History of discovering the specimen

Between the mornings of 15th and 18th December 1997, fisherman Urs Büumler found in his nets a drowned little bird. It was about the same size as a Little Grebe *Tachybaptus ruficollis*, but he could not identify it. The locality was at Zollikon, Lake Zurich (47°20’ N, 8°34’ E), 400 m beyond the borders of Zurich. The nets were placed 40 m from the shore at a depth of 3-4 m. At that time of the year, the area is the favourite place for the fishing of spawning whitefish *Coregonus*. The drenched bird was carefully taken out of the net and the corpse was kept in a freezer for the next few days. In due course, U. Büumler informed René von Allmen, who had asked him to preserve any bird drowned in his nets.

In spring 1998, R. von Allmen brought the bird to his taxidermist, Bruno Ambauen, who
111. Marbled Murrelet *Brachyramphus marmoratus* of Asian subspecies *perdix*, found dead between 15th and 18th December 1997 in Lake Zurich, Switzerland. Note the lack of a white partial collar and the more extensive dark plumage on nape and lores, features which exclude the nominate subspecies.

112. Marbled Murrelet *Brachyramphus marmoratus* of Asian subspecies *perdix*, found dead between 15th and 18th December 1997 in Lake Zurich, Switzerland. Note the dark juvenile belly feathers.
also could not identify the species. R. von Allmen collected the mounted specimen and exhibited it in his private collection. It was not until September 1998 that Jürg Kägi, by chance, discovered the bird, which he thought was a young Black Guillemot Cepphus grylle. He took some photos and wrote about his findings to Raffael Winkler, at the Naturhistorisches Museum Basel, who in turn informed the Swiss Rarities Committee. There, the bird was correctly identified by LM from photographs as a first-winter Marbled Murrelet Brachyramphus marmoratus of the Asiatic subspecies perdix (plates 111 & 112). The specimen was examined at the session of the Swiss Rarities Committee on 28th November 1998, and the subspecies was unanimously admitted to Category A of the Swiss List (Knaus & Balzari 1999). This record represents also the first observation of the species for the Western Palearctic. The specimen is now exhibited at the Naturhistorisches Museum Basel (no. 99–004).

**Description of the specimen and measurements**

Small, neckless auk with brownish-grey upperparts; dark crown, dark colour extending below the eye straight to the gape; white crescent below the eye; indistinct whitish patches on both sides of the nape; white scapulars; upperwing and tail uniformly dark, all rectrices blackish; chin, throat, breast and belly white, the latter marked with brownish-black patches; fine and long, slightly downcurved dark bill; legs brownish-pink, feet blackish.

The body feathers seem to be completely moulted, with the exception of the dark juvenile belly feathers. The plumage looks fresh, without any visible abrasion on remiges. Measurements are given in table 1.

**Identification**

The only similar small auk with white scapulars is the closely related Kittlitz’s Murrelet B. brevirostris. That species was, however, excluded by its paler appearance in winter, created by the whiter ‘face’ with a contrasting dark eye, and its much shorter bill. The identification of the subspecies was confirmed through the generally larger size (table 1) and the different colouring (especially the lack of a white partial collar: see fig. 1 & plate 112), which excluded the nominate American subspecies marmoratus (Harrison 1985, 1987; Shibaev 1990; Ralph *et al.*

<table>
<thead>
<tr>
<th></th>
<th>Total Length (in mm)</th>
<th>Flattened Wing (in mm)</th>
<th>Exposed Culmen (in mm)</th>
<th>Bill Height (in mm)</th>
<th>Tarsus (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>B. m. marmoratus</em></td>
<td>250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (Shibaev 1990)</td>
<td>134.2±1.2 (25)</td>
<td>15.5±0.3 (36)</td>
<td>6.0±0.1 (26)</td>
<td>16.2±0.2 (37)</td>
<td></td>
</tr>
<tr>
<td>Female (Shibaev 1990)</td>
<td>132.6±1.8 (23)</td>
<td>15.3 (23)</td>
<td>5.8±0.1 (23)</td>
<td>15.9±0.3 (39)</td>
<td></td>
</tr>
<tr>
<td><em>B. m. perdix</em></td>
<td>330</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (Sealy <em>et al.</em> 1982)</td>
<td>141.6±4.0 (7)</td>
<td>20.3±1.4 (6)</td>
<td>6.4±0.3 (5)</td>
<td>17.4±0.9 (6)</td>
<td></td>
</tr>
<tr>
<td>Male (Shibaev 1990)</td>
<td>141.2</td>
<td>20.2</td>
<td></td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>Female (Shibaev 1990)</td>
<td>138.3</td>
<td>19.6</td>
<td></td>
<td>18.0</td>
<td></td>
</tr>
<tr>
<td>Swiss specimen</td>
<td>300</td>
<td>141</td>
<td>18.2</td>
<td>6.0</td>
<td>19.0</td>
</tr>
</tbody>
</table>

Table 1. Measurements (in mm) of the two forms of Marbled Murrelet *Brachyramphus marmoratus* and those of the Swiss specimen found in 1997. Measurements of *B. m. marmoratus* are from British Columbia, those of *B. m. perdix* from Sea of Okhotsk (Sealy *et al.* 1982; Shibaev 1990). Figures give mean ± S.D. (sample) when available, with range in parentheses below. Bill width of Swiss specimen was 5.0mm.
When the question of origin was discussed, the likelihood of an escape was quickly dismissed, since no Marbled Murrelet is known to be kept in captivity. Furthermore, there was no evidence of human assistance: this species lives in remote areas, and all feathers of the specimen looked fresh. In addition, young birds are more likely to be genuine vagrants than adults.

Although at first sight an unlikely candidate for natural vagrancy to the Western Palearctic, this case is not without precedent. There were already European records of four other small Pacific Ocean auks: Parakeet Auklet *Cyclorrhynchus psittacula*, Crested Auklet *Aethia cristatella*, Ancient Murrelet *Synthliboramphus antiquus* and Tufted Puffin *Lunda cirrhata* (Hørring 1933; Risberg 1990; Waldon 1994; Cederroth 1995).

### Taxonomy

The Marbled Murrelet is currently separated into two phenotypically distinct subspecies (figs. 1 & 2): a smaller one in North America (*B. m. marmoratus*) and a larger one (50-70 g heavier) in Asia (*B. m. perdix*). The Asian form was described as a separate species in 1811, but was lumped with *B. marmoratus* in the twentieth century (cf. AOU 1998).
Molecular data from Zink et al. (1995) do, however, show a degree of differentiation between *perdix* and *marmoratus* comparable to that between well-differentiated species (using mitochondrial DNA). Other recent analyses of both cytochrome *b* sequences and allozymes suggest that *B. m. perdix* is genetically distinct from other brachyramphine murrelets (Friesen et al. 1996). In the view of those authors, this form clearly represents a distinct species, referred to as the Long-billed Murrelet *B. perdix*, supporting its earlier classification. It is in most regards similar to the North American form in terms of its feeding, breeding, moult and habitat ecology, but, unlike its American counterpart, it is migratory. While the evidence for separation is considered by some authors to be inconclusive and to require further examination (Monroe & Sibley 1993; del Hoyo et al. 1996), the American Ornithologists’ Union did split the two forms recently (AOU 1998).

**Breeding range**

The Asian Marbled Murrelet breeds on the coast of the Pacific Ocean, from east Kamchatka through the Kurile Islands and Sakhalin Island and along the shores of the Okhotsk Sea south to northeastern Hokkaido (fig. 3; AOU 1998; Gaston & Jones 1998); in this last region, it is either a very rare breeder or only occasional (Brazil 1991). The nominate subspecies breeds from the Aleutian Islands through Alaska and British Columbia south to California. Most of the North American population breeds in the Alexander Archipelago, Prince William Sound and Kodiak Archipelago in Alaska (Piatt & Ford 1993). The maximum distance inland at which breeding radio-tagged Marbled Murrelets have been found is about 100 km, although most appear to nest less than 60 km inland (Ralph et al. 1995).

**Ecology**

This murrelet’s ecology is poorly known, as the species is nocturnal and non-colonial on its breeding grounds, which are scattered in forested areas. Only four nests of *B. m. perdix* were found in Russia during the 22 years from 1963 to 1984 (Shibaev 1990). Coniferous forests, especially of East Siberian Larch *Larix daurica*, provide the most important breeding habitat in northern Siberia. On Hokkaido Island in Japan, a breeding female with three eggs was collected in June 1961, as well as four fledged young in August 1982 (Brazil 1991). Up to 1993, 17 nests of *B. m. marmoratus* had been found in Alaska (Piatt & Ford 1993). Unlike most seabirds, Marbled Murrelets fly inland to nest solitarily on mossy branches or in hollows of large trees in old-growth coniferous woods. The flightless juveniles presumably stay there until they fledge (Harrison 1985), or perhaps use the nearest river or stream to reach the sea (Konyukhov & Kitaysky 1995). Some fraction of the population nests on the ground in Alaska (Piatt & Ford 1993).

At sea, they feed mainly inshore, rarely venturing more than a few kilometres offshore (Sealy 1975; Harrison 1985). During
summer, however, they have been recorded at up to 75 km from land (Morgan et al. 1991). Year-round use of coastal freshwater lakes, usually within 20 km of the ocean, is known from Sakhalin and Kamchatka as well as along the west coast of North America (Carter & Sealy 1986). The diet is dominated by crustaceans and small fish, usually caught at less than 30 m under the surface, and generally within 500 m of the shore (Sealy 1975).

**Conservation status**

Although widespread, the Marbled Murrelet is one of the four species of Pacific auk listed in *The World List of Threatened Birds* (Collar et al. 1994). Marbled Murrelets are declining in numbers throughout most of their range owing to conflict with logging interests, vulnerability to oil pollution, and drowning in gill nets (Ralph et al. 1995). They have almost disappeared from several parts of their range, especially in the south, and are under pressure from loss of habitat in other areas.

The species is listed officially as ‘threatened’ in Canada and ‘endangered’ in California, Oregon and Washington (Friesen et al. 1996). In Alaska, where 85% of the 300,000 North American Marbled Murrelets reside (Ralph et al. 1995), a possible 50% decrease from 1972 to 1992 has been suspected (del Hoyo et al. 1996). Outside Alaska, the species is probably even more restricted in its breeding to high-volume old-growth forests than is the Northern Spotted Owl *Strix occidentalis*, and it has recently become an important symbol for the saving of old-growth forests in the Pacific Northwest (Piatt & Ford 1993). The sharply declining Russian population, estimated at 50,000 to 100,000 individuals, is also under increasing threat from the logging of prime old-growth forests. This logging activity has accelerated in recent years, particularly on Sakhalin Island and the Kamchatka Peninsula, apparently without regard for wildlife considerations (Konyukhov & Kitaysky 1995). To make matters worse, intensive development of the oil industry on the Okhotsk and Bering Sea shelves is proceeding without appropriate control and is, according to Konyukhov & Kitaysky (1995), potentially threatening to shelf ecosystems in general.

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Fig. 3. Breeding and wintering distributions of the Marbled Murrelet *Brachyramphus marmoratus* in the Pacific Ocean (from Gaston & Jones 1998).
The Marbled Murrelet was one of the five species most severely affected by the Exxon Valdez oil spill in 1989 (Piatt & Lensink 1989).

**Movements**

The Russian population is the most migratory, leaving its breeding grounds in September and October for the Sea of Okhotsk, where it spends the winter. A few remain off Sakhalin, but many migrate south to Japan (Hokkaido, Honshu), where most records are from November to March (Brazil 1991). A few occasionally reach the Sea of China south to Fujian (Etchécopar & Huc 1978; Cheng 1987), Korea and Taiwan. Other noteworthy records are of a first-year found on 26th October 1967 180 km inland on Lake Khanka, and of an adult on 13th July 1980 more than 200 km inland, on the Bikin River (Shibaev 1990). The most northerly record is of one bird collected near Kolyuchin Bay on the north coast of the Chukotskiy Peninsula (Bédard 1966). In North America, there are 36 confirmed records of the form *perdix*, 23 of which are from far inland or from the Atlantic coast of Newfoundland, Massachusetts, North Carolina, South Carolina and Florida (Mlodinow 1997). Interestingly, these records are from localities much farther east than the American subspecies is known to occur during its breeding and non-breeding seasons (fig.3; Jehl & Jehl 1981; Sealy *et al.* 1982; Ralph *et al.* 1995).

**Circumstances of the appearance of the Marbled Murrelet in Switzerland**

With its strictly Pacific Ocean distribution, the Marbled Murrelet is one of the least expected vagrants to this side of the planet, and certainly not to be expected in the most continental location possible in Central Europe (at least 600 km from the North Sea and the Atlantic Ocean, 300 km from the Mediterranean Sea). Indeed, the only other auk ever recorded in Switzerland was a Common Guillemot *Uria aalge*, collected in January 1836 at Vevey, Lake Geneva (Winkler 1999). In addition, the small and declining population size of the Marbled Murrelet makes the Swiss record even more extraordinary. The Asian subspecies is, however, migratory, at least in the northern part of its breeding range, and has proved capable of long-distance vagrancy south to Taiwan, north to the Chukotskiy Sea and (presumably) east to inland lakes and the Atlantic coast of North America, more than 10,000 km from its nesting grounds. The possibility of misoriented birds flying in the opposite direction to that of the sea from their nest
has been put forward in those cases when grounded fledglings have been discovered far inland (Ralph et al. 1995). Unlike the low skimming flight over water, the commuting flight overland between the nesting site and the sea occurs at great height (Harrison 1985). This could expose the birds—especially fledglings leaving the nest—to storms. Furthermore, the flight is described as swift and direct, but not powerful, which could make this species liable to be drifted by strong winds, as in the case of other classic Siberian vagrants to Western Europe (cf. Cottridge & Vinicombe 1996).

The shortest way to Europe would be a straight route from the Sea of Okhotsk through Yakutia to the Lena, Taimyr Peninsula, Kara Sea, Barents Sea, Finland and the Baltic Sea, totalling ‘only’ 7,000 km, instead of some 10,000 km through continental Siberia (fig. 4). The hypothesis of a northern route could be supported by the Chukotskiy Sea record. On the other hand, analysis of the weather maps from the Swiss Meteorological Institute reveals strong north winds over Central Europe on 14th December 1997, turning to northeasterlies over western Russia and the Baltic Sea and to easterly winds over Central Europe on 15th December 1997 (fig. 5). A possible scenario for the appearance of the murrelet on Lake Zurich could be that the bird followed a flock of Tufted Ducks *Aythya fuligula*, a large number of which winter on Swiss lakes, which hold 22% of the wintering population of Western Europe (Géroudet 1987). Ringing recoveries have shown that some of them originate from the Ob and Yenisey Basins, 4,500 km from Switzerland. If, instead, the murrelet crossed North America and the Atlantic Ocean following the same latitude, it must have travelled at least 17,000 km, which is less likely.

Of the 16 Pacific Ocean auk species, four

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**Fig. 5.** Weather map of 15th December 1997. Note the strong northeasterly winds from Russia. H = High. T = Trough.
were already on the Western Palearctic list: (1) Parakeet Auklet, collected on Lake Vättern, Sweden, in December 1860 (Risberg 1990); (2) Crested Auklet, collected at sea, northeast Iceland, in August 1912 (Hörring 1933); (3) Ancient Murrelet, adult observed at Lundy, Devon, England, during three consecutive springs from 27th May 1990 to 29th April 1992 (Waldon 1994); and (4) Tufted Puffin, adult observed at Lagoa Set, Halland, offshore in Laholmsbukten, Sweden, on 1st and 8th June 1994 (Cederroth 1995).

There are records of two other Pacific Ocean species in the Western Palearctic: Aleutian Tern Sterna aleutica in Great Britain (1979; Dixey et al. 1981), and Glaucous-winged Gull Larus glaucescens in the Canary Islands (1992; de Juana & Comité de Rarezas de la Sociedad Española de Ornitología 1998) and Morocco (1995; Porphyrio 9: 170). A Swiss report from 1969 of the latter species has been rejected owing to the circumstances of its finding not having been confirmed (Winkler 1999).

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We should like to thank Urs Bäumler, René von Allmen, Bruno Ambauen, Jürg Kägi and Dr Raffael Winkler, for drawing the specimen to our attention; Hubert Duperrex, Jehl, Christian Marti, Steven G. Mlodinow and Dr Bernard Volet, for their help in finding references; and Michel Baudraz, Steffen Gysel and Paul Mosimann, for reviewing and improving the manuscript. We thank the following, who kindly permitted us to reproduce the figures and plates in this article: Linda Cooper for her slides of a live bird; Dr C. John Ralph, of the US Forest Service, Redwood Sciences Laboratory, California, for the figure showing the head patterns of B. m. marmoratus and B. m. perdix; Oxford University Press for the distribution map and Ian Lewington’s colour plate from Gaston & Jones (1998); and the Swiss Meteorological Institute for the weather map.

References

The Ancient Murrelet, which has a similar distribution to that of Marbled Murrelet, has been recorded occasionally far inland in North America, most frequently in October and November. These appearances have been associated with offshore storms and poor visibility along the Pacific coast. Just like the British Ancient Murrelet, which spent three consecutive springs at a latitude similar to that of its British Columbian breeding areas, the Swiss Marbled Murrelet was at precisely the mean latitude (47°) of the species’ normal winter range. As the Marbled Murrelet is able to survive on freshwater lakes for considerable periods (Carter & Sealy 1986), the good condition of the bird collected in Lake Zurich, apparently diving after fish, is not surprising.

This amazing record gives the opportunity to raise concern in Europe for this little-known, threatened auk and to plead for the implementation of conservation measures within its breeding range.


198 British Birds 93: 190-199, April 2000
Maumary & Knaus: Marbled Murrelet in Switzerland


Lionel Maumary, Praz-Séchaud 40, CH–1010 Lausanne, Switzerland

Peter Knaus, Pflanzschulstrasse 49, CH–8004 Zurich, Switzerland

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