Conical stones of the Louisiade Archipelago of Papua New Guinea and of the New Georgia Group of the Solomon Islands

Abstract
This essay provides more information than the previous literature about the conical stones of Rossel and Sudest in the Louisiade Archipelago of Milne Bay Province, Papua New Guinea. They are unique to these two islands in Papua New Guinea and were made before living memory. They are now used as nutcrackers and pounders and almost certainly were also used without mortars in former times. Nutcrackers of similar shape are used in the New Georgia Group of the Solomon Islands and it is possible that there is a connection between the conical stones of these islands and of those of the Louisiades. The information provided in this essay raises questions which are beyond the research possibilities of the present authors and can be answered only by geological and archaeological research and by someone doing field research in the New Georgia Group.

Keywords: conical stones, solomon islands, rossel island, louisiane archipelago, biko

Introduction
The people of Sudest and Rossel islands in the Louisiade Archipelago of Milne Bay Province, Papua New Guinea, use small conical stones to crack large nuts and pound their contents. The stones are of special interest because the people of these islands find them in the ground or in rivers and say they do not know who made them. So they must be of considerable age. Representative examples are shown in (Figure 1) (Figure 2) (Figure 3) (Figure 4) (Figure 5). The Sudest stones, previously reported briefly by Pamela Swadling,1 were seen by us during two visits to Sudest in 1989 and 1990.2 The Rossel stones were seen by the late John Liep during fieldwork between 1971 and 1973 and Ben Shaw during fieldwork in 2011 and 2012. Those seen by Shaw are reported in his Ph.D. thesis of 2014. Swadling reports those seen by Shaw in Rossel Island, another two in the National Museum and Art Gallery of Papua New Guinea, one in the Queensland Museum and one in the Cambridge University Museum of Archaeology and Anthropology. Details of these stones are provided below in the section on Rossel Island conical stones. Two of these had previously been reported. The one in the Queensland Museum had been published by James Edge-Partington,3 that in the Cambridge Museum by WE Armstrong.4 These two are illustrated in (Figure 4) (Figure 5) below. Neither author mentions that the people who use them do not know who made them. Conical stones of the same shape as those of the Louisiades are also used in the New Georgia Group of the Solomon Islands (Figure 6) (Figure 7) (Figure 8) (Figure 9).

The Sudest conical stones
We visited fifteen villages on the north and south coast of the western half of Sudest and one more (Gesila) on the way from one coast to the other. In most villages between one and three conical stones were shown to us when we enquired after them. Altogether we saw about twenty of the conical stones and collected some of them. They are called biko (or bigho) throughout the western half of Sudest.

1We are grateful to the anonymous referees of an earlier version of this essay for their comments on it and drawing our attention to Pamela Swadling’s article of 2016. And to Swadling for a copy of the article
2Swadling’s report was based an early version of the present essay.

Villagers said that the conical stones are not made by them, indeed that they are not made by people at all, but found in rivers, or in the ground while gardening, or in abandoned villages. One informant said that rain and floodwaters sometimes wash them out of the ground and carry them into rivers. Of the five conical stones in Figure 1, the first and second from the left are of a fine-grained amphibic rock of basaltic appearance and the third, fourth, and fifth from the left are of a medium-grained melanoconic rock of dioritic appearance.5 Informants in Gesila Village said that biko are used to pound a nut called kiekie. The nut has a hard, dark-brown shell and a white kernel. According to the Gesila informants the shell is cracked with an ordinary stone. The kernels are left for a day to make them soft and then baked in a clay pot. The biko is used to flatten the baked kernels into a small, thin, flat cake. The cake is soaked overnight in water to remove the poison it contains. Finally, it is put between two sheets of sago cake and baked on a hot stone for consumption. Informants in the villages of Mitin, Giama, and Embabilie said that biko are used as nutcrackers but did not mention that they are used as pounders. Probably they are used as nutcrackers and pounders by all those who use them in Sudest.

The length of the biko we saw in Sudest ranged from 7.5 to 25.3 cm. Most examples were below 15 cm in length. Their greatest diameter ranged from 3.5 to 5 cm. All except one had a regular conical shape. Some had straight sides making them almost perfect cones. Others had curved sides reaching their maximum width near or below the middle and then tapered towards the bottom. Some had a pointed top, others a blunt one. All had a slightly convex bottom rounded at the edge. The seven conical stones illustrated in Figs 1-3 exemplify these properties. The one pounder we saw that was not of regular conical shape may have been a stone naturally shaped, perhaps in a river. It was approximately 10 cm high and approximately cone-shaped but of irregular shape in cross-section. Throughout Sudest a number of types of objects are important valuables that can be used to buy brides, land, pigs, and canoes. Biko, though relatively rare, are not considered valuables by the Sudest people. No importance seems to be attached to them beyond their utility as nutcrackers and pounders.

The Rossel stones
The Rossel informants reported finding conical stones in gardens or by rivers, and said that they are not made by the people at all. Some encrusted with silt, others a smooth surface. They are virtually identical to those found in Sudest.

The Louisiade conical stones

1The first-mentioned author is grateful to Brian Jones of the University of Wollongong in Australia for these descriptions, obtained from him in the 1990s.
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The Rossel conical stones

John Liep told the first-named author that he obtained very similar information regarding conical stones he observed in Rossel Island between 1971 and 1973. He saw many such stones there in villages and collected at least two of them, one of which is in the National Museum and Art Gallery of Papua New Guinea. His informants told him that they are found in the ground when new gardens are made. One was found at some depth in the ground during the construction of a house for him at Pum on the northern side of Rossel. One or two of the conical stones Liep saw on Rossel may have been up to 25 cm long but most were much shorter. The two he collected measure 9.8 and 11 cm. The shortest he measured was 6.5 cm long. Typically, the Rossel stones have curved sides, reaching their maximum width above the bottom and then tapering towards the striking end. As on Sudest, the Rossel people do not regard the conical stones as valuables. According to Liep, the islanders have no idea who made them but do not believe that they were imported in the past.

Shaw (Figure 11.21) illustrates nine conical stones which he observed during his fieldwork in Rossel Island from 2011 to 2012. They are similar in shape to the Rossel stones illustrated here in (Figure 4) (Figure 5) and measured from 6.3 to 13.6 cm in length. Shaw includes a tenth pounder among the conical stones, but its shape is so irregular that it was perhaps shaped by nature rather than humans. He also illustrates three cylindrical stone pounders (Fig. 11.22), which measured 7.4 to 10 cm in length. He (ibid. 326) suggests the cylindrical pounders are older than the conical ones and were replaced by the latter because their conical shape makes them easier to use. Shaw (ibid. 324) reports that ‘no complete pounders were found in excavations’ and that the thirteen pounders mentioned ‘were recorded either in the possession of local residents or collected as surface finds’. Shaw does not report the views of Rossel Islanders as to the age or origin of the pounders.

According to Liep (op. cit.), the Rossel people, like those of Sudest, use the conical stones to crack the shell of nuts. On Rossel it is usually the galip (Canarium) nut, which is eaten raw. Liep reports that the Rossel people prepare the nut which the Sudest people call kiekie in the same way as the Sudest people. He did not see them use the conical stones to crack or pound the kiekie nuts, but does not exclude the possibility that they do. Shaw (op. cit.: 325) also reports that the conical stones were used to crack Canarium nuts and pound.
their flesh. Liep mentions that old people on Rossel also often use them to crush betelnuts. He also reports that the conical stones may at times be used for rain magic but, if they are so used, they may then not be put to any profane use. Normally, Rossel people use a stone sphere as a ‘rain-charm’. The Rossel conical stone published by Armstrong (Figure 4 in this essay) was collected by a Mr Craig before 1923. It is 10.4 cm long and in the Cambridge Museum of Archaeology and Anthropology (Nr 1922.1821). Two Rossel conical stones were collected by Sir William MacGregor in 1892 and deposited at the Queensland Museum. They are 7.6 cm (Nr M 7351) and 9.2 cm (Nr M 5508) long. The latter is shown in Figure 5. This appears to be the conical stone Edge-Partington published in his *Album*.

**Figure 5** Conical stone from Rossel Island collected by Craig before 1923.

The National Museum and Art Gallery of Papua New Guinea also has two conical stones from Rossel Island. They are catalogued as Nrs 000330.BNV.04 and 013051.BOE.01. The latter was collected by John Liep. Although Sudest villagers claim that *biko* are not made by humans, it is clear that they are artefacts but apparently made before living memory. As no special importance is attached to them, it would be otiose to speculate that their being artefacts is kept secret from Western inquirers. The Sudest/Rossel conical stones are not the only type of artefacts which some of the Louisiades people regard as objects created by nature. The most widely-used ceremonial exchange valuable in Milne Bay Province is a finely shaped, highly polished, greenstone axe blade, called *tobwatobwa* in some parts of the Louisiades and *beku* in the Trobriands. They were quarried at Suloga on Woodlark Island until approximately the 1870s. They are dark green with light green striation. The final shape and polish appears to have been added in a number of places in the province. Hundreds of the blades were still in circulation in the late 20th century. One would expect it to be common knowledge among the people of the province that the blades were quarried and polished by humans. Yet Debbora Battaglia (op. cit.) reports that some people in the Calvados Chain (the western part of the Louisiades) believe the Woodlark axe blades to be ‘natural objects unshaped by man’ which ‘lie in estuaries, growing as shells grow’.

**Figure 6** Conical stone from Rossel Island collected by MacGregor in 1892.

We are not aware of any archaeological research that has been carried out on Sudest. However, Shaw records a wide range of stone tools used in Rossel Island, including of course the conical stones discussed in this essay, most of which fell out of use after the introduction of metal tools. Two types of stone tools, waited axe blades (ibid. Figures 11.5–11.7) and sago beaters (ibid. Fig. 11.19, he believes to be of locally occurring stone. A single fragmentary tool flake with white striation may also have been sourced from local rock (ibid. 289 and Fig. 11.2). Shaw seems to believe that most of the other types of stone artefacts found on Rossel were imported because of the low occurrence of stone flakes from the production or reshaping of stone tools and the limited occurrence of medium grained rock that would have been suitable for tool manufacture on Rossel. However, he does not specifically comment on the likely origin of the conical stones found on Rossel. He does not mention that they also occur on Sudest.

Armstrong reports that Craig, who collected the conical stone pounder shown in Figure 4, ‘had experience in mining [and] had not come across any rock on Rossel of similar material’ to that of the conical stone he collected. Armstrong (ibid.) also mentions that when Craig collected the ‘pestle’ he ‘discarded what may have been the mortar belonging to it’. No description of the mortar is provided. Presumably it was a stone mortar. There are no other reports of stone mortars from Rossel or Sudest. We did not see any during our visits to Sudest in 1989 and 1990.

The Solomon Islands conical stones

Another region of Melanesia where stones of the same shape as the Louisiades pounders are used are the Solomon Islands, the archipelago closest to Sudest and Rossel in a north-easterly direction. There too, the stones are used as nutcrackers. Unlike those of Sudest and Rossel, they are attached to a cane-handle and appear to be more uniform in size than those of the Louisiades. Twenty examples of the Solomons nutcrackers in the British Museum, London, the Field Museum of Natural History, Chicago, the Australian Museum, Sydney, and the Solomon Islands National Museum, Honiara, that have been measured range in length from 5 to 9 cm. Another, once in the collection of Leo Fleischmann, Sydney, is 6 cm long. Jean de Surville observed the use of one of these nutcrackers during his 1769 voyage through the Solomon Islands; at a place on the north-east Coast of Santa Isabel Island he named Port Praslin. He records that it was called hapiau there.

The great majority of the Solomon Islands nutcrackers in the four museums mentioned and the Fleischmann Collection whose place of collection is known were collected in the New Georgia Group, especially Vella Lavella. Another was collected in Santa Isabel and three more in Buka, Bougainville. The following is the collection data for the nutcrackers with the most reliable information in the collections mentioned.

a. Field Museum Nrs 135830 and 135832 were collected by A.B. Lewis in Vella Lavella Island in the New Georgia Group. Nr 276841 was collected in Santa Isabel.

b. Solomon Islands National Museum Nr 70.095 is from Ndovele Village, Vella Lavella Island (Maria Lane, pers. comm., Feb. 26, 1991).

d. British Museum Oc1927, 0310.23 is from Simbo Island in the New Georgia Group. According to Dorota Starzecka (pers. comm., April 8, 1991), Oc1927, 0310.27 was also collected in Simbo Island. Both objects are illustrated in the museum’s online research catalogue.

e. British Museum Nrs Oc1902, 0603.10 and Oc1944, 02.1366 are shown in the online research catalogue as being from the New Georgia Group. The latter is illustrated in the museum’s online research catalogue.

f. Australian Museum Nrs E.50529/1-2 and E.80701 were collected in Buka, Bougainville.

g. The nutcracker formerly in the Fleischmann Collection was bought from its collector who had obtained it in Ndovele Village, Vella Lavella Island.

The New Georgia Group origin of the Solomons nutcrackers is supported by Maria Lane. She advised that while she was an ethnologist at the Solomon Islands National Museum her colleagues there told her ‘that these items are found only in the Western Province and not throughout the Solomons’. However, as noted above, the three examples in the Australian Museum were collected in Buka, Bougainville. Edge-Partington also appears to have attributed the Solomons nutcrackers he illustrated to the New Georgia Group.

He gives this locality for the example he published in An Album of Weapons (1890-98, Vol. II: 106, Nr 1). The object is in the British Museum (Oc, +.3461) but the museum records provide no place of collection. Maria Lane mentioned that, according to the Solomons museum catalogue, the vernacular name for the nutcrackers in Ndovele Village, Vella Lavella is *patulamu*, a name that differs from *hapiau*, the name reported by Fleurieu.

### Discussion

In her essay titled ‘Mid-Holocene Social Networks in Far Eastern New Guinea’ of 2016, Swadling provides a survey and discussion of prehistoric stone mortars and pestles and includes the conical stones of Rossel and Sudest in this survey. She does not distinguish between two senses of the word ‘pestle’ in her essay: the narrow sense in which it refers to implements for grinding and pounding used with a mortar and the wider sense in which it refers also to implements not used with a mortar. As dozens of conical pestles (or pounders) have been observed in Rossel and Sudest but only one mortar, it is quite unlikely that these pounders were used with mortars in times before living memory. Some are less than 8 cm long and would be difficult to use with a mortar. This also means that the age of the mortars provides no evidence of the likely age of the conical pounders of these islands. In recent decades Rossel and Sudest Islanders have of course used the conical stones without mortars. This essay is written from the perspective of the history of material culture. It summarises the factual information we have about the conical stones of Rossel and Sudest, and the New Georige Islands and raises issues that are best answered by geological and archaeological research in the Louisiades and by someone doing research in the New Georgia Group. These issues include the following.

1. It may seem unlikely that there is a link between the conical nutcrackers of the New Georgia Group and the conical stones of the Louisiades, given that the two island groups are separated by over 400 km of ocean. However, Sheppard et al. propose that in the remote past there was some interaction between the Solomon Islands and Milne Bay Province. They mention two pieces of evidence for this. They report (ibid. 75) that an obsidian flake excavated in the Reef Islands in the Solomons has been sourced to Fergusson Island in Milne Bay Province. And they also report that Tochilin et al. propose that certain pieces of prehistoric potsherds found at the Roviana Lagoon, New Georgia Island, in the New Georgia Group, which were not made locally, originated at Muyuw (Woodlark) Island in Milne Bay Province. To the above can be added evidence of a connection between the Solomons and Rossel Island. Armstrong et al. report, as Sheppard and others mention, that some Rossel Islanders ‘think they originally came from an island eastwards’. Shaw also reports that Rossel Islanders believe that some people migrated from the Solomon Islands to Rossel at some time in the past. And Maria Lepowsky reports that the small Bwetha clan [of Sudest] is said to have originated somewhere in the Solomons Islands, where one woman was caught by a cyclone while fishing in a canoe and blown westward until she washed ashore near East Point, Rossel Island. Several generations later a descendant married at Seghe on Vanatinai [that is, Sudest Island], and members of the Bwetha clan are now found scattered around the island. Hence, the possibility that there is a connection between the conical stones of Rossel and Sudest islands and those of the New Georgia Group cannot be excluded. Of course it is also possible that they were invented independently in Milne Bay Province and in the New Georgia Group.

2. As already noted, Craig, who collected the conical pounder shown in Fig. 4 and had some experience in mining, had not seen the type of rock the pounder is made of in Rossel. However, given that a considerable number of conical stones were observed by Liep and Shaw in Rossel and ourselves in Sudest and none has been reported from other islands of Milne Bay Province or other provinces of Papua New Guinea, it seems most likely that they were made in one or both of these islands. Shaw agrees that it is ‘possible the pounders were made on Rossel and Sudest as both islands have areas of outcropping diorite, with some dolerite and basalt’. The present inhabitants of Sudest speak an Austronesian language and those of Rossel a Papuan language. It seems likely that Sudest once had a population speaking a Papuan language which was absorbed by Austronesian-speaking immigrants. It is tempting to speculate that the present inhabitants of Sudest do not know who made the conical stones because they were made by the previous inhabitants speaking a Papuan language. However, this idea is undermined by the fact that the Papuan-language speaking people of Rossel also do not know who made those they use.

3. We have not been able to establish whether the conical stones of the New Georgia Group have been made within living memory. The report in Fleurieu, mentioned above, shows that in these islands they were in use in the 18th century.

4. Geologists would be able to establish whether the conical stones of the Louisiades and of the New Georgia Group are made of types of rock which occur on the islands where they are used. As noted above, three conical stones have been collected in Buka Island, which is of course part of the state of Papua New Guinea. However, these stones are likely to have been obtained from the New Georgia Group, not from other parts of Papua New Guinea.

The information on the internet regarding the geology of Rossel and Sudest does not include a mention of aphonitic rock of basaltic appearance or melanocratic rock of dioritic appearance, the types of rock of which the five Sudest pounders in Fig. 1 are made.
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5. Until one of the conical stones of Rossel and Sudest is discovered under conditions which permit it to be radiocarbon dated by surrounding material, their age will remain unknown.

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Conflict of interest

None.

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