EXAMPLES OF ADAPTIVE RE-USE OF WORLD WAR II ARTEFACTS IN MICRONESIA

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Many Pacific Islands are littered with the remains of World War II. These remains range from the wrecks of ships, tanks and aircraft, to coastal defense installations and general base infrastructure. The abundance of material left behind after the cessation of hostilities meant that local communities had abundant opportunity to salvage elements and put them to their own use. This paper provides an overview of the nature of adaptive reuse to which World War II artefacts have been put in Micronesia, highlighting the impact on heritage sites but also the innovation and transmodification that occurred, establishing new historic contexts for the artefacts.

The Pacific War (1941–45) had a profound impact on the Micronesian communities. Base developments by Japanese and US forces alike saw the make up of their islands change with the formerly productive central parts of several islands built over changing the economy of the islands. This resulted on occasion in wholesale realignments of settlement patterns on other atolls. The effects of the war brought about personal hardship and trauma, and left behind reminders of the war. A less welcome rem(a)inder of the war is the ubiquitous unexploded ammunition, while the non-lethal remains form an asset for tourism, exploited by the local airlines, and the dive industry.

It is not surprising that the abundance of artefacts left over from the Japanese and the US base developments provided the local communities with a vast array of resources for scrap metal collection and personal use. It appears that the reuse of the materials started as soon as it was deemed safe to do so without risking reprisals (see the case of a Val dive bomber described below), or soon after war’s end. The Japanese bases, once given up, quickly became sources of household utensils and tools, and later a source of all sorts of material for manufacturing other items. Soon after the Japanese surrender and repatriation of the garrison forces the Marshallese went back to the base islands to look for equipment and household goods that could be of use.

While examples of secondary use are on occasion illustrated in survey reports and conservation studies, no systematic study has been carried out. The aim of this paper is two-fold. On the one hand it is to demonstrate the range of adaptive uses to which artefacts from Word War II were put, and the concomitant level of damage to the integrity of these war places. On the other, as Micronesian communities are becoming increasingly affluent, these aspects of community life are gradually disappearing. In that regard, then, this paper also provides a photographic record of the use of such items in the first half of the 1990s.
The majority of the examples shown in this paper come from the Republic of the Marshall Islands and unless cited otherwise, are based on personal observations.

**Sites**

In several instances bunkers and the like are now utilised as sheds, storage facilities and pig sties, and larger structures, such as air command centres or ammunitions depots are used for generator buildings or construction storage sheds or outright human habitation.

A bomb and ammunition storage building on Wotje, which is in perfect structural condition, was planned to be used as a power house for the Wotje Northern Marshalls High School and in the interim was used as a storage building for construction materials.11

The air operations buildings in Wotje, Wotje Atoll, and Taroa Island, Maloelap Atoll (both Republic of the Marshall Islands) are being used as private dwelling, while the same type of building on Aslito Field in Saipan serves as the Northern Marianas Visitors Bureau.12 The first floor of the bomb-damaged radio-direction finding and command building of the Japanese base on Taroa, Maloelap Atoll served as a church (Fig. 2).

The wooden buildings of most Japanese bases had been destroyed during the U.S. bombing raids. On Majuro, however, the base had been left intact and taken over by the occupying U.S. forces. The U.S. utilised most of the buildings, and tore down others. After the U.S. forces left the buildings were surrendered to the Marshallese who moved in, until the structures were too unstable to be utilised. Today, only one building of the former base survives (site MI-Mj-209).

The concrete foundations often served as foundations for shower units and other buildings. On Mile the water tanks of the main generator station serve as the foundations of the Mile guesthouse operating in the early 1990s; while the foundations of the Japanese RDF building on Majuro as well as the foundations of the warehouses and the tennis court were all used as foundations for modern housing

One of the houses of the Japanese seaplane base on Djarrit, Majuro Atoll, was still in existence in 1992 and then used as a dwelling.13 Several houses in Djarrit contain large, thick beams, which very likely result from Japanese buildings of the World War II period. After the collapse or demolition of such buildings, wooden beams were salvaged and re-used.

**Water-tanks**

Given that the atolls of the Marshall Islands depend on rainwater as the sole source of drinking water, it is not surprising that water storage facilities are of prime concern. Only the urban atolls of Majuro and Kwajalein have centralised water supplies. Inhabitants on other atolls rely on rainwater collections off their private catchments, such as roofs, shed and the like.

Where possible, the concrete water tanks built by the Japanese have been repaired or refurbished and are commonly used at present for the same purpose. This was observed on Taroa, Wotje and Majuro.

**Runways**

The most commonly utilised site dating to World War II are airfield runways. The Japanese erected airbases on Mile, Jaluit, Wotje, Taroa (Maloelap), Roi-Namur and Kwajalein. These airfields had multiple runways, with the main runway oriented towards the predominant direction of the wind. All the latter runways are still or again used, either with or without improvements by the U.S. administration and the Republic of the Marshall Islands government (Fig. 1). The U.S. runway on Delap is now out of service, but had been used for a prolonged time.

**Marston Matting**

One of the most ubiquitous pieces of US-origin World War II equipment are the pierced steel planks, colloquially also known as ‘Marston matting.’ These interlocking planks had originally served as mats to consolidate soft ground, such as the coral soils so that vehicles and aircraft could use the area without getting bogged. After the war these items saw wide
spread use as fence panels (Fig. 31, Fig. 32), as house walls for breezeways (Fig. 29) and as pig pens (Fig. 30). While these items are prevalent on islands and atolls that once supported US bases, post World War II transport meant that equipment was moved around.

The use of Marston matting as fence material is very widespread in the Marshall Islands (Uliga I., Delap I., and Laura I., Majuro Atoll; Mile I., I. Atoll; Mejatto I., Kwajalein Atoll) and beyond such as Pohnpei and Chuuk.¹⁴

**Quonset huts**
The use of the reinforcement structure of Quonset huts as fence posts has been reported from Chuuk.¹⁵

**REUSE OF AIRCRAFT PARTS**
The aluminium-skinned aircraft were a major source of raw materials, ranging from small pieces to entire panels of the fuselage, from equipment to propeller blades.

**Fuselage**
Even while war was still raging in the islands, plane wrecks were quickly stripped of part or all of their aluminium sheeting, mainly for use as coconut-grinder blades, husking-stick points and other artefacts.¹⁶

This has been reported, for example for the B-24 bomber that crashed in 1944 on Arno Atoll.¹⁷ Similar is the apparent fate of the “Val” dive-bomber (Aichi D3A; site MI-Mj-29) that crash-landed in January or February 1944 on the shore of Laura, at the time the main population centre of Majuro Atoll. The plane had apparently run out of fuel and attempted to crash-land on the sand beach at Laura in January or February 1944, when it struck a coconut tree and lost its tail in the process. The aircraft was complete, save for its tail which had been torn off, in February 1944,¹⁸ but stripped of most of its aluminium skin barely a month later (Fig. 11).¹⁹ However, such use is not confined to the post World War II period: aluminium from aircraft was used as recently as 1989 as casting aids for concrete water tanks on Taroa, Maloelap Atoll (own observations).

US air raids on the Japanese air bases destroyed a large number of Japanese planes. The fuselages of several planes were cannibalised for large aluminium sheeting for construction projects, serving as forms for pouring concrete (Taroa, Maloelap Atoll) or as, in flattened form, as side walls/panels for a house (Arbar Island, Mile Atoll; Fig. 12).

**Propellers**
While the most common use of propellers and propeller blades is that of an ornament (Fig. 9; Fig. 10), blades have also been used as reflectors to guide the way at night through the lagoonal pass Laura, navigational markers for Majuro Atoll.²⁰

**Drop Tanks**
One of the relatively common finds at the shores and on the islands of the atolls of Micronesia are oblong or torpedo-shaped aluminium cylinders, which at first glance can easily be mistaken for floats of flying boats or seaplanes. These objects are either found at the shore, or, more commonly, in use as water tanks at home sites. These, however, are external wing tanks, which could be discarded (‘dropped’) in flight. They belonged to a North American F-86 “Sabre” jet aircraft, which saw extensive service in the Pacific Area until the late 1950s. These drop tanks come in a variety of shapes and fuel capacities

- 120 gal. combat tanks with straight fins
- 120 gal. combat tanks with straight fins and side panels
- 200 gal. (finless) drop tank
- 200 gal. Misawa tank
- 206.5 gal. ferry tank

It would appear that all of the fuel tanks so far found in Micronesia are 120 gallon combat tanks, that had been dropped off as part of training exercises. These drop tanks were made by a variety of manufacturers on behalf of the USAF, among them Japanese companies such as Shin Meiwa. These drop tanks, like all others of their type seen on various atolls in the Marshall Islands and elsewhere, were used as water catchment: Bouj I., Ailinglaplap Atoll;²¹ Ebon I., Ebon Atoll (Fig. 39);²² Lukej I., Arno Atoll.
A survey on Mejatto Island, Kwajalein Atoll, encountered a drop tank used as a water catchment. The tank had been found washed ashore on Rongelap Island, Rongelap Atoll, and brought along when that atoll’s population was evacuated Mejatto Island in Kwajalein Atoll. This example documents the importance Marshallese attach to additional water storage options and to the value of drop tanks in the 1990s.  

**Oxygen bottles**  
The most common and the most enduring use found for parts of B-24 aircraft are the oxygen cylinders, originally installed as an oxygen supply for high altitude missions. A standard Liberator would carry at least 10 of these cylinders. Today, these aluminium cylinders are found cut in half, either length wise or—more commonly—across to serve as cooking pots. Due to their large size and round bottoms these pots are most suitable for use in open fireplaces. Such ‘pots’ have been seen by the author on the following location: Bouj I., Ailinglaplap Atoll; Airok I., Ailinglaplap Atoll; Jelte, Majuro Atoll (Fig. 54); Mile I., Mile Atoll; Wotje I., Wotje Atoll; Taroa I., Maloelap Atoll; Ine I., Arno Atoll; and Mejatto I., Kwajalein Atoll (Fig. 55).  

All of these islands have seen long-range bombing by 7th AAF squadrons, and B-24 crashes are confirmed for all these atolls with the exception of Ailinglaplap. However, the nature of the cylinders meant that they would float and thus could well originate from planes which crashed on the open sea or exploded in mid-air. Ailinglaplap, then, is downwind and down-current of Majuro and Maloelap and close to the flight route from Kiribati (then the Gilbert Islands) to Kwajalein Atoll.

**GUN EMLACEMENTS AND AMMUNITION**  
The costal defense and anti-aircraft gun batteries erected on the Japanese bases also provided a range of materials that could be adapted for other uses.

**Recoil springs of coastal defense guns**  
The guns themselves have found little reuse, given their size and weight. The recoil of the heavy guns was buffered through recoil springs set in oil-filled tubes. Some of the guns which had been damaged during air raids had their recoil springs expose. Such springs have found reuse as fence posts on Chuuk, and as supports for guiding rails for copra dryers on Mile I., Mile Atoll (Fig. 27).

**Ammunition Ready Magazines**  
Ammunition for the 127 mm dual purpose guns came as complete rounds, with the projectile fixed on a shell casing containing the propellant. At the gun emplacements these complete rounds were stored in ammunition ready boxes (Fig. 51) which had been set in concrete recesses in the emplacements. A large number of these boxes seem to have survived the US air attacks on the gun batteries. These boxes, stripped of the separators for the rounds, have found reuse as storage lockers (Jinbinmen I., Mile Atoll; Fig. 21, Fig. 22), as water tanks (Mile I., Mile Atoll) and as copra drying ovens (Mile I., Mile Atoll; Fig. 52, Fig. 53).  

Containers for powder bags were also used as water catchments (Fig. 13, Fig. 14).

**Shell Casings**  
The seemingly abundant number of 127mm DP rounds left behind (see below) allowed people to both salvage the propellant for use in bomb fishing (see below) and to extract the shell casings as scrap metal (Fig. 7; Fig. 8). Because of the value of cuproalloys in the scrap metal trade shell casings only found limited reuse. Examples that were encountered was the use of a casing as a pig bell on Mile I., Mile Atoll (Fig. 46), as well as the use of two casings as a seat (Wotje I., Wotje Atoll; Fig. 50). The latter use must be seen as temporary give the large pile of collected casings ready for sale to scrap metal dealers.

**Ordnance**  
Unlike as it might appear, ordnance has seen some secondary use. Spent shells have been...
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noted as borders for house platforms on Towoka I., Mile Atoll (Fig. 34).

World War II artefacts are also sometimes thrown in copra bags to increase their weight and hence the financial return. Occasionally World War II shells find their way into the copra grinder, with potentially disastrous effects.31

Unexploded World War II ordnance, which is abundant on many places even after repeated clean ups (cf.. Spennemann et. al. 1990), is collected for use as explosives in (illegal) bomb-fishing. In Chuuk, islanders go to the length of recovering large shells from the holds of sunken ships.32

**Bomb Craters**

Base installations had been the targets of sustained air attacks. The islands were left pockmarked with bomb craters. Several of the deep bomb craters were subsequently used as taro planting pits. This was seen on Mile I., Mile Atoll (Fig. 16) and Taroa I., Maloelap Atoll.

**Narrow-Gauge Railroad Tracks**

The larger gun batteries required narrow gauge railroad tracks to allow for the efficient movement of ammunition from the storage buildings to the gun emplacements. It is not surprising that the length of railroad tracks found a range of secondary uses.

On Mile I. two lengths of railroad tracks were used as guide rails for the fire box of a copra dryer (Fig. 27). On the same island a pig pen erected out of interlaced and piled railroad axles was noted (Fig. 28). General fencing was also constructed of shortened lengths of tracks on Chuuk.33 For Chuuk the use of railroad tracks as beams in houses and for the reinforcement of concrete has been mentioned. In addition short lengths of this material are reputedly used as (sitting) planks in out houses.34

**Narrow-Gauge Railroad Carts and Axles**

The buckets of narrow gauge railway cars have been described as being used for water cisterns on Chuuk.35 The use of axles is more ubiquitous. Axles set upright into the ground have been used as foundations for raised houses on Ebon Island, Ebon Atoll (Fig. 25) and Chuuk.36

A railroad axle can be used as a part of a work-out and fitness equipment, usually among other pieces of weight lifting equipment. In such use, railroad axles have been seen on Ebon I, Ebon Atoll (Fig. 23),37 and on Mile I., Mile Atoll. They are also known to serve as toys in general on Chuuk.38

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Table 1. Observed domestic secondary use of archaeological WW II artefacts

<table>
<thead>
<tr>
<th>Pig pens</th>
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<th>Stepping stones</th>
<th>Fence</th>
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<th>Copra dryers</th>
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Examples of Adaptive re-Use of World War II Artefacts in Micronesia

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<td>Aircraft Fuselage</td>
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Examples of Adaptive re-Use of World War II Artefacts in Micronesia

Fig. 1. The main east-west runway of the Japanese air base of Mile Island, Mile Atoll, RMI, today serves as the runway for the domestic airline connections (1991).

Fig. 2. Japanese command building serving now as a church. (Taroa Island, Maloelap Atoll, RMI)(1991).

Fig. 3. Japanese radio-communications building serving now as Xavier High School (Moen, Chuuk, FSM)(1992).

Fig. 4. Japanese radio-communications building serving now as Xavier High School (Moen, Chuuk, FSM)(1992)

Fig. 5. Japanese 20 mm cannon emplacement serving as a pig sty. (Mile I., Mile Atoll, RMI)(1991).

Fig. 6. Japanese 20 mm cannon emplacement serving as a pig sty. (Mile I., Mile Atoll, RMI)(1991).
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Fig. 7. Scrap metal collection of Japanese 127 mm shell casings. The items have been stockpiled for sale at a future date. (Wotje I., Wotje Atoll, RMI)(1991).

Fig. 8. Scrap metal collection of Japanese 127 mm shell casings. The items have been stockpiled for sale at a future date. (Wotje I., Wotje Atoll, RMI)(1991).

Fig. 9. Propellers of Japanese aircraft and ships as well as a machine gun moved to a hotel as a garden ornament (Truk Intercontinental, Moen, Chuuk, FSM)(1991).

Fig. 10. Propellers of Japanese aircraft moved to a house as garden ornaments (Moen, Chuuk, FSM)(1991).

Fig. 11. A Aichi D3A ‘Val’ on the beach at Laura (Majuro Atoll, RMI) in 1945. Note that the plane has been stripped of aluminium. 39

Fig. 12. Part of the fuselage of a Mitsubishi G4M “Betty” aircraft flattened out and serving as aluminium siding on a residence (Arbar I., Mile Atoll, RMI)(1991).
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Fig. 13. Japanese copper-alloy containers for powder bags for 150 mm coastal defense guns, serving as water container (Mile I., Mile Atoll, RMI)(1991).

Fig. 14. Japanese copper-alloy container for powder bags for 150 mm coastal defense guns, serving as water container (Mile I., Mile Atoll, RMI)(1991).

Fig. 15. Bomb craters in copra plantation. (Mile I., Mile Atoll, RMI)(1991).

Fig. 16. Bomb crater used as a taro patch. (Mile I., Mile Atoll, RMI) (1991).

Fig. 17. Japanese rice cooker serving as a water catchment (Wotje I., Wotje Atoll, RMI)(1991).

Fig. 18. Japanese rice cooker serving as a water catchment (Wotje I., Wotje Atoll, RMI)(1991).
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Fig. 19. Japanese rice cooker serving as a water catchment (Mile Island, Mile Atoll, RMI)(1991).

Fig. 20. Japanese rice cooker in situ (Wotje Island, Wotje Atoll, RMI)(1991).

Fig. 21. Japanese 127 mm ammunition ready boxes serving as storage boxes (Jinbinmen I., Mile Atoll, RMI (1991).

Fig. 22. Japanese 127 mm ammunition ready boxes serving as storage boxes (Jinbinmen I., Mile Atoll, RMI (1991).)

Fig. 23. Axles of a narrow-gauge tramway serving as a weightlifting set. (Ebon I., Ebon Atoll, RMI)(1992).

Fig. 24. Axle of the narrow-gauge tramway. (Ebon I., Ebon Atoll, RMI)(1992).
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Fig. 25. Axles of the narrow-gauge tramway serving as posts for a house. (Ebon I., Ebon Atoll, RMI)(1992).

Fig. 26. Remains of a Japanese tanker truck with the tank removed (Mile I., Mile Atoll, RMI)(1991).

Fig. 27. Tramway rails used as guiding rails for a fire-box of a copra drying oven. Note the use of a recoil spring of a 150 mm coastal defense gun as a support for the guide rails (Mile I., Mile Atoll, RMI)(1991).

Fig. 28. Tramway rails used as a pig pen (Mile I., Mile Atoll, RMI) (1991).

Fig. 29. Marston matting used as part of a house wall (Wotje I., Wotje Atoll, RMI)(1991).

Fig. 30. Marston matting used as a pig pen (Mejatto I., Kwajalein Atoll, RMI)(1993).
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Fig. 31. Marston matting used as a fence. (Laura, Majuro Atoll, RMI)(1991).

Fig. 32. Marston matting used as a fence. (Kolonia, Pohnpei, FSM)(1991).

Fig. 33. The aluminium framework of a radio transmitter set used as a food preparation table. Note the use of plastic netfloats cut in half, serving as washing bowls (Mile Island, Mile Atoll, RMI)(1991).

Fig. 34. Disarmed naval projectile and cylinder of an aerial bomb used as a border of a living platform. (Tokowa I., Mile Atoll, RMI)(1991).

Fig. 35. Aluminium drop tank washed ashore and unclaimed (Sapuk, Moen, Chuuk, FSM)(1992).

Fig. 36. Drop tank on Laura, Majuro Atoll, RMI(1991).
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Fig. 37. A F-86 droptank serving as the main water catchment at a house site (Mile I., Mile Atoll, RMI)(1991).

Fig. 38. A F-86 droptank as the main water catchment at the principal’s residence site (Lukwey I., Arno Atoll, RMI)(1992).

Fig. 39. A F-86 droptank at an abandoned house site previously serving as a rainwater catchment (Ebon I., Ebon Atoll, RMI)(1992).

Fig. 40. Detail of Drop tank on (Ebon I., Ebon Atoll, RMI)(1992).

Fig. 41. Droptank parts used as entrance pylons at a Sakau Bar (Kolonia, Pohnpei, FSM)(1992).

Fig. 42. Oxygen bottles used as a pig pen (Mile I., Mile Atoll, RMI)(1991).
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Fig. 43. Japanese sea mine, serving as water container (Mile I., Mile Atoll, RMI)(1991).

Fig. 44. U.S. fuel tanker trailer serving as a water catchment. (Mile I., Mile Atoll, RMI)(1991).

Fig. 45. A droptank nose cone used as entrance pylons at a Sakau Bar (Kolonia, Pohnpei, FSM)(1992).

Fig. 46. Casing of a Japanese 127mm round serving as a pig bell (Mile I., Mile Atoll, RMI)(1991).

Fig. 47. Part of a radio mast used as belltower (Protestant Church, Mile I., Mile Atoll, RMI)(1991).

Fig. 48. Japanese rice cooker serving as a water catchment (Mile I., Mile Atoll, RMI)(1991).

Fig. 49. Tank unit from a Japanese tanker truck serving as water tank (Mile I., Mile Atoll, RMI)(1991).

Fig. 50. Two Japanese 127 mm shell casings, serving as seat (Wotje I., Wotje Atoll, RMI)(1991).
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Fig. 51. A Japanese 127 mm ready magazine in situ. (Wotje I., Wotje Atoll, RMI) (1991)

Fig. 52. A Japanese 127 mm ready magazine reused as a copra dryer (Mile I., Mile Atoll, RMI) (1991).

Fig. 53. A Japanese 127 mm ready magazine reused as a copra dryer (Mile I., Mile Atoll, RMI) (1991).

Fig. 54. Half an oxygen cylinder from B-24 aircraft used as a pot (Jelte I., Majuro Atoll, RMI) (1989).

Fig. 55. Half an oxygen cylinder from B-24 aircraft used as a pot (Mejatto I., Kwajalein Atoll, RMI) (1993).

BASE INFRASTRUCTURE ITEMS
In addition to the military equipment left behind, the Japanese bases were of course replete with infrastructure components that allowed the base to function as human settlement.

Rice Cookers
The bases required that large numbers of soldiers needed to be fed. To achieve this the kitchens were furnished with large semi-globular cast iron rice cookers, which make for good water catchment. This was observed on Mile (Fig. 19) and Wotje (Fig. 17, Fig. 18).

Radio equipment
Radio communications facilities on the bases required masts, the remains of which were used as a bell tower for school on Mile (Fig. 47) and as support posts for a school in Chuuk. In addition aluminum framework pieces of radio transmitter set were used as an outdoor table on Mile (Fig. 33).
CONCLUSIONS
As this brief study has shown, the range of adaptive uses to which salvaged World War II material can be put is only limited by human imagination. Yet environmental conditions, with the overall shortage of water, prefers applications that allow the storage of water. As environmental decay in the aggressive tropical marine climate continues unabated, and as the communities are gradually becoming more affluent, the number of adaptive reuses will decrease. Some of the items, such as the 127mm projectile ready lockers noted on Jinbinmen are in good condition and could be collected by local museums as part of an exhibit. On the whole, however, the material culture is too fragmented and too decayed to warrant such collection.

ENDNOTES
2. Eg Majuro: Spennemann 1996
8. The remains of the war, namely the metal parts, such as the remains of tanks, trucks, guns, ships and the like soon attracted the interest of scrap metal dealers. Scrap metal dealers were particularly interested in the higher valued non-ferrous metals and alloys, as were used in brass fittings and copper wiring of generators, motors and other equipment, breech blocks and firing mechanisms of guns, copper alloys used in gun mountings, as well as in the alloy casings of artillery shells. As a result, the historic sites were torn apart and the useable and marketable materials were extracted, while the less marketable, or more cumbersome iron was left behind. Surprisingly, counter balance weights are still commonly present, but this may be attributable to their large weight. Hence, a great number of sites has been partially destroyed—or vandalised—in the process. These scrap metal drives continued the destruction of historical resources at an unprecedented rate. While a bombed and burned-out generator station was still easily recognisable as such, these generators were cannibalised in search for the copper wiring of the anchors, the fly-wheels were taken if feasible and the like. A sorry sight is often all that remains.
For some islands scrap metal was a major source of revenue. In the Marshall Islands for example scrap metal, apparently mainly scrap iron at that time, was the second largest export commodity in 1967 grossing over U.S.$16,000 compared with U.S.$ 15,000 for handicrafts and U.S.$ 827,904 for copra. (U. S. Army Corps of Engineers 1969:4). Scrap metal was exported from the Republic of the Marshall Islands as late as 1987, when $8,000 worth of metal was shipped (OPS 1989a, p. 145).
Even today, although scrap metal collection is no longer of any importance in the Marshall Islands, one can encounter households with small or larger piles of non-ferrous metal parts from guns, shell casings and the like in their yards (Fig. 7, Fig. 8).
11. own observations; future use information: pers. comm. Tony Phillips, Mayor, Wotje Atoll Local Government
13. The building has since been pulled down.
15. Denfeld 1979b, p. 126
27. pers. comm. Tamar Jordan, Majuro
31. Johnson 1989; Reeder 1989; Steege 1989; Spennemann 1990b
32. Hezel and Graham 1989:51
33. Denfeld 1979b, p.126.
34. Denfeld 1979b, pp. 126.-127.
35. Denfeld 1979b, p. 126.
37. Spennemann 1992b
38. Denfeld 1979b, p. 126.

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