A journey through Austronesian and Papuan linguistic and cultural space
Papers in honour of Andrew Pawley

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Introduction

Today small ships can travel up the Sepik River as far as Ambunti some 200 km as the crow flies from the sea (Figures 1–2). In pre-European times, contrary to expectation, trading activities did not extend from the coast up the navigable length of the Sepik River. Groups living in the middle Sepik, that is the stretch of river from above Angoram upstream to Ambunti, received coastal trade items not via the Sepik River, but overland from the north coast. Coastal trade goods were brought up the Sepik River but were diverted in its lower reaches up its southern tributaries. The latter in turn linked with routes into the central highlands. This paper examines how this cultural fence may have arisen.

The trade network that extended from the coast to the lower Sepik River and then diverged up its southern tributaries, as far as the flanks of the central highlands, is called in this paper the lower Sepik trade sphere (Figure 3). It was one of two trade spheres operating in the mid-lower Sepik basin in the early twentieth century. The other trade sphere, called here the middle Sepik trade sphere, extended from the north coast by foot over the coastal mountains and thence by foot and/or canoe to the middle Sepik. The southern links of this sphere, extending from the middle Sepik floodplain to the central highlands, were severely disrupted in about 1905 when the floodplain dwelling Chambri fled south to the foothills after being attacked by warriors from an Iatmul village (Gewertz 1983:105).
In addition to the long distance networks that linked coast, floodplain and highlands there were local trade networks that were primarily concerned with trading local products. It is proposed here that the long distance and local networks of the two trade spheres played a major part in producing the current language distributions found in the Sepik-Ramu region.

It is possible to gain some insights into the antiquity of coastal–highlands interaction in the Sepik-Ramu from prehistoric stone artifacts. These were made and used in the early to mid-Holocene. During this period an inland sea existed in the Sepik-Ramu region.

The inland sea

For much of the last 10,000 years the Sepik-Ramu floodplain did not exist. Instead there was a brackish inland sea that reached its fullest extent 6500 to 7500 years ago (Figure 4). This inland sea made it possible to voyage from the Bismarck Sea to the foothills of the central highlands. The Sepik and Ramu rivers and many smaller rivers drained into this inland sea via deltas (Chappell 2005, Swadling 1997). Freshwater originating from the central highlands and coastal mountains and tidal flows from the Bismarck Sea flowed through two passages located on either side of Bosmun Island situated near the mouth of the inland sea (Figure 4). The western passage was near Marienberg and the eastern near Bunapas. The presence of coral and white sand at Marienberg suggests that the circulation pattern within the inland sea operated with seawater entering via the Marienberg passage and brackish water discharging by the Bunapas passage. This would explain why mid-Holocene brackish water shellfish middens (Swadling 1997) occur in the vicinity of the Bunapas passage (Chappell 1993, 2005).
Different styles of stone mortars and pestles and their distributions during the time of the inland sea provide an indication of interaction during the mid-Holocene (Figures 4–5). Pedestal mortars, for example, demonstrate that there were links between the highlands and shores of the inland sea, then east along the New Guinea coast as far as Oro (Swadling, Wiessner and Tumu 2008). Other finds shown in Figure 5 show that these links extended from the highlands along the coast to the Huon Peninsula across Vitiaz Strait to West New Britain, as far as the Willuamez Peninsula (Figure 1). Independent confirmation that links existed between West New Britain and the lower Sepik region in the mid-
Holocene is provided by obsidian artifact finds. Four stemmed obsidian tools have now been found in the lower Sepik region. One is unavailable for study, but the remaining three have been sourced to the Willaumez Peninsula (Swadling and Hide 2005:307–308). They were manufactured in West New Britain from some time before 6160–5740 years ago and ceased to be used by 3480–3160 years ago (Torrence and Swadling 2008).

**Figure 3:** Schematic representation of the lower and middle Sepik trade spheres

Upstream of both the Sepik and Ramu deltas are large clusters of stone mortar and pestle finds (Figure 4) suggesting that these areas had higher populations than surrounding areas in the mid-Holocene. Such artifacts have been dated in the highlands from 8000 to 3000 years ago (Swadling and Hide 2005:293). The finds from the vicinity of Kambot may have come from small islands in the former inland sea. Some are shown in Figure 4, but spot heights on the floodplain indicate that there would have been many other islands in the inland sea. Other mortar and pestle finds have been reported from the north coast and offshore islands such as Kairiru, Muschu and Manam.

The presence of a mortar as well as a pestle in the foothill country drained by a tributary of the Karawari, and a stone figure from the upper reaches of another Karawari tributary are significant as these finds lie on an important trade route between the floodplain and lower Lagaip valley in the highlands (Swadling, Wiessner and Tumu 2008). Another indication that this trade route dates back to the mid-Holocene are the trochus armbands\(^2\) that were excavated from deposits of that age in the Kutepa rock shelter located in the

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\(^2\) Trochus armbands were not observed in the highlands in the 1930s (Hughes 1977:185). It is also relevant to note that few *Trochus niloticus* occur on the modern Sepik coast, but the species is common in the Vitiaz Strait region. The presence of stemmed obsidian artifacts of mid-Holocene age from West New Britain in the lower Sepik makes it likely that the trochus armbands found in the Kutepa rock shelter originated from the shores of Vitiaz Strait.
lower Lagaip (pers. comm. Jo Mangi 1988). It is on this same trade route at an altitude of 600 metres that the Yafebaiyeli sago swamp is located. This ten square acre sago swamp is located in an east-west fold in the northern flanks of the central highlands (Dornstreich 1974:140–141, Map 4) and was possibly established as a source of food for trading parties. Yen (1985:837) considers sago above 300 metres to have been planted. The altitude, size and location of this swamp on this trade route make it a prime site for a palaeo-environmental study.

Apart from the above-mentioned route, there were other routes via different Karawari tributaries into the highlands from the shores of the inland sea. East of the Karawari there were also routes via the upper Yuat and its tributaries (Gorecki and Gillieson 1989), the upper Keram (Flanagan 1983:13) and rivers that drain into the Ramu (Görlich 1998; Kaspruś 1973; Majnep and Bulmer 1977).

**Figure 4:** The Sepik-Ramu inland sea at its fullest extent 6500–7500 years ago. Also shown in the distribution and frequency of prehistoric stone mortars and pestles (shoreline follows Chappell 2005).
The formation of the floodplain and emergence of two interaction spheres

After 4000 years ago the inland sea started to infill, resulting in the formation of the current floodplain and the seawards progradation of the coastline (Chappell 2005). When the Sepik-Ramu floodplain formed, its drainage pattern was different to what exists today. The key difference was that the Ramu River did not follow its current direct course to the Bismarck Sea, but was actually a tributary of the Sepik. Formerly the Ramu River flowed west in the vicinity of Annanberg and then followed the current course of the Keram River (Figure 4). Aerial photos such as those available on Google Earth clearly show that the channel of the Keram River is superimposed on larger meander bends than the Keram’s flow capacity can produce. The Ramu has changed its channel position more than once as another of it’s abandoned palaeochannels can be seen between the current channels of the Keram and the Ramu (Yu et al. 1991). River channel changes such as that of the Ramu have implications for social interaction on and across the floodplain, as river transport is the only means of travelling any distance in this environment.

After 4000 years ago access to the Sepik basin from the coast was only possible via two routes. These routes were via the Sepik River or overland from the north coast. Control of the Sepik River would have become a strategic concern. It is likely the Ramu and Sepik groups who produced the clusters of mortars and pestles found upstream of the Ramu and Sepik deltas would have competed to gain control of the main Sepik channel. The Ramu group were able to divert trade from the lower Sepik River to its southern tributaries, especially the Ramu/Keram, Yuat and eastern Karawari rivers. The latter was then probably flowing via a palaeochannel that is now Kenglame passage. Such a scenario would explain the origins of the lower Sepik trade sphere.

A very different scenario explains the origins of the middle Sepik trade sphere. The descendants of the Sepik groups would have found that they were cut off from supplies of exotic north coast trade goods when trade items could not be obtained via the Sepik River. This would have encouraged them to move away from the developing floodplain and back swamps and to try to re-establish their coastal links via the coastal mountains to the north. This need to relocate and regain former links may explain the current distribution of speakers of the Ndu language family (Figure 8). People speaking languages from this family are found mainly north of the main river in the middle Sepik. Their distribution extends into the foothills of the coastal mountains and in the case of the Boiken speakers north to the coast and offshore islands (Allen 2005; Roscoe 1989, 1994; Swadling and Hide 2005). Like the speakers of the long-present Torricelli family (Laycock 1973), the ancestral speakers of Ndu languages established trade networks that extended from the north coast to the middle Sepik.

The long distance trade networks

Historical descriptions of trading activity are available for the main environments within the lower Sepik trade sphere, but this is not the case for all environments in the middle Sepik trade sphere. The least known section of the latter concerns the route from the southern part of the floodplain up the northern flanks into the highlands, but Kumagai (1998:49) provides some information on links across the floodplain to the foothills. This

Archaeologists may find that surveying the banks of former palaeochannels, especially the Keram, may turn out to be a productive way of finding prehistoric settlement sites.
lack of observations can probably be explained by the major disruption to life on the middle Sepik floodplain that occurred early in the twentieth century. This was the dispersal of the Chambri in about 1905 after attacks by Iatmul from Parambei village. The Chambri did not return to their island for more than 20 years (Gewertz 1977, 1983:105–106, 220). However, the wide swathe of people speaking Sepik languages, south of the middle Sepik River and up onto the northern flanks of the central highlands, and in the case of the Hewa into a highlands valley (Lagaip), suggests that trade networks once extended south of the middle Sepik into the highlands (Figure 3).

**Long-distance traders**

Historical accounts can provide us with some indication as to the nature of trade in different environmental zones in the prehistoric past. Coast to highlands trade is dependent on chains of interpersonal relations with the nature of the environment influencing the actual distance travelled in any particular segment. Within the social networks that make up the lower Sepik interaction sphere two segments stand out as being longer than others and thus critical for maintaining links between the coast and the highlands. These segments cover from the coast up the lower Sepik, on the one hand, and from the edge of the floodplain to the edge of the highlands, on the other. At the beginning of the twentieth century the Murik dominated both the coastal and lower Sepik trade (Lipset 1985, 1997; Tiesler 1969–70), whereas many different groups were involved in moving goods between the floodplain and the highlands. The Gadio who live on the upper Karawari and its major tributary the Korosameri provide the basis for the observations given here.

In the first half of the twentieth century the Murik dominated riverine trade up the lower Sepik as far as their ancestral homeland at Moim Lagoon. They were also the leading seagoing traders both east and west of the Sepik delta. Their trading partners extended westwards along the coast as far as Yakamul in West Sepik province, on the offshore

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4 This major disruption arose because the political economy of the middle Sepik changed following the importation of iron tools. These were brought into the middle Sepik from the north coast via the traditional trade sphere. In the late nineteenth century a number of trade stations were established on the Sepik coast. They were manned by either German or Ternate traders (Swadling 1996:219–220). By about 1905 sufficient iron tools had been imported into the middle Sepik to make the stone tools produced by the Chambri redundant. Accordingly the Iatmul from Parambei village no longer felt any need to protect their source of stone tools and raided the Chambri, who were forced to flee. The Parambei attackers even had a shotgun acquired from the Germans (Gewertz 1977:38–39, 1983:105).

5 According to their oral history the Murik moved to the coast 200 or more years ago (Somare 1975:15; Lipset 1997:28). It is not clear what prompted their move from just upstream of Angoram to the coast. Perhaps visits by European ships including the visit in July 1616 by the Dutch sailing vessel commanded by Jacob le Maire might have been a significant factor. The journal of the voyage by Jacob le Maire and his captain Willem C. Schouten reports passing Manam and then sailing through what was assumed to be the discharge of rivers. The sea in the latter area was observed to have reduced salinity, to be coloured by sediments and to have trees, branches and leaves floating on its surface. This description fits the nature of the discharge of the Sepik and the Ramu rivers. Le Maire and his crew anchored at two locations just west of the Sepik River mouth for three days. During this time they received two visits from the inhabitants of the East Sepik coast. On the last day of their visit twenty canoes containing, men, women and children came along side. The Dutch were disappointed in not being able to obtain one of the pigs they saw in the nearby villages. Coconuts were scarce and not cheap, the ship’s journal records that the locals wanted a fathom of linen for four nuts (De Villiers 1967:219–221). The inclusion of women and children in the canoes going out to the ship suggests that this was not the first time that a ship’s crew had traded with the people in this part of New Guinea.
islands from Walis to Manam and eastwards along the coast to just beyond the mouth of the Ramu River. Despite the presence of Austronesian speaking communities (Figures 2 and 6) along the coast and offshore islands, the Murik dominated in both the maritime and riverine movement of goods. This raises the question as to whether during the time of the inland sea the population clusters living upstream of the Sepik and Ramu deltas had a similar hegemony over their respective regions.

The other long segment within the lower Sepik sphere involved carrying up goods from the floodplain and bringing down items from the highlands. The Gadio described here played a comparable role to that of the Mountain Arapesh who moved goods over the coastal mountains (Mead 1967:22; Dobrin and Bashkow 2006). The people living on the northern flanks of the central highlands are renowned for the distance they travelled on foot. In some cases they would take three to five days to reach trade partners (Hatanaka 1988). The Gadio were one of the groups involved in such activity in the headwater area of the Korosameri and Karawari rivers (Figure 3).

In 1967–68 taro was the Gadio’s staple. They used sago when garden food was in short supply and as provisions when travelling. Yafebaiyei, mentioned above, was their main sago swamp. The Gadio’s most important trade route was the one that linked the highlands and the Sepik lowlands. This interest influenced marriage patterns amongst this predominantly patrilocal group. To the north they obtained brides from the Alamblak living at the edge of the floodplain and to the south from the Nete living on the highlands fringe. The Alamblak depend on sago, collecting, hunting and fishing for their livelihood and had haus tambarans, religious sculpture and male initiation ceremonies, whereas the Nete depend on sweet potato cultivation and pig husbandry. In the 1960s the Gadio regularly visited their affinal kin and co-resided with them during their visits, shared economic work and exchanged goods (Dornstreich 1974:37, 122, 198, 216–217, 494, 504–505, 518; Foley 1991:6, 10). Overall the Gadio’s main contribution to the trade network was labour, their efforts moved goods from the foothills to the highlands fringe and vice versa.

The north coast to highlands chain of interpersonal relations did not end in the highlands but continued south across New Guinea. For instance, the lower Sepik route into the highlands via the Gadio, described above, continued south from the lower Lagaip to the Tari basin and thence south to the Papuan Plateau, where links extended to the south coast. As with other groups located on this chain the Tari considered this alignment across ecological zones to be their most important trade route (Ballard 1994:141).

**Exotic trade items**

Exotic items from the coast that reached the highlands included shell valuables, such as shell rings and Nassa shells. Dances and ceremonies were also traded upriver from the coast. For instance, Mead (1948:172) reports that the Biwat of the middle Yuat occasionally obtained these from a lower Yuat village in the early twentieth century. The antiquity of the trade in dances and ceremonies is an interesting question, as it has implications for interpreting prehistoric ceremonial activities such as the wide distribution of bossed stone mortars in eastern New Guinea as well as their distribution east as far as the Willaumez Peninsula of West New Britain.

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6 The desire to learn the latest dance seems to have provided a major incentive for trade in some areas. For example, the Beach Arapesh recognised that the Murik used the selling of dances as a way of promoting their shell valuables, baskets and other products (Mead 1970:35).
From the highlands and its flanks came a different range of exotic items. In 1932 Mead, based at Biwat on the middle Yuat, recorded that bird of paradise plumes, pearl shell crescents, hunting magic, stone axes, stone sago cutters, bows and arrows were traded from the highlands to the Sepik floodplain (Mead 1948; McDowell 1989, 1991). How far bird of paradise plumes from the highlands were traded downriver is not documented. However, some indication of the importance of highlands trade goods in the Sepik-Ramu basin is evident in the distribution of stone axes and pearl shell breast ornaments on the floodplain.

**Figure 5:** In the mid-Holocene long-distance links between the highlands, coast and West New Britain were made possible by the presence of the inland sea. The comparable mortars and pestles found in these regions are the legacy of this contact.
The distribution of stone axes from the highlands on the Sepik-Ramu floodplain, apart from an odd leakage, falls within the area of the lower Sepik trade sphere. Plotted on Figure 8 is the recorded distribution on the floodplain of stone axes from the Jimi and Wahgi quarries in the highlands as well as the extent of the Chambri stone tool trade. The middle Sepik floodplain was supplied by a local source at Chambri Hill (Gewertz 1977:87–90, Pétrequin and Pétrequin 2006:309–316). The inner ring represents the direct trade by the Chambri with their trade partners, whereas the outer ring shows the onward trade made by these trade partners. It is not known when production at the Chambri quarries commenced, but they ceased production when the Chambri abandoned their island in about 1905 (Gewertz 1977:38–39, 1983:105). By this time stone tool use was in decline throughout the lower-middle Sepik floodplain.

The pearl shell crescents being traded down the Yuat in 1932 seem to have been more important to the people of the middle Sepik trade sphere than those of the lower Sepik. In the middle Sepik they are the second most important shell valuable for the Iatmul and are third for the Chambri (Milan Stanek pers. comm. 1985; Gewertz 1983:238). The German expeditions up the Sepik made respectively in 1909 and 1912–13 report the presence of pearl shell crescents at Malu near Ambunti and at a Iatmul village, Parambei No. 2 (Reche 1913; Kelm 1966: Plate 125). They were not common.

Neither Mead nor Gewertz make specific comments as to how the Chambri received their pearl shell valuables. For Gewertz (1983:77) shell valuables originated from the north and reached the Chambri through the Iatmul and left the region to the south through Sepik Hills groups. As the Torres Strait is the source of the pearl shell used to make the crescents, it is likely that the Chambri either received them from groups living near the Korosameri or Karawari Rivers or indirectly from these groups via the Iatmul. Here it is relevant to note that pearl shell crescents feature in the prehistoric rock art of the Karawari found in rock shelters on the flanks of the central highlands (Swadling et al. 1988:19, Plate 45). This area is close to where the best quality and greatest number of pearl shells were observed in the highlands in 1933. This was the upper Wahgi of the Western Highlands and the first Europeans in the area were told that the pearl shell had been obtained from the inhabitants of the Kaugel and Nebilyer valleys to the south (Hughes 1977:55, 57, 185). Pearl shell artifacts have been traded across New Guinea for a long time, as broken pieces of pearl shell dating from 3000 to 2000 years ago have been excavated from the Ritamauda rock shelter in the Yuat gorge (Swadling and Anamiato 1989:225–227).

The local trade networks

Historical accounts indicate that local networks extended out from nodes along the long distance networks. For instance, the Biwat of the middle Yuat were not only a node in the long distance network, but were also the focus for the local trade network that extended east and west across the middle Yuat floodplain. Some exotic items were traded in the local network, but most items were local products such as pottery, spears, paddles, net

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7 Mead observed during the four months she spent with the Chambri in 1933 that one kina shell changed hands four times. Some idea of the importance of this valuable is gained from the nature of these transactions. They were as follows: Tchuikumban received the kina shell from his classificatory sister during a ceremony to open a men’s house in return for his contribution of sago and coconuts; he gave it to his prospective father-in-law’s clan to help them fulfill their debt to his fiancée’s dead husband’s father; but took it back when he feared his wedding was off; he then contributed it to a pig payment his clan made to their affines in order to end a major mourning ceremony (Gewertz 1983:75).
The impact of a dynamic environmental past on trade routes and distributions


On the flanks of the central highlands ceremonies provided an opportunity for trade between groups living in the same environmental zone. Dornstreich observed for the Gadio that aggression and ritual were closely related, but mutually exclusive events. A yabu ceremony would be held to temporarily end the prevailing sporadic raiding and this would provide the opportunity for trade. For the Gadio such occasions allowed them to obtain goods such as arrows and formerly stone axe blades. Such ceremonies were in decline by the late 1960s (Dornstreich 1974:508–509, 513, 516).

Language families, interaction spheres and trade networks within the lower-middle Sepik

Environmental changes that date back at least 4000 years have influenced the development of the language families found in the lower-middle Sepik. It is likely that the formation of the floodplain played a part in their distribution pattern and that protoforms were spoken on the shores of the inland sea during the mid-Holocene. This proposed antiquity is comparable to that proposed for the language groups in the Eastern Highlands on the one hand and the Wahgi communities in Simbu and the Western Highlands on the other (Foley 1986; Swadling 2005:11).

Figure 6: Modern language map
(Sources: Laycock 1981; Dornstreich 1974; Foley 1991, 2005; Ross 2005)
Looking at the distribution of language families (Figure 6) as well as interaction spheres and the trade networks within the latter (Figure 3), it is apparent that there is a close relationship between language and trade in the lower-middle Sepik and Ramu. Trade was undertaken by using canoes, as these were the only way of travelling any distance across the floodplain. Within the lower Sepik trade sphere related languages occur along the trade networks that developed along each major waterway. This explains why the Lower Sepik, Yuat and Ramu language families have a generally linear distribution.

Trade networks within the other proposed trade sphere, which extended from the north coast to the middle Sepik (Figure 3), brought coastal goods, such as shell valuables, to the middle Sepik. The absence of settlements until relatively recently along the Sepik River, from upriver of Angoram to downriver of Ambunti\(^8\) may explain how Lower Sepik language family speakers came to be resident at Chambri and formerly at Aibom.\(^9\) The Chambri and Aibom hills in the swamp country south of the Sepik River have stone and clay resources respectively. Although the Chambri stone trade prior to its demise about 1905 attracted large numbers of shell valuables (Gewertz 1983:238), little is known as to the nature of the trade networks that extended south of the middle Sepik into the highlands. The large number of Sepik languages spoken by people living along the foothills, northern flanks, and in the case of the Hewa within the highlands, suggests that active trade networks once extended up the western Karawari tributaries, as well as up the April and Wogamush rivers. Some of these links may date from the time of the inland sea and others may be more recent. Despite the possibility of varying time scales, trade networks provide a plausible explanation as to how languages within the Sepik language family came to be spoken from the north coast south into the highlands.

Conclusions

The long-term view presented in this paper shows that environmental changes can have significant impacts on the formation of trading relationships and spatial networks and on the distribution of language groups.

In the early to mid-Holocene a large inland sea covered much of the middle and lower Sepik-Ramu basin. This body of water allowed canoe access from the Bismarck Sea to the base of the central highlands. Ease of interaction between coast, lowlands and highlands was far greater across the inland sea than subsequently when the position of the rivers and tributaries of the floodplain restricted movement and changed access to former trade partners and resources. During the time of the inland sea, the people inhabiting the Sepik-Ramu had links not only with the highlands but also along the New Guinea coast and across Vitiaz Strait to West New Britain. This interaction is demonstrated by the presence in the Sepik of obsidian artifacts from West New Britain and the occurrence of particular styles of mortars and pestles in both east New Guinea and West New Britain.

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\(^8\) The first Iatmul were Sawos who left the swamp forest north of the Sepik River and settled on the banks of the river. Iatmul genealogies indicate that this happened more than 250 years ago. Unlike the Kwoma who claim to have expelled or absorbed the previous occupants of the Ambunti hills, Iatmul traditions indicate that the banks of the middle Sepik River were unoccupied when they settled there (Newton 1997:379). By the early twentieth century Iatmul villagers dominated the middle Sepik floodplain.

\(^9\) The people at Aibom came under Iatmul influence post 1850 (Schuster 1990).
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Figure 7: Modern extent of the Ndu language family (following Layock 1981)
Note that *latmul* from Kandingai only settled south of Lake Chambri in 1944 at the invitation of a Chambri *luhuai* (Gewertz 1983:138–140).

Figure 8: Distribution of highlands axes and extent of the Chambri stone tool trade
The inner dashed line indicates the extent of trade by Chambri with their own trade partners and the outer ring shows the onward trade by these trade partners (based on Gewertz 1977:Map 3.1).
All the rivers that formerly flowed into the inland sea, apart from the Sepik, the Korosameri and current channel of the Karawari, join the Sepik River in or near its lower section (Figures 2 and 4). Once the inland sea infilled, the available routes across the floodplain influenced the way the interaction spheres developed. The only means of travelling any distance across the forming floodplain was by river transport. This meant access routes between the coast and the highlands followed the pattern of the river channels on the floodplain. This pattern gave rise to the lower Sepik trade sphere and explains why in the early twentieth century the main flow of upriver trade from the Sepik delta was not up the main channel to the middle Sepik, but south from the lower Sepik up its southern tributaries, principally the Keram, with the Yuat and eastern Karawari system being also important trade routes. It is proposed in this paper that these trade networks played a major part in producing the language family distributions found in this part of the Sepik-Ramu floodplain.

A different situation seems to have developed for those groups living in the vicinity of the former Sepik delta of the inland sea. Once the infilling of the former inland sea began groups moved away from the developing floodplain seeking to regain coastal links via the coastal mountains to the north. This would explain the distribution of speakers of languages belonging to the Ndu family within the Sepik language family.

In summary, interpersonal trade relations within the middle-lower Sepik-Ramu can be grouped into two trade spheres. One trade sphere extended from the north coast through to the middle Sepik, the other from the Sepik delta to the southern Sepik tributaries, as far west as the Karawari. Speakers of languages belonging to both the Sepik family and long-present Torricelli family (Laycock 1973) participated in the coast to middle Sepik trade sphere, whereas the lower Sepik to southern Sepik tributaries trade sphere was operated by speakers of the Lower Sepik, Yuat and Ramu language families. These observations link linguistic distance and interaction spheres, and the trade networks within them, and raise interesting questions for both linguistics and archaeology.

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