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## ARCHAEOLOGY IN NEW ZEALAND



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The Clutha Archaeological Project 1977-87:  
A Summary Report

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After the announcement in 1975 that the Clutha Valley hydro-electric power project would proceed, the Ministry of Works (on behalf of the New Zealand Electricity Department) commissioned archaeological surveys of the Cromwell Gorge area. They were undertaken in the summer of 1975-76 by Professor Charles Higham (Higham and others 1976) and Graeme Mason (1977) assisted by Otago Anthropology Department students. In 1977 a further survey was conducted along the route of the new gorge highway by Mary Newman (1977). The surveys revealed that over 150 (mainly historic) sites would be affected by the proposed dam(s) in the Cromwell Gorge, a number which was beyond the resources of the University.

Following discussions in 1976-77, an agreement was reached between the N.Z. Historic Places Trust (NZHPT) and the Ministry of Works (MWD). The main features were:

1. MWD/NZED would fund a structured five year programme of archaeological and historic research;
2. The project (the Clutha Valley Archaeological Project) would be under the direction of a resident archaeologist seconded to M.W.D., Cromwell, but employed and overseen by the N.Z. Historic Places Trust.

The archaeological programme officially commenced in December 1977 with the appointment of project archaeologist Neville Ritchie who remained in the position until the project's termination in June 1987.

The agreement between MWD and NZHPT, was notable from an archaeological point of view, in that it was the first great gain attributable to the newly passed Historic Places Amendment Act 1975. Without the legislation, there would have been little or no funding for archaeological mitigation work and few resources to ensure it was written up properly. Legislation does not automatically protect sites, but the advent of the Historic Places Act has lessened destructive impacts in many instances. It has also ensured that there has been some discouragement of, and compensation for, the physical loss of sites by securing funding for mitigation work. In this case, the archaeological project provided the wherewithall to maintain an effective archaeological presence in Central Otago for a decade (the original five year work programme being

extended following significant finds and to allow sufficient time to write up reports).

#### A Chronological Summary

By mid 1977 negotiations between the Trust and the MWD were concluded and a project archaeologist was employed officially for a term of five years. Because of the general lack of knowledge about the sites in the area (most of the known ones were historic), the job initially was loosely defined in terms of research objectives, but these gradually crystallised as the ground surveys progressed. The immediate objective was to conduct systematic surveys of the entire upper Clutha valley and its tributaries, possibly an important precedent being established, in that there was informal agreement that the entire valley, from the floor to the mountain tops would be surveyed (i.e. way beyond the immediate extent of the proposed reservoirs), so that the real impact of the losses caused by the hydro project could be assessed.

Initial fieldwork priorities were largely governed by the MWD's need to gain clearances for the Clyde dam. So work was centred on the Cromwell Gorge and Lowburn areas where an extensive test pitting programme was conducted in the summer of 1978. The 44 recorded rockshelters in the gorge were the primary focus. From this work two broad site-types were considered to be worth further investigation and research: the sites associated with the activities of the Chinese miners, and the few pre-European sites.

By the end of 1979, seven rockshelters had been investigated, of which two were occupied in pre-European times (the Rockfall 1 and Italian Creek shelters; Ritchie 1982c; see Appendix 4 for dates), and five by Chinese miners between 1866 and 1890 (Ritchie 1986b). Major surveys were also completed in the Kawarau Gorge (Ritchie 1983c), the upper Clutha Valley around Luggate (Ritchie 1980c), and in the Shotover Valley (the latter at the behest of the MWD who were investigating possible silt retention schemes for the valley).

Cromwell's Chinatown was targeted for excavation in the summer of 1980 (Ritchie 1980a, 1983a, 1986b). There is no doubt that the Chinatown excavation really brought the archaeological project to the attention of the public, and amongst researchers overseas, particularly in the United States where there is a burgeoning interest in the history and archaeology associated with that nation's many Asian immigrant groups. Prior to Chinatown, the excavations had been relatively small, and although informative, had not provided a large volume of material to work on. Chinatown changed that and had a major influence on the direction of the programme for the next few years.

Following the Chinatown excavation, a survey of the Roxburgh Gorge was conducted (Harrison 1982). The latter went some way to redress a sorry situation. When Lake Roxburgh was formed in 1956 there had been no prior archaeological survey or archaeological investigations of any sort, despite the fact the gorge was an important mining area, and probably of pre-European activity - for moa hunting and as a route into the interior. The situation is, of course, understandable when considered in historical perspective, the N.Z. Archaeological Association had only been born the year before, and most of its members like the rest of the population probably knew little about the resources of the old gorge or its location. So there was little effort to record or salvage anything before it was lost (although 2 historic burials were relocated). The survey located and recorded about 150 sites including 87 rockshelters with occupation material (that compares with 44 in the Cromwell Gorge and 25 in the Kawarau Gorge). The surviving sites in the gorge probably represent less than half the number that existed prior to the gorge's inundation.

During 1980 survey work associated with the Queensberry dam proposal (Ritchie 1980d) and a tangential survey of the Bendigo goldfield (by Chris Jacomb and Sheridan Easdale) were concluded. About mid year during survey work on the Slip Stream nephrite deposit (in conjunction with the Southland Museum and Mt Aspiring National Park), a virtually complete *Dinornis* moa skeleton was found in a rock shelter in the Dart Valley. This was excavated about a month later (Ritchie 1980b) and is now on display in the Park Visitor Centre at Glenorchy.

The summer of 1980-81 was devoted to excavations on threatened pre-European sites (Ritchie and Harrison 1981d). The largest of these, Owens Ferry, was located after a bottle collector brought in a bag of pieces of coloured rock for identification. The rock fragments were in reality flakes of silcrete and porcellanite and the bag also contained a few bits of moa bone which bore definite cut marks. The eroding source of this material was located and the ensuing excavation proved the site to be a medium size moa hunting camp. Because of other work commitments I accepted an offer from Brian Kooyman (a University of Otago anthropology student) to analyse the material from the site and incorporate it into his Ph.D. research. His conclusions were published in the N.Z. Journal of Archaeology (Kooyman 1984).

The other pre-European sites included two oven complexes (the Parkburn and Tinwaldburn oven sites) on the banks of the Clutha River above Lowburn, and the Rockfall 2 shelter in the Cromwell Gorge (Ritchie and Harrison 1981d). The Rockfall 2 shelter contained sparse remains of a butchered moa, silcrete and porcellanite flakes, chips of green argillite adzes, and a shallow oven pit (Ritchie 1982c). The Parkburn site consisted

of four virtually undisturbed oven pits (another eight had been destroyed by ploughing) and furnished radiocarbon dates of 1500AD. Unfortunately no artefacts or midden were uncovered during the excavation of the Parkburn ovens nor the single oven Tinwaldburn site so it was not possible to positively ascertain the role of the sites. As both oven complexes are sited beside backwaters of the Clutha River, they were probably associated with eeling or duck-catching.

In addition, to the pre-European sites, two substantial subfossil deposits (the Firewood Creek and Station caches), which were uncovered during the construction of the new Cromwell Gorge highway, were also excavated (Ritchie 1982a). These sites, which predate human occupation in the area, contained the remains of moas, tuataras, and several extinct bird species including the giant South Island flightless goose (*Cnemiornis calcitrans*), the laughing owl and Finsch's duck, and locally extinct species such as kiwis and wekas.

The excavations in the summer of 1981-82 concluded with a rescue excavation at the Dart Bridge site near Glenorchy (Anderson and Ritchie 1981c; 1986c). The excavation was undertaken because of continuing erosion of the site by the Dart River. The final fieldwork for the summer involved a survey of the Carrick goldfield. About 100 sites, remnants of the nineteenth century reef mining operations were recorded.

During the summer of 1981-82 excavations were centred around four Chinese hut and shelter sites in the upper Clutha selected after assessment of the Luggate and Queensberry survey data (Ritchie 1986b). These surveys enabled the establishment of a descriptive terminology for tailing sites which has enabled their recording in a more meaningful way by facilitating comparison of key features (Ritchie 1981a). Five off-project jobs were also undertaken in the 1981-82 summer: an eleventh hour survey of the Ruataniwha depression was completed (less than a month before Lake Ruataniwha, part of the upper Waitaki power scheme, was created). Our presence in the Waitaki valley also enabled an inundation effect study to be carried out on partially submerged sites around Lake Waitaki and the crew was able to work briefly on Barry Fankhauser's oven excavations in South Canterbury, after which surveys of the Bobs Cove lime kilns and the 12 Mile catchment, Lake Wakatipu, were conducted for the Lands and Survey Dept (Ritchie 1982d).

1982-83 saw further historic site excavations in the upper Clutha and Kawarau Gorge (including the Hanging Rock, and Riverside Chinese shelters, and a forge site; the latter two were excavated principally for interpretative purposes for the Otago Goldfields Park), and the removal of an historic European burial (an unknown miner) from the route of the new Cromwell

Gorge highway. By the end of 1982 the major surveys and associated reports were finished and the analysis of excavated materials and writing up began in earnest. During the year a major survey by Simon Holdaway and Debbie Foster of the areas affected by the lower Clutha hydro proposals was also completed under the direction of the Cromwell office (Holdaway and Foster 1983).

From the initiation of the Clutha archaeological project, a close working relationship was maintained with the Otago Goldfields Park administered by the Department of Lands & Survey. After the Chinatown excavation the Department had somewhat reluctantly accepted responsibility for management and maintenance of the Chinatown site. It was understandably reluctant to spend money and energy on a site which would shortly be inundated. But the site, as I had argued, proved to be by far the most frequently visited unit in the Park, and even more so after one of the huts was restored. By early 1983 the Goldfields Park needed little convincing that they needed a replacement for Chinatown. As most of the former Chinese settlements in Central Otago had been largely destroyed, the selection of the Arrowtown Chinese settlement was not difficult. The settlement was smaller than that at Cromwell but with two real advantages: a standing Chinese store, and easier access for those who have difficulty with steep tracks. Using funds provided by the Department of Lands & Survey, excavation of the Arrowtown Chinese settlement and store became the major projects for the summer of 1983-84 (Ritchie 1984a, 1984c, 1986b), along with further historic site excavations (the Ledge, a European house-site; and the Rapids, a Chinese miners' campsite in the Kawarau Gorge (Ritchie 1986b). Off-project fieldwork included assisting Atholl Anderson and Lyn Williams with the Lee Island excavations, working with Lyn on an assessment excavation at Ackers Cottage, Stewart Island, and a site survey of Pig and Pigeon Islands, Lake Wakatipu, with Russell Beck and Karl Gillies (Southland Museum) and Brian Ahern (Mt Aspiring N.P.) (Ritchie 1987a).

During 1984 off-project excavations were conducted on the site of a newly discovered moa-hunter site at Coal Creek near the Roxburgh hydro (Anderson and Ritchie 1984d), and at the 1st Hermitage (Ritchie 1985c) and 1st Ball hut sites (Bedford 1985b) in the Mt Cook National Park. The major investigation of the year, on the site of the Halfway House hotel in the Cromwell Gorge, was directed by Stuart Bedford (Bedford 1985d, 1986).

1985 commenced with excavations at the Phoenix Quartz Mining Co's Dynamo site (Ritchie 1985a, 1985d) in Skippers Creek, Shotover valley, a prelude to reconstruction on the site a year later. The site is significant because this remote location witnessed the first major industrial usage of

hydro-electricity in New Zealand. This work was followed by four further Chinese site excavations: the Platform and Flax Grove shelters in the Kawarau Gorge, the Willows hut site in the Upper Clutha, and horticultural terraces associated with Cromwell's Chinatown. The Flax Grove excavation is especially notable for the number of paper artefacts recovered (Ritchie 1986b).

With the assistance of MWD personnel semi-successful efforts were also made to remove the remains of one of the old gold dredges from the Kawarau River for a dredging interpretation display to be established by the Otago Goldfields Park. Despite having two D8s, a diver, a jet boat and a backhoe (and skilled operators) at our disposal, after several steel cables snapped, and the major components had refused to move, it was decided that the river had won the first round. The recovery of one set of the huge turbines and pumps from the old Ripponvale irrigation scheme pumphouse was more successful. Although the pumphouse will be flooded, the pumps have been re-erected in a static display on the future shoreline upstream of the old pumphouse site.

About mid 1985 the first of a series of test excavations were conducted on former business sites in the old main street of Cromwell, as the sites were cleared of structures. The 'downtown' Cromwell excavations continued intermittently into the summer of 1986-87. Only four sites proved particularly productive - the Bridge hotel site (the first hotel in Cromwell dating from 1862, where a bottle dump was uncovered), the sites of the adjoining White Hart and Commercial Junction hotels, and areas behind the former store sites associated with Cromwell's Chinatown.

With the end of the project in sight, only one small investigation, on a Chinese hut at Horseshoe Bend, Upper Clutha was conducted during the summer of 1986 (although test excavations continued in downtown Cromwell as individual building sites were cleared by MWD). Horseshoe Bend was the 23rd Chinese site to be excavated as part of the project, while another 40 have been tested to some degree. During 1987 Alexy Simmons completed photographic, structural and historical documentation of the old Cromwell Bridge (Simmons 1987).

#### Material Culture Studies

The chronological summary of the fieldwork reflects the nature and diversity of the Clutha archaeological project. But from the outset it was intended to achieve a lot more than just recording of the affected sites, rescue excavations and the associated reports. The duration of the project and the presence of a fulltime archaeologist (with a fulltime assistant) enabled much more in-depth research on the main

artefact categories (glass and tin containers and European and Chinese ceramic containers and domestic wares) than had been possible on any project in New Zealand previously. The detailed studies of various artefact types broke new ground in historic archaeology in New Zealand, particularly with regard to dating tin matchboxes (Anson 1983, Bedford 1985a), and the analysis of glass and tin containers (Ritchie & Bedford 1983d, 1985b), and a wide range of both European and Chinese artefacts found in the Central Otago sites (Bedford 1985c, Cameron 1985, Foster 1983, Piper 1984, 1988, Ritchie & Harrison 1982b, Ritchie 1986a, Ritchie & McGovern-Wilson 1986d, Ritchie & Park 1988b). In addition to these specific studies, the artefacts from several major site assemblages were thoroughly documented, in part, to provide baseline data for future studies (Ritchie 1985c, 1986b, Bedford 1985b, 1986).

### Site Management

The duration of the project enabled much greater emphasis on long term site management in the area, through the establishment of a productive working relationship with the Otago Goldfields Park, and direct liaison with government agencies such as Lands and Survey, the Mines Dept, Ministry of Works and Development, the N.Z. Electricity Dept, and more distantly with Fiordland, Mt Aspiring, and Mt Cook National Parks. Several papers were produced on various aspects of site management including reservoir archaeology, goldfield sites, and the management of sites on public lands (e.g. Ritchie 1979a, 1981b, 1981f, 1982e, 1983b, 1983e, 1984b, 1985f).

### Public Relations

Prior to the stationing of an archaeologist in Cromwell, the region was an 'archaeological vacuum' because of the lack of a major museum or recognised archaeologists in the area whom people could contact. Although some did contact the Otago Museum, for most it was just too far away. The establishment of a regional archaeological facility undoubtedly resulted in a greater awareness of things historic in the area, particularly archaeological resources. This heightened awareness came about simply because an archaeologist was stationed in Central Otago and was in a position to talk to people directly about the sites on their properties, and through public relations activities such as talks, field trips, lab tours, the establishment of displays (in the MWD Information Centre and the Cromwell and Arrowtown museums), and handouts (Ritchie 1985e). During the project c.2000 sites were added to the national site recording scheme and virtually every farm in the upper Clutha was systematically surveyed.

### Information, Reports and Publications

Information derived from the archaeological investigations and surveys was disseminated in three main ways:

- a. as scientific papers (mainly excavation reports and material culture studies) in established archaeological publications;
- b. managerial/advisory papers (including survey reports and papers on specific aspects of site management). These were produced and released by the Cromwell office. Some were initially presented as conference papers. Survey reports outlining the nature, distribution and likely impact on the sites in each area were produced for the client (NZED/MWD). These reports are a permanent record of the sites in the upper Clutha and should be useful long term management tools. In addition all the recorded sites were inputted into the national site recording scheme maintained by the N.Z. Archaeological Association.
- c. through public relations (notably public talks and field trips. Only one truly popular publication was produced, viz a giveaway booklet on the Clutha Archaeological project (Ritchie 1985e). Copies of all reports were deposited in the local library, the MWD library in Cromwell, the Hocken Library in Dunedin, and forwarded to the NZHPT in Wellington for inclusion in their library. Copies of all survey reports detailing the sites likely to be affected by the dam proposals were also sent to the MWD Head Office.

### Acknowledgements

A full list of the many individuals and agencies who materially assisted the Clutha Archaeological Project with information or services would be formidable (see Ritchie 1986b). While their contributions are gratefully acknowledged, I would specifically like to thank the many students who assisted with the surveys, excavations, lab work, and compilation of reports and site records. Over 150 worked on the project (some several times). Without their efforts and cameraderie much less would have been achieved.

Institutional support, for which I am indebted, was provided by the Ministry of Works and Development (Cromwell based staff being particularly helpful), the N.Z. Historic Places Trust, and the Otago Goldfields Park. A good working relationship with the staff of these organisations helped ensure that the archaeological project was productive and effective.

Appendix 1 Clutha Project: Record of Excavations And  
Field Surveys

- 1978 Feb. Directed Italian Creek excavation, Cromwell Gorge. A transient Maori site. Directed all succeeding excavations unless stated otherwise.
- 1978 May Kawarau Gorge Archaeological Survey Part 1.
- 1978 Nov. Test excavations, threatened sites (35), Cromwell Gorge.
- 1978 Dec. Firewood Creek excavation. Chinese miners' camp, S133/424.
- 1979 Feb. Caliche shelter excavation. Chinese miners' camp, S133/223.
- 1979 Mar. Shotover Valley Archaeological Survey.
- 1979 May Kawarau Gorge Archaeological Survey Part 2.
- 1979 Jun. Firewood Creek Moa Deposit Excavation.
- 1979 Aug. Luggate-Upper Clutha Archaeological Survey
- 1979 Nov. Excavation of Sheung Fong and Ha Fong Chinese rockshelters, Cromwell Gorge, S133/21 & 22.
- 1979 Dec. Queensberry Archaeological Survey, Upper Clutha valley.
- 1980 J-F Excavation of Cromwell's Nineteenth Century Chinatown, S133/48.
- 1980 Mar. Lake Roxburgh Archaeological Survey.
- 1980 Apr. Slip Stream Nephrite-Dart Valley Moa Recovery Expedition.
- 1980 May Queensberry Archaeological Survey Part 2.
- 1980 Aug. Bendigo Goldfield Archaeological Survey.
- 1980 N-D. Owens Ferry moa-hunting camp excavation, S132/4.
- 1981 Jan. Parkburn ovens excavation, S124/4.
- 1981 Jan. Tinwaldburn oven excavation, S124/16.
- 1981 Jan. Excavation of Station sub-fossil faunal cache.
- 1981 Feb. Rockfall II excavation, Cromwell Gorge, S133/169.
- 1981 Feb. Dart Bridge excavation, Upper Wakatipu, S122/1.
- 1981 Mar. Carrick Goldfield Archaeological Survey.
- 1981 Nov. Queensberry II Chinese site excavation, S124/207.
- 1981 Dec. Apple Tree site excavation. Chinese miner's hut, S124/212.
- 1981 Dec. Sandy Point excavation. Chinese miner's hut, S124/231.
- 1982 Jan. Northburn shelter excavation, S133/77.
- 1982 Jan. Ruataniwha Depression Archaeological Survey, Upper Waitaki.
- 1982 Jan. South Canterbury prehistoric ovens excavations. Director: B. Fankhauser.
- 1982 Feb. Bobs Cove-12 Mile Archaeological Survey.
- 1982 Nov. Ah Wee's hut excavation, Luggate area, S115/54.
- 1982 Dec. Poplars site excavation, Chinese miners' camp, Luggate, S115/44.
- 1982 Dec. Hanging Rock shelter excavation, Kawarau Gorge, S133/474.

- 1983 Jan. Mining forge site excavation, Kawarau Gorge, S133/790.
- 1983 Feb. Riverside Chinese shelter excavation, Kawarau Gorge, S133/791.
- 1983 Jun. Excavation of historic burial, Cromwell Gorge.
- 1983 N-D Arrowtown Chinese settlement and Ah Lum's store excavation, S123/249 & S123/250.
- 1984 Jan. The Ledge historic house site excavation, Kawarau Gorge, S133/868.
- 1984 Feb. Rapids site Chinese hut & forge excavation, S133/453.
- 1984 Jun. Coal Creek moa hunting site excavation S152/12.
- 1984 Nov. First Hermitage and First Ball hut excavations, Mt Cook National Park.
- 1984 Dec. Halfway House Hotel site excavation, Cromwell Gorge, S133/156.
- 1985 Jan. Phoenix Quartz Mining Company's Dynamo Site excavation.
- 1985 Jan. Willows Chinese hut site excavation, Luggate, S124/42.
- 1985 Jan. Excavation of Chinese horticultural terraces, Cromwell's Chinatown.
- 1985 Feb. Platform Chinese rockshelter excavation, S133/466.
- 1985 Feb. Flax Grove Chinese rockshelter excavation, S133/494.
- 1985 Feb. Bridge Hotel site dump excavation, Cromwell.
- 1985 May Test excavations on Terrace horticultural site.
- 1985 Jun. Test excavations on sites of former Chinatown stores.
- 1985 Aug. Further excavations on sites of Chinatown stores.
- 1986 Jan. Horseshoe Bend Chinese hut site excavation, S115/62.
- 1986 Mar. Phoenix Dynamo reconstruction work (electricity centenary).
- 1986 Sep. Cromwell Junction & White Hart Hotel site excavations.

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#### In Press

- a/ Form and Adaptation: Nineteenth Century Chinese Miners' Dwellings in Southern New Zealand. In Baywood Publishing Co. volume on Archaeology of the Overseas Chinese, P. Wegars (ed.), Anthropology Dept., University of Idaho.
- b/ Last Days of Cromwell's Chinatown. Historic Places in New Zealand. (September 1989 issue).
- c/ Chinese Miners in Central Otago. In New Zealand Unearthed, Bookmakers, Auckland.

#### In Prep.

- a/ The Ledge: A European House-site in the Kawarau Gorge: A Report on the Analysis of Excavated Materials.
- b/ Cromwell's First Hotels: Archaeology and History.

### Appendix 3 Repositories of Excavated Materials from Clutha Archaeological Project

1. Otago Museum, Dunedin: This institution, because there is no suitable long term storage and curation facility for archaeological materials in Central Otago, now holds the bulk of the items uncovered during the course of the project. In particular, it holds all faunal remains (from sub-fossil, pre-European and historic sites), as well as all other items (artefacts, charcoal and soil samples etc) from the pre-European site excavations (see App.1 & 2 for list of excavated sites and related reports and publications). The museum also holds most of the material recovered from the European and Chinese historic site excavations, including faunal remains. The historic material is stored in labelled plastic bags in cardboard boxes by type/site. e.g. "glass containers", "buttons", tin matchboxes" etc. Because of the large volume, all the material from the Clutha excavations is held in one room, 'the Clutha room', in the storage area of the Museum. It is available to future researchers.

Some of the pre-European site material (e.g. the moa bones and flake material from the Owens' Ferry site) which was being worked on by Anthropology Department students, is presently housed in the Department's laboratory. These materials will eventually be placed in the Otago Museum.

2. Cromwell Museum: The Cromwell Museum has displays containing selected Chinese and European artefacts which were uncovered during the course of the project.

3. Cromwell Information Centre: The M.W.D. Information Centre adjacent to the Cromwell Museum contains a small selection of historic artefacts from the Clutha project excavations, as well as showing slides of the excavations and historic sites (part of the audio-visual presentation) and photographs in wall-mounted displays. A notable artefact in the Information Centre display is 'the spoon' from one of the early spoon dredges, the prototype gold-dredge developed in the Cromwell area.

4. Arrowtown Museum: Within the Arrowtown Museum there is a special display (by Chris Jacomb and Sheridan Easdale) of items recovered during the excavation of the Arrowtown Chinese settlement and the adjacent Ah Lum's store. The display also incorporates photographs, plans etc.

5. Arrowtown Chinese Settlement & Ah Lum's Store: Following the excavation of these sites, the Otago Goldfields Park took over the sites in 1984. Since that date the store has been restored, and many of the former Chinese huts in the settlement

have been reconstructed. For security reasons, they do not contain artefacts from the excavations but their reconstruction was based on a combination of archaeological and pictorial evidence (old photographs). As noted a full display of items recovered from the sites can be seen in the nearby Arrowtown Museum; the rest of the material is housed in the Otago Museum.

Appendix 4 Radiocarbon Dates from Pre-European Sites Excavated during the course of the Clutha Archaeological Project

N.B. All dates are 'charcoal dates'.

| <u>Lab.No.</u> | <u>Date</u><br><u>A.D.</u> | <u>Site and Provenance</u> | <u>Reference</u>        |
|----------------|----------------------------|----------------------------|-------------------------|
| NZ4715         | 1641                       | Italian Ck, A2 hearth      | Ritchie 1982c           |
| NZ4716         | 1371                       | Italian Ck, A4 hearth      | Ritchie 1982c           |
| NZ4714         | 1559                       | Italian Ck, A2 hearth      | Ritchie 1982c           |
| NZ5324         | 1363                       | Dart Bridge, complex B     | Anderson & Ritchie 1986 |
| NZ5326         | 1508                       | Dart Bridge, complex D     | Anderson & Ritchie 1986 |
| NZ6039         | 1251                       | Owens Ferry, Layer 10      | Kooyman 1984            |
| NZ6040         | 1187                       | Owens Ferry, Layer 8/9     | Kooyman 1984            |
| NZ6038         | 1343                       | Owens Ferry, Layer 8/9     | Kooyman 1984            |
| NZ4972         | 1276                       | Rockfall 1, oven           | Ritchie 1982c           |
| NZ4973         | 1001                       | Rockfall 1, oven           | Ritchie 1982c           |
| NZ5067         | 958                        | Rockfall 1, oven           | Ritchie 1982c           |
| NZ5341         | 1574                       | Rockfall 2, oven           | Ritchie 1982c           |
| NZ5340         | 1318                       | Rockfall 2, oven           | Ritchie 1982c           |
| NZ6855         | 1295                       | Coal Creek, oven           | Anderson & Ritchie 1984 |
| NZ6687         | 1287                       | Pig Island, oven           | Ritchie 1987a           |
| NZ5536         | 1595                       | Parkburn, oven 1           | Ritchie & Harrison 1981 |
| NZ5537         | 1610                       | Parkburn, oven 2           | Ritchie & Harrison 1981 |
| NZ5538         | 1524                       | Parkburn, oven 3           | Ritchie & Harrison 1981 |
| NZ5539         | 1454                       | Parkburn, oven 4           | Ritchie & Harrison 1981 |
| NZ5416         | 1647                       | Tinwaldburn, oven          | Ritchie & Harrison 1981 |
| NZ5417         | 1577                       | Tinwaldburn, oven          | Ritchie & Harrison 1981 |