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## SHORTER COMMUNICATION

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### SEAFOOD “GARDENS”

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*Ana tai timu, ana tai pari.*

All good things happen in the fullness of time.

*Māra mataitai* (seafood gardens) have been a feature of the Māori economy for hundreds of years but are very much under-represented in the literature, although the ubiquity of shells in middens, especially *pipi* (*Paphies australis*), *tuatua* (*Paphies subtriangulata*) and *tuaki* or cockles (*Austrovenus stutchburyi*), attests to their importance over the centuries. However, it has often been assumed that they were just harvested where they occurred, without detailed management regimes. Some have been rather doubtful of applying the term “gardens” to seafood but, as will be seen, these resources were certainly cultivated. Of late, the term has also been used in North America (see Thornton *et al.* 2015, Williams 2006). The issue of nomenclature has been complicated by cross-cultural attitudes to indigenous efforts at resource management. Shepard Krech III (1999) in his controversial book, *The Ecological Indian*, examined a range of traditional Native American harvests and argued for no evidence of an ethic of sustainability. However, in response, Michael Harkin and David Rich Lewis arranged a symposium to examine Krech’s findings and in their 2007 book, which summarises the symposium, they state that Krech’s ethic view was rather wanting, merely reflecting the dominant, traditional, academic paradigm.

#### SEEDING

Garven *et al.* (1997: 24) report that seeding of shellfish beds was a feature of shellfish husbandry: “Shellfish beds were seeded with superior strains taken and transplanted from other areas, and established beds were both enhanced and depleted by biological methods.” Ngāi Tahu *kaumātua* ‘elder’ Rakihihia Tau, in his evidence to the Waitangi Tribunal, provides some examples:

Toheroa have been seeded at South Brighton/Karorokaroro (Pegasus Bay). These root stocks came from Kahuraki point (North of Westport) and Waikawa (Picton); similarly, tuatua in Pegasus Bay; cockles in Ihutai (Heathcote Estuary) ex Otepoti (Otago Harbour) and Kaikoura; scallop beds outside the North East bays of Akaroa. (Wai 27a [Ngāi Tahu Claim] 1988: 9-10)

In an interview in 1999 Tau expanded, explaining that with the permission of the local people, and in return for some other species, seed stocks were gathered in the form of gravid *toheroa* (*Paphies ventricosa*). *Pōhā*<sup>1</sup> used to transport these “root stocks” were dropped in the inter-tidal zone and pricked with holes to allow a slow release of spat on each incoming tide. The pattern of holes would identify the *whānau* ‘family groups’ who had transported it, warning others not to interfere. Unquestioning adherence to the rules of society was the guarantee that such investments were safe. From time to time some of the growing stock suffered from soft-shell disease. Tau advised that at such times a whelk was brought in from Lyttleton Harbour to cull those with the disease. They could only bore through the shells of the infected *toheroa*.

While cultural extensions, such as the pattern of holes, have a purpose of their own, we must not lose sight of the fact that they had to be consistent with the primary objective: in this case, protection of the spat while permitting their gradual escape into the surrounding waters. The cultural function of recording ownership and discouraging potential interference, could have more easily been carried out in other ways (e.g., “labelling” the *pōhā* with a bunch of feathers, as was done to record the contents of those going into storage) but the primary consideration was for holes to allow spat to escape. Therefore, it was a small matter to arrange them in a pattern that was at once practical, aesthetically pleasing and culturally helpful.

#### HABITAT ENHANCEMENT

In 1994, during a *hui* ‘community gathering’ at Ōtākou Marae, *kaumātua* Tatane Wesley (known as Tat) noticed some outsiders down on the cockle beds, dragging five gallon plastic buckets of harvested cockles across the growing cockles, breaking many shells. He went down to remonstrate with them and on his return began to let off steam about “foragers”. It was at this time that he outlined the proper way to harvest *tuaki* (*Austrovenus stutchburyi* or cockles) and how to optimise their growth. One of the important things to do, he said, was to remove rocks and stones from the beds as they take up space that *tuaki* could grow in. He likened this to working the soil in a vegetable garden. He used the phrase “weed the garden” to describe the removal of undesirable material and species from the cockle beds. Tat was adamant that harvesting the largest *tuaki*, after the breeding season had ended, helped the overall size of the crop as it allowed the next tier to develop. This is contrary to the usual philosophy of harvesting the sub-adults, rather than the primary breeding stock. A similar philosophy existed in Canterbury. The late Rik Tau explained in 1999 that if stones were encountered on a sandbank they were removed and thrown towards the shore as, if they were thrown seawards, the tides would bring them back.

It is little wonder that seafood gathering areas were termed *māra* ‘gardens’. As Thornton *et al.* (2015:189) argue, marine resources are also “cultivated” in the American Northwest. However, it is difficult to accept “cultivation” as an appropriate term for fish—enhancement or management seem more apposite. “Gardening” is preferred for sedentary seafood such as shellfish (Williams 2006). Williams then offers “mariculture” (2006: 11) for those who cannot accept “gardening”. She draws attention to the way that archaeologists have for many years resisted the notion that clam gathering areas had been enhanced by human agency.

### TĀIKĪ

*Taua* ‘aunt’ Pauline Wai Dargazis (1936-1998), scion of the Rūrū *whānau* ‘family’ of Koukourarata, explained and demonstrated to Matiu Payne over a period of years, the age-old practice of constructing *tāikī* (specifically small, enclosed seafood gardens, near settlements). Payne passed on the techniques and associated *tikanga* ‘correct practices, methods’ to members of a *hui* at Tūtehuarewa Marae on 14th and 16th October 2001, where we actually constructed some *tāikī*. A brief outline is also provided by Payne (2001) in the booklet published for that *hui*, which relates how the shellfish, *tio* (*Ostrea lutaria*), *kuku* (*Perna canaliculus*), *pāua* (*Haliotis* spp.) and *tuaki*, have all been farmed in *tāikī*, for many generations, at Koukourarata, as well as at a number of other locations throughout Te Wāi Pounamu (South Island). Due to confidentiality, the full details cannot be provided but fundamentally, *tāikī* were rock enclosures with internal rocks to support a roof. They were located close to the normal low tide level, seeded, filled with seaweed to discourage crabs, and covered as protection against excessively rough seas. Recently, a series of new measures have been included in order to disguise *tāikī*, as societal controls no longer protect a garden against predation by others, especially folk who are not members of the local community. This is an important example of age-old values being continued, with adjustments to the exigencies of the new times.

### DIET

There is little firm evidence to support detailed traditional knowledge of nutritional values, yet the balance in the diet, and particularly the use of *tuatua* as a food of last resort, strongly suggest an innate understanding of dietary needs. The material discussed below shows the importance of carbohydrates and fats<sup>2</sup> in the human diet and the basis for the well-known and necessary “balanced diet”. Pre-European Māori appear to have had an intuitive understanding of dietary requirements. Eating patterns, as indicated by dietary preferences (allowing for some “taste” items), seem to be largely

consistent with nutritional needs in that most provide a key dietary element. “[It has been shown that] if the body lacks some chemical, the individual will tend (in an imperfect way) to develop a specific appetite or partial hunger for that food element” (Maslow 1954: 81). Johns (1990: 17) comments: “humans develop specific appetites related to nutritional deficiencies such as salt, iron and vitamins.” *Te reo Māori* ‘Māori language’ recognises this, as in the idiom (when translated to English), “I’m hungry for a feed of (for example) oysters (or ice cream) etc.”. Folk who are simply hungry are likely to say “I’m hungry for a *kai*” (*kai* meaning ‘food’). This is of interest for two reasons. It illustrates that during most seasons there were dietary choices and, in addition, that the people innately knew which foods were vital at the time. Strategies for husbandry of those items could then be set in place and followed. The Ngāi Tahu environmental attitude was closely linked to economic benefit, and may well have originated from economic concerns. However, I argue that by the time of European contact, the environment had become a primary determinant of Ngāi Tahu behaviour, linked to, but independent of, purely economic considerations.

#### NUTRITIONAL BALANCE

Vlieg provides two tables: “Proximate composition of shellfish (g/100g wet weight)” (1988: 47) and “Calculated gross energy of the edible part of shellfish” (1988: 50), from which data for the five shellfish with highest gross energy have been extracted and conflated in Table 1, below.

Table 1. Approximate composition of shellfish with highest gross energy.

Species	Protein	Fat	Carbohydrate	kcal	kJoule
<i>Tuatua</i>	16.7	2.2	6.2	110	460
Bluff Oyster	12.9	3.0	3.1	103	429
<i>Pāua</i>	20.8	1.0	0.9	99	415
Rock Lobster <sup>3</sup>	21.9	0.8	0.7	97	408
<i>Kina</i>	10.8	5.4	0.6	94	394

With the exception of *tuatua*, all are favoured traditional Māori foods and even today are still preferred. But of special interest is the fact that *tuatua* have the highest energy levels of all (even more than finfish). To claim a relationship

between dietary preference and nutritional value, the enigma of the *tuatua* must first be resolved. Perhaps the key lies in its relatively high carbohydrate level which, in line with Speth and Spielmann's (1983) assertion, would be invaluable in facilitating the conversion of excess protein into energy at times of plant carbohydrate shortage.

*Tuatua* does feature prominently in many archaeological sites, but somewhat enigmatically and sporadically over time. Anderson (1983), who recognises three periods of food intake, says that during "The Early (Moa Hunting) Period: ... Shellfish account for no more than 5-10 percent of the total [intake of animal food]" (1983: 16). During the "Middle Period": fishing became the major activity and "it provided 31 per cent of the food represented in the late (14th-century) occupation level at Pounaweia and 89 per cent of that at 14th century Purakaunui" (Anderson 1983: 26). By "The Late Period" further adaptations had taken place and shellfish became relatively unimportant. Even at Pounaweia, where fishing was for a long period the major contributor to the diet, dense layers of *tuatua* shell tend to be interspersed with layers having few *tuatua*. This could mean that *tuatua* were only available in some years, or were eaten when preferred foods were not available. Shortages of *tuatua* appear unlikely and the latter hypothesis is preferred. It is supported by Leach *et al.* (2001: 22-23) and confirmed by Te Mahana Walsh of Kāti Huirapa who said "the old people only ate *tuatua* when there was nothing else. They didn't really like it" (pers. comm., 1994). This may be a South Island preference as in many parts of the North Island *tuatua* are harvested in bulk.

It may be argued, as Carson does in the case of *umu tī* 'Cordyline oven' in island Polynesia, that "use only in times of famine still constitutes a food restriction" (2002: 346), but when the major determinant is taste the argument does not hold up. Rather, the avoidance of *tuatua* except in times of hardship demonstrates a range of choices that allowed taste preferences to be indulged at most times.

Underlying this issue is the question as to what such a preference might be based on. According to Vlieg, "The principal carbohydrate in fish (glucose) is not very sweet, and flavour appears mainly due to the presence of non-protein nitrogenous compounds" (1988: 6).

#### KARENGO

*Karengo* (*Porphyra columbina*), an edible seaweed closely related to Japanese nori and Welsh laver, only grows on certain types of intertidal rocks, none of which occur naturally south of the Clutha River mouth. Yet, I was told that there is a *karengo* colony on a large cluster of uniformly sized boulders in a small bay some way south of the Matura. As the sea current is south

to north, the boulders and the algae could only have been brought in from many miles away.<sup>4</sup> This suggestion is supported by the uniform size of the boulders: each is about as large as a strong man could carry to and from a canoe (Anon., pers. comm.<sup>5</sup>, 1999). The conjunction of the boulders and the *karengo* at a locality many miles from where either naturally occurs, is strongly suggestive of the human agency claimed by my informant.

#### ALLOCATION

As will be seen, access to resources and management of them was highly organised in a manner that spread responsibilities as widely as possible.

#### Wakawaka and Mahika/Mahinga Kai

*Wakawaka* was a system of ensuring that the widest possible range of tribal members shared in a resource. Ngāi Tahu *kaumātua* Taare Tikao said: “*Ka tika tonu a ia hapu ki tona wahi mahinga a ia hapu ki tona whenua mahinga e kore e pokanoa tetahi hapu ki runga ki to tetahi hapu whenua mahi ai. He ritenga nui rawa ki te Maori ki te pokanoa tetahi tangata hapu ranei ki te mahi noa atu*” (n.d.: 1). This translates as each *hapū* ‘subtribe’ kept strictly to their own food harvesting area and a *hapū* would not wander at will, which was a very important rule. In other words, they would never go to another’s area, the words “*ritenga nui rawa*” stressing that this was an absolutely inviolable rule. Also, it was critical to the management of resources, since not only was it a means of ensuring that everyone had a share in the harvest, it also clearly assigned responsibility in a way that no other could interfere with.

Anderson (1998) interprets the Canterbury and Murihiku usages of the word *wakawaka* as indicating different practices in the division of resources in each region. This tends to confirm the two distinct cultural areas suggested in Williams (2004). In Canterbury, *wakawaka* are said to have been “major divisions of land and sea, each of which could encompass numerous mahinga kai” (Anderson 1998: 112); he terms this “The *wakawaka* model”. By contrast, in the south, *wakawaka* were usually divisions of a single resource, that is of a single *mahika kai* site. This he terms “The *mahinga kai* model” (*mahinga* being a linguistic variant of *mahika*; see Williams 2010: 149). Minor refinements to these models are suggested below.

There were also *wakawaka/mahika kai* reserved for people in transit. A good example was at Hereora in Christchurch, where the cabbage trees still grow at Burnside High School. The trees were a landmark in the swamp, and thus easily found by travellers who did not need to ask permission to take resources at such a spot (Wai 27b [Ngāi Tahu Claim] 1988: 35). This is not to say that there were no restrictions whatsoever, for just like the guest’s responsibility to the host, it was incumbent on the occasional user to only

take what was actually needed. The usual ethic of “waste not want not” would apply, even to those who were placed outside fully regulated society. Presumably there were still further (and perhaps ultimate) sanctions which could be imposed, as in the case of the well-known ancestors Moko and Tuhuru, both of whom were banished for transgressions against the people.

Within our social order, authority by the Arikitanga or leading Rangatira [chief] existed over all wakawaka. This was essential for the protection of our people, our networking system through our whakapapa [geneology] for the uses of mahinga kai and the siting of our kainga nohoanga [temporary dwelling place]. The Town Planning examples I have given locally, applied throughout the whole of our Tribal rohe [territory]. (Tau to Waitangi Tribunal, in Wai 27a [Ngāi Tahu Claim] 1988: 34)

In describing *wakawaka* in his testimony (No. 39) to the 1879-81 Smith/Nairn Commission into South Island land sales (p. 78), the prominent 19th-century leader Rawiri Te Maire drew a diagram which has been copied as Figure 1, below. Conceptually, this diagram explains the *wakawaka* system very simply. However, Figure 2 shows a more specific application of the concept.

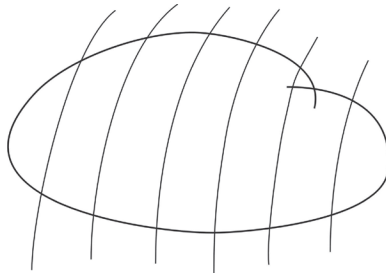


Figure 1. Visualisation of *wakawaka* by prominent 19th-century leader Rawiri Te Maire.

Figure 2 shows a series of *wakawaka* in the Canterbury area (Anonymous n.d.). Two charts have been deliberately conflated to make the figure ambiguous, due to the sensitive nature of the information contained in them. The oral explanations to the Tribunal, by Rakiihia Tau and Peter Ruka Korako, amplified the system denoted on the map. Nevertheless, the principles of what may be regarded as “traditional Māori surveying”, triangulation using stars and prominent landmarks, are clearly evident. Manakau (or Manukau, in the



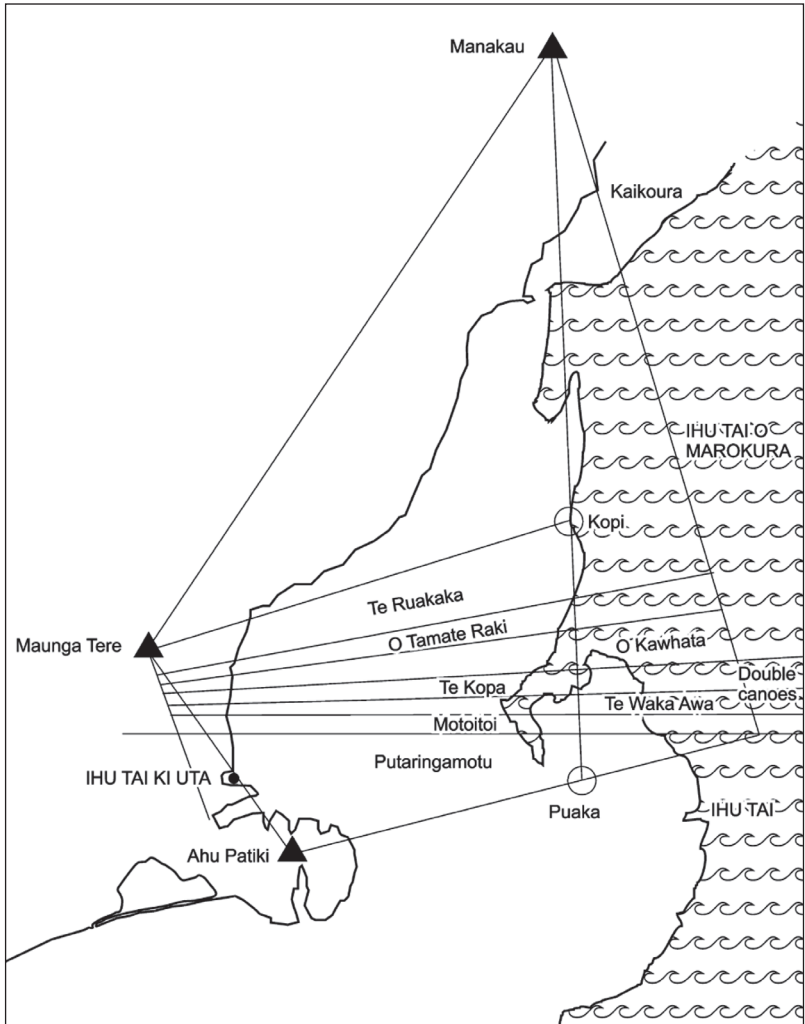


Figure 2. *Wakawaka* in Canterbury.

Seaward Kaikouras), Maunga Tere (Mount Gray) and Ahu Patiki (Mt. Herbert) are the most prominent peaks in the region and they provide fixed reference points. Kōpī (Venus when seen in the morning) and Puaka (Rigel in Orion) are stars and provide drift points at sea, each of which can be easily located on the fringe of the south to north current, *Te Tainui o Waitaha*, which is deflected easterly by Banks Peninsula (Peter Ruka Korako to Waitangi Tribunal, in Wai 27b [Ngāi Tahu Claim] 1988: 90-91). Clearly, reference to stars would be at a quite specific time. The *wakawaka* are, from north to south: *Te Ruakākā*, *O Tamateraki*, *Okawhata*, *Te Kopa*, *Te Waka Awa*, *Motoitōi*, *Pūtaringamotu* and *Ihu Tai*. The *whānau* of each *wakawaka*, as well as having their own resource base, had particular responsibilities. Some were given the task of maintaining the currency of off-shore fishing skill, others were charged with responsibility for the quality of shellfish species, yet another cared for “the secret paths and trails through the swamps [of the present Christchurch area]. By moving one log a trail could be changed leading people into traps” (Wai 27b [Ngāi Tahu Claim] 1988: 35).

*Wakawaka* for different foods might overlap, so that different groups might harvest each of the resources of any given area as territories were not necessarily either discrete or contiguous.

The same *wakawaka* system was practised inland for the gathering of *kauru* [cabbage tree stem], *kiore* [Polynesian rat], etc. These foods would be collected by the various *whānau* groups or collective groups. It is important to note that not all people would gather [each of] the various foods. Our people specialised in certain food gathering skills. (Wai 27b [Ngāi Tahu Claim] 1988: 34)

The point he is making is that with each *whānau* having a different focus, responsibilities might overlap in the sense that in one area, boundaries for *kāuru* need not be the same as for *kiore*. Each notional map would be overlaid upon another. Their seasons differed and so whilst *whānau* “A” would give consideration to factors related to *kāuru*, when they were in the area (spring, or early summer, every four to five years), *whānau* “O” would give consideration to factors related to *kiore*, every year, in late autumn. Importantly, each would be aware that another group also had rights in the area and that their own actions must not interfere with the interests of the other. *Weka* (*Gallirallus australis*, woodhen), not under such strict control, would be the subject of attention from other groups in late winter, and the *weka* hunters would be mindful of the interests of both “A” and “O”. Peter Ruka Korako provided an explanation to the Waitangi Tribunal: “The sub groups would divide into work units, and they would seasonally hunt around the season’s clock, catching, collecting, preparing and bartering as a commercially viable Tribal entity as

a local franchise holder would” (Wai 27b [Ngāi Tahu Claim] 1988: 87). He goes on to say, “The social order thus served to reaffirm *whakapapa* ties as well as re-establishing order and settling disputes” (p. 89).

The system was facilitated by each type of preserve having its own classificatory name. The lists compiled by H.K. Taiaroa in 1879/80 show the terms: *koutu aruhe*; *para kāuru*; *mara mahetau*, *taewa*, or *pora*; *matatiki*,<sup>16</sup> *pā*, *re*, or *rauiiri tuna*; *tapua weka*; *werohangā* or *taheretanga manu*. These are, respectively: fern-root “digs”; cabbage tree groves; cultivations; eel springs, weirs, swamps or preserves; *weka* runs; bird spearing or snaring groves. Each term refers to the fact that rights gained through *whakapapa* are involved, each being effectively a “preserve” with the different terms reflecting the different nature of each type of preserve. *Koutu aruhe* and *mara* are quite localised, though not as localised as a *rauiiri tuna* ‘eel springs’ which would be a very specific location on a stream, whereas the garden could shift around at the locality. There is no term given for *harakeke* ‘flax’ cultivations. A *tapua weka* would be rather more extensive, though not as large as a *para kāuru*, which might cover many acres. These preserves often had their own names, rather like contemporary farm names (e.g., in Taiaroa’s List 11, page 4: “E Mahinga tuna Ko te Whakahoki a Paroro”). Such a sophisticated classification system reflects the importance of a *tikanga* for every resource.

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It may be difficult to accept “gardening” as the most appropriate term for such practices but with clear elements of species enhancement and habitat improvement it certainly constituted a type of horticulture, rather than just a “catch as catch can” strategy. Allocation between extended family groups fits neatly within the overall Ngāi Tahu system of controls on resource access, emphasising that there was no suggestion of “catch as catch can” foraging but a regimented allocation method, suited to the management of the resource. This is backed up by the regime of practises that were employed.

#### NOTES

1. Bags made from the hollowed leaves of bull kelp (*Durvillea antarctica*).
2. Speth and Spielmann (1983: 13) say that carbohydrate is much more efficient than fat for converting excess protein to energy.
3. Lobster, while not shellfish, are included because of similarity in gathering.
4. Professor Helen Leach has quite correctly queried whether the rocks may have reached their present location as a form of ballast (pers. comm., 2000). However, the remote site, together with a difficult approach for a vessel of any size, suggests that it is an unlikely place for ballast to be dumped other than deliberately.

5. To preserve confidentiality of this prized resource the informant has asked that both he and the precise location remain anonymous.
6. A *matatiki* is an underwater spring somewhere in the course of a stream. It is usually a source of somewhat warmer water, and eels are inclined to congregate at such places. This contrasts with a *puna* which is the actual source of a stream, that is, the spot where the flow emerges from underground.

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### *Oral Informants*

- Anon., Ngāi Tahu, *kaumātua* ‘elder’
- Payne, Matiu, Ngāi Tahu
- Tau, H. Rakihihia, Ngāi Tahu, *kaumātua*
- Walsh, Te Mahana, Ngāi Tahu, *kaumātua*
- Wesley, T.A.T., Ngāi Tahu, *kaumātua*

### ABSTRACT

This article reviews seafood gardening by Ngāi Tahu, including seeding, habitat enhancement, species improvement and marine storage. It is argued that a regime of management practises certainly justifies the term “gardening”, as has been argued for similar practises elsewhere (in particular, the American Pacific coast).

*Keywords:* Māori resource management, *māra mataitai*, seafood gardens, *taikī*

### CITATION AND AUTHOR CONTACT DETAILS

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