



NEW ZEALAND JOURNAL OF ARCHAEOLOGY



This document is made available by The New Zealand Archaeological Association under the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License.

To view a copy of this license, visit
<http://creativecommons.org/licenses/by-nc-sa/4.0/>.

A Study of Avifaunal Remains from Chinese Sites in Central Otago, New Zealand

Neville Ritchie

New Zealand Historic Places Trust, Cromwell

and

Richard McGovern-Wilson

Anthropology Department, University of Otago

ABSTRACT

Comparison of poultry husbandry and cooking procedures in South China with the avian remains from the study sites shows that the Chinese miners essentially transplanted traditional husbandry of fowls and ducks and the associated cooking methods into their new situation with minimal modification. The assemblages also show that they took advantage of "free resources" such as wild ducks, swans and wekas.

Keywords: CHINESE, MINERS, CENTRAL OTAGO, AVIFAUNAL REMAINS, DOMESTIC AND WILD.

INTRODUCTION

The study of avifaunal remains from pre-European sites has been an integral part of archaeological research in New Zealand almost since its inception. The recent festschrift volume *Birds of a Feather* (Anderson 1979) exemplifies the efforts which have been invested in such studies over the years. However, to date there have been no significant analyses published on the avian remains from historic sites in New Zealand, partly because scant faunal material was recovered from the systematic investigations completed thus far (Prickett 1981: 562; Spring-Rice 1983: 148). This paper, which describes the excavated avifaunal remains from several Chinese sites near Cromwell, together with a recent unpublished B. A. (Hons) dissertation by Piper (1984) on all the fauna from one of the sites discussed, begins to redress this imbalance.

The faunal remains from 16 Chinese sites have recently been studied. Some 6,000 whole or part bones were recovered and have been examined and identified to species, element and meat cut. Over 90 percent of the bones are derived from butchered domestic animals, notably cattle (*Bos*), sheep (*Ovis*) and pigs (*Sus*) and the wild rabbit (*Oryctolagus cuniculus*). Of the other bones in the assemblages, approximately 300 (5 percent) are bird bones.

OBJECTIVES

The objectives of the study were:

- 1) to define minimum numbers and species and account for their presence.

2) to determine butchering techniques, meat cut preferences and the significance of bird meat in the local Chinese subsistence pattern.

3) to examine husbandry, hunting or collecting strategies.

THE ASSEMBLAGES

Bird bones were found in 12 of the 16 study sites (Fig. 1), namely the Cromwell (S133/48) and Arrowtown (S123/249) Chinese urban settlements, Ah Lum's—a Chinese store at Arrowtown (S123/250), and the following rural huts and rockshelters—Ha Fong (S133/22) and Caliche shelters (S133/223) in the Cromwell Gorge; the QB2 (S124/207), Apple Tree (S124/212), Sandy Point (S124/231), and Poplars (S115/44) hut sites in the Upper Clutha valley; and the Rapids (S133/453), Hanging Rock (S133/474) and Riverside (S133/791) shelters in the Kawarau Gorge. Hens' eggshell was found in the Firewood Creek (S133/424), Sheung Fong (S133/21), and Northburn (S133/77) shelters, and was recovered in seven of the sites listed above. Each of the sites had only one detectable "Chinese layer" although they varied considerably in thickness and composition. The sites span the period from about 1870 until 1920 (Ritchie 1983; 1984; in prep.).

In each instance, the faunal remains were derived from excavations in and around habitations or adjacent midden scatters. Despite considerable searching, no concentrated "bone pits" were located. Although the total avifaunal assemblage is not large (118 individuals, see Table 1) it is substantial enough to reveal trends and indicate the main species which were exploited. The following reasons can be advanced to account for a suspected low retention of bird remains in the sites: 1) disposal of wastes into adjacent creeks or rivers; 2) the bones were softened and chopped up in the cooking process which would accelerate their decomposition; 3) the bones were consumed by other animals such as pigs, cats and rodents; 4) they were discarded into fireplaces and burnt (burning is evident on many of the animal bones from some of the sites); 5) the relatively thin bird bones have fared badly in response to the annual and diurnal temperature and climatic extremes of Central Otago.

THE FAUNAL REMAINS

A total of 118 birds are represented in the combined assemblages; of these, 95 bear evidence of butchering in the form of breakage and cut marks. The method and forms devised by Leach (1979: 103–106) were used for assessing and maximising minimum numbers.

The domestic hen (*Gallus domesticus*) was the most common species. Bones were recovered from 12 sites, both rural and urban; and hens' eggshell was found in another 3. Hens make up 61 percent of the total Minimum Number of Individuals (MNI). At Chinatown, hen bones were associated with all but three of the huts. Two of the 18 specimens were immature birds. These were identified by unfused epiphyses on the long bones and the rougher texture of the bones.

The Chinatown bones were originally examined by R.J. Scarlett (then Osteologist, Canterbury Museum) who identified a few bones as belonging to "very large specimens of domestic chicken". However, McGovern-Wilson, who was responsible for determining species of all the bird bones from the sites, believes their size and physical characteristics more closely resemble those of the domestic turkey (*Meleagris g. gallopavo*), and concluded that five individuals were represented (McGovern-Wilson n.d.a: 1).

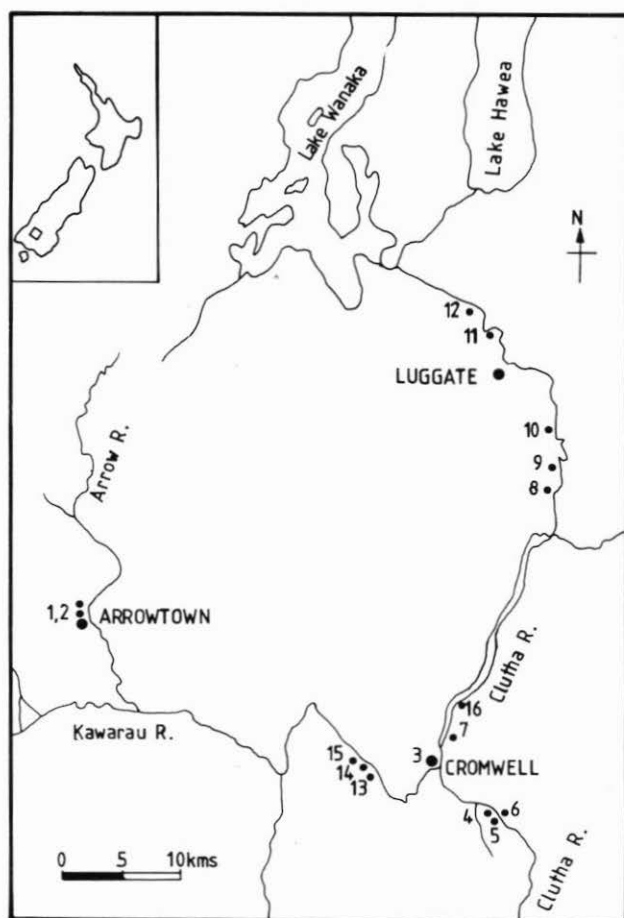


Figure 1: Sites mentioned in the text. 1. Arrowtown Chinese settlement; 2. Ah Lum's store; 3. Cromwell's Chinatown; 4. Ha Fong; 5. Sheung Fong; 6. Caliche shelter; 7. Firewood Creek; 8. Queensberry II(QB2); 9. Apple Tree; 10. Sandy Point; 11. Ah Wee's; 12. Poplars; 13. Rapids; 14. Riverside; 15. Hanging Rock; 16. Northburn.

Similarly, the majority of the bird remains at Arrowtown were either those of domesticated hens (23 individuals, 6 immature) or turkeys (3). Eight of the "Arrowtown hens" were found in or near Ah Lum's store.

Skeletal evidence of domestic hens (MNI=23) was recovered from 9 of the 13 rural sites. Again, the presence of sub-adult and immature specimens indicates that young birds were frequently eaten. Amongst the hen bones (MNI=2) from Ha Fong shelter in the Cromwell Gorge, one set could be described as "normal", whilst the other (8 bones) are only half the normal size in linear terms. They are possibly the remains of a bantam or a Chinese species such as a silky, which are both small birds in comparison to the domestic fowl (McGovern-Wilson n.d.b: 2).

Spurs on some of the tarso-metatarsi indicate the presence of roosters and suggest the breeding of domestic fowls. One was recovered from Chinatown (H7), two from Arrowtown (ACS/4 and 6) and one from the Poplars. The Chinatown specimen had an arthritic growth on the distal side of the spur.

Sparse eggshell, believed to be hens', was found in four huts at Chinatown (H16, 21, 24 and 26), two at Arrowtown (ACS/8 and 10) and in ten rural sites—the Poplars, QB2, Rapids, Willows and Ah Wee's hut sites, and the Hanging Rock, Northburn, Sheung Fong, Ha Fong and Firewood Creek rockshelters. The presence of single egg-cups in two huts at Chinatown (Ch/7 and Ch/23) and outside Ah Lum's store suggests that some of the Chinese had adopted the European practice of boiling eggs and eating them out of the shell.

Bones of mallard ducks (*Anas platyrhynchos*) were found in two sites (Arrowtown and Ha Fong). According to Anderson and Anderson (1977: 336) the common domestic duck of south China is *Anas platyrhynchos*—the mallard. Taking this information into account, together with the fact that the species was not common in the wild in Central Otago before 1920, makes it almost certain that the bones are those of domestic ducks. Although this species was first released in 1867 by the Otago Acclimatisation Society, they did not become established until about the turn of the century, following frequent liberations (Oliver 1974: 610–612). Mallards only became common in the Queenstown area in the early 1960s, and it is very unlikely that they were established around Cromwell before 1920 (Hamel pers. comm.).

The other main feature of the assemblages is the presence of several wild birds, notably black swans (*Cygnus atratus*), grey and paradise ducks (*Anas superciliosa*, *Tadorna variegata*) and wekas (*Gallirallus australis*). At Chinatown, five paradise and three grey ducks, five black swans and a single mute swan (*Cygnus alors*) are represented (the latter identified on the basis of the strut formation on the dorsal side of an anterior fragment of the sternum), whilst at Arrowtown the remains of five paradise ducks were recovered. These indicate that the Chinese supplemented their food or meat supplies by acquiring wild species (although possibly for feasts only). The means of trapping or killing the wild birds is not readily apparent from the skeletal remains. The possibility that they purchased "wild game" cannot be ruled out.

The unbutchered remains of a New Zealand quail (*Coturnix novaezealandiae*; identified by R.J. Scarlett in 1980), were recovered from hut 18 in Chinatown. These birds, together with wekas, were once common in the upper Clutha area. Although Buller thought the native quail still existed in small numbers in some areas of the South Island in 1872, there had been no reliable sightings in the preceding five years (Oliver 1974: 438). Wekas became locally extinct about 1900, succumbing to poisonous baits laid for rabbits (Ritchie 1980: 45). Interestingly, weka remains were only found in the rural sites. Possibly there was no suitable habitat left in the vicinity of the established mining towns or they had already disappeared from those areas through over-exploitation or poisoning.

A harrier hawk (*Circus approximans*) found in ACS/1 was a surprise inclusion in the Arrowtown bird list. McGovern-Wilson concluded the single bone, a humerus, belonged to a sub-adult specimen, a nestling, which would have been taken in the period between January and late March (Oliver 1974: 430–1).

Bones of a black shag (*Phalacrocorax carbo*) among those from the Poplars site suggests its range through Central Otago was much the same as it is today.

The bones of several small introduced birds found principally within the huts of the urban sites bear no definitive evidence of butchering. They include house sparrows, thrushes/blackbirds and single specimens of bellbird and tom tit. The high incidence of immature specimens among these tree-nesting species is attributed to their falling out of nests above the sites.

DISCUSSION

The cuisine of Guangdong, the province of origin of most of the Chinese who came to New Zealand in the nineteenth century, was based on an almost infinite variety of steamed and stir-fried rice, noodle and vegetable dishes supplemented with specific meats (Yee 1975: 49, 58). Pigs, poultry and fish supplied the main sources of protein (Anderson and Anderson 1977: 336). Most peasants raised a few chickens, sometimes a pig or ducks, and grew vegetables (Yee 1975: 23). However, only the wealthy would have eaten pork, fowl or aquatic meats with their rice on a regular basis (Anderson and Anderson 1977: 319). Pig and fowl raising was popular because these animals can be kept in house yards or pens, will eat just about anything, reach maturity in a year and are prolific breeders (Lee and Lee 1979: 25). Since most of the land was used for rice and vegetable production, few pastoral animals were raised, except as beasts of burden or for tillage.

As a consequence of their role in the long-established food production system in their homeland, most of the Chinese men who sought their fortune in New Zealand would have been well versed in fowl and pig husbandry and vegetable growing when they arrived, and probably wasted little time before applying their knowledge within their new surroundings (non-avian aspects are discussed elsewhere: Ritchie in prep.).

Although pork was the most important meat in southern China (Anderson and Anderson 1977: 336), chicken was considered a must for festive occasions, and their eggs provided an important additional source of protein. Chickens were a popular food because of their versatility, and the fact that all the carcass was usable (Yee 1975: 30). They constitute a "convenient meat unit" and, unlike larger animals, can be killed and prepared for eating with a minimum delay. A freshly killed pullet, which had not laid an egg, was preferred (Lee and Lee 1979: 285). Scraps could be made into stock (Yee 1975: 23).

Poultry, being such an integral part of traditional southern Chinese cuisine, would not have been willingly foregone by the miners if birds could be acquired. That they were available, and were raised and consumed regularly, is clearly evident from the avifaunal remains from the sites, which are dominated by the remains of domestic fowls. They comprise over 60 percent of the MNI and include roosters. Juvenile specimens constitute only 23.4 percent of the total number of chickens and never more than 50 percent of the chickens from any one site. This suggests that adult birds were selectively consumed. It is likely, especially in the case of the urban assemblages, that the surviving fowl bones considerably under-represent the actual volumes of birds consumed.

The Rev. Don, the Presbyterian missionary to the Chinese on the southern goldfields, made several references to the fact that fowls and ducks were an important component of celebrations and feasts. For example, when describing a Mid Winter festival celebration he noted, "There are no particular forms observed in keeping this feast; the only indication. . . being the consumption of the usual amount of duck, fowl and brandy" (Don 1.3.1883: 164). Don provided other interesting insights into the role of poultry too, such as an instance where he waited at the hut of a Chinese miner until he returned from his claim at noon. On seeing Don, the Chinese man invited him to lunch and immediately caught a

fowl and killed it. He presented it on the table at 12.45 pm with rice, onions and celery—all well done according to Don (1.9.1882: 44). However, despite his appreciation of their culinary expertise, he recorded elsewhere (Don 1.3.1885: 27) that he considered the pig was the only animal the Chinese treated humanely. He described an instance where a Chinese man living at Riverton was fined 10 shillings for cruelty to animals. He had packed, to be carried over the road to the Round Hill workings, eight ordinary size fowls in a box of 1.25 cubic feet capacity.

As noted before, the presence of mallard duck bones in the Arrowtown and Ha Fong assemblages almost certainly reflects the keeping of domestic ducks or the acquisition of their meat. Dried duck-meat was sold in some Chinese stores in California (Spiers 1958: 79). A similar product was probably imported or prepared in New Zealand. Duck eggs are likely to have been important too. Traditionally, they were often preserved in various ways: the yolks removed, dried and salted; the whole egg salted; or made into "hundred year old eggs". The latter are in reality cured for two to four months by placing whole eggs in a mixture of lime, ash and salt and sometimes tea. The chemicals osmose through the eggshell and both flavour and preserve the egg (*ibid.*: 336).

The presence of domestic turkey bones in both the Arrowtown and Chinatown sites is interesting, because turkeys are not traditional Chinese fare. It is possible, if they were raised locally by Chinese or Europeans, that they provided a relatively cheap alternative meat source, possibly compelled by shortages of fowls or ducks at the time of a celebration-feast. Unfortunately, no records have been found on the costs of domestic poultry on the southern goldfields. Prices are likely to have varied depending on local supply and demand. An examination of the data on avian remains reported from seven Chinese sites in the United States indicates that domestic hens (MNI varied from 2 to 25 individuals) were the main poultry consumed, with lesser amounts of turkey, duck and goose (Jones *et al.* 1979: 111–114; Dansie 1979: 390; Langenwalter II 1980: 105; Praetzelis and Praetzelis 1982: 73; Lalande 1982: 27; Brott 1982: 79; Simons 1984: 174). Turkey remains were reported from three of the sites, all urban, namely Lovelock, Nevada (Dansie 1979), Sacramento (Praetzelis and Praetzelis 1982) and Woodland, California (Simond 1984: 174).

BUTCHERING EVIDENCE

From study of the butchered bones, it is apparent that all parts of the exploited species were consumed, although cranial bones are represented by sparse fragments. Few intact bones were recovered. Most of the butchered bones bear "chop" marks indicating they were cut with a cleaver or similar implement. In most instances the distal or proximal ends of long bones have been detached from the shaft with a single cut/chop. Examination of the butchered sterna and pelvic fragments indicate that they were produced by transverse slicing at about 3 cm intervals across the carcass. Most of the sterna fragments are probably from domestic chicken, but only those with part of the rostrum, which allows positive identification, have been included in the MNI calculations. This cutting pattern is consistent with traditional Chinese cooking procedures, where meats and other foods are usually cut into portions small enough to be easily handled with chopsticks. Dicing foodstuffs also makes them suitable for stir frying or stewing and minimises cooking time, the latter being an important consideration when firewood is in short supply.

Some bones (probably mostly fowl or duck) bear "snap-break marks". These present a problem because it is difficult to tell whether the breaks were deliberate or are the result

of post-deposition damage. The Chinese often break bones in the process of deboning or portioning a chicken (Lee and Lee 1979: 189-190). Comparative counts were made of the proximal and distal portions of all the butchered fowl wing bones (carpometacarp, humeri, ulnae and radii) and leg bones (femora, tibiae and tarsometatarsi) to determine if there was any consistent patterning in the cut locations on the wing and leg portions of the birds. This study proved inconclusive, although the ratio of distal to proximal ends varied by as much as 50 percent or more (see Table 2). Diced or broken central shaft portions were not included, because of the difficulty of accurately identifying these fragments. It was concluded that the specific location of cuts on the limb bones was not critical and merely a function of where the cleaver happened to land in the course of rapidly "dicing up" a chicken carcass. Counts of complete bones revealed that there were twice as many complete leg bones as wing bones, suggesting the "meatier" leg portions were more frequently boned.

TABLE 2
DISTRIBUTION OF PORTIONS OF FOWL BONES

WING BONES	complete	proximal end	distal end
Chinatown	2	18	7
Ah Lum's store	0	10	15
Arrowtown	1	14	22
All Other Sites	3	9	16
LEG BONES			
Chinatown	6	16	7
Ah Lum's store	1	14	16
Arrowtown	0	5	10
All Other Sites	4	5	3

CONCLUSIONS

The avian remains from the study sites indicate that many of the Chinese miners in Central Otago kept domestic poultry (fowls and to a lesser extent ducks) or were able to acquire their meat (possibly imported as dried flesh) and eggs (and also domestic turkeys). They also supplemented their diet with birds from the local environment. These included waterbirds such as swans, grey and paradise ducks, and ground dwellers, e.g., wekas (and the native quail during the earliest years of settlement). Small arboreal birds such as bellbirds, thrushes and blackbirds may have been consumed occasionally but the recovered bones of these species bear no evidence of exploitation. The keeping of fowls in the goldfields settlements and camps follows a long established tradition of poultry raising in South China; the consumption of fowl meat being considered an essential part of festive occasions and a desirable dietary component (for eggs and meat) at other times.

Comparison of poultry husbandry and cooking practices in South China with the avian remains from the study sites shows that the miners essentially transplanted indigenous poultry husbandry and cooking methods into their new situation with minimal modification. Most of the bones recovered bear one or more clean knife or cleaver cuts consistent with accounts of traditional poultry butchering and meat preparation procedures, as documented by Yee (1975) and the authors of many other Chinese cookbooks. No clear changes

in birdmeat butchery or acquisition practices were determined between the earliest sites and the later ones. The presence of several turkey bones in the Arrowtown (MNI=3) and Chinatown (MNI=5) assemblages is somewhat surprising. These birds were not a significant meat source in southern China, and their consumption amongst Europeans in New Zealand has largely been restricted to Christmas and other celebrations. Their presence in both of the urban sites may reflect acquisition from local European suppliers rather than turkey raising by the Chinese, although the latter possibility cannot be ruled out. They were possibly raised or acquired to supplement festal supplies.

The assemblages also clearly show that the Chinese took advantage of "free resources" such as wild ducks, swans and wekas. Interestingly, none of the sites contained exclusively wild or domesticated species. Similar patterns of subsistence, i.e., supplementing domestic poultry with wild birds, have been documented at the Sacramento "Chinatown" (Praetzellis and Praetzellis 1982: 73) and the Woodland Chinese site (Simons 1984: 168) in the United States.

REFERENCES

- Anderson, A. J. (Ed.). 1979. *Birds of a Feather*. New Zealand Archaeological Association Monograph 11, *British Archaeological Records International Series 62*.
- Anderson (Jr.), E. J. and M. L. Anderson. 1977. Modern China South. In Chang, K. C. (Ed.), *Food in Chinese Culture: Anthropological and Historical Perspectives*, pp. 317-382. Yale University Press.
- Brott, C. W. 1982. *Moon Lee One, Life in Old Chinatown, Weaverville, California*. Great Basin Foundation, Redding, California.
- Dansie, Amy. 1979. Beef, Bobcat and other Beast Bones: Faunal Remains from Lovelock's Chinatown. In Hattori, E. M., Rusco, M. K. and D. R. Tuohy (Eds), *Archaeological and Historical Studies at Ninth and Amherst, Lovelock, Nevada*. Vol. 2, pp. 348-410. Nevada State Museum Archaeological Service, Carson City, Nevada.
- Don, Rev. A. 1882-1885. (Presbyterian missionary to the Chinese on the southern gold-fields "Our Chinese Mission", *New Zealand Presbyterian*, 1. 9. 1882: 44; 1. 3. 1883: 164; 1. 3. 1885: 27.
- Jones, T. W., Davis, M. A. and G. Ling. 1979. *Idaho City: An Overview and Report on the Excavation*. University of Idaho Anthropological Research Manuscript Series 50.
- Lalande, J. M. 1982. Celestials in the Oregon Siskiyous: Diet, Dress, and Drug Use of the Chinese Miners in Jackson County, Ca., 1860-1900. *Northwest Anthropological Research Notes* 16(1). Spring 1982. pp. 1-61.
- Langenwaller II, P. E. 1980. The Archaeology of 19th Century Chinese Subsistence at the Lower China Store, Madiera County, California. In Schuyler, R. L. (Ed.), *Archaeological Perspectives on Ethnicity in America*, pp. 102-112. Baywood Publishing Co., Farmingdale, New York.
- Leach, B. F. 1979. Maximising Minimum Numbers: Avian Remains from the Washpool Midden Site. In Anderson, A. J. (Ed.) *Birds of a Feather*, pp. 103-122. New Zealand Archaeological Association Monograph 11, *British Archaeological Records International Series 62*.

- Lee, C. B. T. and A. E. Lee. 1979. *The Gourmet Chinese Regional Cookbook*, Castle Books, Secaucus, New Jersey.
- McGovern-Wilson, R. n.d.a. Report on the Bird Bones from the Chinese Settlements at Cromwell and Arrowtown. Unpublished manuscript. 7p. August 1984.
- McGovern-Wilson, R. n.d.b. Report on Bones (Avian) from Various Chinese/Historic Sites in the Clutha Valley. Unpublished manuscript. 5p. October 1984.
- Oliver, W. R. B. 1974. *New Zealand Birds*. 2nd Edition. Reed, Wellington.
- Piper, A. K. S. 1984. Nineteenth Century Chinese Goldminers in Central Otago: A Study of the Interplay between Cultural Conservatism and Acculturation through an Analysis of Changing Diet. Unpublished B. A. (Hons) dissertation, Anthropology Department, University of Otago, 79p.
- Praetzellis, M. and A. Praetzellis. 1982. *Archaeological and Historical Studies of the JJ56 Block, Sacramento, California*. Cultural Resources Facility, Anthropological Studies Center, Sonoma State University.
- Prickett, N. 1981. The Archaeology of a Military Frontier: Taranaki, New Zealand, 1860–1881. Unpublished Ph. D. thesis, Anthropology Department, University of Auckland.
- Ritchie, N. A. 1980. *Queensberry Archaeological Survey*. New Zealand Historic Places Trust, Cromwell. 45p.
- Ritchie, N. A. 1983. Archaeological Research on Nineteenth Century Chinese Settlement in the Cromwell Area. *The Courier*, Bulletin of the Queenstown and District Historical Society, Issue 29: 2–18, May 1983.
- Ritchie, N. A. 1984. *The Arrowtown Chinese Settlement: An Interim Report on the Excavation*. New Zealand Historic Places Trust, Cromwell. 78p.
- Ritchie, N. A. In preparation. History and Archaeology of the Chinese Miners in Southern New Zealand: A Study of Adaptation, Acculturation and Change. Ph. D. thesis in preparation, Anthropology Department, University of Otago, Dunedin.
- Simons, D. D. 1984. Avifaunal Remains from the Woodland Opera House Site. In *The Chinese Laundry on Second Street: Papers on Archaeology at the Woodland Opera House Site*. *California Archaeological Reports* 24, pp. 167–180.
- Spiers, Robert F. G. 1958. Food Habits of Nineteenth Century California Chinese. *California Historical Quarterly* 37: 79–84, 129–136.
- Spring-Rice, W. 1983. The History and Archaeology of Fort Galatea, Bay of Plenty, New Zealand, 1869–1969. Unpublished M. A. thesis, Anthropology Department, University of Auckland.
- Yee, R. F. 1975. *Chinese Village Cookbook: A Practical Guide to Cantonese Country Cooking*. Taylor and Ng, Yerba Buena Press, California.