The Scientific Significance of Cook's Third Voyage

by

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In order to limit this paper to reasonable length, it will be confined to a discussion of the scientific significance of the Hawaiian portion of Cook's third voyage, and the topic will be narrowed still further to emphasize only that segment of science called natural history.

Cook's first two Pacific voyages produced significant advances in scientific knowledge. In addition to observations on geography, ethnography, and astronomy, major collections of plants and animals were obtained by trained scientists and collectors. On return to Europe the collections were described and many of the results were published in the scientific literature. On the third voyage a combination of the lack of trained naturalists and the perhaps inevitable confusion accompanying the deaths of the chief naturalist as well as Captian Cook and Captain Clerke resulted in very little publication of scientific results.

Why the lack of trained naturalists on the third voyage? Unlike the American space exploration program which sent a "real" scientist only on a later trip to the moon, the 18th and 19th century European voyages of exploration generally provided for the inclusion of competent scientists and collectors.

On Cook's first voyage the chief naturalist was the 25-year old Joseph Banks, already a prominent botanist, elected a Fellow of the Royal Society at 23, later President of the Royal Society for 42 years (Cameron, 1952). Banks used his own personal funds to support a total party of 10, including

Dr. Daniel Carl Solander, the Swedish botanist who was the favorite pupil of Linnaeus, a draftsman, three artists, the most prominent of whom was Sydney Parkinson, and four servants (Beaglehole, 1955). After the voyage the plants were described mostly by Solander and plates were prepared, but the work was never published. Parkinson died on the way home, a month after the Endeavour left Batavia (Beaglehole, 1962). His illustrated journal (Parkinson, 1773) was published by his brother, after extended arguments with Banks (Beaglehole, 1962; Merrill, 1954). There were several plants mentioned, some of which were formally, if not conventionally, described and named.

As Cook's second voyage approached, Banks proposed going along with 16 others in his party, Dr. Solander, a painter, 3 draftsmen, 2 secretaries, and 9 "servants acquainted with modes of preserving animals and plants". Cook protested the proposed size of the party and space required, Banks objected to Cook's choice of ships, and the comptroller of the Navy put many obstacles in Banks' way. Eventually he withdrew and went on an expedition to Iceland (Cameron, 1952; Merrill, 1954).

The naturalists appointed to make the voyage, with Banks' encouragement, were a father and son team, Johann Reinhold Forster and Georg Forster. The artist was William Hodges (Beaglehole, 1961). The Forsters were excellent naturalists, who worked competently with both animals and plants. The father, according to the accounts of nearly all who have written about him, seems to have been a rather prickly, extremely intelligent, somewhat paranoid character (Cameron, 1952; Merrill, 1954; Beaglehole, 1961; Ewan, 1974; Hoare, 1976). As was standard practice, members of the expedition were required to sign documents stating that they would not publish their own journals of the voyage until after the official journal has appeared. The father signed such

a document, the son was only 17 and it was not thought necessary for him to do so. A few weeks before the official journal appeared the son Georg Forster published the Forsters' journal under his own name (Forster, 1777). Leaving moral and ethical considerations aside (as many non-scientists think most scientists are wont to do) the Forsters did a lot of fine scientific work and got it published.

As a result of this flap, it seems likely that Cook was not anxious to burden his ships with temperamental scientists for the third voyage. The naturalists who made the trip seem to have been solid citizens if not distinguished scientists. They were mainly selected by Cook himself.

The chief naturalist was William Anderson, surgeon on the Resolution. John Webber was the artist. William Ellis, surgeon's mate on the Discovery made a number of paintings and drawings. David Nelson, a gardener by training, was recommended to Banks who had him sent on behalf of Kew Gardens as botanist (St. John 1976a). William Bayley was the astronomer; William Bligh, the hydrographer.

Anderson, the senior naturalist, fell ill before the voyage reached these islands, although he went ashore with Cook on Kaua'i and the journal of the voyage gives a brief account of their walk through taro patches at Wai-mea. He died off Alaska before the ships returned to Hawai'i later that year (Beaglehole, 1967). He and Ellis collected a few animal specimens including bird skins (Kay, 1972).

Ellis' major contribution to natural history was twelve watercolor paintings of birds, and some of fish, many of which have never been published.

Webber's illustrations of scenery and people are better known, but not all of his seven bird paintings have been published (Wilson, 1977) despite the fact that Ellis (1782) published a 2-volume illustrated journal of

the voyage, and a book of colored illustrations based on Webber's drawings (Webber, 1808) was published posthumously.

Nelson, the gardener-botanist, apparently got on shore only for brief periods while the ships were at Ke-ala-ke-kua, Hawai'i. Among other activities, he made one four-day trip up the slopes of Mauna Loa during which he collected a number of plants (St. John, 1976a). However, he lacked the training to describe the new species and publish the botanical results of the voyage himself; Cook was dead; without his influence and drive and in the absence of a qualified scientist there was no one to organize the writing up of the scientific results of the voyage.

Nelson's 130 or so plant collections were turned over to Sir Joseph Banks and placed in the British Museum. Banks was too busy to study them. He gave to to Solander who died shortly thereafter. They were passed on to Robert Brown who was busy with the Australian flora. The collections remained in the British Museum and were never studied as a group until Professor Harold St. John did so a few years ago (St. John, 1976a).

During the voyage Nelson also gave Captain Clerke a list of 34 plants he had observed in Hawai'i, mostly cultivated species or common weeds. Clerke died before returning to England. His journal with Nelson's list of plants remained unpublished until 1967 (Ewan, 1974).

There were not many other natural history specimens from Hawai'i. We know of one fish specimen, a few shells, and a few bird skins (Kay, 1972)--hardly a creditable collection from an area as biologically rich and scientifically fascinating as Hawai'i.

Most of our information about Hawaiian natural history in 1778-9 thus has to be deduced from reading the journals and perusing the illustrations prepared on the voyage.

William Bligh's charts and drawings of coastlines were the standard for the next hundred years. Some of the oceanographic comments are equally valid today:

> The currents seemed very uncertain; sometimes setting to windward; and, at other times, to leeward, without any regularity. They did not appear to be governed by the winds, nor any other cause that I can assign: they frequently set to windward against a fresh breeze. (Cook and King, 1784, Vol. 3, p. 117)

Cook's journals included very brief descriptions of the vegetation around Wai-mea, Kaua'i and on Ni'ihau. Wai'mea had extensive taro plantations, sweet potatoes which weighed 12 to 14 pounds, at least 6 kinds of bananas as well as a plantain, sugar cane, and paper mulberry or wauke. Trees were not common in the lowland here, but several kou trees were noted, coconuts grew very poorly, and only one breadfruit tree was seen. Ni'ihau was described merely as having some fragrant shrubs and plants (Beaglehole, 1967).

The best description of the vegetation on Hawai'i was given in the journal of John Ledyard (Munford, 1963), the American adventurer who was a corporal of the marines in Cook's crew. Ledyard organized the 4-day trek up Mauna Loa on which Nelson obtained many of his plants. The lowlands around Ke-ala-ke-kua Bay contained many fields of sweet potato, a few patches of sugarcane, and some bananas. About three miles inland, on steeper slopes, were extensive groves of breadfruit trees, above which the land was thickly covered with ferns. At about four to five miles from the shore the rain forest began. Ledyard mentions spending two nights under a fallen tree which was 32 feet in circumference and lay four feet above the ground (Munford, 1963). The tree was most probably either a koa or an 'ōhi'a-lehua tree, both

of which still occur in these forests. Curiously, no specimens of koa collected by Nelson have been found (St. John, personal communication), but we know he did collect 'ōhi'a-lehua. On the other hand, the journals refer to finding drinking water "left by rain in the bottom of an unfinished canoe; which though of the colour of red wine, was to them no unwelcome discovery." (Cook and King, 1784, Vol. 3, p. 111). This mention of a canoe probably refers to koa; also the heartwood could well stain water the color of red wine--but then so could 'ōhi'a-lehua wood. Professor St. John has a paper which will soon appear in the journal Pacific Science listing Nelson's collections and giving interpretations of the vegetation as revealed by both the collections and the notes of Ledyard and others.

An analysis of the birds observed and collected in the islands was published by Erika Wilson in the August 1977 issue of 'Elepaio , the journal of the Hawaii Audobon Society. She consulted a number of original manuscripts and the paintings of Ellis and Webber in the British Museum, and found records of at least 22 species of land and water birds. Among those noted were 'alae-'ula, 'ō'ō, 'apapane, and 'i'iwi. Ledyard reported the collection of "a number of fine birds of the liveliest and most variagated (sic) plumage that any of us had ever met with" (Munford, 1963, p. 122). Others described the trapping of birds for feathers by Hawaiians who used the sticky sap of a small tree as a bird lime. Captain King's journal reported that the Hawaiians had tame nēnē, and that ravens (the Hawaiian crow or 'alalā) were kept around the houses (Wilson, 1977).

Ledyard mentioned catching "several curious insects" (Munford, 1963, p. 122) but there is no further record of the specimens.

While some of the areas pictured 200 years ago look very similar today, others have changed greatly, and not just as a consequence of

artistic license. Cook and his men were important agents of such change. Cook left behind in Hawai'i some English plants and animals. There is a general human tendency to be somewhat uncomfortable in new and different surroundings, and people often set out to make them less different, to make them more like home, to "improve" them. In keeping with this tendency, and probably in an effort to assure a more varied food supply for future explorers, Cook left on Ni'ihau a male and two female goats, a pair of pigs "of the English breed", and the seeds of melons, pumpkins, and onions (Beaglehole, 1967). These were the first of an ever increasing influx of plants and animals which, as much as the ever increasing influx of humans, has caused changes in Hawaiian ecosystems leading to the disappearance of many of the plants and animals Cook's men found here.

In this connection one must consider George Vancouver. As a young midshipman on the Discovery with Cook, he was a member of the Ledyard-Nelson expedition to Mauna Loa, and was thus one of the first party of Europeans to see a pristine Hawaiian rainforest. Fifteen years later, as Captain Vancouver of another ship named Discovery, he left in Hawai'i the five cattle from which developed the immense herds of wild cattle that proved so destructive to these same forests.

One example will indicate the amount of environmental change. Of about 130 kinds of plants collected by Nelson 15 lay unstudied in the herbarium for almost 200 years until they were described by Harold St. John in 1976. Thirteen of the 15 have never been collected again, the other two were subsequently collected only by Menzies, the naturalist on Vancouver's voyages. All are probably extinct today (St. John, 1976b).

It is presumptious to attempt to evaluate the scientific significance of Cook's third voyage, or even that small part of it which I took as my

topic, as a summary to this paper - but one should at least try to do so. The amount of information gathered on Hawaiian plants and animals was reasonably good considering the lack of scientific training of the naturalists and the misfortunes that occurred during the voyage; it was disappointingly small in terms of what was published at the end of the voyage and what could have been discovered in Hawai'i, some of which undoubtedly disappeared forever before representative specimens made their ways to the cabinets and collections of that part of the world which placed value on such objects. Although it does not become a scientist to indulge in baseless speculation, I must confess I sometimes wonder what David Nelson missed.

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