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TRIMMED PEBBLE IMPLEMENTS OF *KARTAN* TYPE FROM ANCIENT KITCHEN-MIDDENS AT CLYBUCCA, NEW SOUTH WALES.

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(Plate xii, and Figure 1.)

This preliminary note describes a small series of pebble implements from ancient kitchen-middens in the Kempsey district on the north coast of New South Wales. Mr. A. H. Voisey (1934, p. 94) described the site as follows:

> A heavy deposit of shells follows the somewhat irregular line of the old coast almost continuously from Grassy Head to Collombatti, keeping at about the same general height of ten feet above high-tide level. *Ostrea cucullata* and *Arca trapezia* are the most common shells. An occasional gastropod is found, while human bones and pieces of flint have been reported from Collombatti. Most of the *Arca* shells have been broken at the posterior margin, a circumstance indicating that the deposit represents not a raised beach, but an aboriginal kitchen-midden . . . it appears probable for the Kempsey area that the water in which the molluscs lived lapped the old cliffs during the human period, or, in other words, that the emergence which drove the sea eastwards occurred after the advent of the aborigines.

During a reconnaissance to this locality in May 1940, I was able to examine part of these middens, which appear at present as grass-covered mounds extending for some miles along the bank of Clybucca Creek. They are composed of a closely packed mass of the shells of the most abundant gregarious molluscs of mud-flat habitat, the Drift Oyster (*Ostrea cucullata*), Cockle (*Arca trapezia*), Sydney Whelks (*Pyrazus herculeus* and *australis*), and the Sea Snail (*Polinices strangei*), the two former predominating. Mr. T. Iredale, Conchologist at the Australian Museum, has informed me that these molluscs develop in comparatively still water on tidal flats, a condition which existed at the time they were collected by the aborigines (Voisey, 1934, p. 101). The thickness of the deposits is considerable; one pit, dug by lime-burners who have carted away large quantities of the shells, has a face seven feet deep which did not expose the surface upon which the middens lie. Reddish coloured firestones, suitable for crushing into pigment, are common among the shells.

The following implements were collected in the lime-burners' pits, and in and on the surface of the middens:

Cores.—Five specimens. E.48688 is a globular quartzite pebble, 8·5 cm. in greatest diameter and 21 oz. in weight, knapped all over its surface. E.48689–90 are irregular quartzite cores, 7·5 and 10 cm. long, 6 and 19 oz. in weight. E.48694 is oval and high-crowned, 10 × 8 × 6 cm. and 28oz., with a knapped margin along one side and end which may have been used for chopping; it is a coarse-grained, hardened sedimentary rock, not very suitable for flake implements. E.48693 is a flat, rounded pebble, 7 × 7·5 × 3 cm., and 8 oz.; a large flake has been struck from one end, and two small flakes from the other end to form a concave working edge, 2·5 cm. long, on one corner; the material is grey chert.

No prepared striking platforms are present on any of these cores.

Blocks, karta type.—Two specimens made from thick portions of split pebbles, with outer crust surface and inner cleavage face. E.48691 is quartzite, 8·5 × 8·5 × 5·5 cm., and 20 oz., semicircular in section, with a cleavage face at one end, and a trimmed convex edge at the other end. E.48692 is sandstone, 9 × 7 × 5·5 cm., and 14 oz., with a short trimmed edge at one end. The trimming is from the cleavage surface on both specimens.

Blocks, worimi type.—Two characteristic wedge-shaped specimens. E.48696 is of basaltic stone, 10 × 9 × 5·5 cm., and 24 oz., with semi-discoidal margin, knapped and trimmed at one end from the cleavage surface; it has outer crust and inner cleavage surfaces, and its chord edge bears signs of use. E.48695, of silicified conglomerate material, 10 × 10 × 5·5 cm., and 26 oz., has inner and outer surfaces formed by cleavage faces, and signs of use on its chord edge. It is similar in all respects to the porphyry *worimi* from Anna Bay.

Uniface Pebble Implements.—Three specimens, two of sandstone and one of slate. One is keeled, with a trimmed edge round its semi-discoidal margin, and one has a lateral trimmed margin. One is portion of a split-pebble, with a trimmed lateral margin. They are from 7–9·5 cm. long, 5–7·5 cm. wide, 1·5–5 cm. thick, and 4–14 oz. in weight.

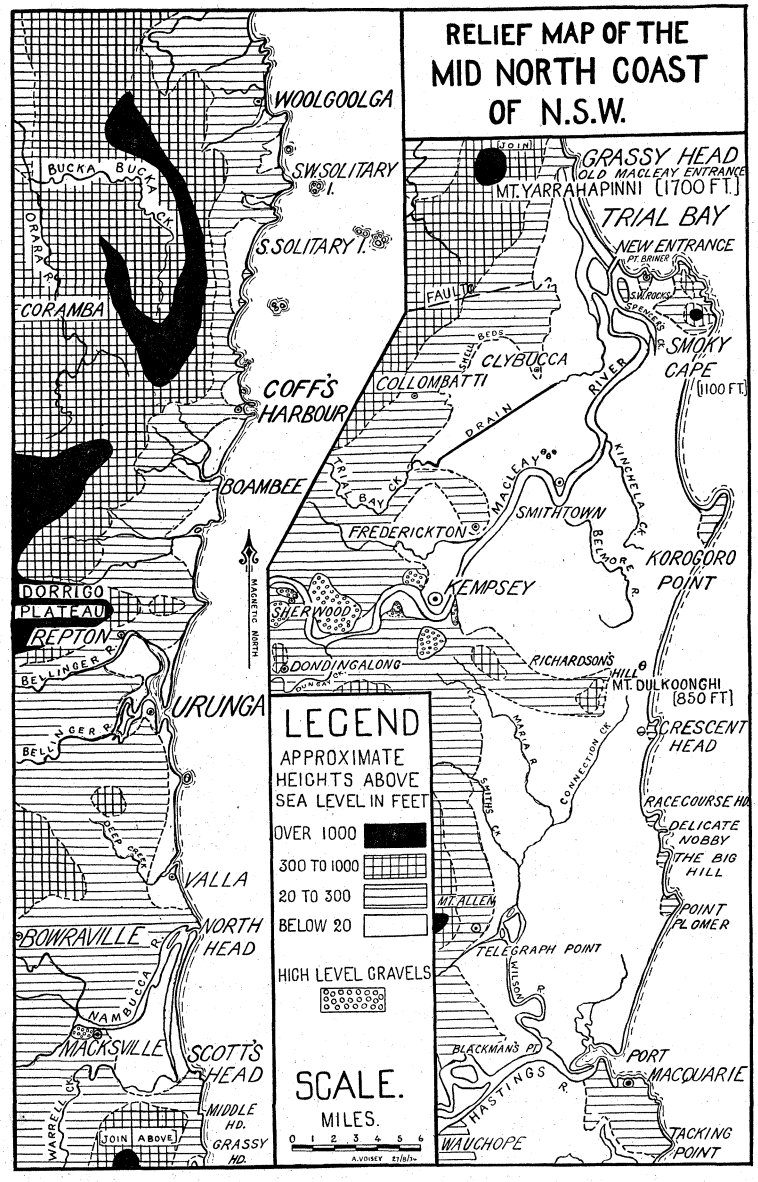

Figure 1.

Blocks.—Three specimens, E.48700–01, E.48704. Elongate and irregular pieces knapped from pebbles, with from straight to convex lateral working edges. They are 8·5 to 10·5 cm. long, 6–12 oz. in weight.

Scrapers.—E.48702 is a side scraper, with a slightly concave edge, and E.48703 has a well used concave edge on one lateral margin. They are 5·5 and 3 cm. long respectively.

Discussion.

Figure 1 is Voisey's map on which is shown the old coast-line prior to the recession of the sea. Professor L. A. Cotton, Department of Geology, University of Sydney, has given me the following statement regarding the antiquity of these kitchen-middens:

During the last stage of the Pleistocene Ice Age in Europe the abstraction of water from the oceans and its accumulation as ice on the sub-polar lands led to a pronounced lowering of sea-level over the whole ocean surface. The date of this condition has been estimated by glacial geologists as about twenty-five thousand years ago. Since that time the sea rose gradually, but there were short intervals during which the level remained stationary or even partly receded. Finally, the rise attained an elevation of rather more than two hundred feet above the level in the glacial period mentioned. Here for a considerable time the sea-level was more or less stable. This condition was maintained for a period sufficiently long for the cutting by wave action of the broad rock benches which flank many of the headlands along the coast of New South Wales. The time required for this must be measured in thousands of years.

While wave action was cutting back the headlands, the detrital material so formed drifted into the bays and made them shallow. In addition, sediments carried into the bays by streams added to the marine deposits and gave rise to shallow tidal flats which were favourable for the development of shellfish. It was at this stage that conditions became suitable for the aborigines to gather the rich harvest of food which is attested by the remains of their kitchen-middens.

A subsequent recession of the sea of ten to fifteen feet put an end to this condition. The age of the kitchen-middens, therefore, lies between the date of the cutting of the rock platforms and the more recent recession of the sea. The date of the latter event has been estimated by Cotton (1926) as from three to five thousand years ago.

It would seem that the greater part of the time from twenty-five thousand years ago to five thousand years ago would be required to cut the rock platforms. If twelve thousand of the twenty thousand years in the interval mentioned be allowed for this process, there would remain eight thousand for the rise in sea-level to two hundred feet to be accomplished, and this may well be sufficient for the necessary melting of the polar ice caps under the influence of an increase in solar activity.

If these speculations be accepted, the kitchen-middens would have accumulated in a period lying between seventeen and five thousand years ago. If we assume that half of this period was required for the development of the mud flats, then the earliest of the kitchen-middens would date back about eleven thousand years.

While there is good evidence for events dated at about five and twenty-five thousand years ago, the records of the interval between these dates can at present be only a matter of conjecture, but it does not seem that the estimate of eleven thousand years can depart widely from the true value.

Thus the importance of these implements lies in the fact that they were made and used by the aborigines of the Kempsey district during the period of the formation of the middens—that is, between eleven thousand and five thousand years ago. The middens were apparently abandoned by the aborigines when the supply of shellfish was cut off because of the drying up of the shallow estuary or lake. Whether the aborigines lived in the district prior to the formation of the shallow basin with its vast supply of mollusc food, and then settled along its shores to take advantage of the harvest caused by the changes in the physiography, or whether they penetrated the area some thousands of years later, cannot be decided, but the extent of the midden deposits indicates a very early occupation of the old coast-line shores. It is probable that ancient kitchen-middens occur at many places where similar changes have taken place along the Australian coast-line generally. Similar pebble implements have been described by Tindale and Maegraith (1931) from an old lake shore at Hawk's Nest, and "apparently associated with a raised beach" at Rainy Creek, on Kangaroo Island, and by Tindale (1937, pp. 52–54) from an old land surface covered by estuarine and marine beds at Fulham, South Australia. They occur as a distinct culture at Yamba and Crescent Head (McCarthy, 1941) and are distributed throughout south-eastern Australia, from Point

Cartwright, Queensland, to South Australia, and are recorded from Tasmania. They have been distinguished as the *kartan* culture by Tindale (1941, p. 145), and form the Hoabinhien I culture in Indo-China, the latter term also being used in the Malay Peninsula and Archipelago. Hoabinhien I is assigned to the beginning of the Mesolithic period by prehistorians of the Far East and Malaya (McCarthy, 1938, pp. 33–38).

Voisey mentioned in his report that human bones have been found in the ancient middens at Collombatti, near Clybucca, and it would be interesting to know whether they are of Tasmanoid or Australoid physical types. It is intended, when conditions permit, to make a detailed investigation of these middens to ascertain the full range of artefacts and associated physical type.

Thanks for the block of Figure 1 is expressed to the Royal Society of New South Wales.

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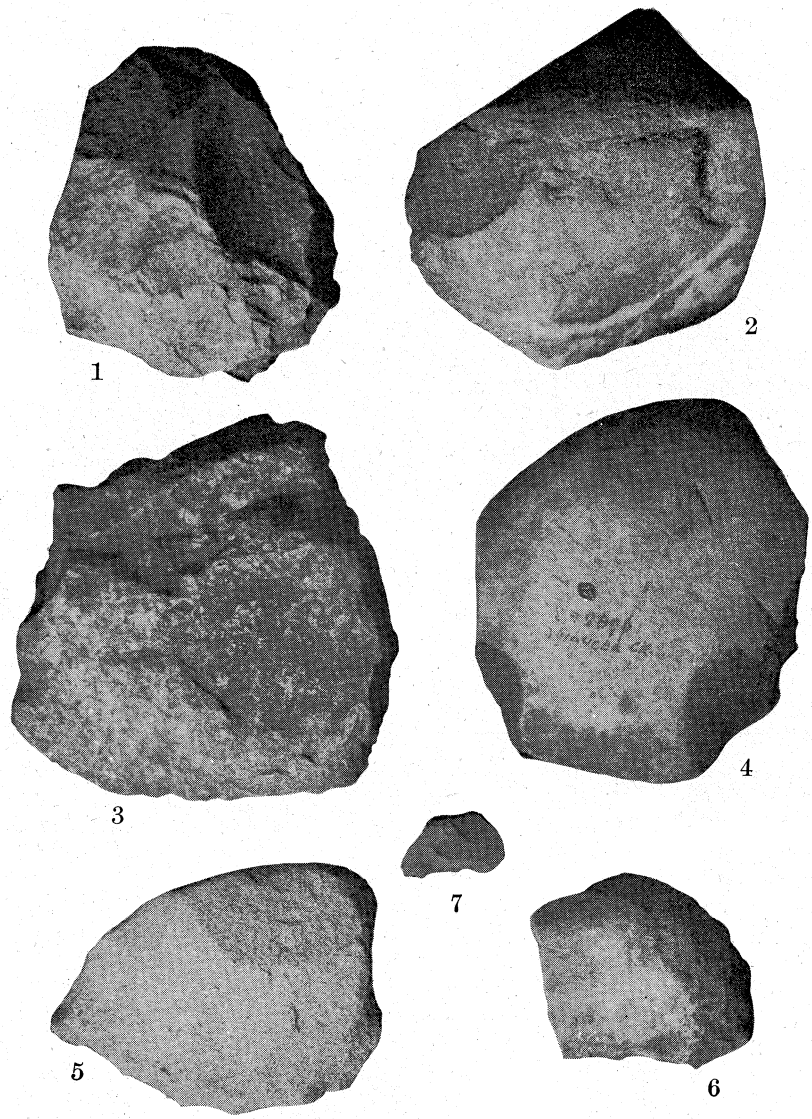
EXPLANATION OF PLATE XII.

Fig. 1.—Core, E.48688.
Fig. 2.—*Karta,* E.48691.
Figs. 3-4.—*Worimi,* E.48695-48696.
Fig. 5.—Uniface split-pebble implement, E.48698.
Figs. 6-7.—Scrapers, E.48702-48703.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