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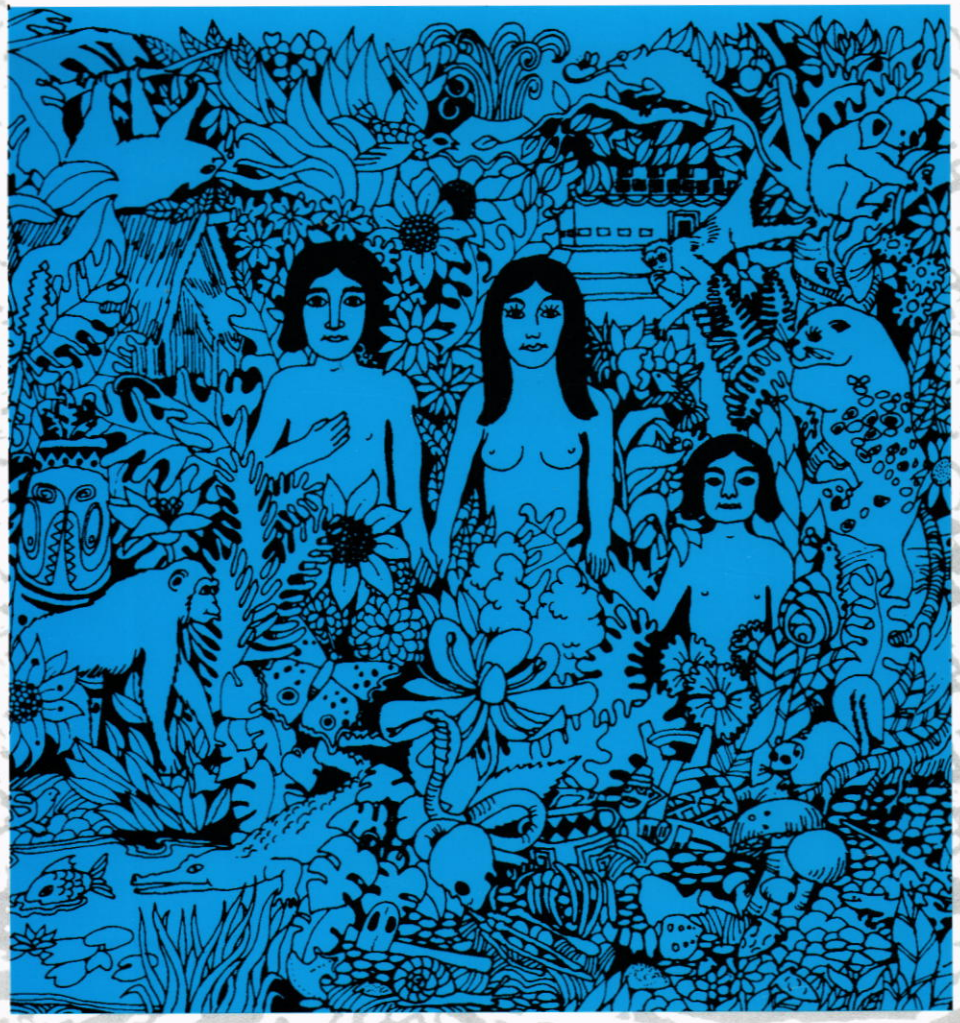

FIFTY YEARS IN THE FIELD. ESSAYS IN HONOUR AND CELEBRATION OF RICHARD SHUTLER JR'S ARCHAEOLOGICAL CAREER

Edited by Stuart Bedford, Christophe Sand and David Burley

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NEW ZEALAND ARCHAEOLOGICAL ASSOCIATION MONOGRAPH

GOURDS IN NEW GUINEA, ASIA AND THE PACIFIC

Jack Golson

In this contribution to the volume honouring Dick Shutler, I write about gourd remains excavated 35 years ago at a site in the Papua New Guinea Highlands and the implications of a recent reassessment of their age and of their identification as *Lagenaria siceraria*, the bottle gourd. While this restudy took place as part of a general review of early agricultural sites in the Highlands, it is of immediate interest in the light of a recent article on the bottle gourd in the Pacific by Roger Green (2000), who encouraged this publication of the results.

It is an appropriate piece to offer in recognition of Dick Shutler's manifold contributions to the study of the Pacific past, since it answers to a number of his long-standing interests and concerns. Thus it illustrates the importance of radiocarbon chronologies in providing a framework for comparative evaluations across space and time, the need for multidisciplinary approaches in addressing problems in the Pacific field and the importance of the Asian background to an understanding of the story of people in the Pacific.

In the discussion that follows I refer to dates in two different ways. I use 'b.p.' (= before present, by convention 1950) when the dates in question, and the chronological statements based on them, involve radiocarbon ages that have been left uncalibrated to allow their recognition in the sources from which they have been taken. Where radiocarbon ages have been calibrated to calendar years, which is common practice these days, I use 'B.P.' to refer to them and the chronological statements based on them, indicating calendar years Before Present, again 1950.

BACKGROUND AND CONTEXT OF THE GOURD FIND

In mid-1966 a small team from the Australian National University (ANU) undertook salvage work at Warrawau Plantation, then at an early stage of development as a tea estate on drained swampland in the upper Wahgi Valley near Mt Hagen at about 1600m altitude in the central highlands of Papua New Guinea. This resulted from a letter from an Australian visitor to the plantation who talked about the discovery of stone and wooden artefacts during drainage there. The work was begun by two people who were already in Papua New Guinea on other fieldwork. Ron Lampert, archaeological field officer in the Department of Anthropology and Sociology in the Research School of Pacific Studies at ANU, was engaged on an extensive archaeological reconnaissance in the country for his Department. Jocelyn Wheeler (later Powell), a doctoral student in the Department of Geography in the Research School, was in the Mt Hagen area in the course of palynological research into the history of human impact on the regional vegetation and Warrawau came to be one of the two main study sites for her dissertation. Two of Lampert's departmental colleagues, Wal Ambrose and myself, came later to join the work.

The investigations at Warrawau, at what has come to be called the Manton site after the plantation owner, Mr I.V. Manton, who gave permission for the work to be done, showed that the artefacts whose discovery had been reported to us, and others recovered during our excavations, were associated with former drainage and cultivation of the swamp. Moreover, it became obvious, as a result of visits to other schemes of swampland development under way in the Wahgi Valley and from the evidence of aerial surveys carried out in association with them, that such drainage and cultivation had once been widespread across the extensive Wahgi swamplands, though at European arrival in 1933 these were agriculturally all but unused (cf. Brookfield 1964:22). Moreover, one of the first two radiocarbon dates from the Manton site indicated that drained agriculture there had a fair antiquity, going back at least as far as 2300 ±120 b.p. (ANU-43) (signifying uncalibrated radiocarbon years before present, by convention 1950).

All this had important implications for then current discussions about New Guinea Highlands prehistory. These had to take account of two features of the dominant staple of Highlands agriculture, the tropical American

sweet potato, *Ipomoea batatas*: one, that it was a recent arrival in New Guinea, following its introduction into Southeast Asia by Iberian explorers in the 16th century; the other, that it could grow more productively at higher altitudes and on poorer soils than the staples of traditional Indo-Pacific agriculture like yam, taro and banana. The American anthropologist, J.B. Watson (1965a:301-303, 1965b:443-448), spelt out a number of possible scenarios in these circumstances and opted for the most radical of them. This was the proposal of an Ipomoean Revolution, in terms of which Highlands populations were likely to have been small, semi-nomadic and only marginally horticultural until the arrival of the new food plant.

The questions that the Manton discoveries raised on this score were the major focus of the articles that soon began to appear about the site (Golson *et al.* 1967; Lampert 1967; Powell 1970b; cf. Brookfield and White 1968). The discoveries set the stage for a wider programme of research into the history of agriculture in the Wahgi Valley (Golson 1976, 1977a), which is still in progress. This has centred on investigations at the Kuk Swamp, some 6km north of Warrawau on the other side of the Wahgi River, where major fieldwork was carried out from 1972 to 1977. In the process the work at Manton's was overshadowed, with the result that only the palynology of the site and its sedimentary context have been described in detail (Powell 1970a:138-164).

Before about 5000 b.p. Warrawau seems to have been part of the actively aggrading floodplain of the Wahgi River, with levees and backwater swamps (Powell 1970a:161-162 for this and what follows; cf. Powell *et al.* 1975:43). By 4900-5000 b.p. extensive ponds and swamps had appeared, perhaps as the result of the disruption of local drainage. A likely cause of such disruption would have been deposition of the erosional products from sustained forest disturbance on surrounding hillslopes, as indicated by the pollen evidence. Such disturbance on the slopes was interpreted as reflecting the activities of shifting cultivators and it continued, while in the valley there was a changing mosaic of *Phragmites* swamp, open water and herbaceous and shrubby vegetation on gravel ridges. Dark brown woody peat (zone 3 of Golson *et al.* 1967:369) developed in lower, wetter areas, into which some archaeological material found its way, indicating human activities nearby. Subsequently, as peat became widely established over the area, people moved into the swamp to drain and garden it, producing a zone of black, structureless, well-humified peat (zone 2 of Golson *et al.* 1967:369) containing structural and artefactual evidence of their activities. The date of 2300 ±120 b.p. for the earliest manifestation of this activity identified during the 1966 excavations was supplied by the wood of a woman's digging stick lying in the base of a linear ditch (Golson *et al.* 1967:370).

In 1977 there was limited reinvestigation of part of the site to allow the field evidence to be reinspected in the light of experience at Kuk. This was possible because of the kindness of David Little, the manager of the estate, who allowed tea bushes to be uprooted and old archaeological trenches to be emptied for two hurried days of inspection. As a result of this, the ditch with the dated digging stick of 2300 ± 120 b.p. proved to be equivalent to a late stage of Phase 3 at Kuk (Golson 1982:120-121), dated between about 4000 and 2500 b.p. (Golson 1977a:619-626). In addition, the basin and island arrangement characteristic of the preceding phase at Kuk, Phase 2 (Golson 1977a:612, 615-619), was recognised in the structures at the bottom of one of the Manton excavation trenches of 1966, cutting M. A radiocarbon sample of organic detritus was taken about 20cm above the base of one of the basins, in direct association with a diffuse layer of a volcanic ash given the code name of R at Kuk, where it sealed in the features of Phase 2, and now known as Kim. The sample gave a date of 3520 ± 70 b.p. (ANU-2084), at the younger end of the range of most satisfactory dates available for the ash, between 3500 and 4000 b.p., pushing back the age of swamp cultivation at the Manton site by some 1500 radiocarbon years beyond that established by the dated digging stick of 1966. This corresponds to a late substage of Phase 2 at Kuk, as indicated by a recent revision of the evidence there (Denham in press).

THE GOURD

In his field notebook of the 1966 excavations Lampert (1966:66) noted the discovery of a crushed gourd at a depth of 193cm near the north end of cutting C. It lay among timber concentrated towards the base of the brown woody peat (zone 3 of Golson *et al.* 1967:369) at the site, which filled one of the depressions that Powell interpreted as 'ponds' (1970a:141, 142, Figs. 8.3, 8.4). It was thus older than the dark peat of zone 2, where the earliest of a series of garden ditches was subsequently dated to 2300 ± 120 b.p., as already noted.

Lampert's workmen told him that the gourd came from a plant grown in village gardens and that it was a water carrier. Powell (1970a:145) concluded that it had been used "artefactually" because it did not contain any seeds. Thus its identification as bottle gourd, *Lagenaria siceraria* (Powell 1970a:141), was reasonable, particularly since there did not seem to be any plausible alternative and the plant, as subsequently became clear, was of widespread distribution in New Guinea (French 1986:107; Heiser 1973:313; Powell 1976:110, 132, 167). However, in her first independent publication about her work, Powell qualified the identification as *Lagenaria* cf. *siceraria* and talked about the introduction of the plant to New Guinea by 2300 b.p. (Powell 1970b:200; cf. Powell 1970a:194).

Because interest in the Manton site was captured by the implications for current theories of Highlands prehistory of its evidence of early drainage for cultivation, little attention was paid in the earliest publications about the Manton discoveries to the Manton gourd itself as a marker of cultivation. Thus, in the "official" announcement of the discoveries, Golson *et al.* (1967:369) merely mentioned the presence of *Lagenaria siceraria* among the materials recovered below zone 1, the undisturbed light yellow-brown felted and unhumified peat that blanketed the site, while Lampert (1967) did not refer to the find at all. Powell noted the status of the plant as an introduction, and the date by which it had been introduced, in an initial paper (1970b), as mentioned above. In subsequent publications (1981:Tables 2, 3, 1982a:Table 3 and cf. Powell *et al.* 1975:37-8), she reported the presence of the gourd under the name of *Lagenaria siceraria* and the date as prior to 2300 b.p., while Powell 1982b:Table 1 simply gave *Lagenaria* for the name and 2300 b.p. for the date.

However, in mid-1969 another radiocarbon date, ANU-288, became available that gave an age for the Manton gourd of 4880 ± 90 b.p., but its existence was inexplicably overlooked in subsequent publications. According to Lampert (1966:66), who early in the excavations collected and registered the sample of wood on which the date was run, it came from cutting D, a maximum of 4m south and 3.5m west of the findspot of the gourd in cutting C. It came from the same basal layer of brown woody peat as the gourd (zone 3 of Golson *et al.* 1967:369) and from a similar depth below the surface, 195cm as against 193cm for the gourd, though at the interface between the peat and the sandy clay of basement. The implications of the date for the antiquity of cultivation in New Guinea were thus missed and information on this score had to await the results of investigations at Kuk.

The northern ends of Manton cuttings C and D were among the spots scheduled for reinvestigation in 1977 in the light of the Kuk work. The immediate purpose was to get a better understanding of the nature of the depression (Powell's "pond"), at the bottom of which the gourd had been found and the radiocarbon sample collected. Unfortunately the main record for this work has been lost and the only description that survives is in Golson's field diary (1977b:75-76), supplemented by slides and photographs. It looks as though in the event only one of the two cuttings was emptied and, if so, this is likely to have been cutting C, the one in which the gourd had been found. Some pieces of gourd shell were recovered in 1977 20cm above the base of the depression, which corresponds to the depth of the layer (zone 3) in which the gourd find was made, but it is impossible to say whether they came from backfill or ground that had not been dug out in 1966. Kim ash was recorded as a sporadic layer in the upper fill of the depression, 60-80cm above its base.

Samples were taken from the walls of the completed excavation of 1977 for pollen analysis and dating. Wood from the basal 20cm of the deposit was dated as ANU-2086, with a radiocarbon age of 4710 ± 110 b.p.. This is consistent with its stratigraphic position well below Kim ash and in excellent agreement with ANU-288, 4880 ± 90 b.p., on wood from the basal fill of the same depression, being zone 3 of the site stratigraphy, the one in which the gourd was found.

DISCUSSION

The bottle gourd, *Lagenaria siceraria*, has long been of interest because, as a plant of the Old World tropics, of possibly African origin, its worldwide distribution in prehistoric times raises questions about ancient contacts between the Old and the New Worlds (e.g. Heiser 1973:312; Purseglove 1968:125; Whistler 1991:52). Recently there has been a new turn to the story: linguistic, botanical and archaeological research pursued by different scholars indicates a dual origin for the bottle gourd in the Pacific. According to Green (2000), who has brought the various strands of evidence together, the plant came into Near Oceania (New Guinea, the Bismarck Archipelago and the Solomons chain) from the west sometime after 3000 years ago, when the settlement of the islands beyond was under way. However, it had not reached Fiji or Western Polynesia before the Europeans arrived there within the last few hundred years, though it was present in Eastern Polynesia earlier than this as a result of an introduction from South America, probably with the sweet potato.

The evidence for the absence of the bottle gourd from Near Oceania when the settlement of the nearer islands of Remote Oceania began is primarily linguistic (Ross 1996:166), but the date of 3000 B.P. (signifying calendar years Before Present, by convention 1950) for the settlement process is archaeological. It is based on calibrated radiocarbon dates for the expansion beyond the Solomons chain of the people of the Lapita culture complex (cf. Specht and Gosden 1997:188), who are generally accepted as having spoken the language ancestral to the contemporary Austronesian languages of the region (cf. Pawley and Ross 1993:445-446).

In support of the linguistic argument for the absence of the bottle gourd from Near Oceania until after 3000 B.P., Green (2000:194) points out that there is no evidence of its presence in the rich plant assemblages from three waterlogged sites of the same or greater age. The oldest of these is on the New Guinea mainland at Dongan in the lower Ramu, with three radiocarbon dates between 5500 and 5900 b.p. (Swadling *et al.* 1991:95), which calibrate to values straddling the 7th millennium B.P.. A second site is

Apalo in the Arawe Islands off the south coast of New Britain, dated between 4410 and 3640 B.P. (Specht and Gosden 1997:178; the 6100-5300 B.P. of Green 2000:194 is a mistaken reading of Spriggs 1997:79). The third is the Lapita site of Talepakemalai in the Mussau group northwest of New Ireland, where stilt house occupation over the reef may have begun about 3200 B.P. (Specht and Gosden 1997:187-188).

Compatible with this evidence was the minimum age of 2300 ± 120 b.p. for the bottle gourd from the Manton site, the earliest date for the plant in the southwest Pacific region (Green 2000:193). There is a 95.4% probability that this date calibrates to between 2720 and 2040 B.P., thus falling below the 3000 B.P. upper limit set for its appearance in the region. Now, however, we have two radiocarbon dates for the Manton gourd, ANU-288 and 2086, overlapping at one standard deviation, which combine to give a calibrated value between 5665 and 5325 B.P.. In addition, there is some doubt about its identification as bottle gourd.

Let us look at the implications of each of these two pieces of information.

The date

The new date range is well before the appearance of the Lapita culture complex in the Bismarck Archipelago and its extension into the wider Pacific. Why then is the gourd not represented in the plant assemblages at the pre-Lapita site of Apalo in the Arawe Islands of west New Britain or the Lapita site of Talepakemalai on the small offshore coral island of Eloaua in the Mussau group?

At both sites the plant remains are exclusively from trees. Of the plant taxa present at Apalo and other archaeological sites in the Arawe Islands, Matthews and Gosden (1997:127-129) say that all are known from modern drift assemblages, at sea and on beaches, so that criteria are needed to discriminate between natural drift and deposition by humans. However, Roger Green (pers. comm. 2001) argues that at both sites the plant remains were associated with cultural remains (Kirch 1989:228-229 and 1997:172-173 for Talepakemalai; Specht and Gosden 1997:178 and Spriggs 1997:79 for Apalo) and there is therefore no taphonomic reason why evidence for gourd could not have been present.

The plant

In his discussion of the Asian background to the bottle gourd in the Pacific, Green (2000:191-193) considers language-related evidence for its appearance in Southeast Asia in the last two millennia B.C. and archaeological evidence for its presence much earlier in Southeast and East Asia. There is also literary evidence for its presence in China in myths of the first millennium B.C. (Walters 1989:309).

One of the problems with the archaeological evidence that Green reviews is the strength of the identification of the botanical material concerned (2000:191-192). He is understandably not in a position to evaluate the East Asian identifications that he cites from the secondary literature, *Lagenaria siceraria* at the early Chinese Neolithic site of Hemudu in the coastal province of Zhejiang south of the Yangtze at around 7000 B.P. and *Lagenaria* sp. from a Japanese site at around 5500 radiocarbon years b.p., or the second half of the 7th millennium B.P.. Li (1983:48-49) says of Hemudu that the identifications were made on seeds and that many pots found there were shaped like gourds. The Japanese site is the Torihama shell midden, deposited in swampy ground, on which Green cites Imamura (1996a:108). In another place, Imamura (1996b:451) provides not only a specific but also a varietal name for the gourd, *Lagenaria siceraria* var. *gourda*, while, referring to the same site, Esaka (1986:226) has *L. siceraria* var. *hispida*.

Peter Matthews (pers. comm. 2001) has drawn my attention to the Sennai Maruyama site in northern Honshu, a large settlement of Early to Middle Jomon, 5900 to 4300 B.P., where bottle gourd has been found (Habu *et al.* 2001:9, 13). He has also looked at the Torihama reports at my request. It is his opinion that bottle gourd is well-authenticated in Japan from the early Holocene.

The Southeast Asian materials, from northwest Thailand and East Timor, were identified by D.E. Yen, with help from colleagues at the Bishop Museum, Honolulu, and he indicated the level of his confidence in the identifications that he supplied.

Green (2000:191-192) notes Yen's qualifications regarding the gourd materials from Thailand, which by my reading of Yen's report (1977) on the botanical remains come from an early Holocene context at Spirit Cave (1977:570) and a later Holocene one at Banyan Valley Cave (1977:591). Yen (1977:576, Table 3) says of the identifications that they were made on the shell of the fruit, of which there were many small fragments, carbonised and uncarbonised, and that in section they resembled *Lagenaria siceraria*. In Table 1 (Yen 1977:570-571) they are included in the second of three categories, A-C, which, among other things, represent a scale of decreasing confidence of identification. Heiser (1979:82-83) reports having had access, through Yen, to two fragments from the Thai corpus, which he compared by thickness, morphology and structure with specimens from his own collection of modern bottle gourds, concluding that the two Thai fragments did not come from a gourd.

Green (2000:193) has little to say about the occurrence of gourd in East Timor beyond noting its identification as *Lagenaria* with a date of about 4000 years ago, citing a general paper of Glover (1977a), as well as Bellwood (1997:231), who is himself citing another general paper by Glover (1977b). Glover's later detailed publication of the relevant investigations (1986:230, Table 131; cf. Table 93 on page 160) shows that shell fragments were recorded from two levels of one site, five in Horizon VIII and one in Horizon VII at Uai Bobo 1, their status as *Lagenaria* being noted by Yen as "possible". Moreover, the date is not 4000 years ago, but less than a thousand (Glover 1986:131-132).

There is another claim for archaeological finds of bottle gourd in Southeast Asia, preserved in the lowest, waterlogged levels of mounds on Kelumpang Island, at Kuala Selinsing in the state of Perak in Peninsular Malaysia (Nik Hassan Shuhaimi 1991:150). The site is provisionally dated from about 200 B.C. to the 10th century A.D. (1991:148). Though the lowest radiocarbon date is said not to represent the bottom level of occupation, it presumably provides a general indication of the age of the preserved gourd remains. This evidence is highly compatible with the suggestion discussed by Green (2000:192) that a Sanskrit origin of the terms for bottle gourd in languages of Indonesia and the southern Philippines reflects the arrival of the plant in the course of Indian contact with the Indo-Malaysian archipelago for which there is evidence from the second century B.C..

In the light of the above, the claim that the Manton gourd of 5665-5325 years ago is *Lagenaria siceraria* is an isolated one in its region. It is time to take into consideration the matter of the uncertain status of the identification.

A RESOLUTION?

Whistler (1990) draws attention to the presence of another gourd in the Pacific, at least in Polynesia and Fiji, used as a container. This is the wax gourd, *Benincasa hispida*. In a summary statement about it, Whistler (1991:51) says that it is indigenous to Southeast Asia and was prehistorically introduced as far east as the Societies or the Marquesas, but that though collected in Polynesia, specifically in Tahiti, in 1773, it was often subsequently misidentified as *Lagenaria siceraria*, the bottle gourd. Its own globose, orange-sized fruits were used in the South Pacific as containers for scented coconut oil (at least in Fiji, Tonga, Samoa, 'Uvea, Futuna and Tahiti [Whistler 1990:119]). Whistler notes that there is no record of the use of the fruit as a container elsewhere by authorities like Burkill (1966:320-321, under *Benincasa cerifera*), Heiser (1979:61-62) and Purseglove (1968:101-102) and suggests that this, together with their smaller, differently shaped fruit, mark the Polynesian plants out as a separate variety (cf. Whistler 1990:119). The information on use given by the authorities cited by Whistler refers to East and Southeast Asia, where the fruits are used for food. Ochse and Bakhuizen van der Brink (1977:185, the reprint, with updating of botanical names, of a work published in 1931) note *Benincasa hispida* as widely cultivated in the Indonesian archipelago, especially in the plains and lower mountains, and describe its uses, all of which are connected with food. Steiner (1961:100-101) lists vernacular names for the plant on the Asian mainland, in Taiwan, the Philippines and Indonesia from Sumatra to west New Guinea, but has nothing for Oceania except Hawaii. However, the name that Steiner records for it here, *dungwa* (1961:101), is from the Chinese, something that Green (pers. comm. 2002) had foreseen as a possibility.

Whistler (1990:119) said that he did not know whether *Benincasa hispida* was present in Melanesia beyond Fiji or in Micronesia. I am told by Robin Hide, who has provided the references on which the following discussion is based, that there is little mention of it in the western Pacific. Thus, in his lexicon of food plant names in the South Pacific, Jardin (1974) has nothing for *Benincasa* in Melanesia and Micronesia and a single entry for Polynesia, which is Tahiti (1974:103). For the Solomons Henderson and Hancock (1988:377) describe it as an introduced cultivar grown for food.

The situation is better for New Guinea. There are early notices for German New Guinea in Schumann and Lauterbach (1901:592, reprinted 1976): from gardened land at the former Hatzfeldhafen on the coast between Wewak and Madang; from the Huon Gulf (1890); from the Ramu Valley (1896 and 1899, the former annotated as from open places in the forest); and from the Gazelle Peninsula, New Britain (1896, flowering in May). In his compendium of Papua New Guinea food plants, French (1986:108) describes the use of the plant for food and says that it is mainly grown near coastal towns for sale to Chinese, without being geographically specific.

There are two particularly interesting records. These report fruits which conform with those of the Polynesian variety of the species proposed by Whistler (1990:119), as opposed to the Asian type described by Purseglove (1968:101-102, Fig. 13E), in both shape and size and in the possession of a hard rind allowing use as a container, though not for coconut oil as in the Polynesian islands, but for lime in betel chewing. One of the records is by Borrell (1989:66, 182) for Kairiru Island, offshore from Wewak, and the other by Peekel (1984:547, 549) for the Bismarck Archipelago, specifically New Ireland, where he lived as a missionary for the first half of the 20th century. He gives

the name in the Pala language (Patpatar in Ross' nomenclature [1996:163]), which is spoken on the central east coast of the island where he was stationed from 1904 to 1911 (Sleumer 1984:3), so this is likely to be an early record. Peekel notes the plant as common, at bush margins and the like, and says that it was not eaten by the locals.

There are only two definite notices of the plant at altitude. One is by Hide (1984:432), who records a wild plant with no uses for Karimui at the Highlands fringe in Simbu Province, at 1100m. The other is by Pawley and Bulmer (in press), who describe it as a wild cucurbit with edible fruit growing at lower altitudes in the Kaironk and Simbai valleys of the Bismarck range, meaning below 1500m (Andrew Pawley pers. comm. 2002). Sterly (1997:72) reports that he collected a dried gourd shell used as an ornament in Simbu, but originating from the Bundi region at "below 1800m" on the northern fall of the central ranges to the Ramu. While it could not be botanically identified, it could have been the fruit of either *Lagenaria siceraria* or *Benincasa hispida*, of which latter Sterly says, without citing sources, that it "seems to be widespread in Melanesia at lower altitudes, but is rarely recorded". For the Highlands proper, Powell has recorded *Lagenaria*, but not *Benincasa*, in gardens in the upper Wahgi Valley near Mt Hagen (Powell *et al.* 1975:28) and in the Tari region of Southern Highlands Province (Powell with Harrison 1982:75-76), while the same picture emerges from Sillitoe's comprehensive survey (1983) of the cultivated plants of the Wola region in between.

There is, however, a recent archaeological record of *Benincasa hispida* from a small swamp called Kana at an altitude of about 1500m in the Wahgi Valley near Minj in Western Highlands Province (Mandui and Muke in press). The swamp was periodically drained for cultivation in the past and the gourd was found, crushed, in an old garden ditch, accompanied by its seeds, which were the key to the identification by Matthews (in press), who sets the find in its wider Asia-Pacific context. The specimen was dated, directly on its shell, to 2450 ± 200 b.p. (ANU-9487), which gives a calibrated age of between 2955 and 1990 B.P.. This is equivalent to the terminal stage of Phase 3 of the Kuk sequence (Golson 1977a:619-623). We should note that this archaeological specimen from Minj is at a higher altitude than any of the *Benincasa* reported ethnographically.

In the light of the above considerations, it may be that the Manton gourd was *Benincasa hispida*, at a slightly higher altitude than that from Minj.

CONCLUSION

This review of the circumstances of the gourd find at the Manton site in the Papua New Guinea Highlands, which has appeared in the literature since its discovery in the mid-1960s as *Lagenaria siceraria* with a minimum date of 2300 ± 120 b.p. (between 2720 and 2040 B.P.), has revealed that there has been evidence all along that the identification was not a certain one and that the true age of the findspot was close to 5000 radiocarbon years ago. Two samples were collected from the brown woody peat where the gourd remains had been found (zone 3 of Golson *et al.* 1967:369), ANU-288 during the 1966 excavations and ANU-2086 during those of 1977. Combined they give a radiocarbon date of 4813±70 b.p., which has a calibrated age falling between 5665 and 5325 B.P..

There is nothing in the archaeological record of the Indo-Malaysian region to support such an antiquity of the bottle gourd in New Guinea. The northwest Thailand sites, which are at the very margins of the region, have provided material of the early and the later Holocene whose identification as bottle gourd is not certain and in the case of two fragments said definitely not to be gourd at all. The finds from East Timor, if they are indeed *Lagenaria*, are not 4000 years old, but less than a thousand. Bottle gourd is said to be present in the lowest levels of mounds on the west coast of Peninsular Malaysia, at which settlement activity began by the second century B.C.. This belongs to the period of Indian trading contact with Indonesia, which would provide the context for lexical borrowing by Austronesian speakers from the Sanskrit for bottle gourd, as discussed by Green (2000:192), as well as the archaeological appearance of the gourd itself on the Malaysian coast.

The suggestion therefore made is that the Manton gourd is likely to be, not *Lagenaria siceraria*, the bottle gourd, but *Benincasa hispida*, the wax gourd, which is archaeologically recorded by Mandui and Muke (in press) at another Wahgi Valley site of swampland gardening and directly dated to 2450 ± 200 b.p. (between 2955 and 1990 B.P.). *Benincasa* is widely cultivated in East, South and Southeast Asia as a vegetable and French's (1986) compendium of Papua New Guinea food crops says that it is grown there mainly near coastal towns for sale to Chinese. Other records for Papua New Guinea, including some from the German period, mention it in garden and non-garden contexts. Two of these (for Kairiru Island and New Ireland) talk about the use of the fruit as a lime container. The New Ireland notice and that from the Highlands fringe at Karimui say that the fruit was not eaten, but the opposite is the case among Kalam speakers of the Bismarck range.

There appears to be no record of *Benincasa's* indigenous presence in Island Melanesia between the Bismarck Archipelago and Fiji, but Whistler (1990) has established it for Fiji and Polynesia, where the fruit was

widely used as a container for coconut oil. The fruits of *Benincasa* used as lime containers at Kairiru and on New Ireland are the same in shape and size as the Polynesian fruits and different from those described for Asia.

Thus we might propose that the wax gourd accompanied the colonising movements that brought people into the islands of Oceania from the west, as opposed to the bottle gourd for whose early presence in the islands of the Indo-Malaysian archipelago and New Guinea there is no firm indication in the evidence that I have reviewed in the foregoing pages. That review thus strengthens the case for the South American origin of the bottle gourd in Eastern Polynesia. Here it came so to dominate the botanical record that the wax gourd was regularly misidentified for it, not only in the central part of Eastern Polynesia, where both were present in prehistory, but also in Western Polynesia and Fiji, where the bottle gourd seems not to have been known until European times (Whistler 1990).

There is, however, a body of evidence that does not fit this telling of the story. This is the material identified as bottle gourd in early and mid-Holocene contexts in Japan, which Peter Matthews considers well-authenticated. If the same is true of the 7000 year old material identified as bottle gourd at the Chinese site of Hemudu, we might expect the plant to have been available for transfer south in the course of agricultural expansions from the Chinese heartland. Thus Bellwood (1996:481-483; cf. Bellwood 1997:208, 211) describes Hemudu as linking with assemblages along the Chinese coast south of the Yangtze, including Taiwan, to constitute a southeastern province of the early Chinese agricultural domain, one offshoot of which is represented by the Austronesians and their southward expansion into Island Southeast Asia and the Pacific. However, no Proto Austronesian term for the bottle gourd has yet been reconstructed to lend support to this supposition (see discussion in Green 2000 and references).

In Jocelyn Powell's opinion (pers. comm. 2001), the status of *Benincasa hispida* is itself complicated, given the differences between the fruits of the Polynesian and Asian plants noted by Whistler (1990). New Guinea seems to have elements of both areas. Thus Borrell's (1989) notice from Kairiru Island and Peekel's (1984, but much older) one from New Ireland describe fruits of the Polynesian type, with the same use as containers and in the Peekel case explicitly recorded as not being eaten. At the same time we have French's (1986) description of the fruit being grown as a vegetable near coastal towns for sale to Chinese, as well as the Pawley and Bulmer (in press) reference to the fruit as edible among Kalam below 1500m in valleys of the Bismarck Range. To Powell the *Benincasa* fruit used as a container in New Guinea appears to represent a different adaptation of the plant as far as the Pacific is concerned.

There is a final point. Problems with the identification of gourd remains in archaeological context have surfaced in the foregoing discussion. It is obvious that they need resolving before progress can be made and it is the phytoliths embedded in the very rind of the fruit that may well prove to be most helpful here (cf. Piperno *et al.* 2000).

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