

SUPPORT FOR A GUSUKU: PALEOENVIRONMENTAL EVIDENCE FROM A TRANSFORMED OKINAWAN LANDSCAPE

S. Jane Allen

AMEC Earth and Environmental Services, 680 Iwilei Road, Suite 660, Honolulu HI 96817, USA

ABSTRACT

Archaeological sites at Camp Foster, Okinawa, include the ridge-top ruins of Chatan Gusuku, a castle in the portion of the installation in Chatan town that was important in local trade and trade with China, Japan, Korea, and Southeast Asia from the twelfth through fifteenth centuries, during the Gusuku Period, the period of state development. The surrounding environment has been so transformed, as the result of bombing during World War II and post-war leveling and fill application, that the site seems to lack a hinterland that could have produced the forest and cultivated goods that are known to have been exported from Okinawa. It is also located well inland from the seacoast, without access to oceangoing ships. Prior to the war, however, the gusuku was coastal, was surrounded by many square kilometres of agricultural fields and forested areas, and was served by a large stream (no longer flowing today) that joined another to form a harbor below the gusuku ridge. Evidence is examined for at least a kilometre of westward progradation along the East China Sea coastline since the Shellmound Period, which preceded the Gusuku Period, and for former resource areas that could have supported the gusuku.

Important archaeological sites at Camp Foster, Okinawa (Figure 1; Allen and Nees 1998; McNeill and Welch 2002), today occupy a landscape that was changed so drastically during World War II and post-war reconstruction that they seem to exist in a contextual vacuum. This article reconstructs paleoenvironmental features that help to explain the past successes of several of these sites in intra-, and interregional trade during the Gusuku Period, c.AD 1000-1609 (for comparisons of Okinawan and Japanese chronologies, see

Imamura 1996; Pearson 1991, 1997; Takamiya 1997), by which time Okinawa had become a fully developed trade-based state, a primary city-state, I would argue, not secondarily derived (c.Pearson 2001). Traditionally oriented toward maritime voyaging, and in contact with many areas, the Ryukyuan state developed along its own unique and independent trajectory, with a political system based on

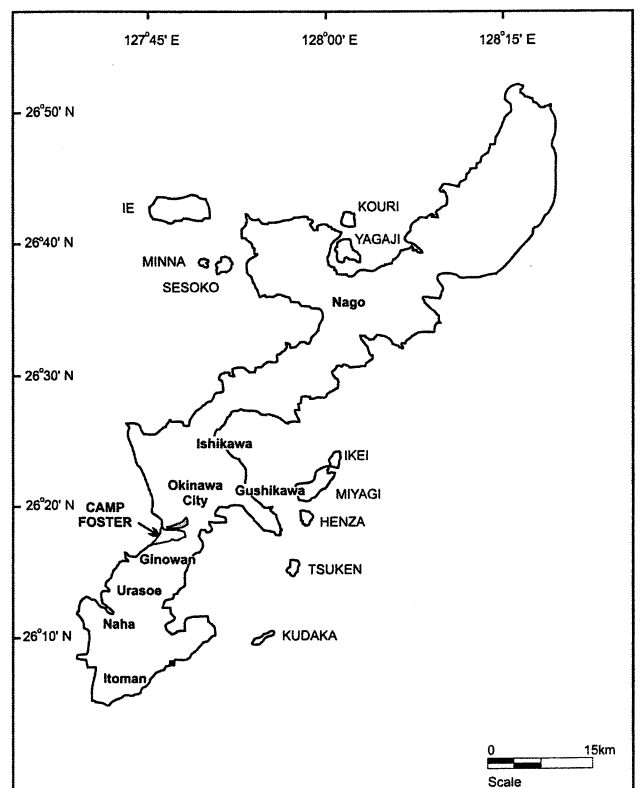


Figure 1: Okinawa, with cities and Camp Foster (Allen and Nees 1998:Figure 2).

traditional indigenous patterns and organizational structures.

The sites at Camp Foster, many researched by Okinawan archaeologists, were surveyed in 1997 by an archaeological team as part of a Navy contract to Ogden Environmental and Energy Services, Honolulu, Hawai'i. Camp Foster, located about a third of the way up the west coast from the south tip of the 105 km-long island, includes lands in three municipalities: Ginowan-shi (Ginowan city) in the south, Chatan-cho (Chatan town) in the northwest, and Kitanakagusuku-son (Kitanakagusuku village) in the northeast (Figure 2).

The southern half of Okinawa, where the population traditionally concentrated, was devastated during the war. Approximately 150,000 people were killed, and priceless traditional sites and records were destroyed. Naha, the capital, in the south (see Figure 1), was virtually destroyed in October, 1944. Kadena, approximately 7.5 km north of Camp Foster, was the west-coast invasion site where the Americans landed on April 1, 1945, to begin the fiercest (and final) three months of fighting in the Battle for Okinawa. Most areas around Kadena, including Camp Foster, were bombed nearly out of existence.

Colonel Hiromichi Yahara, a senior staff officer in the Japanese army, describes seeing, on the invasion day, the predawn silhouettes of 10 battleships, 10 cruisers, and 200 or so smaller ships lined up offshore along the Kadena shoreline, a 7- to 8-km stretch of shoreline that encompassed the shoreline beside today's Camp Foster or immediately north. "There the heaviest gunfire is concentrated. Smoke and debris from the explosions and fires rise up to the sky. The enemy aircraft, looking like hundreds of oversized beans, conceal themselves in the convenient smoke screen before carrying out their bombing operations" (Yahara 1995:xi).

With the exceptions of two very deep valleys and several hills, Camp Foster's landscape today barely resembles the prewar landscape. And even the prewar landscape was much changed since the time of the earliest-dated site occupations in the area, which are believed to date to the later part of the Initial Shellmound Period and the Early Shellmound Period (respectively, 10,000-3000 BP, 3000-2400 BP).

After the war, to make bombed and destroyed areas habitable once again, the U.S. military applied kilometre after kilometre of landfills to areas including Camp Foster, where some areas were leveled and then filled. Some fills at Camp Foster are reportedly more than 4 m deep, covering former beaches and dunes, traditional rice pondfields (irrigated or drained fields) and dryland (unirrigated) fields, and lower hill-slopes and valleys; they create a level to gently sloping surface usually capped with concrete or landscaped with grasses and ornamental plants.

A few areas left relatively unscathed during the war suggest the area's former beauty and abundant natural resources. These include both grassy and forested limestone hills and ridges; broad stream valleys containing old pondfield remnants; and two deep, beautiful, densely forested river valleys cut by Futenma-gawa (Futenma Stream) and Aniya-Aragusuku-Ishijaa-gawa (Ishijaa Stream). These less damaged areas contain large numbers of sites, including rock-cut tombs (believed introduced by the Chinese during the Kingdom Period, AD 1429-1879), prayer sites, rock walls, lithic and ceramic deposits, and sites of other types.

On former plains and plateaus, most surface sites were partially or entirely destroyed during the war. Important finds, however, have been made beneath fills, largely during excavations by archaeologists from Ginowan, Chatan, and Kitanakagusuku (Chatan-cho Board of Education 1992, 1993, 1994, 1997; Ginowan-shi Board of Education 1981, 1982, 1984 a and b, 1989, 1991; Goldstein and Haun 1993; Kitanakagusuku Board of Education 1995, 1997; Okinawa Prefectural Board of Education 1996), with the cooperation of the US military's cultural resource management program.

These buried sites include shell mounds and other deposits containing prehistoric lithics, bone and shell artefacts, earthenwares and stonewares, and shell and bone midden. Nine sites are assigned to the Initial or Early Shellmound Period: three dating to *c.* 2500/2400 BP; at least five to *c.* 3500/3000 BP; and one, near the summit of Kiyuna Ridge in Ginowan, to 5000-2500 BP. This last and potentially earliest site, Ginowan's Kiyuna Yamagabaru Site 5 (05-S05 in Figure 2, which includes sites in Chatan and Ginowan), contains artefacts of very early types including a butterfly-shaped bone artefact and a shell pendant shaped like a shark's tooth. Figure 3 indicates the former traditional village of Kiyuna, where this site and many others are located.

By the end of 1997, 132 sites had been recorded at Camp Foster, primarily archaeological sites but also including natural monuments and folk-cultural sites such as wells and prayer sites. The total number of archaeological features is 376: 95 in Ginowan, 193 in Chatan, and 88 in Kitanakagusuku. Many more rock-cut tombs and buried cultural deposits are anticipated in the deep valleys, which are not yet thoroughly surveyed.

One ridge-top site area in Chatan, the area of greatest interest here, contains buried deposits with materials of types assigned to the Initial through Late Shellmound Period (which ended *c.* AD 900/1000) and the Gusuku Period. The summit is dominated by the ruins of a castle, Chatan Gusuku (Figures 2, 4), which was intensely involved in intra- and interregional trade from the twelfth through fifteenth centuries.

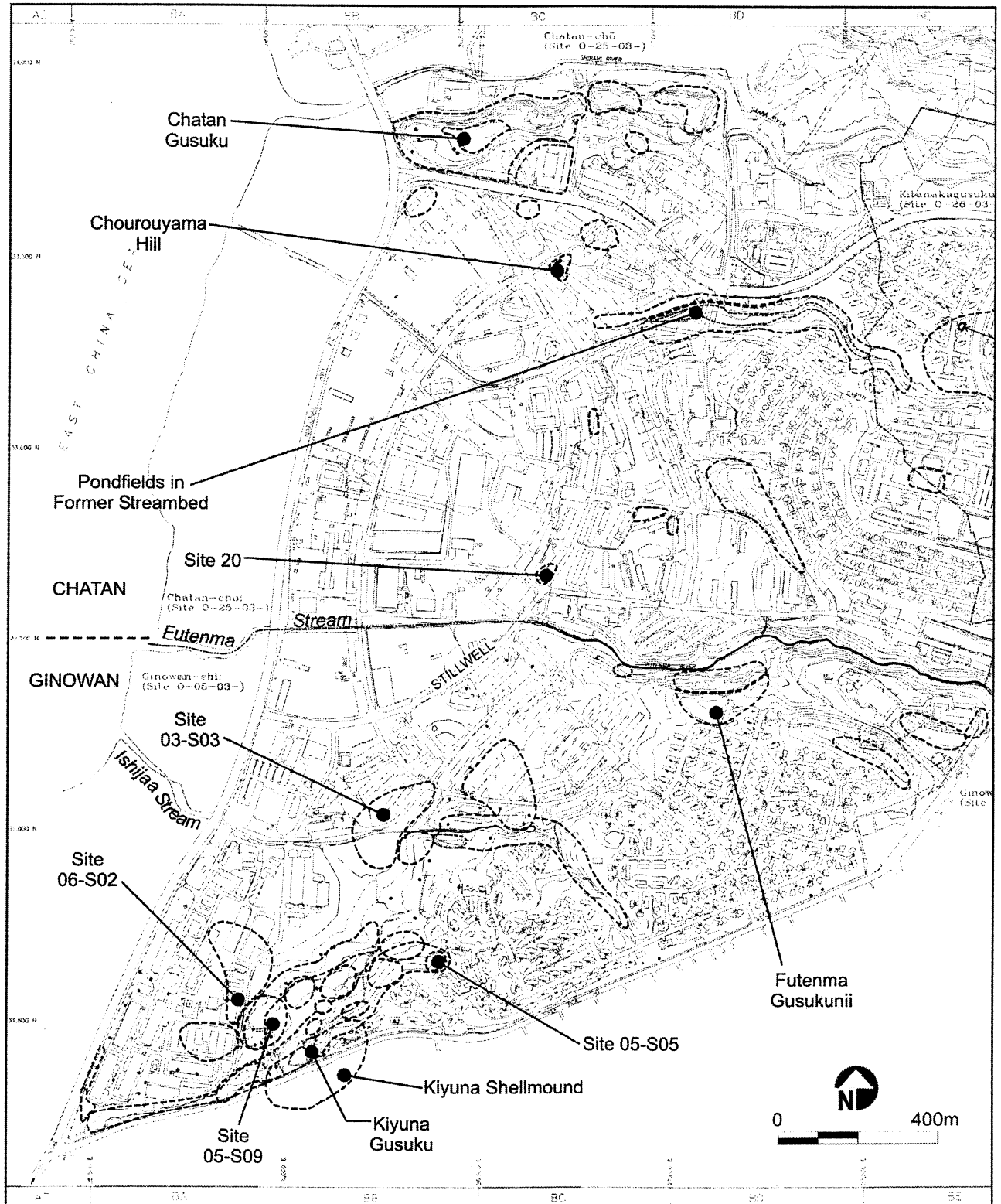


Figure 2: Archaeological sites in Chatan and Ginowan, Camp Foster. Site boundaries indicated by dashed lines; main sites discussed labeled in bold format (Modified after Allen and Nees 1998: Figure 13a).

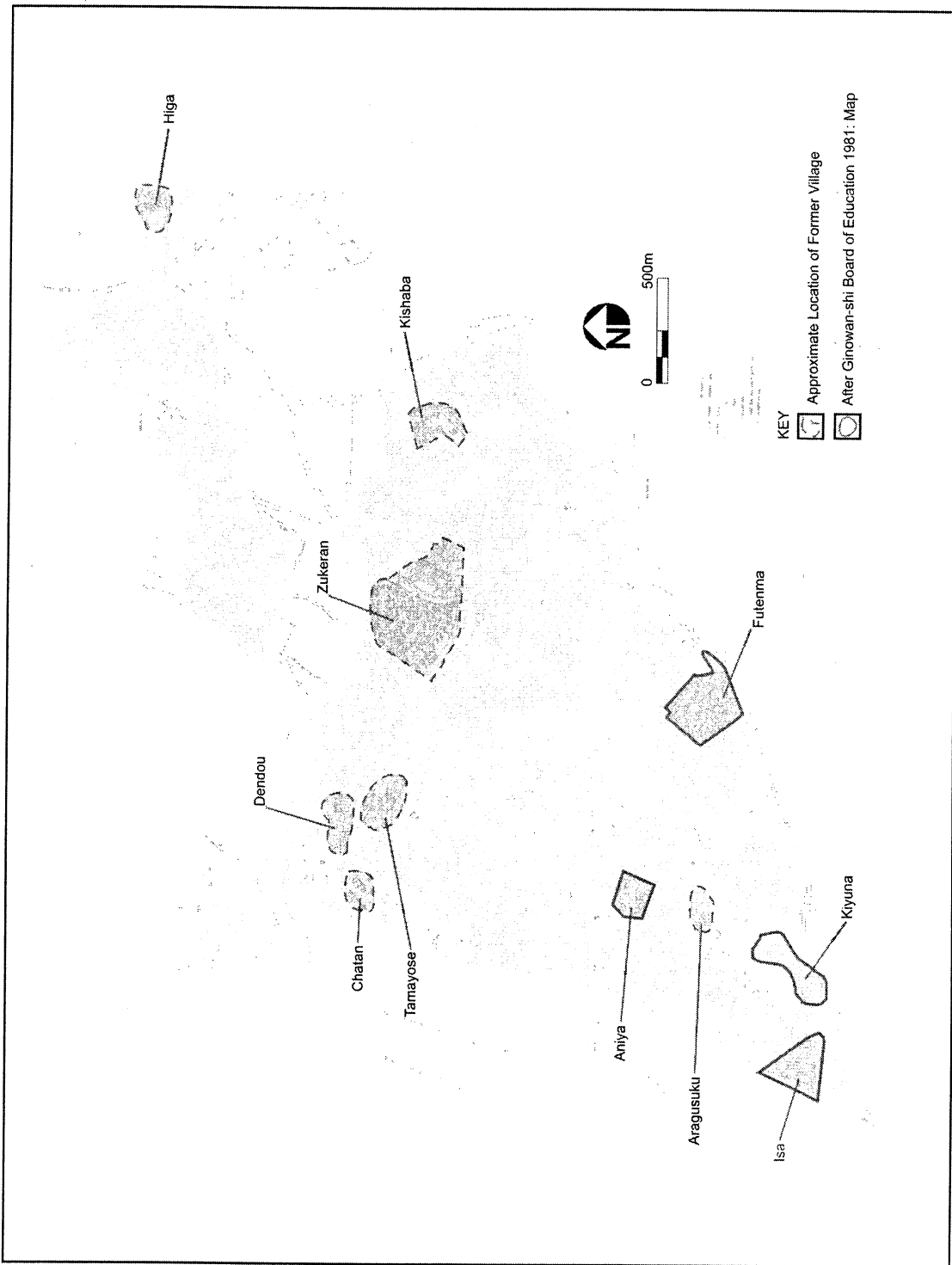


Figure 3: Former villages, Camp Foster (Allan and Nees (1998: Figure 12).

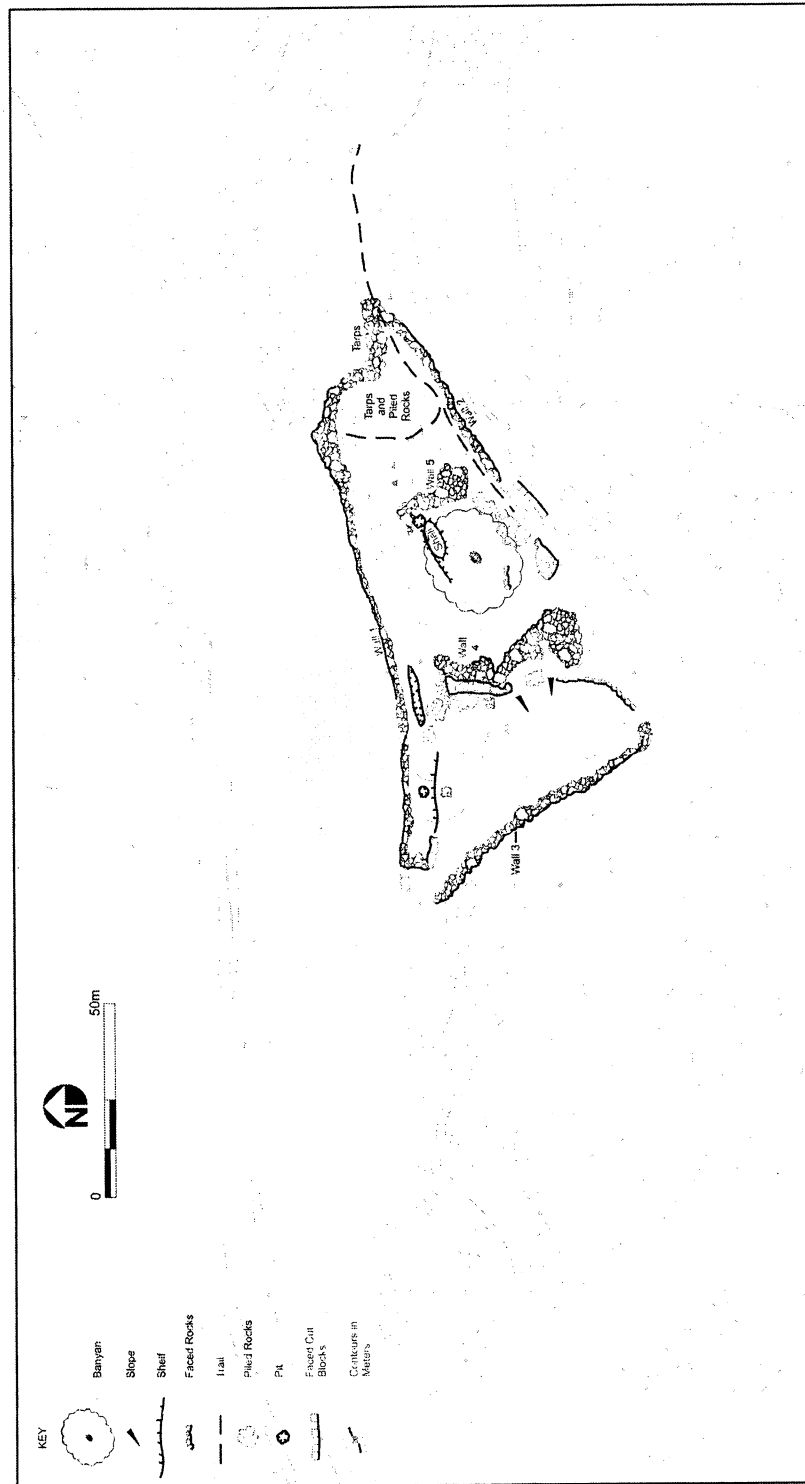


Figure 4: Site map, Chatan Gusuku
(Allen and Nees 1998:Figure 49; Japan, Government of, 1975:Sheets IE-86-19-1 - 19-4).

GUSUKU

Most *gusuku* still in evidence are castles or large, fortified residences on limestone or limestone-and-sandstone ridges (e.g., Pearson 1996:102). At the beginning of the Gusuku Period (c.AD 1000), many small *gusuku* around the island served as residences for *aji* (lords), each controlling a small, local feudal polity (Pearson 1991:263). Takamiya (1997:64) estimates that 337 Gusuku-Period sites are known on Okinawa, including both *gusuku* and the surrounding villages that supported them. Most village sites occupy low-lying agricultural lands; they were not fortified.

From the early part of the fourteenth century until 1429, these local polities were rapidly conquered and subsumed by three large states: from north to south, Hokuzan (or Sanhoku: Pearson 2001), Chuzan, and Nanzan or Sannan. Chatan Gusuku was located in Chuzan, which was centered at Shuri Gusuku (in Naha today). The three states remained in power until c.AD 1429, when Sho Hashi of Shuri united them, becoming the first ruler of the entire island, the head of the Ryukyuan (or Chuzan) Kingdom. In 1609, the Shimazu clan of Satsuma, Kyushu, attacked Shuri Castle, the seat of the Okinawan state, and conquered Okinawa (Pearson 1991, 1996, 1997; Summers 1994).

Archaeological evidence from *gusuku* includes defensive features and many features and materials that reflect more usual, daily activities. Residential use is suggested by hearths, children's game pieces, *go* and other gaming pieces, beads, hairpins, rings, cosmetic jars, and mirrors. Shell midden is often present. Agricultural support is clear in surrounding fields and storage areas, and in paleobotanical evidence analyzed for certain sites. Specialized support was provided by blacksmiths' shops, which forged tools including iron adzes and knives. Involvement in interregional trade is indicated by Southeast Asian, Japanese and Ryukyuan, Chinese, and Korean ceramics, and by Chinese coins and Korean roof tiles (Pearson 1991, 2001). What is harder to see archaeologically is what was exported. Many Okinawan exports were perishable, and most were also transported away from the island's shores.

Most early *gusuku* were small. As the political system became more hierarchical, large, well-fortified *gusuku* developed, in defensible locations. Most still in existence are relatively late, large, walled castles; a good example is provided by Shuri Castle, which has been carefully reconstructed, following original plans. While it may originally have been built earlier, Shuri Gusuku is now known in its later, much-elaborated form, representing the post-AD 1429 period when it was the capital for the island. Shuri covers 33,000 m² (Pearson 2001:Table I) and has impressive walls, gates, audience halls, governmental offices, a kitchen, a pantry, a cookery office, quarters for ladies-in-waiting,

and outer walled areas housing stables and sacred groves (Okinawa Prefectural Government 1992a, b).

Chatan Gusuku is smaller, although, at 13,500 m² it is one of the 15 largest (measured) *gusuku* (Pearson 2001); it is simpler and earlier than Shuri. Earthenwares and other ceramics recovered at the site suggest occupation from the twelfth through fifteenth centuries; Chatan Gusuku was passing out of use as Shuri became the center of government. It was apparently considered sacred by many and is surrounded by sacred groves (*utaki*) and prayer sites (*tun* and a site for prayer to the fire god [*hinukan*]) - some on the ridge, others down-slope, and many more rebuilt on Choroyama Hill (Figure 2), one of the places where imported goods were sorted before transit to Chatan Gusuku. At least 88 rock-cut tombs have been carved in the base of the *gusuku* ridge.

The castle was mapped in 1982 by a team from Chatan and remapped in its current condition by our team in 1997 (see Figure 4). It occupies the seaward segment of the summit plateau of a northeast/southwest-trending limestone ridge overlooking the East China Sea to the west, a major stream to the north, and low-lying lands to the south. The plateau is approximately 500 m long and 150 m wide, 44.76 m above sea level at the summit. At least two springs on the ridge water areas below. The outer walls form an approximate triangle, covering approximately 7500 m², 120-140 m long (east-west) and 35-75 m wide. In the northwest corner an extension, believed walled at one time, adds 30 m east-west and about 10 m north-south. The structural remnants include five wall sections and three main interior level areas. The entire area covers 13,500 m², as mentioned above.

The walls, built of limestone rocks with coral fragments, suggest construction during at least two periods. While most contain piled or stacked subangular and subrounded cobbles and boulders, one segment of the south wall (Figure 5) is keyed and stacked, built of square-cut blocks. The north wall may represent a third technique: it is well-faced and neatly stacked, incorporating tabular boulders and cobbles.

Chatan Gusuku occupied an easily defensible position. Remnant features suggest access from the northeast, probably beginning in a pass between two hills (the east one since leveled), following a trail up the gentle northeast slope, and crossing the plateau to the northeast corner of the castle. The southwest ridge slope is steep and rocky, and the slopes north and south of the castle are cliffs 10-20 m high, both dropping off precipitously.

A trail still leads across the plateau from the northeast, climbing a rocky incline that may once have held steps or a ramp and becoming a narrow path that continues beside (inside) the south wall but below the main rooms. The main



Figure 5: Keyed south wall, Chatan Gusuku. To NE.

entrance seems to have been located approximately midpoint along the south side, where the main south wall ends and a north-south wall to the right of the entry leads upslope into the interior. To the left, a massive piled wall divides the *gusuku* into two main sections. Gardens or outbuildings would have occupied the area to the west, out to the west outer wall; this area held dryland agricultural fields before the war. Today, a garden and prayer sites are located beyond the west wall. The main halls and living quarters were upslope, east of the massive wall, where walls and terraces still suggest former rooms. This is the main area excavated by the Chatan team, who uncovered darkly stained soils containing large numbers of ceramics including imported wares, shell midden, and other items.

The ridge, as noted, was occupied from the Initial Shellmound Period on and represents certain important Okinawan settlement trends. Coastal areas were preferred for the earliest settlements; Chatan ridge was once coastal. Settlement tended to shift inland as agriculture developed; as will be seen, this ridge, although coastal, was once surrounded by the agricultural fields and forests that made inland sites attractive and that later provided subsistence for *gusuku* residents. Coastal areas were again preferred during the Middle and the first 2000 years of the Late

Shellmound Period (c.2400-1900 BP), both represented by deposits surrounding the *gusuku*. As discussed by Takamiya (1996, 1997), settlement emphasized high elevations (again, most inland) after c. 1900 BP.

The site's midden deposits and trade ceramics also represent long traditions of marine exploitation and maritime trade. Marine gastropod shells noted by our crew included a nerite and *Strombus* and *Turbo* species; bivalves included a *Tridacna* species. Gusuku-Period tradewares reflect the castle's involvement in trade with mainland Asia and the islands of Japan. Again, the evidence suggests what was received, but not what was exported. While we know (see below) that Okinawan products were eagerly sought by foreign traders, it is difficult to recognize in Chatan Gusuku's current transformed surroundings what resources were available for export.

DEVELOPMENT AND EXPANSION OF MARITIME TRADE

Maritime voyaging and foreign trade have a long history as an economic mainstay in Okinawa, which was cut off from Asia by high sea levels after 10,000 BP (Imamura 1996:34; Takamiya 1997:57, Figure 3.5, citing research by Kimura Masaaki). The first known Okinawan sites after 10,000 BP date to c. 7000 years ago; since then, all communication and trade with the rest of Asia have been accomplished through maritime voyaging.

Overseas contacts between Kyushu and Okinawa are well-established from 7000 BP (during the Initial Shellmound Period). Yabuchi and Agaribaru ceramic wares, deep bowls with fingernail-impressions and pointed bases resembling Kyushu wares, were manufactured on Okinawa by 6500 BP (Miyagi c.1990; Pearson 1996:105-106; Takamiya *et al.* 1991:292). Contacts with Korea are suggested by deep Sobata bowls incised with motifs related either to Korean geometric or Kyushu wares (Miyagi c.1990; Pearson 1969: 28).

Relationships with mainland Japan and other Asian areas fluctuated through time. c.4500-3000 BP In the Initial and Early Shellmound Periods, contacts with Kyushu continued but exchange contacts narrowed as Okinawa became increasingly self-sufficient, and Ryukyuan ceramic styles flourished. By c.3500-2500/2400 BP (Early Shellmound Period), five regional Okinawan wares, in chronological order, Iha, Ogido, Oyama, Kayauchibanta, and Murokawa, were accompanied by wares from Kyushu, and by bone ornaments that may have originated in south China. Outward contacts expanded between 3000 and 2400 BP, when the Middle Shellmound Period began, emphasizing contacts with the other Ryukyus rather than mainland Japan; contacts with Kyushu continued, however, with imports including Kurokawa ceramics.

Interest in prestige items now apparently increased, leading the way to the later trade in prestige items. A distinctive type of pendant usually made of *dugong* bone (*Dugong dugon*, a herbivorous marine mammal) has been recovered from sites including one at Camp Foster (see Figure 2: Site 05-S05) that dates to 3000-2500 BP or earlier.

After 2400 BP, as settlement returned to the coast, exchange with Japan intensified. Trade with Kyushu increasingly emphasized the export of *gohora* (also, *gohoura*) shells, the shells of a large *Strombus* species (Okinawa Prefectural Board of Education 1997:44) or *Tricornis latissimus*, the Goliath conch, which grew only in Ryukyuan waters and were eagerly sought by the Yayoi élites of Kyushu for bracelets. (See papers by Kinoshita and Shinzato, this volume.) In return, Kyushu supplied metal and ceramics, and may have introduced or enhanced certain rice technologies. Contacts with Japan were regular after 1900 BP, as suggested by numerous items including ceramics; contacts with China were sporadic but continued.

A millennium later, c.AD 1000, the Gusuku Period began, and trade flourished as intra- and extra-regional exchange were organized by the lords of *gusuku*, whose families, retainers, and staffs were supported by local cereal agriculture. By 1997, 337 Gusuku-Period sites were known on Okinawa (Takamiya 1997:64).

Gusuku-Period and Later Imports

Exchanges with China were now regular: Chinese porcelains are among the most common artefacts at Gusuku-Period sites. Song- and Ming-Dynasty Chinese coins have been recovered in large numbers at *gusuku* including Shuri. The first documented Ryukyuan trade voyage to Melaka took place in AD 1317 (Kaneko and Melichar 1972:15, 59), from Pura in southeast Miyako (south of Okinawa); voyages to Melaka became routine during the Gusuku Period. Southeast Asian ceramics and Korean *koryo* celadons are both found at sites on Okinawa, as are grayish roof tiles that are also probably Korean (Pearson 1991).

Satto (AD 1320-1395), the first ruler of Chuzan, distributed agricultural tools made from iron purchased from Japan to farmers in the area (Pearson 1991:270). A Chinese community, possibly also a Korean community, was established in Naha in 1393, and Chinese writing, calendrics, and administrative features appeared. Satto expanded trade with Java, Sumatra, Siam, and Melaka; formalized relations with Japan and Korea; and established official tributary relations with China. Shinto practices arrived from Japan.

In 1372 or 1374, Satto's brother, Sho Taiki, headed a mission to China, offering mainly transshipped Southeast Asian goods, with great success. Okinawa received preferential trade rights and maintained trade with China

even during the years of the Ming Ban (1368-1567), when most Chinese trade with Asian nations ceased.

Goods Transshipped Through Okinawa

Okinawa became a major transshipment center in maritime trade between China and areas including Japan, Korea, and Southeast Asia. The royal annals (*Rekidai Hoan*) record contacts with China and Korea from 1424 to 1867, and with eight Southeast Asian city-states and other centers (Melaka, Palembang, Java, Sumatra beyond Palembang, Sunda-Kerapa, Patani, Annam) during the fifteenth and sixteenth centuries (Haun and Henry 1998:8; Summers 1994:77). Trade with Siam may have begun around the same time as trade with Japan and Korea, in the fourteenth century (Pearson 2001:269, citing research by A. Kobata and M. Matsuda).

Goods transshipped from Southeast Asia to China, Japan, or Korea included sappanwood, pepper, cloves, incense woods and incense, sandalwood, aloeswood, ivory, rhinoceros horn, sea otter skins, and tin. Okinawan traders visited Southeast Asia regularly to obtain these goods. In Melaka c.AD 1500, where four harbormasters, *syahbandar*, supervised traders and other visitors, one was reserved for visitors from the Ryukyus, Champa, and China, who also shared a housing compound (Leur 1967:66; Meilink-Roelofs 1962).

Japanese exports transshipped to China included short and long swords, spears, armour, gloves, shoulder and leg covers, helmets, horse armour and helmets, saddles, bridles, shields, lacquerware, fans, gold and silver vessels, gold, and copper. Chinese glazed porcelains and other ceramics, brocades, medicinal herbs, and coins were transshipped to Japan. Other items listed in the *Rekidai Hoan* include tigers, leopards, parrots, pigeons, mynahs, deer and bear skins, Buddhist texts, Chinese ink slabs, brushes, razors, silks, cotton, mats, drums, bells, bowls (probably porcelains), and wines (Okinawa Prefectural Government 1992a:9; Pearson 1997:131).

Goods Exported from Okinawa

The following local products were exported: horses, which were highly valued; shells collected offshore (*gohora* until c.AD 600; then *Turbo* and later probably a triton); and cowhide, sulfur, safflower dye, silk-floss padding, linen, banana fibre, ramie, fans, white paper, and whetstones (Haun and Henry 1998:9; Okinawa Prefectural Government 1992a:9; Pearson 1997:131, 2001:268). The "banana fibre" may have been *bashofu*, woven from the trunk fibres of *basho*, a banana relative that still grows wild in the hills of north Okinawa; *bashofu* was very popular before World War II throughout the Ryukyu and Amami Islands, and probably throughout a wider area; it is still made in the northern Okinawan village of Kijoka (Nakachi 1996:244).

Several of these products would have been cultivated in fields and gardens around *gusuku*. Others were collected in forests and rocky areas inland for transport to the *gusuku* and export. Another product not destined for export was critical for the support of the lord, family, and retainers: crops including barley, wheat, foxtail millet, legumes, and, later, irrigated rice.

Chatan Gusuku is located inland today, served by a single large stream that flows north of the ridge. No agricultural fields exist in surrounding areas, and the castle appears isolated from any support base, making it difficult to imagine that the *gusuku* could have supplied the land-based products so eagerly sought by Okinawa's foreign trade partners. The remainder of this article, however, reviews evidence that Chatan Gusuku was once surrounded by exactly the kinds of lands needed by the castle for both trade and subsistence.

THE PALEOENVIRONMENT: CHATAN GUSUKU'S SUPPORT BASE

Much of the following information comes from historical, geological, soils, and other environmental reports and maps, supported by our field survey results. These documents include most importantly maps detailing prewar lot ownership and land-use areas in Chatan-cho (Chatan-cho Board of Education 1997) and portions of Ginowan and Kitanakagusuku (Kitanakagusuku-son Board of Education 1997; Ginowan-shi Board of Education 1991:Map 2). These maps, and Japanese topographical sheets (Japan, Government of, 1975), suggest buried landscape features that are very difficult to recognize on the ground today.

Elevations at Camp Foster today range from 2 m asl at the west edge of the Chatan portion to 92.75 m asl on the Futenma Fiiiruu Hill summit in northeast Ginowan, and 94.3 m asl on a ridge at the south boundary of Kitanakagusuku. Landforms include valleys more than 20 m deep, former low-lying fields and plateau lands covered with landfills, limestone hills, and ridges edged by sheer cliffs. Dense forests cover deep valleys and most ridges. Soils range from acid to alkaline, from rocky land with shallow limestone soils to fertile soils formed on various alluvia.

The large stream north of Chatan Gusuku would have supplied water and at least one resource needed in trade: an estuary that would have provided a coastal harbor. The closest major stream south of the ridge today is Futenmagawa, 1.5 km away, on the Chatan/Ginowan boundary (see Figure 2). As mentioned, it has cut one of the two deepest valleys within the installation; the other is the Ishijaa Stream valley in Ginowan. If the Futenma Stream valley was deep and its stream small during the Gusuku Period, it is unlikely to have been used as a transportation route. It would,

however, have provided water and raw materials including rock and woods for both local use and export.

The pre-war land-use map of Chatan indicates that another main stream flowed just south past the *gusuku* ridge until relatively recently. Figure 6 shows only the western end of that stream, where it entered the coastal plain. This stream flowed northwestward from forests inland in a broad valley that still held many active pondfields before the war and whose banks were forested. During the 1997 survey, its valley was found to contain dozens of rock-cut tombs that probably date to the Kingdom Period and later. A named spring (Chibugaa) still waters an area containing obvious old pondfield remnants, and other remnants exist upstream. This stream was undoubtedly of major importance to subsistence at the *gusuku*, and its banks could have produced forest goods for export. At its mouth, it once formed a confluence with the north stream to form a joint estuary, and a harbor for oceangoing vessels.

Beginning inland, it flowed through areas of Shuri clay soils and Ishikawa loams; at the coastal plain, it deposited sediments that weathered into Awase clays and Akamaru and Aha soils. Shuri clays form on limestone and are poorly watered but arable if managed properly; they are used today for cereal, bean, and garden vegetable cultivation. Acidic Ishikawa loams form on schists and feldspathic sandstones and are also arable with management; they support Okinawa pine and broadleaf evergreen forests and are used near villages for sweet potato, bean, garden vegetable, tapioca, melon and tea cultivation. Shuri and Ishikawa areas would have provided good grazing lands for the Okinawan horses that were so highly valued for export, and could support most or all the land-based products wanted by China, Japan, Korea, and the countries of Southeast Asia: safflower for dyes; flax (linen), banana or *basho*, ramie, and silk floss for fibres, textiles, and padding; woods for fans and paper and possibly other fibres for paper. Both these soils and Awase clays, which form on calcareous alluvium and support dryland crops readily, could easily have supplied the barley, wheat, foxtail millet, and legumes needed by the *gusuku* and its lord for subsistence.

The coastal plain, where many square kilometres of rice pondfields were cultivated before the war (see Figure 6), is covered by Awase clays and Akamaru and Aha soils, which formed on varied alluvia and are two of the four most fertile pondfield rice soils on Okinawa. Both have been used extensively for rice cultivation for centuries (Stensland 1957; US Army Pacific 1959). The other two favorite pondfield soils, Okinawa clay loams and Chinen stony clays, are available southeast of Chatan Gusuku, where an arable tract continued for kilometres inland before the war. Both support pondfield rice and other crops, and could have supplied

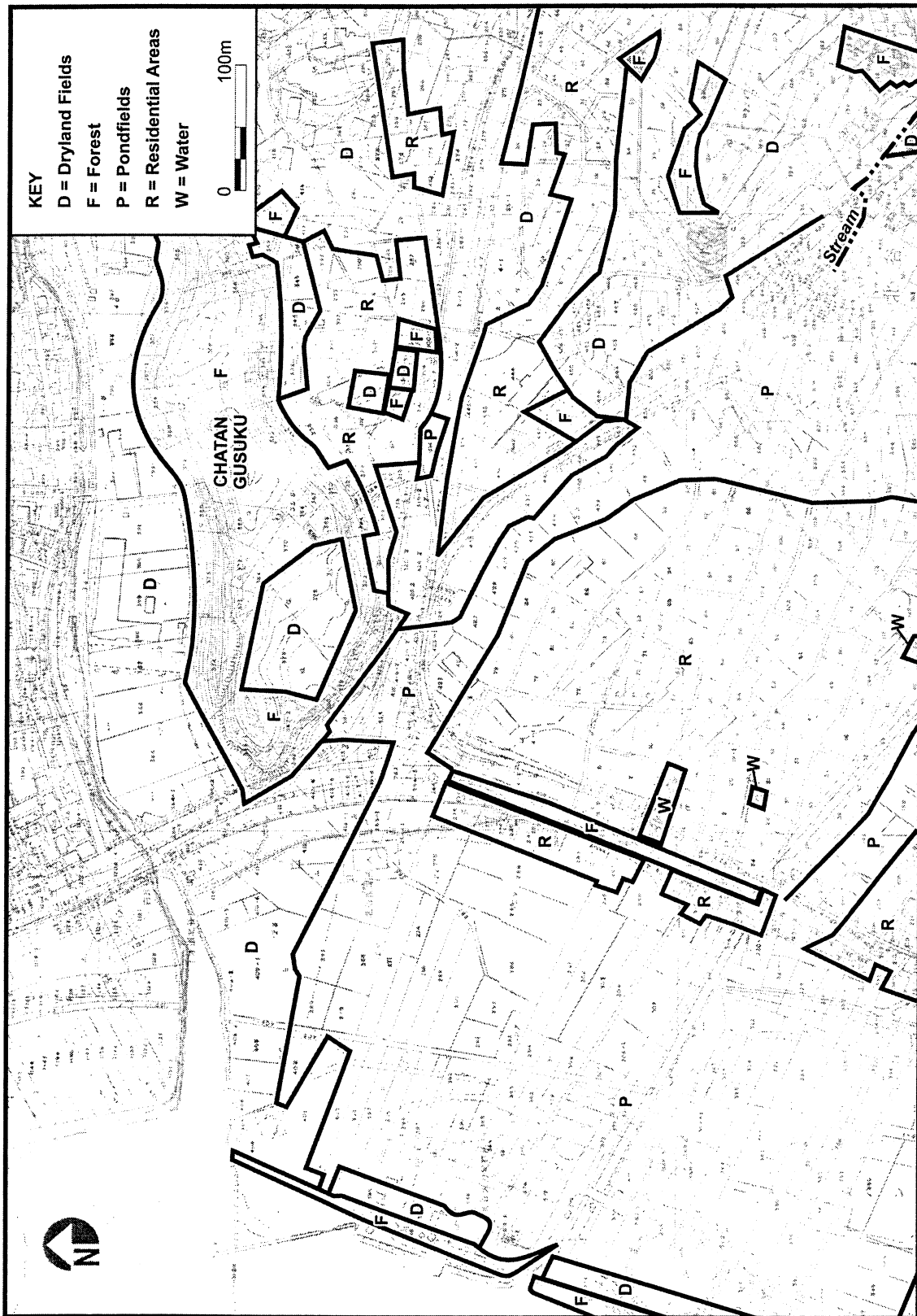


Figure 6: Pre-war land use map of a portion of Chatan (modified after Chatan-cho Board of Education, 1997).

much of what the *gusuku* needed for subsistence. Areas around the Chatan Gusuku ridge held extensive pondfield areas and dryland fields, and many forested areas, as recently as the early 1940s. The dryland field areas actually included the one mentioned earlier, on the ridge itself, where both subsistence and export crops may have been cultivated for centuries.

As noted, the former estuary at the stream mouths below the ridge formed a coastal harbor. The west coast was located approximately 1 km east of (inland from) the current shoreline throughout most of prehistory, based on archaeological evidence from three Middle to Late Shellmound-Period coastal sand dune sites discussed below and a fourth that probably dates to that period; all are deeply buried beneath fills today. It was not until the last few centuries that coastal progradation, perhaps hastened by over-extensive land use and soil erosion, shifted the shoreline westward, away from the castle, leaving it isolated inland. During at least the early portion of the Gusuku Period, the ridge was a small peninsula jutting out into the East China Sea.

The four dune sites that suggest the former location of the shoreline are Chatan's Site 20 and Ginowan's Sites 03-S03, 05-S09, and 06-S02 (see Figure 2). Chatan's Site 20, 1 km inland today, occupied a coastal dune at the base of a limestone cliff during the Middle Shellmound Period. Both the dune and the cliff are now buried beneath a level lawn. Ginowan's Site 03-S03 occupied a coastal dune, which was breached by Ishijaa Stream at some point; it is slightly less than 1 km inland today. Site 05-S09 occupied a coastal dune and marine terrace below Kiyuna ridge; Site 06-S02, a dune at the base of what is likely the same terrace; both are more than 650 m inland today. Site 03-S03 is not dated; the other three were occupied during the Middle or Late Shellmound Period, and Site 05-S09 was in use into the Gusuku Period. The beach line probably followed the Stillwell Drive alignment (see Figure 2) southward through Chatan to Futenma Stream and then turned southwestward around the west base of Kiyuna ridge.

Chatan Gusuku was not the only *gusuku* at Camp Foster to take advantage of coastal location or access to a major stream. At least two additional *gusuku* were occupied from the Shellmound through Gusuku Periods south of Chatan, in Ginowan. Kiyuna Gusuku, which had begun use during the Initial to Early Shellmound Period, overlooked the coast from the summit of Kiyuna ridge, in part overlying a large shell mound. Futenma Gusukunii occupied a high ridge above the mid-reaches of Futenma Stream. Both locations were defensible, and both had access to water, fields, and forest resources.

CONCLUSION

Inland sites are relatively rare at Camp Foster: only two sites were located more than about 300 m inland during the 1400 years preceding the Gusuku Period when the dune sites discussed were occupied. Both Chatan Gusuku and Kiyuna ridges were coastal. Coastal sand dunes, up to 1 km inland today, were among the earliest site locations; at least one remained in use through the Gusuku Period.

While beaches and later an alluvial floodplain formed south of Chatan Gusuku ridge, the area immediately west of the ridge was dominated by the two large streams that joined to form an estuary and harbor. These streams, the forested ridges upstream, and the fertile soils that eventually covered many square kilometres of level and gently sloped lands at the stream mouths and the coast all played important roles in support of the *gusuku*. The ocean supplied *gohoura* shells for export. Forested ridges including the *gusuku* ridge itself could supply wood for paper and fans. Inland areas could support horses, the favorite export, as well as the best-documented Okinawan exports: safflower for dyes; flax for linen; *basho* or banana fibres and ramie for textiles; and possibly other fibres for paper. The dryland and irrigated fields supplied the crops needed to support the lord and retainers at the castle.

Before post-war changes transformed the area, Chatan Gusuku presented the traditional picture of a *gusuku*-dominated landscape, with a ridgetop residence surrounded by hectares of forests and agricultural fields; supplied with water by springs and major streams; and located beside a coastal harbor where trading vessels could moor.

ACKNOWLEDGMENTS

This study was made possible by a contract awarded by the US Navy Pacific Division, Naval Facilities Engineering Command, Pearl Harbor, Hawai'i. Thanks also go to many individuals, in particular the following people: Asato Shijun, our Okinawan colleague, and Rich Nees, Jennifer Robins, and Lisa Anderson, whose fieldwork and research contributed invaluable information; Mr Goya and Mr Ota of the Ginowan and Kitanakagusuku Boards of Education, Mr Matsuda and Mr Yamashiro of the Chatan Board of Education, and Higoshi Kuniaki (Assistant Director), Uechi Hiroshi, and Oshiro Kei at the Prefectural Education Department, Cultural Division, Naha, all of whom provided site information and pre-war land-use data; and, at Camp Foster, Heshiki Kanenao, Dr Christopher White, and Eric Williams, Environmental Branch; and Steve Arn and Takushi Sueko, Facilities Engineering. In Hawai'i, U'ilani Naka'ahiki of AMEC prepared the figures; Mark Ammen, New Perspec-

ALLEN: SUPPORT FOR A GUSUKU, OKINAWA

tives Group, the site map on which Figure 2 is based. Finally, many thanks to Peter Bellwood and Doreen Bowdery for their much-appreciated efforts in putting together the conference and these volumes.

REFERENCES

Okinawan/Japanese-language entries are preceded by asterisks (*). Other sources are in English.

- Allen, J., and R.C. Nees. 1998. *Documentary Archival Research, Field Verification, and Inventory Survey at Camp Foster, Okinawa, Japan*. Vol. 1. For Marine Corps Smedley D. Butler, Okinawa. Ogden Environmental and Energy Services, Honolulu. Submitted to US Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor.
- Chatan-cho Board of Education. 1992. **Chatan Gusuku (Chatan Gusuku, 7th Survey)*. Chatan-cho Cultural Properties Survey Report 12.
- Chatan-cho Board of Education. 1993. **Tamayosebaru Ruins*. Chatan-cho Cultural Properties Survey Report 13.
- Chatan-cho Board of Education. 1994. **Chatan Town Ruins - Detailed Distribution Survey Report*. Chatan-cho Cultural Properties Survey Report 14.
- Chatan-cho Board of Education. 1997. *Map of pre-World War II land use and registered lots. Hand-colored. Original scale 1:2500. Provided and photocopied by Chatan-cho Board of Education in 1997.
- Ginowan-shi Board of Education. 1981. **Cultural Properties in Camp Zukeran*. Ginowan-shi Cultural Properties Survey Report 3.
- Ginowan-shi Board of Education. 1982. **Ruins of Ginowan City*. Ginowan-shi Cultural Properties Survey Report 4.
- Ginowan-shi Board of Education. 1984a. **Caves*. Ginowan-shi Cultural Properties Survey Report 6.
- Ginowan-shi Board of Education. 1984b. **Ruins of Kiuna (Kiyuna)*. Ginowan-shi Cultural Properties Survey Report 5.
- Ginowan-shi Board of Education. 1989. **Buried Cultural Properties in Ginowan*. Ginowan-shi Cultural Properties Survey Report 10.
- Ginowan-shi Board of Education. 1991. **Ginowan-shi Cultural Properties Information Map*. Ginowan-shi Cultural Properties Source Materials 36.
- Goldstein, V.H., and A.E. Haun. 1993. *Task 5 - Cultural, Historical and Archaeological Documentation, MCB Camp Smedley D. Butler and MCAS Futenma, Okinawa, Japan*. Paul H. Rosendahl, PhD, Inc., Hilo. Submitted to US Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor.
- Haun, A.E., and J.D. Henry. 1998. *Inventory Survey at Camps Courtney, Hansen, and Schwab and Background Research and Reconnaissance Survey of the Central Training Area, Marine Corps Base Camp Smedley D. Butler, Okinawa, Japan*. Paul H. Rosendahl, PhD, Inc., Hilo. Submitted to US Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor.
- Imamura, K. 1996. *Prehistoric Japan: New Perspectives on Insular East Asia*. Honolulu: University of Hawai'i Press.
- Japan, Government of. 1975. Topographic maps, Camp Foster. Scale, 1:1000. On file, Map Library, Public Works Branch, Camp Foster.
- Kaneko, E., and H. Melichar. 1972. *Pura Mutuzuma - Archaeological Work on Miyako Island, Ryukyus*. Honolulu: Social Science Research Institute, University of Hawaii.
- Kitanakagusuku-son Board of Education. 1995. **Kitanakagusuku-son Cultural Properties Survey Report 3*.
- Kitanakagusuku-son Board of Education. 1997. *Portion of map of pre-World War II land use and registered lots. Original scale 1:2500. Provided by Kitanakagusuku-son Board of Education.
- Leur, J.C. van. 1967. *Indonesian Trade and Society*. The Hague: W. van Hoeve.
- McNeill, J.R., and D.J. Welch. 2002. *Documentary Archival Research, Field Verification, and Inventory Survey at Camp Foster, Okinawa*. Vol. 2. For Marine Corps Smedley D. Butler, Okinawa. International Archaeological Research Institute, Inc., Honolulu. Submitted to US Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor.
- Meilink-Roelofs, M-A. P. 1962. *Asian Trade and European Influence in the Indonesian Archipelago Between 1500 and About 1630*. The Hague: Martinus Nijhoff.
- Miyagi Tokumasa. c.1990. History of Ryukyuan pottery. Ms. US Navy, Pacific Division, Naval Facilities Engineering Command, Pearl Harbor.
- Nakachi, K. 1996. *Ryukyu Islands and Okinawans*. Naha: Okinawa Times.
- Okinawa Prefectural Board of Education. 1996. Cultural properties in base-occupied areas. Chart 6 in set of charts and attachments prepared for US military installations on Okinawa. Ms. Naha: Okinawa Prefectural Board of Education.
- Okinawa Prefectural Board of Education. 1997. *Cultural Properties of Okinawa. Part V: Maizou Bunkazai*. Okinawa Prefectural Board of Education, Naha (in English and Japanese).
- Okinawa Prefectural Government. 1992a. *Keys to Okinawan Culture*. Okinawa Prefectural Government, Okinawa. Available at Okinawa Prefectural Board of Education, Naha.
- Okinawa Prefectural Government. 1992b. *Shuri Castle - A Look into the Past*. Naha: Okinawa Prefectural Government.
- Pearson, R. 1969. *Archaeology of the Ryukyu Islands: A Regional Chronology from 3000 B.C. to the Historic Period*. Honolulu: University of Hawaii Press.
- Pearson, R. 1991. Trade and the rise of the Okinawan State. *BIPPA* 10:263-81.
- Pearson, R. 1996. The place of Okinawa in Japanese historical identity. In D. Denoon, M. Hudson, G. McCormack and T. Morris-Suzuki (eds), *Multicultural Japan: Palaeolithic to Postmodern*, Chapter 6, pp. 95-116. Cambridge: Cambridge University Press.

- Pearson, R. 1997. The Chuzan Kingdom of Okinawa as a city-state. In T. Charlton and D. Nichols (eds), *The Archaeology of City States: Cross Cultural Approaches*, Chapter 8, pp. 119-34. Washington DC: Smithsonian Institution Press.
- Pearson, R. 2001. Archaeological perspectives on the rise of the Okinawan state. *Journal of Archaeological Research* 9(3):243-85.
- Stensland, C.H. 1957. *Military Geology of Okinawa-Jima, Ryukyu-Retto. Vol. 4. Soils*. Headquarters, US Army, Intelligence Division, Office of the Engineer, with US Geological Survey. Available, Hamilton Library, University of Hawai'i, Honolulu.
- Summers, J. (ed.). 1994. *Okinawa. Where Is It?* Chatan-cho: All Souls' Episcopal Church.
- Takamiya, H. 1996. Initial colonization, and subsistence adaptation processes in the late prehistory of the Island of Okinawa. *BIPPA* 15:143-50.
- Takamiya, H. 1997. *Subsistence Adaptation Processes in the Prehistory of Okinawa*. PhD dissertation, University of California, Los Angeles. Ann Arbor: University Microfilms.
- Takamiya, H., L.A. Pavlish, and R.G.V. Hancock. 1991. Instrumental Neutron Activation Analysis (INAA) of Okinawan pottery: can it be used to indicate prehistoric contact? *BIPPA* 10:292-306.
- US Army Pacific. 1959. *Military Geology of Okinawa-Jima, Ryukyu-Retto. Vol. 5, Geology*. Headquarters, US Army Pacific, Intelligence Division, Office of the Engineer, with US Geological Survey. On file, Hamilton Library, University of Hawai'i, Honolulu.
- Yahara, Col. H. 1995. *The Battle for Okinawa*. (Translated by R. Pineau and M. Uehara). New York City: John Wiley and Sons.

