THE TYPE LOCALITY OF CRAVERI'S MURRELET *SYNTHLIBORAMPHUS CRAVERI*

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SUMMARY

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The type specimen of Craveri's Murrelet *Synthliboramphus craveri* was collected in the 1850s by Federico Craveri and described by Tommaso Salvadori (1865). Errors in Salvadori's paper and seemingly contradictory field data have led to a century-long debate about whether the type specimen was collected on Isla Natividad, off the Pacific Coast of Baja California, or on Isla Rasa in the Gulf of California. With the 1990 publication of Craveri's journals, it is now feasible to consult Craveri's own words. Although his remarks about birds are often sketchy or vague, his journal suggests that he might have collected Craveri's Murrelet on another Gulf island, Isla Partida Norte. The most recent discussion of this issue (Violani & Boano 1990) recognizes Isla Partida Norte as a possible type locality but rejects it in favor of Isla Natividad, based on a note that Craveri inserted in the margin of his journal manuscript after he returned to Italy. That note, however, does not square with subsequent field observations, and Salvadori's (1865) paper does not square with Craveri's journal account. Hence even with the addition of Craveri's journals, the available information is simply too confused and contradictory to positively determine where the type specimen of Craveri's Murrelet was collected. This means that earliest fully documented specimen is the bird collected by Thomas Streets on Isla Rasa in 1875.

Key words: Craveri's Murrelet, *Synthliboramphus craveri*, type specimen, type locality, Baja California, Sea of Cortés

INTRODUCTION

Recently, while reviewing historical records of the Gulf of California, I came across a paper that identified Isla Rasa as the type locality for Craveri's Murrelet *Synthliboramphus craveri*, with Tommaso Salvadori's 1865 type description cited as the authority (Velarde *et al*. 2011). I knew that Thomas Streets had collected a nesting female of this species on Rasa in 1875 (Streets 1877) but was unaware of earlier field work there. Since scientific collecting is an important aspect of island history, I searched the literature on the Italian scientist Federico Craveri and the murrelet associated with him. What I found was an interesting debate about the type locality that has spanned nearly a century, fueled by errors and ambiguities in Salvadori's paper, seemingly contradictory field data and lack of easy access to the primary source, Craveri's field journals.

BACKGROUND

Two main candidates for the type locality have been proposed: (1) Isla Rasa in the Gulf of California and (2) Isla Natividad off the Pacific coast of Baja California. The debate has been largely shaped by four papers. The first is Salvadori's type description, which summarizes Craveri's observations on Isla Natividad and contends that the island supported a population of Craveri's Murrelets (Salvadori 1865). Although Salvadori added that Craveri had previously collected this species in the Gulf, readers generally assumed that Isla Natividad was the type locality.

This assumption went unquestioned until 1916, when Wells Cooke suggested that Salvadori had been mistaken, and that Isla Rasa, not Natividad, was probably the type locality (Cooke 1916). Cooke's paper was based on three main considerations, and despite many errors of fact, his basic approach was sound. First, he cited A.W. Anthony's 1896 and 1897 field observations that Isla Natividad's burrows were occupied solely by Black-vented Shearwaters *Puffinus opisthomelas* (Anthony 1900). Second, he called attention to Salvadori's remark that Craveri had collected the murrelet in the Gulf, where murrelets nested under rocks. Third, he used this remark as the basis for a logical argument: When Craveri collected the murrelet he was inspecting guano islands. Isla Rasa was a major guano island, so Craveri surely stopped there. Rasa is also a rocky island, and Cooke noted that murrelets currently nested there under the rocks. Cooke therefore concluded that the type specimen had probably come from Isla Rasa.

Cooke's paper was persuasive, and Isla Rasa has been cited as the type locality, or possible type locality, ever since (Ridgway 1919, Grinnell 1928, AOU 1957, Mearns & Mearns 1992, Carter *et al*. 2005, Velarde *et al*. 2011). In 1969, however, Robert DeLong and Richard Crossin pointed out one of Cooke's errors, an incorrect latitude figure, which they considered a fatal flaw in his argument, leading them to conclude that Isla Natividad might be the type locality after all (DeLong and Crossin n.d.). Their paper was never published, but it circulated in manuscript and some readers found their case convincing (Jehl and Bond 1975).

Debate about the type locality has also created some confusion. Gaston and Jones (1998) list Isla Rasa as the type locality but state that the type specimens came from Isla Natividad. The most recent American Ornithologists' Union checklist designates the type locality as Isla Natividad, but places the island in two incorrect and

mutually contradictory locations: (1) in the Gulf of California and (2) on dry land on the Sonoran mainland (AOU 1998).

The fourth paper, by Carlo Violani and Giovanni Boano (1990), is the only one to make use of Craveri's original journal. The authors discount Isla Rasa as the type locality and imply that Craveri might have found murrelets nesting on nearby Isla Partida Norte, as they do today (DeWeese & Anderson 1976). Nevertheless, Violani and Boano believe that Craveri collected the type specimen on Isla Natividad, based on a note Craveri later added in the margin of his journal account of that island.

Also in 1990, Domenico Brizio published a transcription of Craveri's journals, which recount his four remarkable journeys undertaken between 1855 and 1859 (Craveri 1990). This important publication makes it practical for scholars outside Europe to evaluate the type locality in light of what Craveri himself wrote. Three passages from his journals, along with the marginal note that Violani and Boano cite, bear on this issue. Craveri's words also make it possible to evaluate Salvadori's paper, as it was based largely on Craveri's journal.

DISCUSSION

In 1855 the Mexican government commissioned Craveri, a chemist by profession living in Mexico City, to assess the resources of the guano islands in northwestern Mexico. Craveri carried out his mission during two voyages. On the first voyage he investigated the Gulf of California. He set sail from Mazatlán on 27 January 1856 and returned on 10 July, after visiting most of the major Gulf islands (Craveri 1990: 136, 388, Mearns & Mearns 1992). His companions and crew were French and Mexican, which is why his narrative is sprinkled with French and Spanish words. In addition to analyzing guano, Craveri and his shipmates observed wildlife and collected specimens, some or all of which he took with him when he returned to Italy in 1859. These included four specimens of Craveri's Murrelet, one of which Salvadori described as the type (Violani & Boano 1990).

On 21 April 1856, Craveri's party anchored at Isla Rasa, remaining there until 29 April. Craveri described the birds observed and the specimens collected:

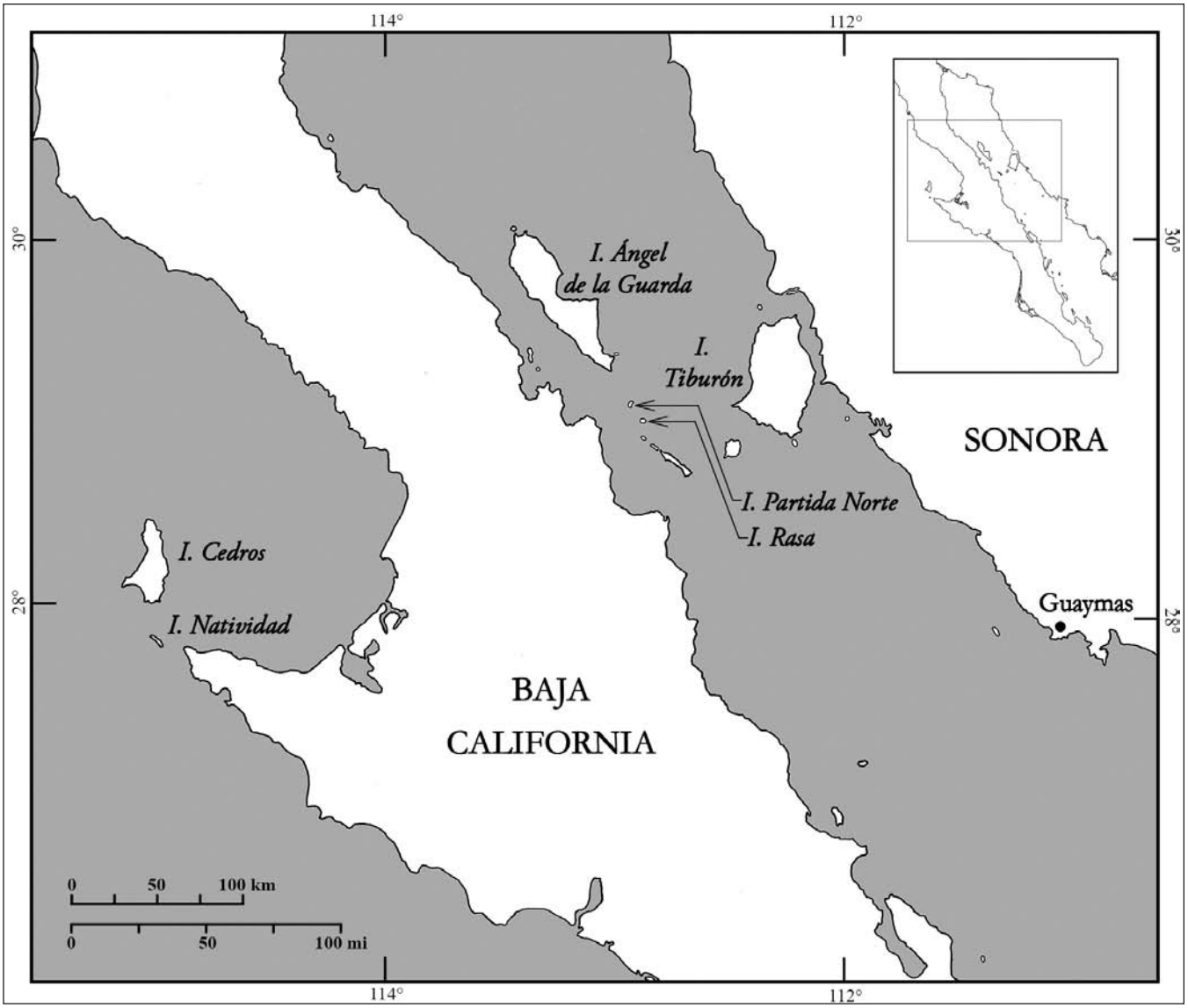

Fig. 1. Location of Islas Rasa, Partida Norte and Natividad. Map by Tracy Davison.

Al nostro arrivo l'isola era coperta dai *Goaland* e Pelicani[,] quest'ultimi avevano i piccoli ed i primi incominciavano deporre le uova[,] ciò che fu un regalo per la tripulazione che ne mangiarono a biseffe. Le uova de Pelicani che s'incontrarono, oltre che non si mangiano, avevano il piccolo addentro, le diedero al majale che abbiamo a bordo, era cosa ridicola veder quell'animale mangiare un secchio d'uova tutti i giorni e far stridere sotto i denti i piccoli Pelicani che alcuni gemevano al rompere il guscio. Tutti questi uccelli abbandonarono l'isola dopo otto giorni d'aver visto continuamente 9. o 10. persone a percorrerla.... José Maria uccise due falchi[,] uno grande ed altro piccolo che avevano famiglia, il S^{r} G[u]illet prese due regazzi della specie grande che gli conserva vivi a bordo, sono magnifici. Uccise pure un Corvo e raccolse i coleotteri che pare vivono dei cadaveri d'uccelli abbondanti sull'isola, prese pure delle scolopendre, e due specie di piccole lucertole, una colle unghie alate. Io lavorai cotanto che non potei quasi osservare niente che non fosse relativo alla mia commissione (Craveri 1990: 268–269).

Upon our arrival, the island was covered with gulls and pelicans. The latter had little ones while the former were beginning to lay eggs, which was a gift for our crew, and they ate them in large numbers. The pelican eggs that we found, in addition to not being edible, had little ones inside, [so] they were given to the pig we have on board. It was ridiculous to see that animal eat a bucket of eggs every day, and to hear the crunching of the little pelicans under its teeth, some of them moaning as their shell broke. All these birds abandoned the island after eight days of having seen nine or ten people continuously walking on it....José Maria [the Chief Steward] killed two hawks, a big one and a little one, both with families. Sr. Guillet took two young of the big species which he keeps alive on board, and [which] are magnificent. He also killed a raven and collected beetles that apparently feed on bird carcasses [that are] abundant on the island. He also took a few scolopendrids and two species of small lizards, one with winged claws. I worked so much that I was almost unable to observe anything that was not related to my commission.

Fig. 2. Craveri's Murrelet at Isla Rasa, 28 May 2007. Photograph by Carlos J. Navarro.

The word "Goaland" is a misspelling of *goéland*, the general French term for "gull" (AOU 1998). In 1875, Streets (1877) identified these birds as Heermann's Gulls *Larus heermanni*, which have nested on Isla Rasa in enormous numbers ever since. Interestingly, Craveri said nothing about terns, which also breed there today in huge numbers (Velarde *et al*. 2005). The lizard with "winged claws" was probably the endemic gecko *Phyllodactylus tinklei* with its flattened toe pads.

Craveri makes no mention of any bird on Rasa that might be a murrelet. For this reason, Violani and Boano (1990) suggest turning to Craveri's narrative of the island he had visited just before Rasa, Isla Partida Norte, which Craveri refers to by its older name of "Las Ánimas" (Craveri 1990: 264, see Hardy 1977: 386, map). The expedition anchored at Isla Partida Norte on 20 April. Late that afternoon and probably the next morning, Craveri and his party went ashore and collected birds:

> In queste passeggiate raccolsi molti di quei piccoli *zambullidores* colle tre dita palmate[,] il becco come i merli, coda cortissima etc.[.] Il modo de raccoglieri fu cercarli sotto le pietre ove covano le uova che trovai da per tutto in numero 2.[,] ne presi tanti di questi uccelli che non gli portai nemeno a bordo, bastando quattro o Sei che José Maria è attorno a fare le pelli. Presi pure una di quelle rondini di mare nere che i francesi chiamano Satanique (Craveri 1990: 265).

> During these walks I collected many of those small *zambullidores* with three webbed toes, a beak like a blackbird, a very short tail, etc. The way to collect them was to look for them under the rocks where they incubate their eggs, which I found everywhere in pairs. I caught so many of these birds that I did not bother to bring [most of] them on board, four or six being enough for José Maria to make into skins. I also caught one of these black sea swallows that the Frenchmen [on board] call satanic.

Today, the Spanish word *zambullidores* means "grebes," which are obviously not what Craveri collected. It literally means "diver," and has been a general folk term applied to several species, much the way the English "duck" is extended in popular usage to a variety of aquatic birds that are taxonomically not ducks (Anderson & Palacios 2008, Enriqueta Velarde 2012 pers. comm.). Since Craveri was a scientist, his observations are probably more reliable than the name he used. As Violani and Boano (1990) imply, his (rather limited) description matches the characteristics of Craveri's Murrelet, which today breeds on Isla Partida Norte in great numbers (DeWeese & Anderson 1976, Daniel Anderson 2012 pers. comm.). Moreover, Craveri took four specimens of Craveri's Murrelet to Italy (Violani & Boano 1990), which is consistent with the "four or six" birds the chief steward prepared as skins. It is therefore entirely possible that one of these Isla Partida Norte specimens was the bird that Salvadori described as the type.

The identity of Craveri's *rondini di mare*, literally "sea swallow," is problematic, but its black color eliminates Craveri's Murrelet, which has a distinctive white underside (Jehl and Bond 1975: 12). The Italian name means "tern," as does the Spanish equivalent *golondrina de mar*. However, the black color of Craveri's *rondini di mare* rules out the predominantly white Elegant Tern *Thalasseus elegans* and Royal Tern *Thalasseus maximus*, the two species that currently breed in the region (almost exclusively on neighboring Isla Rasa).

In English, "sea swallow" also means tern but sometimes, particularly in Britain, it refers to storm-petrels. Two species of dark-colored storm-petrels, the Black Storm-petrel *Oceanodromo melania* and Least Storm-petrel *Oceanodromo microsoma* currently breed on Isla Partida Norte in vast numbers (Velarde *et al*. 2005, Anderson & Palacios 2008, Daniel Anderson 2012 pers. comm.), and records of a breeding colony of these two species date back to the early 20th century (Maillard 1923). Craveri's landing party would have heard their eerie calls emanating from beneath the rocks, and the French contingent might well have considered them creatures of the satanic realm (Enriqueta Velarde and Daniel Anderson 2012 pers. comms.).

On his second voyage, Craveri investigated the guano islands on the Pacific side of Baja California. He set sail from Mazatlán on 10 December 1856 and returned on 16 July 1857 (Craveri 1990: 490, 734, Mearns & Mearns 1992). On 16 June he went ashore on Isla Natividad and described the island and its avian residents:

> Saltato sulla spiaggia trovai un gradino quasi perpendicolare alto circa 4. metri, il quale facilmente arrampicai e mi trovai sui piani inclinati dell'isola. Questi piani s'estendono N.S. a vista d'occhio ed hanno un quarto di lega di larghezza[.] La rocca che gli forma è un Gres quarzoso giallognolo poco coerente. La superficie è pura arena prodotta dal medesimo gres scomposto, il tutto coperto dalle carrateristiche pietruzzi rottolate come lo è l'isola Patos e molte altre guanesche; solo che qui invece di Guano havvi la pura arena. I cormoran collocano i loro nidi in questo piano per gruppi di 2. o trecento, di modo che pajono pelottoni di soldati neri in un campo d'istruzione, che la refrazione [=rifrazione] ottica ajuta molto a tal illusione, che in certi momenti pare un realità. Tutto il terreno che non è occupato dai nidi, ed è la maggior superficie, è tutto bucato da quei certi uccelli neri che i francesi chiamano *Potoyon* o *Plongeons* che io presi nel Golfo sotto le pietre. Questi buchi sono così abbondanti, l'arena che sostiene i corridoi delle loro tane lunghe più d'un metro così sottile, che passandovi sopra il piede gli sprofonda e ad ogni passo si trova uno quasi cadendo mancando il suolo. Malgrado l'abbondanza d'uccelli che in nidi superficiali e sotterranei occupano tutta questa area immensa non trovasi un sacco di Guano (Craveri 1990: 684-685).

> Having jumped onto the beach, I found an almost perpendicular step about 4 meters in height. I climbed it easily and I found myself on the sloping plains of the island. These plains extend north-south as far as the eye can see and [are] a quarter of a league in width. The rock is made of a yellowish, uncompacted quartz sandstone and the surface is of pure sand derived from this decomposing sandstone. All of it is covered by the characteristic small round stones just like Isla Patos [in the Gulf] and many other islands rich in guano; only here, instead of guano, [the surface] is pure sand. The cormorants place their nests on this plain in groups of two or three hundred in such a way that they look like platoons of black soldiers in a training camp, and the optical refraction enhances this illusion so that, at certain moments, they look like the real thing. All the land not occupied by [their] nests, and that is most of the surface, is full of holes made by certain black birds that the Frenchmen call *Potoyon* or *Plongeons*, which I collected in the Gulf from under the rocks. These holes are so abundant that the sand that supports the tunnels of their dens, [which are] more than a meter in length, is so thin that when stepping on it, the sand gives way and your foot sinks, [so that] with each step you find yourself almost falling to the ground. In spite of the abundance of birds occupying this immense area, nesting on the surface and below ground, I found not one sack [worth] of guano.

Craveri goes on to describe his walk part way around the island, the dead cetacean he found, and the almost complete absence of plants. He then says:

> Sotto una tavola di qualche bastimento naufragato trovai dei topi che presi. Vidi pure una bella lucertola che presi con difficoltà scavando varj buchi perché fuggiva da quel che si scavava ed entrava in altro, finalmente la colsi e mi rallegrai perché è un rettile magnifico (Craveri 1990: 687).

> Underneath a plank from some shipwrecked vessel, I found some mice which I collected. I also saw a beautiful lizard which I captured with difficulty. I dug several holes because it would run away from the one I had just dug and enter another one. Finally I caught it and I rejoiced because it was a magnificent reptile.

The French word *plongeon* is the general term for loon (AOU 1998), which could not have been the birds Craveri saw on Isla Natividad. The word is the French equivalent of the Spanish *zambullidor*, literally meaning "diver," and Craveri's French shipmates probably applied it to a number of seabirds.

As for Craveri's Murrelet, neither Craveri's narrative nor subsequent field observations provide any indication that the type specimen came from Isla Natividad. Craveri tells of capturing mice and a lizard but says nothing about collecting birds and even explains why he saw no need to collect specimens there.

Moreover, the birds Craveri saw on Isla Natividad were almost certainly not murrelets. During the late 19th and early 20th centuries, the birds that occupied Isla Natividad's burrows were exclusively Black-vented Shearwaters (Anthony 1900, Lamb 1927), and unequivocal evidence of Craveri's Murrelet on Isla Natividad is limited to a single egg collected there in 1919 (Birt et al. 2012). Since Craveri's Murrelets and Black-vented Shearwaters are both dark above with light-colored undersides, Craveri may simply have failed to realize that the shearwaters in Isla Natividad's burrows were different birds from the murrelets he had collected a year earlier under the rocks in the Gulf of California.

Whatever the explanation, there is no question that the bird Salvadori subsequently described was a specimen of Craveri's Murrelet. Salvadori first presented his type description and then launched into an extended paraphrase of Craveri's account of Isla Natividad:

> Secondo le notizie da essi comunicatemi, questa specie sarebbe comune lungo le coste del Golfo della California, e nell'Isola della Natividad posta nel Pacifico a poca distanza dalla costa occidentale della Bassa California.

> È interessante il racconto della visita fatta a quest'isola per ricerche di guano dal sig. Federico Craveri il 6 giugno 1845. Essa si trova nella Lat. N. 27°–50′–12″;

> Long. di Greenwich O. 110°–10′–45″. All'intorno ha una costa dirupata alta circa quattro metri; presenta diversi piani inclinati, che da Nord a Sud si estendono a perdita di vista, ma non sono più larghi di un quarto di lega. Su questi piani di natura arenosa si vedono gruppi di due a trecento nidi di Cormorani (*Graculus mexicanus*), i quali a qualche distanza sembrano pelottoni de soldati neri in un campo d'istruzione. Tutto il terreno non occupato dai loro nidi è scavato da tane comunicanti le une colle altre e poco profonde nel suolo, per cui camminandovi sopra od ogni passo il piede si sprofonda. In queste tane abitano le piccole *Uriae* che il sig. Craveri aveva già preso nel Golfo della California, ove le trovava nascoste sotto le pietre. Le tane hanno piccole aperture dalle quali quegli uccelli escono con qualche difficoltà. È anche probabile che vi depongano le uova, sebbene il signor Craveri non ve le abbia trovate; egli crede che quelle tane siano scavate dagli uccelli stessi (Salvadori 1865: 388).

> According to the information they [the Craveri brothers] gave me, this species [Craveri's Murrelet] is common along the Gulf of California coasts, and on Isla Natividad in the Pacific, not far from the western coast of Lower California.
>
> Mr. Craveri's chronicle about his visit to this island in search of guano on June 6, 1845 is very interesting. This island is located at Lat. 27°50′12″ North and Long. 110°10′45″ West of Greenwich. It presents a steep coast all around about four meters high, and several sloping plains that extend from north to south as far as the eye can see, but not larger than a quarter of a league. On these sandy plains one can see groups of two to three hundred nests of cormorants (*Graculus mexicanus*), which from a distance look like platoons of black soldiers in a training camp. Under the ground not occupied by their nests are shallow burrows that connect with each other, causing the foot to sink at every step when walking on it. In these dens live the little *Uriae* [= *Synthliboramphus*] which Mr. Craveri had already collected in the Gulf of California, where he found them hidden under rocks. The dens have small openings from which the birds emerge with some difficulty. It is also likely that they lay eggs in them, although Mr. Craveri has not found any; he also believes that these holes are dug by the birds themselves.

Salvadori's paraphrase of Craveri's experience on Isla Natividad is puzzling. In the first place, it contains three egregious errors of fact. One is the date Salvadori cites for Craveri's visit to Isla Natividad, which is off by 12 years and 10 days. Another is the longitude figure he gives for the island — five degrees too far east — which has been a major source of confusion (e.g. AOU 1998). The third is his attribution of information about the murrelet to the Craveri *brothers,* because Federico's brother Ettore was home in Italy at the time Federico was inspecting the guano islands (Olson 1996).

More importantly, Salvadori's text is the source of the idea that the birds in Isla Natividad's burrows were Craveri's Murrelets ("the little Uriae"), an assertion for which Salvadori offers no support. Yet Salvadori makes no claim that Craveri collected the type specimen on Isla Natividad, and he reiterates Craveri's belief that he (Craveri) had already collected these birds "in the Gulf of California." Thus, while Salvadori can hardly be faulted for regarding Craveri's experience on Isla Natividad as "very interesting," why he included it at all is baffling, since it has no discernible relevance to the type specimen of Craveri's Murrelet.

That brings us to the note that Craveri inserted in his manuscript journal. In the margin, alongside his account of Isla Natividad, Craveri wrote in blue pencil:

> Raccolsi la Uria Craveri [sic] (Salvadori)
>
> I collected the Uria Craveri (Salvadori)

Although Violani and Boano (1990) recognize that the birds Craveri collected on Isla Partida Norte might have been Craveri's Murrelets, they nevertheless consider this margin note to be compelling evidence that he collected the *type specimen* on Isla Natividad. While the note might initially seem sufficient to settle the issue, it is inconsistent with Craveri's own journal account, which makes no mention of collecting birds on Isla Natividad. Furthermore, there is good reason to question the note's reliability because it was written from memory long after Craveri collected the type specimen. Craveri could have added it only after he returned to Italy and Salvadori had studied the specimen sufficiently to name it. The minimum interval is therefore two years, from the end of his second voyage in mid-July 1857 to his return to Italy in late 1859, and it might have been as great as nine years, the interval between the end of the 1856 Gulf voyage and Salvadori's 1865 publication. Indeed, Craveri could have pencilled the note at any time before his death in 1890.

In this context, it is worth pointing out that two years after Thomas Streets collected Craveri's Murrelet on Isla Rasa he misremembered the month he visited the island. He reports it as April (Streets 1877: 26), but records show that his ship anchored at Isla Rasa on 18 March 1875 and departed two days later (*Narragansett* Deck Logs: 1875). In short, memory is notoriously fallible, and faulty memory spares no one.

CONCLUSIONS

There is no doubt that Craveri collected the first known specimens of the murrelet that now bears his name. The question is where. Records going back to Streets' report show that they could have come from almost any Gulf island, and possibly a few on the Pacific side (DeWeese & Anderson 1976), but neither Craveri nor Salvadori provide reliable evidence for the type locality. At present, Isla Partida Norte would seem the most likely candidate. But "likely" is a long way from certainty; unless new and unequivocal evidence surfaces, the question of type locality is probably at a dead end. If the ornithological community would prefer a better-documented specimen, it might consider designating the bird that Streets collected on Isla Rasa as the type. At the least, the Committee on Classification and Nomenclature of the American Ornithologists' Union might wish to revise the garbled type locality for Craveri's Murrelet as stated in the current AOU checklist so that Isla Natividad does not lie either in the Gulf of California or on the Sonoran mainland.

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