

Low-cost Surf Boats

By Ronald Powell*

In this article, Mr Ronald Powell, Fisheries Officer in the Cook Islands, describes how a community built five surf cargo boats each 25 feet overall for £NZ500.

THE SOUTHERN Group of the Cook Islands rises steeply from the ocean, which is generally over 2,000 fathoms deep. The fringing coral reef is steep too, and there are practically no anchorages for even the smallest of the inter-island trading vessels. All the cargo which is landed, and all the fruit which is exported, have to be taken through the surf. Surf which rolls in over a long shelving bottom needs a specialized landing technique. Boats have been built to negotiate such surf conditions in many parts of the world. They are usually double ended, that is, the stern is shaped similar to the bow and a round bottom is generally preferred. Excellent surf boats can be seen on most Australian surfing beaches.

In 1961 the Resident Commissioner of the Cook Islands asked me if I could design a cargo-carrying lighter for Atiu in the Southern Group. The need was urgent as the orange trees in the replanting scheme were just coming into bearing and increased outward cargo was likely. It was obvious that the increased crop of fruit could never be exported if there were no boats to get it out through the surf. The Island Council had not rebuilt their boats in many years, and heavy seas had destroyed the last of those which were formerly in use. Furthermore, reef boats are a vital link in the economy of all the Cook Islands.

My first thought was to build some beautiful, shapely, well-finished boats that would probably cost several thousand pounds each to complete, and which would look like a boat builder's dream project. I was also beginning to wonder whether to varnish them and use alternating strips of contrasting coloured timber to complete their finish.

I received a rude awakening when I reached Atiu. We landed through a heavy surf, where disaster looked imminent as our weather-beaten wreck of a boat missed the edge of the dry coral reef and was flung over the reef flat, barely missing a jagged eroded coral cliff. The Atiu people, of rugged Polynesian stock, live under conditions where it may well seem that only the very fit survive. A previous attempt to improve harbour conditions had only complicated an already difficult landing.

'Dumpers'

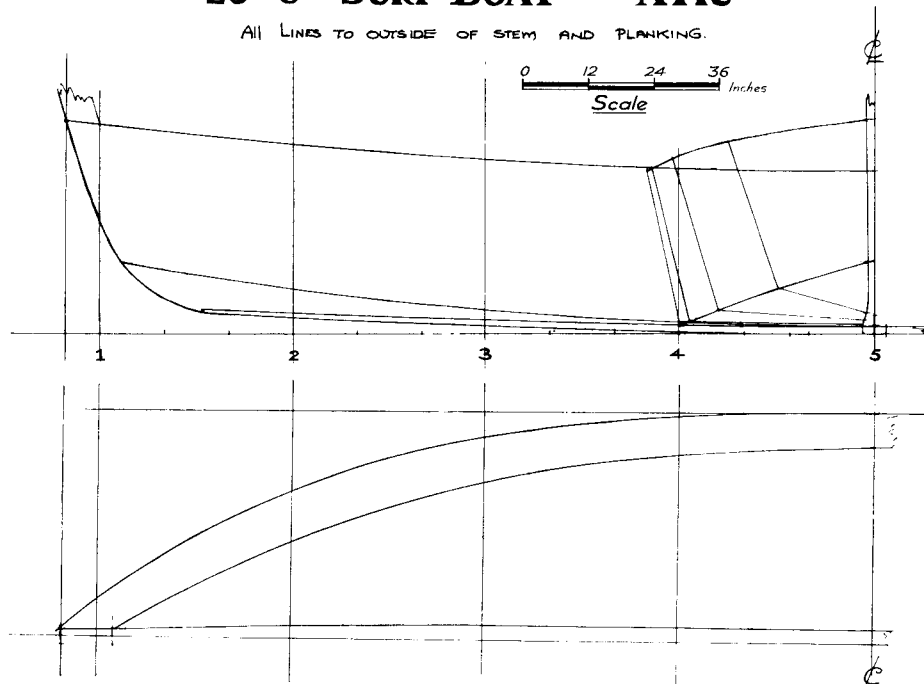
Mr Jock MacCauley, the Resident Agent, introduced me to the Island Council, and although the meeting was conducted in the courteous and well-



Oranges are the main export

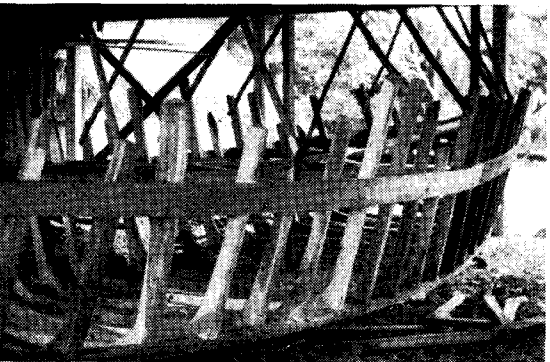
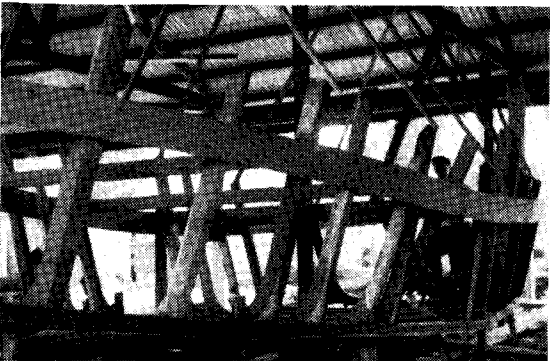
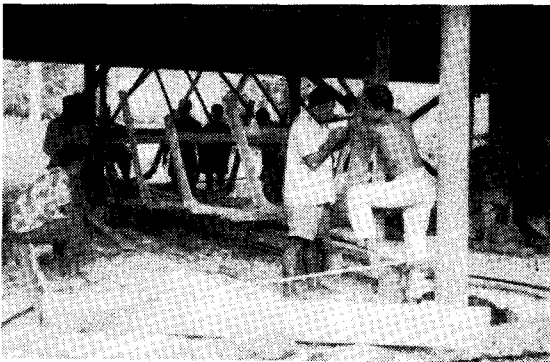
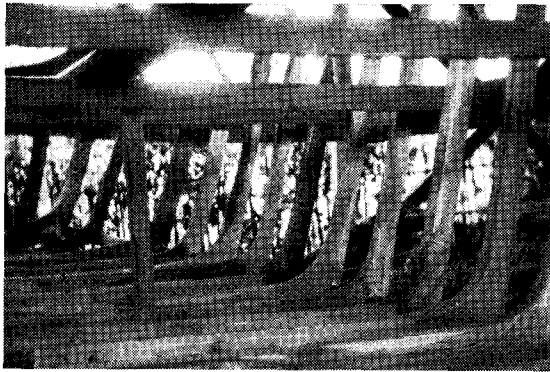
25'~0" SURF BOAT ~ ATIU

ALL LINES TO OUTSIDE OF STEM AND PLANKING.



25-foot surf boat—Atiu. Boats to be double-ended, exceptions being—towing chocks, rowlock stations, and steering oar knee.

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The frames were all cut from grown crooks of local hardwood.

mannered way in which Polynesians greet all strangers, it was apparent that the Councillors had grave doubts about the capabilities of any European to build boats suited to their conditions. We spent the day discussing the



The old men at each village cooked the mid-day meal of taro and coconut cream pounded into poi and served in coconut shells.

type of boat they required, and it was soon apparent that they had a number of ideas based on hard experience. The problems are common in a number of Pacific islands where there are no harbours. The outer-reef face is steep, the reef flat is just awash at half tide, and there is only about a foot of water over it in very calm weather. Calm weather is uncommon, and the long Pacific swell breaks heavily across this outer-reef flat. The breaking seas have none of the characteristic swells that surf-board riders like, but are what are often known as 'dumpers.'

Obviously, the boats would have to stand the surf heavily loaded with general cargo. It is always a difficult problem to manoeuvre a boat so that it can run in over the reef other than at high tide. As the tide drops, the edge of the coral reef bares and the water from the previous sea pours back over the edge in a cascading white breaker.

In moderate weather the operation calls for good judgment and the ability to keep a boat on top of the breaking wave so as to get the greatest depth of water under the bottom. In practice, it often happens that a boat crew may surf in on the forward face of the sea, but the boat will then strike the dry face of the reef with disastrous results. Once a boat has capsized it will often roll completely over, and the crew, passengers, and cargo may be flung into the surf.

Boat Design

Designing a boat for the required purpose looked more and more diffi-

cult. Long, round-bottomed surf boats had already proved useless. Although they may negotiate the actual surf better and be easier to steer and row, they tend to roll down on one bilge as soon as the receding wave leaves them high and dry. A boat in this position will generally fail to lift when the next surge rolls in, and will fill before it refloats. Keels were definitely 'out.' Vee-bottomed boats offered some alternative. The modified vee-bottom has the great advantage that any water shipped, or that leaks in through the seams, collects in the bottom where it can be baled out. However, any attempt to make the slightest vee in the midship section meant that the draught of the boat would be increased, and work would only be possible on the top of the tide. The rest of the day would be lost for all cargo handling.

The Atiu people had already decided that the only type of boat was a double-ended one which was completely flat-floored amidships. Such a type had already been tried, but the builder had found difficulty in making the ends full enough. The 'fine-ended' boat always loaded heavily and invariably swamped in the surf. What seemed to be required was a boat that was flat-bottomed amidships with moderately full ends, and one that would be better to handle under oars than a continuous flat-bottom craft.

The plans show that the shape finally decided upon was the best possible compromise between all these factors. It is a long way from the graceful surf boats of the Australian beaches. But a day spent under these

island surf conditions will soon convince anyone that the very best of boats is likely to be totally destroyed within the first few hours of use when the reef is breaking heavily.

Limited Funds

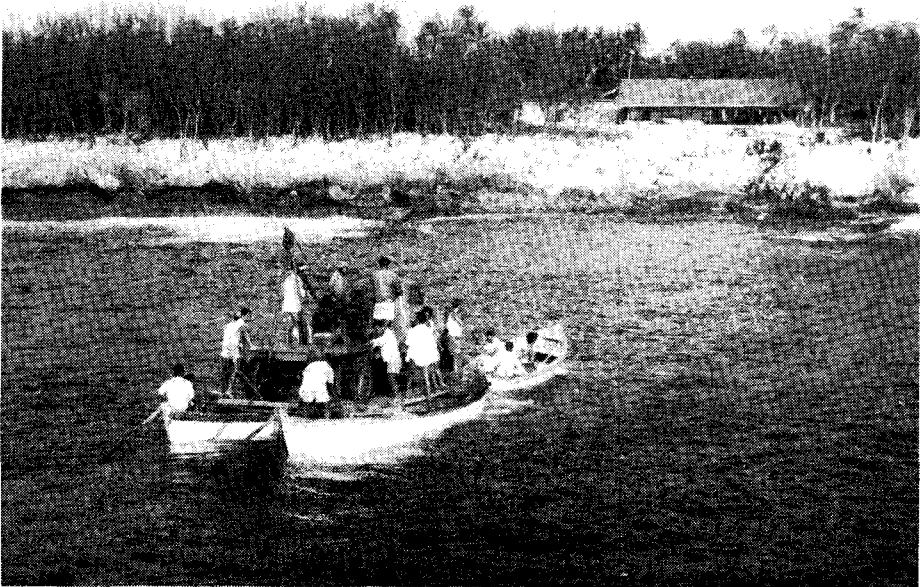
At this point the Island Council came to the conclusion that they would only have £NZ500 to build five boats, each 25 feet long. Perhaps I have lived too long in the islands to get upset about such seemingly impossible circumstances. We broke up the meeting, sat down to an 'umukai' of the usual roast pork and chicken and sampled a little of the orange beer for which the island has long been famous. It was then I discovered that Pastor Bill Marsters of Palmerston Atoll, who had been working on Mangaia for several years, had faced this same problem. He had solved it admirably by simply buying from New Zealand all that £100 would purchase there in the way of such materials as were not available locally, and making the rest.

Materials

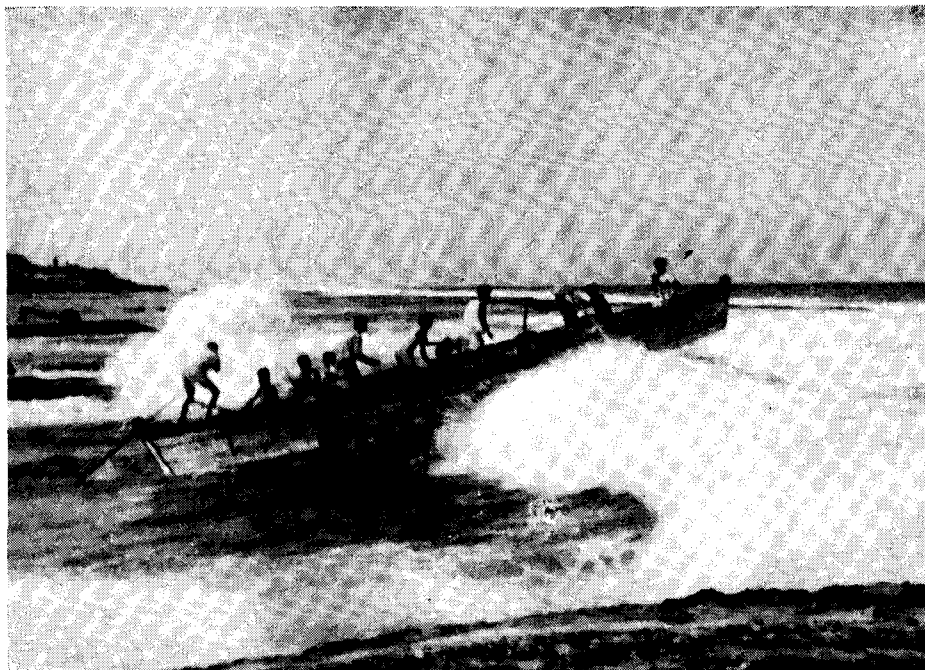
I went and saw the Mangaian boats, and talked with Bill Marsters. I soon felt convinced that £100 per boat was possible under these conditions. I returned to Atiu with the timber and materials. These consisted of imported sawn building-grade Douglas Fir timber for the planking; galvanized Ewbank boat spikes; some galvanized round rods in $\frac{3}{8}$ " and $\frac{1}{2}$ " diameters; galvanized square Whitworth nuts to suit; some borrowed dies to cut the threads; galvanized boat crutches; a few G-clamps; enough paint, caulking cotton, and seam filler; and a couple of ring bolts for bow and stern. The total cost was £500.

Work began immediately. Each village preferred to build its own boat, and although this was neither as quick nor as efficient as building all five boats on the assembly-line principle, it was preferable from the village point of view because if everyone was engaged in boat building there would have been the problem of feeding a very large community. Fresh meat and fish are luxuries. Atiu has a barren reef, and continual fish poisoning with *Deris elleiptica* has depleted what few fish might ever have inhabited the rough shore.

After setting up the framework, which was cut and adzed from a vari-



To carry a truck ashore, two boats are used together. The days with the sea as calm as this are extremely rare.



The harbour of Mangaia is usually better than Atiu landings. Strong backs and calloused bare feet are essential under these conditions.

ety of local hardwoods, I made a set of templates for the planking and completed one boat. I then felt that the

people themselves could complete the rest so I returned to Rarotonga. That was in 1962, and these five boats have

now had six years' hard use on the reefs. They have been damaged at times, as is inevitable, but they are still carrying heavy loads.

I have asked the men who work them if they think that any changes will be needed in design when the time comes to build new boats. They have invariably replied: 'No, they are just what we require and we don't want any changes.' Where communities will work together, and where labour is not measured in cents per hour, and where good hardwood is available, boats of this design can prove to be extremely useful.

Improvements in design would be feasible if just slightly deeper water were possible for landing. Better boat landings are needed on all the outer islands of the Cook Group. The best way to tackle this problem is still very debatable.

It looks as though, for a long time to come, men will have to face the surf with a strong back, calloused bare feet, a respect for the sea, and the ability to survive in heavy surf before the wonders of air travel and the space age catch up on these isolated communities.

URBANIZATION SERIES

The following is a complete list of the articles published so far in the **South Pacific Bulletin. A Technical Paper** (T.P. No. 152—"Urban Problems in the South Pacific") containing a full reprint of each of the first ten articles was published early in 1967. This is available from the SPC Publications Bureau, G.P.O. Box 5254, Sydney, N.S.W. 2001, at \$A2.50. (English and French editions are available.)

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