreds about the woods of the Duke, and they are to be met with on the verge of Breadalbane". Anyone "who never heard of Wild Turkeys in the Highland woods is naturally astonished to ... see great coveys of the big birds in places far removed from houses". All this was certainly true. The local territory seemed to be particularly suitable and the initial spread, especially northwards, was rapid (Dugald Macintyre, pers. comm.).

Wild Turkeys, obviously from the Inveraray introductions, were soon well known in all suitable territory up to Taynuilt, and early on it was also evident that feral breeding populations, apparently quite separate from the main stocks, were getting established in several places. One particularly well known feral breeding population, which persisted until the early 1920s, was on Loch Awe side. Another was across Loch Fyne, near Strachur, which it was presumed had got established by birds from both the Ardlamont and (mainly) Inveraray introductions, since its existence was not known until about the mid-1880s (Dugald Macintyre, pers. comm.).

Rosneath

Also during the 1880s, at the same time as the introduction to Inveraray, Wild Turkeys from Canada were introduced to the grounds of Rosneath Castle, at that time a favourite home of the Argyll family. With artificial rearing and protection they rapidly increased in numbers, and in 1902 "flocks of Wild Turkeys" were said to have "prospered for some time on the Duke's Rosneath estates" (Anon. 1902). The Turkeys steadily moved away from the Castle policies, and eventually spread over virtually the entire Rosneath peninsula and around the west side of Loch Lomond, to join with the Turkeys which had earlier been introduced to the Rosdhu estate (see later).

Kintyre

It is perhaps as well to state that there seem to be no known records of the Wild Turkey from Kintyre. Birds from the Argyll introductions appeared to spread north fairly readily, but not apparently to the south. Introduction to Kintyre was actually

seriously considered at one time. Duncan Colville told me that in the 1880s his father, and other Kintyre landowners, had contemplated introductions with birds offered from the Inveraray and Paltalloch stocks, but in view of the lack of 'sporting' game shooting interest it was eventually thought not to be worth the effort of rearing.

Loch Lomond

Wild Turkeys had been known on Loch Lomondside from at least the early 1870s. The well-known sportsman/naturalist John Colquhoun, in his *Lecture on the Ferae Naturae of the British Islands* (1873), wrote "Wild Turkeys, imported in the egg from America, frequently adorn our extensive preserves, where the rollicking shout of an old gobbler, more familiarly associated with a farmyard, sounds strangely out of place from the midst of an impenetrable thicket. These turkeys are unwilling to take long flights, and prefer to seek safety among the high branches of tall trees. The eggs are bought from Indians, who sell them to traders of this country; and the birds have the real 'gaimy' flavour, much superior to home-fattened ones".

It has always been assumed that this statement was intended to refer to the Colquhoun family estates (Rossdhu) on Loch Lomondside, but positive confirmation of this, plus evidence that there were Wild Turkeys on Loch Lomondside well before the carefully documented introduction to the Ardlamont district of Cowal in 1866, has now been found in an earlier article by John Colquhoun, recently 'rediscovered', and I am grateful to Mr. John Mitchell, Senior Warden of the Loch Lomond National Nature Reserve, for drawing this to my attention. In a popular article, entitled "A Skye-Lark", published in 1862, John Colquhoun wrote as follows: "That magnificent game-birds have been lately introduced is no doubt deeply interesting to the naturalist; but somehow he associates them with the countries from whence they came, and feels inclined to regard them as exiles. The gobble of the wild turkey-cock among the remote copses and tangled coverts of Rossdhu, does away for a moment with the broad Atlantic, and transports the listener to the American backwoods. These beautiful birds, nearly the size of a Norfolk turkey, are of a rich bronze colour, shining like gold in the sun; when disturbed they run into thick wood, or fly for refuge into trees".

Wild Turkeys, therefore, were evidently present at Rossdhu and well known to John Colquhoun by 1862, so presumably had been introduced to the Rossdhu (Loch Lomond) estate some years previously. There is also some additional confirmatory circumstantial evidence. In conversation during the early 1950s, Dugald Macintyre (died 1957, aged 87) told me that he had been told by his father

(also Dugald Macintyre, 1826-1913, and fifty years in the service of the Duke of Argyll, eventually as Head Gamekeeper) that Wild Turkeys had been introduced to Loch Lomondside well before the Argyll introductions. Dugald Macintyre senior was appointed an assistant gamekeeper in 1842, when aged sixteen, and said that he saw his first Wild Turkey in his early twenties (before he got married) on a visit to the Loch Lomond estates. This would place the time of introduction to Loch Lomondside at least around the middle of the 19th century.

At the time I presumed that the elder Dugald Macintyre had simply confused these early Wild Turkeys on Loch Lomondside with the Duke of Argyll's later introduction of the Wild Turkey to Rosneath (Dunbartonshire) in the early 1880s, but I should have known better. The recollection of Dugald Macintyre was crystal clear, and the dating of events by the known circumstances of the Macintyre family was later confirmed for me by Mr. Duncan Colville, the distinguished Argyll historian.

I now realise that the elder Dugald Macintyre's recollections were obviously perfectly correct and entirely in line with the 1862 article by Colquhoun, recently rediscovered. Moreover, John Colquhoun wrote many things on natural history other than his well known books, so it may well be that an even earlier note about the Wild Turkey on Loch Lomondside may yet turn up.

Other Macintyre Recollections

The personal recollections of Dugald Macintyre (born 1870, died 1957), based on his own experiences and on what he was told by his fellow gamekeepers, are very relevant and interesting. According to Dugald Macintyre (pers. comm.), the Wild Turkeys were reared by the various estates more or less like Pheasants, with protection and artificial feeding put out each year. The main density of Turkeys continued to exist closely around the large estates of Ardlamont, Poltalloch, Inveraray, Rosneath, and Rosdhu, but it is also important to realise that Turkeys wandered away very readily and eventually were widely, and in some places commonly, distributed over an extensive area of Clyde and beyond. Indeed, a glance at a map will show that the five known points of introduction, by chance rather than design, could hardly have been better chosen to allow the separate breeding populations, with even a little spread, to coalesce over virtually the entire area.

This is apparently precisely what did happen, and by the mid-1890s the Wild Turkey was widespread and breeding successfully, in estate supported or local feral populations, in practically all suitable places over an extensive area between Rosneath to Crianlarich on the east and Tarbert to Taynuilt on the west. This

was the area of really dense population. There did not appear to be any Kintyre records, but birds seemed to spread north quite readily and were occasionally reported even as far north as Fort William. These wandering birds also established feral breeding populations in several places totally independent of their parent estates; particularly well-known feral populations, thriving very successfully apparently well away from artificially reared birds, were near Strachur and on Loch Awe side.

The Turkeys in the neighbourhood of the big estates were occasionally the subject of organised shoots for guests, but unlike Pheasants, Turkeys were very difficult to drive to the guns so Turkey shoots were not a great success, and ultimately were only arranged very occasionally, as a novelty. Turkeys required for the pot were usually shot as needed from the local flocks by the gamekeepers using shotguns or occasionally small-bore rifles.

The known colonies of feral Turkeys, however, were a very different matter altogether. The birds were totally wild, often very difficult to find, and completely unapproachable. They had to be carefully stalked, and only a rifle could be used; shotguns were quite useless. These feral colonies were usually only shot by mutual invitation among the gamekeepers of the various estates, as a challenging sport, although occasionally some of the estate guests would come on a special trip to test their marksmanship. Dugald Macintyre shot his first feral Turkey in 1889, as a young assistant gamekeeper of nineteen; he shot many on invitation shoots during the 1890s and in the early years of this century, and the last one he shot was when he returned after the first world war, in the early 1920s (Dugald Macintyre 1948, 1949, and pers. comm.).

The Last Turkeys

As previously mentioned, the Wild Turkeys did not present the same opportunity for 'sporting' shooting, as for example did Pheasants, so in this respect were disappointing and eventually ceased to be part of active estate management. As Gathorne-Hardy said (1900), Wild Turkeys were "excellent birds for the table, and a great addition to the landscape" but for this purpose large populations were not required, and intensive artificial feeding had largely ceased by the turn of the century (Duncan Colville, *in litt.*). With the absence of most of the gamekeepers during the first world war, all rearing and artificial feeding was completely abandoned and there was a rapid decline in the estate supported birds, many of which were also understandably poached by local people during the first world war food shortages. Virtually none of the estate birds seems to have survived the

period of the 1914-1918 war.

With regard to the feral populations, the late Duncan Colville, doyen of Argyll naturalists, who shot and fished throughout the whole of Argyll for nearly eighty of his ninety-six years, told me in 1964 that as far as he was aware the last Turkey shot in Argyll was in 1923. In 1919 and 1923, as a guest of the Duke, Duncan Colville went on two Turkey shoots to Loch Awe side, apparently the only remaining colony of Wild Turkeys then known; only rifles were used, and each shoot took the form of a careful stalk. In 1919 several birds were shot, but in 1923 only two birds (both cocks) were seen, one of which was shot by one of the gamekeepers. Earlier, Mr. Colville had also been shown a cock Wild Turkey shot on Loch Awe side in 1911 by his friend Mr. Charles Alston of Letterawe. C.H. Alston, incidentally, was also a well known West of Scotland naturalist who wrote a popular book on sport and natural history in the West Highlands (Alston 1912). This 1911 Wild Turkey was stuffed and on display in Letterawe House for many years.

In his unrivalled knowledge of Argyll local history and natural history, Duncan Colville knew of no specimen of the Wild Turkey having been shot or seen after 1923, so the last remaining population presumably died out around that time.

Clyde Bird Books

To the best of my knowledge, the foregoing facts appear to be all the information which can now genuinely be obtained about the history of the Wild Turkey in Clyde, and no additional details are available in any of the standard works on Clyde birds published over the years.

The account of the Wild Turkey in Robert Gray's notable and contemporary work on *The Birds of the West of Scotland* (1871) is disappointing. Gray clearly regarded the Wild Turkey merely as an introduced bird. He simply mentioned it in passing and contented himself with paraphrasing the account by John Gilmour of the introduction to Ardlamont from 1866 onwards. This is particularly unfortunate, for Robert Gray was exceptionally well informed, and, if interested, could almost certainly have provided significant details of the earlier introduction to Loch Lomondside, which we now know took place.

It is also worth noting in passing that Robert Gray provided the first published account of the Ardlamont Turkeys. Gray took his information from Gilmour's paper read to the Natural History Society of Glasgow on 25th January 1870, but Gilmour's paper was not actually published until 1875, when volume two, part one, of the Society's *Proceedings*, covering the years 1869-1870, was

issued to members.

John Paterson (1901) certainly knew of the Wild Turkeys, by now well established in various parts of the Clyde area, but like Robert Gray before him Paterson simply regarded the Wild Turkey as an introduced bird, and for this reason alone (J.M. McWilliam, pers. comm.) he excluded it from his Clyde bird list prepared for the 1901 British Association Handbook. The Wild Turkey was also excluded from McWilliam's book (1936), but for a very different reason.

In *The Birds of the Firth of Clyde* (1936) the Rev. J.M. McWilliam had originally included the Wild Turkey, plus the Canada Goose and a great deal of other additional information, but the expense of publication eventually necessitated very considerable pruning and H.F. Witherby, McWilliam's old friend and also his publisher, ultimately had to make drastic cuts in a final attempt to achieve publication at a realistic price. It is perhaps unfortunate that the Wild Turkey and other introduced birds were not relegated to the Appendix, but this Appendix was confined to 'escapes', and at the end of the day 'introductions' were omitted altogether. Mr. McWilliam eventually passed on to me the manuscript of his original draft of *The Birds of the Firth of Clyde*. His history of the Wild Turkey commenced with the Ardlamont introduction of 1866, although he did note the introductions made to all the other Clyde estates, and emphasized that by the turn of the century the Wild Turkey was breeding extensively throughout the Clyde area from Loch Lomond to Loch Awe.

The facts then known about the Wild Turkey in the Clyde area were summarised in the paper on the breeding birds of the Clyde area (Gibson 1958), and in the *Supplement to the Birds of the Firth of Clyde* (Gibson and McWilliam 1959). The Wild Turkey was also listed for Knapdale, Upper Loch Fyne, Cowal, Dunbarton and Loch Lomond in the two editions of the *Regional Check-List of Clyde Birds* (Gibson 1960 and 1981), so it is perhaps a little unfortunate that all these sources were apparently overlooked both by Fitter's book on introduced species (1959) and in the preparation of the relevant section of *The Birds of the Western Palearctic*.

Audubon

As is well known, the male Wild Turkey, entitled 'Great American Cock', appears as the justly famous plate number one in John James Audubon's magnificent colour-plate work on *The Birds of America*. Possibly less well known, however, is the fact that this plate was actually engraved in Scotland, by W.H. Lizars of Edinburgh in 1826. The headquarters of the Scottish Natural History Library, the national collection of Scottish natural history books and journals, is also in the Clyde area, where the Amer-

ican Wild Turkey apparently bred for longer than anywhere else in the world outside its natural home in North America. It is probably very fitting, therefore, that a magnificent original plate of Audubon's Wild Turkey is on permanent display at the Library entrance.

Conclusions

In summary, from around 1850 until the mid-1880s the Wild Turkey was introduced to at least five separate estates throughout the Argyll and Dunbartonshire parts of the Clyde faunal area. During this time there were several importations of fresh stock, but I have been unable to trace any further introduction which took place after 1890.

With artificial rearing and feeding, these populations increased very substantially, rapidly coalesced, and soon spread to neighbouring and more distant areas, where apparently genuine feral breeding got established and continued for many years. In fact, by the early 1890s, in estate supported or feral populations, there was a virtually continuous breeding population of Wild Turkeys in the Clyde area from the Rosneath peninsula, along Loch Lomondside, throughout Cowal, Knapdale, and Upper Loch Fyne, up to Loch Awe, and in some areas it may not have been easy to say where the estate flocks stopped and the feral breeding populations started.

Unfortunately, lack of interest in the Wild Turkey as a sporting game bird apparently led to the cessation of most artificial support by the turn of the century, and with this, plus fairly intensive pursuit, the population of the estate supported birds steadily dwindled. The very marked reduction of active estate management during the period of the first world war saw the virtual end of the artificially supported populations, and the remaining feral populations finally appear to have died out in the early 1920s.

Although at the time it may have seemed clear that some populations were truly wild, living what appeared to be a completely separate existence away from the estate birds, presumably the estate supported flocks had actually been acting as some kind of occasional, but necessary, reservoir, from which fresh stock had been arriving from time to time, and when this reservoir dried up the end of the feral populations was in sight. The pressure of excessive predation, both natural and human, may eventually simply have been too much for the Wild Turkey to resist in what was always really an alien environment, and the simple explanation may be that at the end of the day, as has been experienced elsewhere, the Wild Turkey was not able to sustain a viable unsupported population away from its natural home.

Nevertheless, whatever the truth of the matter, the Wild Turkey did breed successfully and widely throughout the Argyll and Dunbarton areas of Clyde for some three-quarters of a century, and appears to have a perfectly reasonable claim to be regarded as a Clyde bird, certainly better than, say, the Canada Goose or some of the more exotic Pheasants, now usually included in national check-lists, but with a considerably less lengthy successful Clyde history.

It is hoped that these brief collected notes will set the record straight about the history of the Wild Turkey in Clyde. Apart from the meagre information previously published, this account has been based almost entirely on the personal recollections of Mr. Dugald Macintyre and Mr. Duncan Colville, and hitherto unpublished research by the Rev. J.M. McWilliam, to each of whom I am correspondingly grateful. Any additional information, particularly about the Turkey's Clyde history before 1850, will be most gratefully received.

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THE RUBY-CROWNED KINGLET AT LOCH LOMOND

A SIFT THROUGH THE EVIDENCE RELATING TO THE ALMOST FORGOTTEN 19TH CENTURY RECORD

By JOHN MITCHELL
Nature Conservancy Council

The Original Record

In the summer of 1852 Donald Dewar, son of the late parish schoolmaster for Arrochar in Dunbartonshire, Scotland, visited Kenmore Wood on Loch Lomondside with the intention of procuring a small number of Goldcrests *Regulus regulus*. On examination of a dozen or so birds shot that day, amongst them was a single specimen of what Dewar took to be a Firecrest *Regulus ignicapillus*. This he safely deposited in his collection. There, according to Dewar's later statement (Bree, 1860), the prepared skin lay for nearly six years before being produced as an exhibit at a meeting of the Natural History Society of Glasgow held on 27th April 1858. As a result, the specimen fell under the more seasoned eye of Robert Gray, best known today as author of the *Birds of the West of Scotland* (1871), who correctly identified the supposed Firecrest as a North American Ruby-crowned Kinglet or Wren *Regulus calendula* (Gray, 1868 and 1871).

Initial Acceptance

Dr. Dewar presented the Ruby-crowned Kinglet to leading bird artist John Gould, who exhibited it as a British-taken example to the Zoological Society of London on 11th May 1858 (Anon, 1858). As part of the Gould collection, the specimen - an adult male in worn summer plumage - was later donated to the British Museum in London (Gadow, 1883), and is still available for examination at the Museum's Department of Ornithology at Tring. An account of the Ruby-crowned Kinglet's appearance on Loch Lomondside was first published in Bree's *History of the Birds of Europe* (1860), and the subsequent inclusion of the species in the fourth edition of Yarrell's *History of British Birds* (1871), edited by Professor Alfred Newton, gave the record an additional seal of approval.

Subsequent Doubts

It was not until seven years after the premature death of Dr. Dewar in 1876 that the authenticity of the Ruby-crowned Kinglet's occurrence in Scotland was openly questioned. By raising doubts as to Dr. Dewar's reliability, Henry Seebohm in his

History of British Birds (1883) effectively undermined the Loch Lomondside record, possibly already regarded with some uncertainty as the result of being linked, quite improperly, to an unsubstantiated report of a Ruby-crowned Kinglet obtained in Gloucestershire in 1871 (Mellerish, 1902; and unpublished manuscript notes *per* C.M. Swaine) and an earlier completely erroneous record of the same species from County Durham in 1852 (Bree, 1860; Hancock, 1874).

With Seebohm sitting on the British Ornithologists' Union's committee responsible for the compilation of the first *List of British Birds* (1883), it is perhaps not too surprising that the Loch Lomondside Ruby-crowned Kinglet failed to achieve full acceptance. Seebohm's comments on the record were to be echoed by Howard Saunders (just as Saunders' remarks were copied in their turn by later writers) in his own *Illustrated Manual of British Birds* (1889), but the additional insertion of italics"the American Ruby-crowned Wren is *said* to have been shot near Loch Lomond" served to make Dewar's account of the occurrence seem even less probable.

Errors in Publication

A series of publication errors began with a carelessly filled-in specimen label, which resulted in an incorrect date for the record being given in the British Museum Catalogue (Gadow, 1883). This was followed by a proof-reading oversight which led to the Ruby-crowned Kinglet being described as a Fire-crested Wren in the standard work on Loch Lomondside birds *A Guide to the Natural History of Loch Lomond and Neighbourhood* (Lumsden and Brown, 1895). Although this error was quickly corrected by the author in the *Annals of Scottish Natural History* (Lumsden, 1896) it may well have had the effect of further lessening confidence in the record.

Worse was to follow, for in the *Hand-List of British Birds* (Hartert *et al*, 1912) the Loch Lomondside Kinglet was unaccountably transformed into a multiple occurrence involving two birds. Through lack of checking, this inexplicable mistake was perpetuated in both the *Handbook of British Birds* (Witherby *et al*, 1940) and *The Birds of Scotland* (Baxter and Rintoul, 1953).

Rejection by the B.O.U.

Seldom can an ornithological record have been so badly treated, and its inevitable spiral downwards to almost total obscurity is well reflected through three editions of the B.O.U.'s *List of British Birds*. For the first edition published in 1883 the committee square-bracketed the Ruby-crowned Kinglet, having considered the Loch Lomondside record 'not positively authenti-

cated'. In the second edition produced in 1915 the record was relegated to an appendix, the evidence being regarded as 'not entirely satisfactory'. By the third edition of the *List* in 1923 all reference to the record had been dropped, the Ruby-crowned Kinglet having apparently failed to meet even the minimum criteria for a bird of 'uncertain status' in Britain.

Independent Appraisals of the Record

The first B.O.U. committee chose to set aside the favourable judgement made on the Loch Lomondside record by two preceding custodians of ornithological standards, Robert Gray and Dr. Charles Bree, each of whom had the opportunity to investigate the circumstances of the occurrence *at first hand* while Dr. Dewar was still alive. Gray, who professionally held the appointments of Branch Inspector for the City of Glasgow Bank, then Superintendent and finally Head Cashier for the Bank of Scotland, had a trained ability for probing beneath the surface of dubious statements, financial or ornithological. By repeated correspondence with Dr. Dewar, Bree pronounced himself satisfied "that there could have been no mistake about the matter" (Bree, 1860).

The first published re-examination of the evidence was made by T.A. Coward in 1920, who dismissed the possibility of a cage-bird importation from North America and concluded that "the history of the capture of this bird seems satisfactory". Coward further expressed his concern at what he described as "the growing habit of throwing doubt on the records of the older and long since departed ornithologists."

Since the publication of Coward's *Birds of the British Isles* (1920) the case of the Loch Lomondside Ruby-crowned Kinglet has been looked at afresh by Fisher (1953), Alexander and Fitter (1955), and Nisbet (1963). How thorough these latter enquiries were is not known, but none of the writers considered the record to have been proved. Fisher discarded the record without explanation. Alexander and Fitter merely paraphrased what Howard Saunders and T.A. Coward had previously written, and added that this was just "another case of whether or not one is prepared to believe the man who shot it". Nisbet concurred with Coward in dismissing the likelihood of an escaped cage-bird due to the difficulties in keeping small insectivorous species in captivity, but went one step further than all the other adjudicators by alluding to the possibility of deliberate fraud.

Why the Record was Set Aside

To find out why the earlier favourable opinion of the Ruby-crowned Kinglet's authenticity was suddenly reversed, it is necessary to turn back to Henry Seebohm's published comments,

which undoubtedly played a large part in the rejection of the record by the ornithological establishment of the day, viz. "The Ruby-crowned Wren, *Regulus calendula*, of North America has been included in the British fauna by several writers; but the evidence is very unsatisfactory. The specimen upon which its claim to be a 'British' bird rests is said to have been shot in the summer of 1852 by Dr. Dewar in Kenmore Wood, near Loch Lomond. It was not until six years afterwards that the bird was identified by Dr. Dewar and exhibited by Mr. Gray at a meeting of the Natural History Society of Glasgow; and it is therefore extremely probable that during such a lapse of time an American skin had unwittingly found its way into the drawer in which Dr. Dewar placed the Goldcrests which he shot on the day of its reputed capture. The bird differs so strikingly from its allies, the Goldcrest and the Firecrest, that it is impossible to conceive how it could have been overlooked for the space of six years!until more evidence is obtained it is extremely inadvisable to admit it to our fauna" (Seebohm, 1883).

Seebohm's fellow B.O.U. committee members evidently agreed, but is his reasoning for discarding a previously accepted record quite so authoritative as it appears?

Examination of Seebohm's Case

Before attempting to answer what Seebohm considered to be causes for concern, two important points should be noted in the accuracy and content of his account:

The statement that the specimen was identified by Dr. Dewar himself is factually incorrect. For nearly six years the skin (labelled as a Firecrest) lay stored away, until it was eventually seen by Robert Gray and its true identity revealed.

Seebohm's cautious phrases - "said to have shot" and "reputed capture" - inevitably implanted additional seeds of doubt.

Identification: Taking Seebohm's principal criticism that the Kinglet should have been identified more readily, which would have been fair comment if directed at an experienced ornithologist, particularly one on familiar terms with the American literature and specimens then available in this country, he seems to have been quite unaware that at the time the Ruby-crowned Kinglet was obtained Donald Dewar was still a student and had not yet become a member of the Natural History Society of Glasgow, only formed the previous year. The incident also pre-dated the opening of the present major museums in both Glasgow and Edinburgh. The chances, therefore, of the young highlander having ready access to an adequate North American treatise or a coll-

ection of Nearctic study skins must have been exceedingly small.

Moreover, all too easily overlooked today is the fact that, up to the mid-19th century, problems were still being encountered with the separation of the two European *Regulus* species, and if a cross-section of the bird identification books of the period is examined it is not too difficult to understand why. Even the exacting A.G. More in an unguarded moment fell headlong into the pages of the *Zoologist* with a supposed Firecrest he shot on the Isle of Wight, and in later and wiser years felt obliged to publish a retraction of the record in order to preserve his reputation (More, 1849 and 1853).

Almost certainly not known to Seebohm at the time is the fact that some male Ruby-crowned Kinglets never fully attain the characteristic vermilion head feathers (see Bent, 1964). The Loch Lomondside specimen had an orangey-red crown patch, thus giving credibility to the initial identification of the bird as a Firecrest by the inexperienced young Dewar. There is no evidence to suggest that Seebohm ever personally examined the specimen.

Delay: Concern was also expressed by Seebohm over the length of time the Kinglet lay in Dr. Dewar's cabinet before its identity became known. The indisputable fact is that even in institutional collections wrongly determined zoological and botanical specimens of importance have been housed for periods considerably longer than six years before being correctly named. Whatever the origin of the closely related North American Golden-crowned Kinglet *Regulus satrapa*, believed to have been obtained near Oldham in 1897, it apparently lay in full view under a glass cover labelled as a Goldcrest for twenty-four years before its real identity was suspected (Stubbs, 1922).

In the case of the delay involved before the Ruby-crowned Kinglet was produced for examination, it seems never to have been taken into account that, shortly after completing his studies, Dr. Dewar left this country to accompany a British expeditionary force as a civil surgeon during the 1854-56 Crimean campaign (Anon, 1878; Addison, 1898). Establishing himself in medical practice would have left Dewar little time for natural history pursuits on his immediate return home.

Substitution: Finally, there is Seebohm's rather speculative suggestion of an American specimen being unwittingly substituted, an extremely unlikely event in a small private collection, and moreover, one that could only pass undetected if Dr. Dewar was incapable of recognising his own handiwork in the preparation of the original skin. Having put this very point to

several professional and amateur taxidermists, without exception all assured the writer that they would have little difficulty in picking out a particularly interesting specimen prepared by themselves only a few years earlier, similarly being able to reject the work of someone else. The Loch Lomondside Kinglet skin is poorly prepared, evidently by a novice, and is certainly not suggestive of professional work for the commercial market (I.C.J. Galbraith, *in litt*).

If, as Seebohm conjectured, an American skin was inadvertently placed in the drawer, one pertinent question which appears never to have been asked or answered is what then happened to the bird originally shot in Kenmore Wood and identified as a Firecrest, which if genuine would have been a much sought-after item in its own right? Are we seriously being asked to believe that Dr. Dewar absent-mindedly removed this prized self-taken specimen from his cabinet and then equally absent-mindedly disposed of it? Anyone clutching at that particular straw understands little of the dedicated collector.

A Carefully Planned Fraud?

Moving on to our own time, answer must also be made to the suggestion by Nisbet (1963) of deliberate deception, since not a shred of evidence has ever been forthcoming to support such an allegation. The specimen was given away, so any financial motivation can be discounted forthwith, the only alternative to which is a fraudulent attempt to have a hitherto unrecorded Nearctic species accepted on to the British List to gain personal prestige. Fortunately, despite the passage of time, Dr. Dewar can still be summoned back into the witness box to exonerate himself completely from any accusation of this nature. In a letter dated 6th December 1859 and later published, Dewar wrote "Although I look upon the occurrence of *Regulus calendula* in this country as a subject of extreme interest, still it holds no claim to a place among our birds (present writer's italics), farther than one of the many stragglers which from time to time find their way to our shores" (Bree, 1860). Hardly the words of a man intent on securing a permanent place for himself in the record books.

Modern Supporting Evidence

There seems little reason to suppose otherwise than that the underlying reason for the rejection of the Ruby-crowned Kinglet record by Henry Seebohm and his colleagues was an understandable reluctance to accept, within the limits of mid-19th century knowledge, that a minute insectivorous bird only fractionally larger than a Goldcrest could successfully complete

a sustained crossing of 2,000 miles of open sea between Newfoundland (the part of its breeding range nearest to Europe) and the British Isles. With the advantage of many more years of accumulated evidence, however, the present day ornithologist no longer questions such a possibility.

Studies on energy metabolism in migrating birds, such as those undertaken by Odum *et al* (1961), have convincingly demonstrated that insectivorous species are capable of storing sufficient fat reserves to undertake journeys of considerable magnitude. Amongst the growing number of authenticated instances of Nearctic land-birds reaching Britain, one of the most significant in this particular case is the Parula Warbler *Parula americana* (see Sharrock & Sharrock, 1976, for a resume of records), a particularly small wood warbler which overlaps both in wing-length and body-weight with the Ruby-crowned Kinglet (Clench and Leberman, 1978; A.D. Brewer, *in litt*).

Despite its tiny size, the Ruby-crowned Kinglet is an acknowledged long-distance traveller, the nominate eastern race *R.c. calendula* summering north to Labrador and wintering south to Florida, with vagrants recorded in the Bermudas and the southern West Indies (Bent, 1964; Bond, 1974). In 1859 a single bird was obtained at Nanortalik, south Greenland (Reinhardt, 1861). Observations from ships (Durand, 1963 and 1972; McClintock *et al*, 1978) have confirmed that during the autumn migration Ruby-crowned Kinglets wander hundreds of miles out into the western North Atlantic. Under favourable weather conditions (strong following winds) the Kinglet's potential flight range has been estimated at approximately 2,700 miles (D.J.T. Hussell, *in litt*).

Nearly fifty years before the importance of down-wind 'drift' in trans-ocean crossings became generally accepted, Paterson (1904), in a brief but meteorologically detailed note of a Ruby-crowned Kinglet which alighted on the *S.S. Furnessia* bound for Glasgow from New York on 31st October 1903, showed that the bird had almost certainly been helped on its way by strong westerly tail-winds on the south side of a vigorous depression in the northern Atlantic. The Kinglet died the next day, but had by then completed nearly three-quarters of the distance to British or other European shores.

Migration in late autumn is characteristic of the species, and must frequently coincide with weather patterns conducive to a swift ocean crossing. It was not too unexpected, therefore, when a recent computer prediction (Robbins, 1980) included the Ruby-crowned Kinglet in a short list of Nearctic land-birds most likely to be added to the European list.

Summary

The case for what was once an accepted British record is founded on a specimen-supported statement made by a reputable ornithologist describing when, where and how the Kinglet was obtained, its occurrence in Scotland being documented and the evidence publicly endorsed by two competent investigators who each had the advantage of direct contact with the individual concerned.

In contrast, the opposing view on the validity of the record appears to rest on little more than personal opinion given by a leading and influential figure some thirty years after the event. Repetition at regular intervals, together with inexcusable inaccuracies in the standard literature, have slowly but surely moulded this opinion into what could so easily be mistaken for proven fact.

If the mist which has shrouded the Loch Lomondside Ruby-crowned Kinglet for nearly a century has now been lifted sufficiently for ornithological historians at least to question whether the continued rejection of the record is justified or not, then the re-opening of its case will have been well worth while.

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Mr. John Mitchell, 22 Muirpark Way, DRYMEN,
By Glasgow G63 ODX.

THE SALMINCOLA (CRUSTACEA: COPEPODA) OF THE TROUT: RECENT OBSERVATIONS AND SOME GLEANINGS FROM THE NOTES OF THE LATE G.F. FRIEND

By GEOFFREY FRYER
Freshwater Biological Association

Introduction

That the Salmon *Salmo salar* serves as the host of the lernaeopodid copepod *Salmincola salmoneus* (L.) (the so-called gill maggot) is well known. Much less well known is the fact that in Britain the Trout *S. trutta* also harbours a *Salmincola* whose status has been subject to debate. The latter parasite was described from the River Rye (erroneously recorded as Ray) in Yorkshire by Gurney (1933) as *S. gordonii* Gurney. Since then the only published references to its occurrence in Britain are those of Friend (1939) who recorded it from two localities in Scotland, Bruce *et al* (1963) who found it in Port Erin Bay, Isle of Man, on Sea Trout, and Fryer (1969) who confirmed its continued existence in the type locality and added two other Yorkshire stations. Prior to this, however, it was probably seen in Scotland by Edward (1877), Scott (1894) and Scott & Scott (1913), but was generally reported in a perfunctory manner and always wrongly assigned to other species. Scott (1901) merely confirms that Edward collected what could only have been this species.

G.F. Friend's Notes

During the preparation of a handbook on the parasitic crustaceans of British freshwater fishes I had occasion to look through notes made by the late Mr. G.F. Friend that had come into my possession when I was studying the related *S. edwardsii* (Olsson), a parasite of the Char *Salvelinus alpinus*. Although in fragmentary form, these showed quite clearly that Mr. Friend had seen material of the trout-frequenting *Salmincola* from various parts of Scotland, in which region it is apparently widespread. As it is highly desirable that this information should be recorded, the essence of these notes is presented here.

Unfortunately, in spite of a search by his son Mr. P. Friend and by Dr. P.S. Maitland, none of Mr. Friend's material of this or any other crustacean parasite has been found, so it has not been possible to study his Scottish material. However, a chance remark by Dr. C.R. Kennedy revealed that Mr. A. Campbell had also collected specimens of a trout-frequenting *Salmin-*

cola in Scotland. These Mr. Campbell kindly placed at my disposal. They comprise eight specimens, some in good condition, others imperfect, from five localities, and supplement the only material previously available to me, namely one specimen in good condition from the River Swale at Richmond, Yorkshire, another in excellent condition from the River Burn, a tributary of the Ure, near Masham, Yorkshire, and a damaged specimen from the Rye, all from Trout, and another damaged specimen allegedly taken from a Perch *Perca fluviatilis* (a fact that I now doubt) from Bretton Park Lake, Yorkshire.

Through Dr. Kennedy I also learned that Mr. J. Conneely had found a *Salmincola* on Trout in Ireland. Of the three specimens collected, Mr. Conneely kindly sent me the best one for examination. Although this unfortunately lacked a bulla I have little hesitation in assigning it to *S. gordonii*.

In contrast to the few specimens of *S. gordonii* that have been seen, abundant material of *S. salmoneus* from Salmon has been available.

S. gordonii as a Valid Species

Before discussing the trout-frequenting parasite, it is necessary to justify the continued recognition of *S. gordonii* as a valid species, in view of Kabata's (1969) opinion that it is not distinct from *S. salmoneus*. First it is relevant to record that Friend, who had much experience of the genus *Salmincola*, and who had made a careful study of *S. salmoneus* (Friend 1941), was convinced of the distinction between this species and *S. gordonii*. My own observations incline me to the same opinion.

Size

The immediately obvious difference between the two species is one of size. The Swale specimen used in the illustration is diminutive by comparison with even small individuals of *S. salmoneus* from Britain (Figures 1 and 2) but, as in almost all characters, there is no positive dividing line between the two. Kabata (1969) gives the trunk length of the smallest individual of *S. salmoneus* that he examined as 1.48mm, than which that of the trout-frequenting individual from the Swale is smaller but, while it is clear from Friend's notes that *S. gordonii* is almost always smaller than *S. salmoneus*, large *S. gordonii* may be larger than the smallest *S. salmoneus*. It is, however, unusual for individuals of *S. salmoneus* in Britain to be less than 4mm in length. Friend (1941), who had seen thousands of specimens, gives the size range as from 5 to 8mm. The largest individual of *S. gordonii* seen by Friend was apparently 4.3mm in length, but it is clear that it is often much smaller than this and

from Brown Trout. The notes indicate that about 140 Trout were examined and yielded 14 specimens. Thus, with one possible exception, all known specimens of *S. gordonii* have been obtained from *Salmo trutta*. The possible exception was recorded by myself (Fryer 1969) and consisted of a single specimen found among a collection of *Achtheres percarum* Nordmann from Bretton Park Lake, Yorkshire. All the parasites seen had allegedly been removed from Perch, to which *A. percarum* is confined, by River Authority officials. As only four host fishes, all collected at the same time and place, were apparently involved, and as a Perch and a Trout can hardly be confused, I accepted the provenance of this specimen. In view of the fact that *S. gordonii* does not apparently parasitize the more closely related Grayling it would scarcely be expected on the Perch, and it seems probable that in some way the sample was contaminated.

Distribution

From Friend's notes plus Mr. Campbell's records it has been possible to produce a map showing the known distribution of *S. gordonii* in Scotland, to which the Yorkshire records have been added (Figure 5). It would be particularly interesting to have information from areas between these two regions, especially for those in which *S. salmoneus* is known to exist. It appears that *S. gordonii* is not uncommon in some areas. Thus Friend's notes indicate that 14% of the Brown Trout of Loch Lee (Angus) were infected.

S. gordonii is not confined to Britain. Its occurrence in Ireland is noted here and Mr. Conneely hopes to publish details. Friend's notes show that he obtained material from Medalfelsvatn, Iceland, and suggest that he had seen specimens from Sweden and the Faroes but the references to the two latter areas are obscure.

It is hoped that this note will stimulate interest in a search for and work on these parasites, in order that their phyletic, ecological and geographical relationships can be clarified.

Acknowledgements

I am indebted to Dr. P.S. Maitland who placed Mr. Friend's notes at my disposal, to Mrs O. Jolly who helped to elucidate them, and especially to the late Mr. G.F. Friend, a fragment of whose labours is recorded here. A remark of Dr. C.R. Kennedy led to my discovering that *Salmincola* had been seen on Trout in Scotland and Ireland by Mr. A. Campbell and Mr. J. Conneely respectively, both of whom generously made material available. To all three I am most grateful, as I am to Dr. C. Andrews for the specimen from the River Burn.

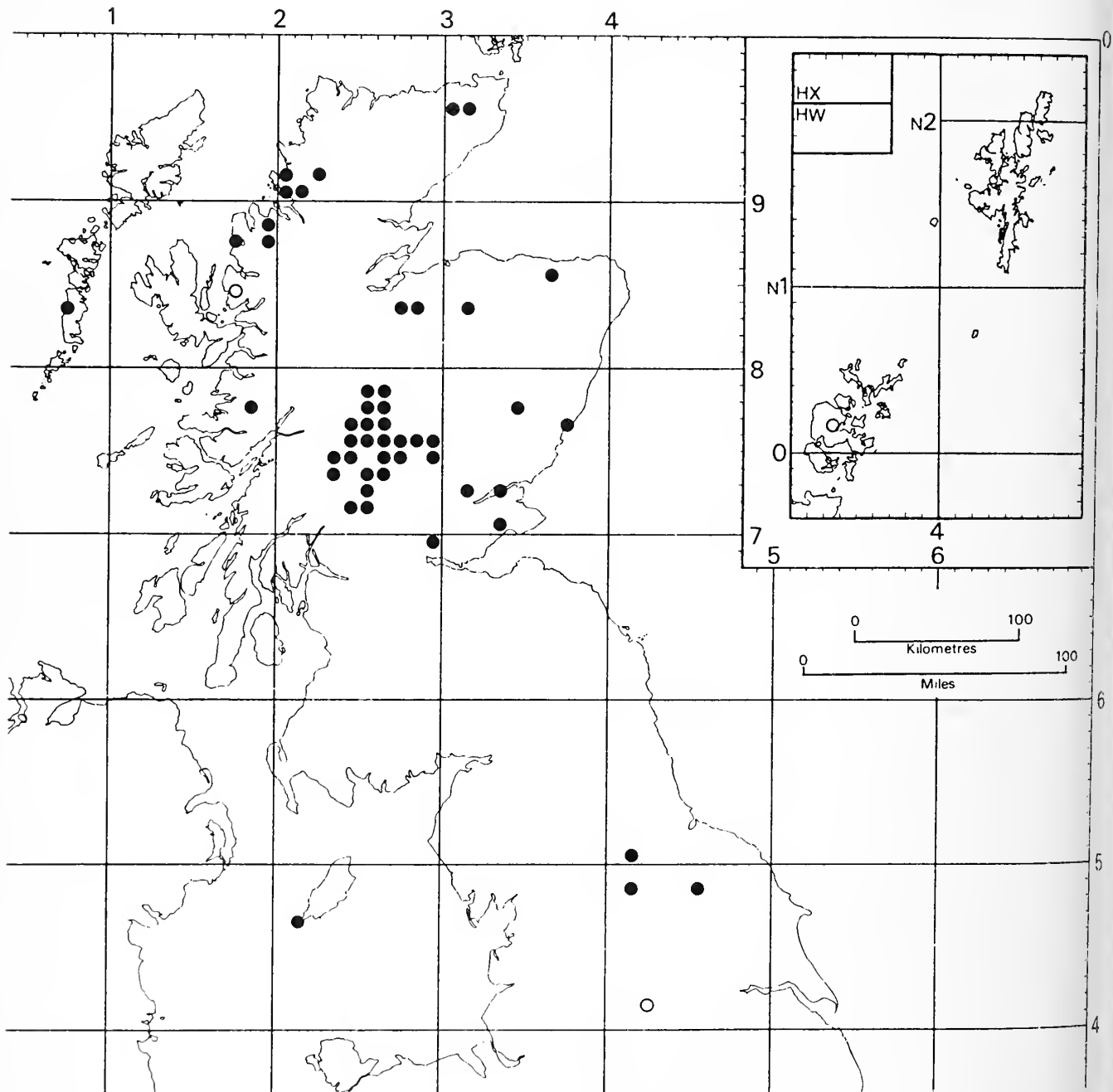


Figure 5.

The known distribution of *S. gordonii* in Britain. When a lake in which the animal occurs spreads into more than one square all squares involved are recorded. In the case of rivers, where a precise locality is not available, one arbitrarily determined site only is recorded. Open circles indicate areas from which Mr Friend apparently received material but for which precise localities are not recorded. The Yorkshire locality for which doubts regarding the host exist (see text) is similarly indicated.

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ADDITIONAL NOTES ON THE BIRDS OF MID-ARGYLL

By IDA RAINIER
Argyll Representative,
Royal Society for the Protection of Birds

In 1975 I compiled a short account of the birds of Mid-Argyll, covering Upper Loch Fyne and Knapdale, largely based on the collected observations of a small team of local ornithologists from 1964 to 1974 (*Western Nat.*, 4: 95-113). Since then our team has been joined by Miss Catherine Pollock, of Tayvallich Estate, who has contributed most of the information on the Ross peninsula (Keills).

The period covered by this supplementary article is 1975 to 1982, and the following selected notes are those considered to be more important or more likely to be of interest to other observers. Arrangement and nomenclature follow the *List of Recent Holarctic Bird Species* by Professor K.H. Voous, published by the British Ornithologists' Union (1977).

GREAT NORTHERN DIVER *Gavia immer*

Continues to decrease, the decrease apparently coinciding with the intensive trawling for shellfish in the sea lochs.

GREAT CRESTED GREBE *Podiceps cristatus*

One, Sound of Jura, 17th February 1979.

WHOOPER SWAN *Cygnus cygnus*

At present, numbers apparently steady in north Knapdale, with between three and four hundred each winter for past six years, present on most suitable lochs.

BEAN GOOSE *Anser fabalis*

Two (shot and identified) out of a small group along with a large flock of Greylags and some Whitefronts on farmland near mouth of River Add on 9th December 1977. Apparently first record for north Knapdale. Recorded from Kilberry area in 1968, 1969 and 1970, but not previously, since the Bean is not included in Miss Marion Campbell's 1968 *Check List of the Birds of Mid-Argyll*.

WHITE-FRONTED GOOSE *Anser albifrons*

Flock of about fifty, with Greylags, on farmland near mouth of River Add, 6th to 12th December 1977. While fairly common

near Kilberry, plus some occasionally at Ormsary, White-fronts are seldom reported from north Knapdale.

PINTAIL *Anas acuta*

A pair on Loch Coillebar (near Achnamara) 1st May 1976, but no evidence of breeding. Six, also on Loch Coillebar, on 6th October 1980.

SHOVELER *Anas clypeata*

One drake, in flooded field at Kilmichael-Glassary, 21st March 1976. Pair near Tayvallich on 21st May 1978, but no evidence of breeding.

LONG-TAILED DUCK *Clangula hyemalis*

Party of six on Loch Craignish, 28th April 1980. One drake at Keills, 17th May 1980.

GOSHAWK *Accipiter gentilis*

No further breeding records known, but several additional sightings of single birds, as follows: Achnamara 18th January 1976 and 15th October 1976, Lochgilphead 19th October 1977, Achnamara 12th February 1978, Minard 13th May 1979, and Tarbert 20th October 1979.

ROUGH-LEGGED BUZZARD *Buteo lagopus*

From 5th to 20th October 1979 one seen frequenting the same field at Keills, Loch Sween, as the bird seen in October/November 1973.

OSPREY *Pandion haliaetus*

Only one fully authentic record - one bird seen catching a fish in West Loch Tarbert on 18th October 1975 - but from 1976 to 1981 several, probably genuine, reports from other parts of the area, as in previous years.

CAPERCAILLIE *Tetrao urogallus*

One male, Achnamara forest, 24th February 1976.

GREY PARTRIDGE *Perdix perdix*

[Last century the Partridge was reported as plentiful in the area, but has long since virtually disappeared. Recently, however, at least one farm and one estate has started to breed Partridges, and it will be interesting to see if these birds get established in the wild.

I understand that a few Red-legged Partridges *Alectoris rufa* were also introduced, but apparently without any success. One was seen beside the River Add, near Kilmartin, on 10th December 1977].

QUAIL *Coturnix coturnix*

Two, or possibly three, birds heard calling, some distance apart, in uncut barley field near Kilmartin, 19th and 20th August 1976.

WATER RAIL *Rallus aquaticus*

Now known to be reported occasionally from Keills. Elsewhere, one in roadside ditch on main Lochgilphead road 19th February 1976, and one at Ardfern, Loch Craignish, on 31st October 1976.

CORNCRAKE *Crex crex*

Still holding on in a few suitable places. Heard calling regularly at Kilmichael-Glassary and Kilmartin, 1975 to 1982, and at Ardfern during summer 1982.

GREY PLOVER *Pluvialis squatarola*

Several small flocks of up to twenty birds were seen at Danna during December 1975 and January 1976. One at Keills, 3rd August 1980.

SANDERLING *Calidris alba*

Two at Keills, 11th February 1978.

RUFF *Philomachus pugnax*

A female at Loch Craignish 10th and 11th February 1981, and (probably the same bird) 12th March 1981.

GREENSHANK *Tringa nebularia*

Still relatively uncommon north Knapdale, although now being reported with increasing frequency, winter and on passage; at least thirty records, 1978-1982. Two birds were seen together on 23rd October 1976 at Ormsary, apparently the first record for the south of the area.

GREEN SANDPIPER *Tringa ochropus*

One Scotnish (Tayvallich) 26th October 1980.

GREAT SKUA *Stercorarius skua*

One off Tarbert, 14th October 1974. One off Ardrishaig, 8th September 1982.

LITTLE GULL *Larus minutus*

One immature bird, Keills, 24th May 1976.

GLAUCOUS GULL *Larus hyperboreus*

One sub-adult, eating placenta of ewe, Kilberry 14th April 1975. One, Lochgilphead, 11th March 1981.

LITTLE AUK *Alle alle*

'Wreck' during severe south-west gale at end of January 1976 when many dead birds were washed up, and two were found alive as far inland as Kilmartin and Ford.

STOCK DOVE *Columba oenas*

One at Keills, 1st May 1977.

TURTLE DOVE *Streptopelia turtur*

Three sightings, of presumably the same bird, 31st May and 2nd and 3rd June 1976, on farmland by roadside near Kilmartin. Apparently first record for north Knapdale.

SNOWY OWL *Nyctea scandiaca*

One seen on Crinan Moss, 14th November 1977, after several days of severe northerly gales. Bird eventually observed at close quarters from a car for almost five minutes. [There is one older record, of "an enormous completely white owl", seen south of Lochgilphead by a Forestry Commission worker on 18th January 1955. *Glasgow Bird Bulletin*, 7: 13].

LONG-EARED OWL *Asio otus*

Pair certainly breeding West Loch Tarbert woods 1975 and 1976; possibly later. Present and almost certainly breeding, Stonefield 1977, and Achnamara 1976 and 1982, but extremely difficult to prove. Several pairs breeding Inveraray district, and said to be still present.

NIGHTJAR *Caprimulgus europaeus*

Further steady decrease, and the few remaining Knapdale breeding pairs are in the south. Heard calling regularly near Crinan during summers of 1975 and 1976, but at the end of the

1976 season two birds were found dead, apparently run over by a car, on Crinan Moss road. No other north Knapdale records until 27th May 1981, when one seen near Seafield Loch, Achnamara. One or two pairs were still breeding in Inveraray district until 1981, but no reports during 1982.

GREEN WOODPECKER *Picus viridis*

Occasional sightings still reported from Lochgilphead and Inveraray areas, but proof of breeding exceptionally difficult to obtain.

NUTHATCH *Sitta europaea*

During the past ten years the small but increasing number of records by experienced observers shows that the Nuthatch is thinly established in suitable habitat, particularly in north Knapdale and Ormsary; as yet no Kilberry records. Near Lochgilphead (Shirvan-Castleton estate), a bird seen carrying food several times during summer 1976, and I myself also saw a Nuthatch carrying food there on 27th June 1981.

RED-BACKED SHRIKE *Lanius collurio*

One immature bird found dead (very decomposed) near Kilmartin on 27th September 1979. A juvenile was seen near Tayvallich on 21st May 1977 by Miss Pollock, who took an excellent description at the time. This would appear to be the first record for Knapdale, but was not reported in time for inclusion in Dr. J.A. Gibson's *Regional Check-List of Clyde Birds* (1981).

JAY *Garrulus glandarius*

One seen at Ormsary on 23rd October 1976 and two further records from the same area in 1981, but no proof of breeding as yet. Breeding West Loch Tarbert woods 1975 to 1978, but apparently no subsequent records.

THE 1982 CENSUS OF GANNETS ON AILSA CRAIG

By J.A. GIBSON

Chairman, Clyde Area Branch

Scottish Wildlife Trust

As in previous years, the 1982 Ailsa Craig Gannet census again took the form of a one-day census made from the sea in early May, with the usual check counts of selected control areas later in the year. After extensive tests over many years (see previous Clyde Seabird Reports) it became clear that the one-day census from the sea, combined with the later control counts, gave results strictly comparable with the original method of the census spread over an entire week, and this has been the method used for the past ten years, with the proviso that if any obvious discrepancy were to be found with the later control counts, then the entire census would be repeated. So far I am relieved to say that this has not happened.

Present Population

The detailed counts for 1982 are given in the accompanying Table 1, along with the comparative counts for the previous three years. As before, all are direct counts through binoculars of occupied nests, and all figures comprise the mean of several counts of each cliff-section made at different times throughout the same day. Control counts made later in the year are used only as checks, and are not included in the official census.

The counts of 17,987 occupied nests in 1980, 18,983 nests in 1981, and 20,161 occupied nests in 1982 have each been the highest populations ever recorded for Ailsa, and in 1982 the colony passed 20,000 occupied nests for the first time. It is worth noting that up to 1950 the colony had shown an average population of only some 5,000 nests.

On at least four occasions during some 45 years of direct counts since 1936, the Ailsa colony has shown dramatic, and as yet unexplained, peaks and crashes of population, in 1940/41, 1955/56, 1960/61 and 1974/75, but no further 'crashes' have been recorded since 1975. Indeed, as previously reported, during the seven years from 1976 to 1982 the colony has steadily increased by approximately 1,000 nests a year.

Index of Room

The index of the amount of 'room' available for Gannets on Ailsa, arrived at by adding together the maximum number of nests

Table 1
 Counts of Gannet Nests on Ailsa Craig
 1979 - 1982

Total for each cliff section represents the mean
 of several separate counts

<u>Colony</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
Slidderly	301	298	287	290
Slidderly, Top Ridge	500	488	501	499
North of the Slunk	428	451	490	487
Foot of the Slunk	471	492	511	523
Above Ashydoe	201	220	240	239
Balvaar	889	822	902	999
Below Balvaar	116	137	171	198
Balvaar, Top Ridge	341	351	327	301
Balvaar to Cairn	411	437	463	502
The Cairn	2203	2188	2302	2499
Cairn to Mare	523	601	670	663
Barrheads	2001	2051	2194	2243
Above Black Holes	202	277	362	402
Mare	3394	3801	4107	4272
Mare, Lower Ledge	135	130	169	183
Above Bed o' Grass	193	200	221	247
Mare-Stranny Point, S1	483	467	484	573
Mare-Stranny Point, S2	399	427	490	551
Mare-Stranny Point, S3	684	701	722	751
Mare-Stranny Point, S4	717	736	791	848
Stranny Point, South Side	38	43	44	42
Main Craigs, Main Part	882	991	898	1024
Main Craigs, Top	1083	1199	1168	1287
Main Craigs, East	281	336	321	387
Main Craigs, East Top	70	81	90	88
Main Craigs, Far East	-	-	-	-
Main Craigs, Far East Top	43	51	58	63
Grand Total:	16989	17976	18985	20161

ever counted on each individual section of the cliffs, had reached 19,643 nests by 1979 and 20,789 nests by 1981, but since the Gannets have now shown clear signs of moving back from the cliffs to colonise the sloping ground at the cliff tops, a tendency first noted in 1974 (a year of very marked increases), the index of room no longer has its previous significance and is now largely academic. Nevertheless, during twenty-five years the index actually doubled, from some 10,000 nests in 1955 to some 20,000 nests in 1980.

Previous Work

Direct counts of all occupied nests have now been carried out at the Ailsa Craig Gannet colony for nearly half a century. This work commenced in 1936, with a pioneer count by H.G. Vevers and James Fisher, and apart from a slight gap during the war years, when only curtailed counts and estimates of population could be used, they have continued without a break ever since. The results of the 1982 Gannet census are being published in this, the first volume of the newly restored *Scottish Naturalist*, and by arrangement with the Editors it is also hoped to continue publication of future census work in the same journal. The results of the previous annual census work, however, have appeared in various publications, in particular for the past twenty-odd years in the series of Clyde Seabird Reports largely created for the Ailsa Gannet census by the Renfrewshire Natural History Society. For ease of future reference, therefore, it seems useful to give the published sources of all previous results, which are listed below in chronological order, along with a few other items which have a direct bearing on the Ailsa Gannet colony.

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SPECIAL REVIEW

CLAPHAM, A.R., TUTIN, T.G. and WARBURG, E.F. (1981). *Excursion Flora of the British Isles*. 3rd edition. 23.5 x 12.4 cm. Pp. xxxiv + 499, with 10 text figures and one loose blue card of signs and abbreviations. Cambridge University Press, Cambridge. Price £12.50.

A good flora is an indispensable tool for anyone interested in the wildlife of terrestrial environments. No 'flower book' can ever take its place, for none can present, in a portable format, sufficient information on the variability and plasticity of those most plastic organisms, the vascular plants; nor can any but the most numerous, detailed and expensive diagrams portray adequately the technical characters which are used to place plants in their correct taxa at all levels of classification from the species upwards. These characters are of various kinds, displaying themselves at different scales of size and at various seasons. Properly studied, they teach one to observe plants with something approaching the perceptiveness of an artist, which is both an interesting paradox of science and the reason why a good flora is also an indispensable aid to the teaching of botany.

The origins of the present work go back to the aftermath of war when two friends, out for a walk, decided to pay an unannounced call on the late Sir Arthur Tansley at his home in Grantchester. The friends were the late Mr Humphrey Gilbert-Carter and Mr (afterwards Professor) T.G. Tutin. The former had performed prodigies in fostering an enlightened interest in plant taxonomy during the lean years between the wars when excessive specialisation had led to the neglect of this basic branch of botany by many British universities. The latter, one of Gilbert-Carter's numerous distinguished pupils, was persuaded by Tansley to begin the compilation of an entirely new British flora. The result, in 1952, was the publication of the first edition of the *Flora of the British Isles* which, in its various editions and versions, has never since had any serious rival.

'See-tea-and-double-you', as this book is commonly called, has appeared in two versions and five editions. The first edition of the *Flora* ran to liv + 1591 pages and was printed on bible paper for portability -- by poachers, it was irreverently alleged. The first edition of the *Excursion Flora of the British Isles* appeared seven years later in the same format. It comprised xxxiv + 597 pages and would fit comfortably even into the coat pocket of a law-abiding citizen. This was followed in 1962 by a second edition of the complete work. With xlviii + 1269 larger pages of normal-weight paper, this was not designed with portability in view. The thinking here was that field requirements were adequately met by the *Excursion Flora*. This 1962

edition has remained the definitive British flora up to the present time and, whilst now considerably dated, may continue in this role for some time to come, although the production of a third complete edition has been considered and there have, for some years, been plans for an entirely new 'critical flora' of the British Isles to be written by Professor D.H. Valentine and others. In 1966 the project suffered grievous loss through the untimely death of Dr. E.F. Warburg, affectionately known as 'Heff' due to a marked resemblance between himself and the noble quarry of Pooh and Piglet's celebrated pitfall trap. To our great good fortune his colleagues soldiered on to produce, in 1968, a second edition of the *Excursion Flora*, initially with identical format to the first but later reprinted on thicker paper. Such is the ancestry of this latest edition, and when one recalls the many field botanists other than the authors who have contributed to it, the great advances made in mapping the distribution of British vascular plants, and the opportunities to incorporate revisions, additions and corrections which successive editions have afforded, it is a distinguished ancestry indeed.

The most generally useful innovation in the third edition of the *Excursion Flora* stems from another project recently carried to completion largely due to the enthusiasm of Gilbert-Carter's pupils. This is *Flora Europaea*, the fifth and final volume of which appeared in 1980. In taxonomic treatment and nomenclature the new edition largely, though not slavishly, follows *Flora Europaea* which, seeing that *Flora Europaea* now costs £50 per volume, is at least a considerable relief to the pocket. However, changes in nomenclature make this edition anything but a relief to the memory. For example, those unfamiliar with current taxonomic fashion may not welcome the notion that the Sea Lyme-grass *Elymus arenarius* has become *Leymus arenarius*, or that the Sand Couch-grass formerly called *Agropyron junceiforme* should henceforth be known as *Elymus farctus*.

The decision to publish the second edition of the complete *Flora* in a larger format has always posed a problem for botanists in Scotland. In earlier editions of the *Excursion Flora*, species were selected for detailed treatment primarily on the basis of their being "generally common in lowland districts". Thus most of the more interesting specialities of the Scottish uplands and the north were either omitted entirely (for instance *Alchemilla conjuncta* and *Deschampsia alpina*) or, more usually, mentioned only in the keys (as with *Eriocaulon aquaticum* and *Scheuchzeria palustris*). Thus one was faced either with the toil of carrying the much larger book up to our remoter cliff ledges or the temptation of collecting a specimen - a method of botanising now rightly regarded with contempt. It is therefore a great pleasure to report that the new edition goes some way towards solving

this problem. There is, for instance, a fairly detailed treatment of *Hieracium* with some useful habitat illustrations, and some very uncommon species like *Diapensia lapponica*, which were mentioned only briefly in the earlier field editions, now have full descriptions, while for others, such as *Juncus trifidus* and *Gnaphalium supinum*, the entry in the key is much expanded. In addition, various subspecies are mentioned (as in *Trichophorum caespitosum*), while several keys have been revised (*Drosera*, for example). Portability is achieved by a return to bible paper - the volume is only 2cm thick - and by lengthening the page. But although the result is far from bulky there seems to have been a small miscalculation. It looks as if it were intended to slip into the map pocket of an anorak, which would be an excellent idea. Unfortunately the book is 9mm taller than a folded 1:50,000 Ordnance Survey map, so my anorak's map pocket is too small. I am also apprehensive that the flexible plastic cover will not last. Time will show, and certainly a copy in use for eleven months is still intact, but diaries bound this way tend, with somewhat heavier use, to break at the spine in a similar period.

Two comments remain to be made. One is less a criticism of this *Flora* than of plant taxonomists in general. Taking the various editions and versions in chronological order of their publication, we find the Common Mouse-ear Chickweed named as follows: *Cerastium vulgatum*; *C. vulgatum*; *C. holosteoides*; *C. fontanum* ssp. *triviale*; *C. fontanum* spp. *glabrescens*. For the Mountain Fern we find, using the same convention, *Thelypteris oreopteris*; *T. oreopteris*; *T. limbosperma*; *T. limbosperma*; *Oreopteris limbosperma*. I have no doubt that such chronic indecision can be supported by arguments of a sort. It was also, paradoxically, part of the justification for writing the first full edition that our nomenclature had become disastrously idiosyncratic when compared with that used on the Continent. Nevertheless it remains true, especially of specific epithets, that alteration seldom serves a scientifically useful purpose; is not therefore a path to academic distinction; renders the literature of one generation incomprehensible to the next; is frequently the despair of potential recruits to field botany; brings disrepute upon the whole discipline of plant taxonomy; and ought to be discouraged by international agreement, as has been done in zoology. There are numerous nomenclatural changes in this book. Purchasers must put down their money with their eyes open, realising that although this is partly the consequence of taxonomic silliness, its authors cannot stop the nonsense on their own.

A second point is the patchy treatment of conifers. This is a group which many otherwise erudite field botanists prefer to overlook, although in modern Scotland one has to be something

of an ostrich to accomplish this feat. Things will not greatly improve while our standard *Flora* omits *P. contorta* from its treatment of *Pinus*, this being our most commonly planted species, and while it mentions neither *Cupressus*, *Chamaecyparis* nor any species of *Abies*.

I have used this book for many months and, despite these criticisms, have found it convenient in relation to the information it contains, and a conspicuous advance on its predecessors: an advance for which its revisors deserve congratulation. Its price is not excessive by the standards of today, and certainly not by those of its publisher, and I have no hesitation in recommending it to anyone who takes Scottish field botany seriously.

H.A.P. Ingram

REQUEST FOR INFORMATION

A BIBLIOGRAPHY OF SCOTTISH ORNITHOLOGY

As most Scottish ornithologists already know, for many years Dr. J.A. Gibson, Scottish Representative, Society for the Bibliography of Natural History, has been working on a comprehensive bibliography of Scottish ornithology. The project was originally intended to supplement the Scottish section of the extremely useful book by Mullens, Kirke Swann and Jourdain (*A Geographical Bibliography of British Ornithology*), which classified all British bird publications geographically up to 1918, but has now been extended to include all publications on Scottish ornithology from earliest times to the present day.

Notices about the proposed bibliography have already been published in the *Journal* and *Newsletter* of the Society for the Bibliography of Natural History, *Scottish Birds*, and the *Western Naturalist*. The original bibliography had actually been completed and was nearly ready for the printer, but was totally destroyed in the disastrous fire at Dr. Gibson's home in spring 1975, so is now having to be entirely rewritten.

After widespread consultation it has been decided to issue the bibliography in sectional parts, covering each decade from the middle of the 19th century, with two preliminary parts covering the early publications up to 1850. Each section will be complete in itself, with separate prefix letter and numbering, although all will ultimately form part of one complete survey. A detailed synopsis is given overleaf, and publication will probably commence with part H, the beginning of the 20th century.

The work will first be an alphabetical listing under authors, and will be further collated under the Scottish faunal areas, sub-divided locally into counties, districts, islands, etc, with a final species index. The original bibliography had short abstracts of all items, but it will be impossible to do all this again, and the replacement work will therefore be a straightforward listing.

It can be assumed that all items appearing in the standard national and local journals will have been duly noted, but what is particularly required is a note of any items published in out-of-the-way journals, local guide books, chapters in local histories, etc, which, although very interesting, might well have had a considerably restricted circulation and so be unknown to anyone without first-hand local knowledge. An extremely comprehensive list of such items had already been compiled, and it is undoubtedly this type of information which is proving to be most difficult to

replace after the fire. Indeed, it is already apparent that some 'out-of-the-way' items included in the original survey, but subsequently destroyed in the fire, have not been rediscovered, particularly for north and east Scotland, and to cope with this problem each section will have space for later additions with consecutive numbering.

Any ornithologists, therefore, who can give details of any unusual items, or who would be prepared to check the listings for any part of the country which they know particularly well, are asked to contact Dr. Gibson at the Scottish Natural History Library, Foremount House, Kilbarchan, Renfrewshire PA10 2EZ. All assistance will be most gratefully received and acknowledged.

The more publicity the project gets the more complete, and so the more useful, the bibliography will ultimately be, so it will be very helpful if other natural history journals or societies will copy or abstract this notice.

A BIBLIOGRAPHY OF SCOTTISH ORNITHOLOGY

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CONTENTS

Editorial	3
Ruffe <i>Gymnocephalus cernua</i> (L.), New to Scotland, in Loch Lomond Dr. P.S. Maitland, Mr. K. East and Mr. K.H. Morris	7
Tropical Drift Fruits and Seeds on Coasts in the British Isles and Western Europe II. History (1560-c.1860) and Folk-Lore Dr. E. Charles Nelson	11
On the Breeding of the North American Wild Turkey in the Clyde Faunal Area Dr. J.A. Gibson	65
The Ruby-crowned Kinglet at Loch Lomond A sift through the evidence relating to the almost forgotten 19th century record Mr. John Mitchell	81
The Salmincola (Crustacea: Copepoda) of the Trout: Recent observations and some gleanings from the notes of the late G.F. Friend Dr. Geoffrey Fryer	91
Additional Notes on the Birds of Mid-Argyll Mrs Ida Rainier	103
The 1982 Census of Gannets on Ailsa Craig Dr. J.A. Gibson	109
Review	113
Request for Information	117

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