

John Buchanan F.L.S. botanist and artist (1819–1898)

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Abstract: John Buchanan (1819–1898) was employed by, or associated with, some of the first organisations that provided an administrative or scientific framework in the colony – the Reconnaissance and Triangulation Surveys of Otago, the Otago Provincial Geological Survey, the Colonial Museum and Geological Survey of New Zealand, the Colonial Botanic Garden, and the New Zealand Institute. Buchanan's contribution to each of these organisations has been widely acknowledged but, apart from his published work and a few of his drawings and paintings, the details of his life and work remain unchronicled. A chronological account of Buchanan's life and work are presented as well as documentation about the fate of Buchanan's botanical collections.

Keywords: John Buchanan, botanist, artist, New Zealand, Otago Provincial Geological Survey, Colonial Museum and Geological Survey, New Zealand Institute, Colonial Botanic Garden.

Introduction

John Buchanan belonged to a highly competent group of men who, although largely untrained, had the intelligence and ability to respond to the stimulus provided by the leaders of the small scientific community that existed in mid-nineteenth century New Zealand. Buchanan was employed by, or associated with, some of the first organisations that provided an administrative or scientific framework in the colony – the Reconnaissance and Triangulation Surveys of Otago, the Otago Provincial Geological Survey, the Colonial Museum and Geological Survey of New Zealand, the Colonial Botanic Garden, and the New Zealand Institute. Buchanan's contribution to each of these organisations has been widely acknowledged, but apart from his published work and a few of his drawings and paintings the details of his life and work remain unchronicled.

On the day of Buchanan's death, at the meeting of the Wellington Philosophical Society, Sir James Hector said, 'Mr Buchanan was well known to the members as

one who had done great service to the New Zealand Institute by the beautiful way in which he had illustrated Volumes I to XIX of their *Transactions*. When he [Sir James] came out to New Zealand in 1861 Sir Joseph Hooker asked him to look out for a man called John Buchanan, who sent Home to the herbarium at Kew the best collection of plants that were received from Australasia. On arrival in New Zealand he [Sir James] accordingly advertised for Mr Buchanan who immediately responded, and to whom he was able to give an appointment as draughtsman and botanist in 1862. About six years ago Mr Buchanan retired from the public service. Mr Buchanan contributed many valuable papers – perhaps the most valuable papers that had ever been contributed – to the botany of New Zealand, and he had also worked in the interests of science in many other ways. He was a great explorer, or rather wanderer, and he endured much hardship in collecting specimens of geological interest, minerals, birds even, and certainly, above all other things, plants.

Mr Buchanan's collection of plants made in New Zealand were forwarded from time to time to Sir Joseph Hooker at Kew, and the whole of the plants he collected up to 1863 were embodied in the *Flora of New Zealand* published in 1865 [sic; *The Handbook of the New Zealand Flora* was published in 1864 (Galloway 1998).] Of course since then he has made other large collections. These also were sent to Kew; but duplicates remained here, and were placed at the disposal of the late Mr Kirk who made use of them in his work now partly published. Mr Buchanan had left a large collection of specimens, books, drawings, and manuscript notes, all of which he [Sir James] saw on the last occasion on which he was in Dunedin in the crypts and cellars underneath the museum in that city. Sir James added that he hoped a little better care would be taken of the collection until they reached a more enlightened age. There might be many unknown facts embodied in these notes because Mr Buchanan studied the botany of New Zealand at a time when there were no rabbits, and when there had been no great bush fires – when the country was more in a state of nature than it is now. His botanical researches in the south of New Zealand were made single-handed; and the great interest in the botany of New Zealand lay in the original flora of the far south. Sir James repeated that he hoped great care would be taken to preserve every scrap of work left by Mr Buchanan. They all mourned Mr Buchanan's death, though at the same time it had to be said that it was a happy release for him' (Hector 1899).

The following chronological account of John Buchanan's life is based primarily on papers housed at the Museum of New Zealand Te Papa Tongarewa (Te Papa), the Alexander Turnbull Library (ATL), the Hocken Library at the University of Otago, and Land Information New Zealand, Dunedin (LINZ). The fate of Buchanan's botanical collections is documented in Appendix I.

Scotland 1819–1851

John Buchanan was born on the 13 October, 1819, at Levenside, Dunbartonshire, Scotland. His parents were William Buchanan (born 1798) and Nancy, née Somerville, who married in 1817 (D. Saunders, pers comm). John was their first-born. He was followed by two brothers, James who was born about 1821 and Peter in 1823. A sister, Agnes, appears to have been the only other child. She was probably born about 1825 (ATL). From

James's obituary notice it seems that the parents were buried in the Southern Necropolis, Glasgow.

Little is known of Buchanan's early childhood, but it is likely that his father was a tenant on the Levenside estate owned by the Campbells of Stonefield from the mid-eighteenth century until 1836, when it was sold to James Ewing and renamed Strathleven (A.F.Jones, pers comm). His boyhood, therefore, was probably rural and his early education at a parish school. He was apprenticed in the craft of pattern designer in the calico printing trade at Bartholemew & Co's Printworks at Dalmonach in the Vale of Leven, which was perhaps close to his home.

From letters written by Buchanan's boyhood friend, Alan Burns, it appears that both were later employed in the drawing shop of Henry Monteith & Co., Barrowfield (ATL). This was the firm of calico printers in which the botanical artist Walter Hood Fitch of Kew also received his training in textile design based on plant forms. Buchanan attained the position of foreman in the drawing shop, but mentioned later that he was employed on the Clyde decorating glass panels for the saloons and staterooms of the iron-steamers, probably owing to a decline in the textile trade. He also said that this employment diminished as mechanical methods replaced the hand-produced decoration by artists and craftsmen. As the textile trade slumped further, many became unemployed and emigration from the area increased. Buchanan's friends Alan Burns and Alexander Dick chose Nova Scotia and Melbourne respectively. Buchanan's choice of New Zealand may have been influenced by the earlier departure of emigrant ships from Greenock bound for the Scottish Free Church Settlement of Dunedin. Whole families left the towns and villages, some of whom may have been his friends, neighbours, or even relatives. Four years before his departure from Scotland, Buchanan visited the Continent. His passport and visa show an entry stamp for the Port of Boulogne on 28 June 1847, but there is no indication of how far nor for how long he travelled (ATL).

His friends' letters, particularly those of Alex Dick, reveal that Buchanan lived in the village of Busby. He probably lived there for a number of years, as Dick describes at some length the changes in the streets and the circumstances of the local people they both knew, many of whom attended a function in Dick's honour when he returned for a visit in 1870 (ATL).

Emigration to Dunedin, New Zealand

On 2 July 1851 Buchanan sailed for New Zealand on the barque *Columbus* from Gravesend. The voyage took seven months and, after calling at Wellington and Nelson, the *Columbus* reached Port Chalmers in February 1852. 'John Buchanan, single' is noted amongst the arrivals in the shipping news of the *Otago Witness* of 21 February. The date of his arrival has repeatedly been given as 1849. This is apparently a confusion with an earlier arrival. John Buchanan, a married man with two little daughters, arrived on the *Phillip Laing* in 1848 with the family of Thomas Buchanan, who had an eight-year-old son named John (Hocken 1898).

The Provincial Survey of Otago

In the Classified Roll of Electors for the Province of Otago, 1852, only one John Buchanan 'Labourer, Householder, MacLaggan St., Dunedin' is listed. This is probably the married man, as it is known that Buchanan, along with other single men of the town (where paid work was hard to get), spent a short time on the gold fields of Victoria.

The Roll for 1857–58 again lists only the one John Buchanan as an 'agriculturalist, freeholder and joint householder, North East Valley'. This confirms that he had returned to Dunedin to work the small property that he had purchased from the Colonial and Immigration Commissioners on 15 June 1851 prior to his departure from London. A dated pencil sketch of a partially cleared block of bushed hillside titled 'No. 45 in 1856' shows a cottage, garden, and barn enclosed by fences and a fenced field with six haystacks on a road frontage (Buchanan guardbook, ATL). A Crown Grant for Section 45 of 12 acres, 3 roods, and 23 poles was not obtained until 29 March 1864 (J.G. Blackman, pers comm). Apart from working on his small holding, Buchanan was employed as a survey assistant after, and perhaps before, the Provincial Survey of Otago commenced under the recently appointed Chief Surveyor, John Turnbull Thomson, who with two Assistant Surveyors, Alexander Garvie and James McKerrow, undertook a rapid Reconnaissance Survey of the Province in order to provide a general map to precede pastoral settlement. This was followed by a triangulation survey showing all the topographical features of rivers,

swamps, hills, and forests (Hall Jones 1963).

In September Thomson's party travelled from Dunedin to Invercargill, where, by 1 October, they were engaged in building a survey office (Roberts 1895). Buchanan's sketch of the Mataura Falls dated 1856 (*Otago Provincial Gazette* 5 1862) suggests that he may already have been employed on the survey, but this and a second undated drawing, 'Mataura Falls in flood', were not made in September 1856, because the river was not bridged until 1868. Both Buchanan's sketches show a bridge and a cluster of dwellings.

1857 – In the months of October, November, and December, Garvie's survey extended to the south-eastern parts of the Province, the area between the Clutha and Mataura Rivers. Garvie's Field Book No. 50 (LINZ, Dunedin) shows that on 3 October he 'bought off Ross & Kilgour' the following provisions:

50lb	Overhead biscuits
30lb	Sugar
6lb	Tea
4lb	Coffee
5lb	Salt
1lb	Baking soda
6lb	Oatmeal and some twine

An account of the trip is given in Garvie's *Journal of a Reconnaissance Survey of part of the Province of Otago* (LINZ, Dunedin). They left Dunedin on 12 October and returned on 15 December. A scribbled note records that on 21 October they were at Pomahaka, where mutton was purchased from 'Oliver'. The journal begins on Monday, 12 October – 'Start from G's house and reach the ferry about 6 pm' – and also notes the weather, the vegetation, and, for example, the route:

Very bad travelling today having to cross numerous small creeks mostly soft with steep scrubby banks bogged one of the packhorses which was with difficulty got out and shortly after the other fell backwards having slipped in rising the steep scrubby bank of a creek.

On Tuesday, 13 October, they were on the 'Margin of Lake [Waiholo] warm, calm and sunny'. This survey included the Catlins, Wyndham, Waikaka, and Waikoikoi: the 'country between the Clutha and Mr Thomson's survey on the Mataura'. The field books that detail both this and the

surveys of 1858 contain many small sketches and views, a system that Buchanan continued in his own diaries in later years. Like Garvie, he described the weather, the landscape, and the route, with the similarity extending to his noting of Sundays, the only day set aside for a kind of leisure – the care of clothing and gear, the updating of field books, journals, and maps, and a rest from constant travelling!

1858 – In February the Chief Surveyor sent Garvie to survey the country that Alexander and Watson Shennan had recently explored and where they had taken up pastoral leases. Garvie's account (LINZ, Dunedin) commences on Tuesday, 9 February:

Resume the survey with Wm McGlashan and John Buchanan as men with two packhorses belonging to the former one looks rather young and not quite broke in – they started late yesterday and I joined them at Boyds. [Taeri].

Wednesday 10 – 'Taeri Hill called Mt Hinden – men camp near Stewarts. Thursday 11 – Start for junction of Suttons River anxious to get over snowy ranges with a good stock of provisions camp at side of creek. Country all dotted with rocks and stones of schist grass of good quality but thin indications of very hard frosts in winter.'

Friday 12 – '... Buchanan shot a pig – soon after the young horse took fright (McGl thinks of the smell of blood on his hands) and bucked and kicked till all the pack was thrown off – it was loaded again but did the same, had to leave its load and send back the other horse for it.'

Saturday 13 – '... young horse took fright again (McGl supposes at a spear grass) bucked and kicked again till everything was off and scattered about – loaded it again did the same thing told the men to go down and camp and send the other horse to take the load ... went up the range myself ... returned to camp when McGl started on his young horse with my saddle for D. Stewart's supposed about 16 miles off by a direct route to try to hire his horse'.

Sunday 14 – '... NW squall blew down the tent which is quite unfit for any exposed [?] McGl arrives with an old worn out horse which he proposed I should ride and pack my own'.

Monday 15 – '... keen frosty SW wind started to cross the ranges packed my own horse – old horse having been ridden too hard yesterday seemed unfit to carry me and soon gave in from sheer weakness'.

Tuesday 16 – to **Sabbath 21** [omitted].

Monday 22 – '... crossed plain entered the river gorge in the mountains ... find gold in the Clutha and small specks in the Manuherikia'.

Thursday 25 – '... McGl, shot a wild dog in the morning but it limped off, see tracks and dung'.

Friday 26, Saturday 27 – '... started and made our old camp'.

Sunday 28 – [Apparently in camp].

Monday, 1 March – A mention of an extensive fire, apparently behind Maungatua. Garvie noted that smoke 'obscured the peaks making bearings of the snowy Mts impossible'.

Friday 5 – '... mist cleared off – sent McGl to Stewarts with the old horse and started with B and the white horse – crossed the deep gully of Lees Stream ... reached the ferry at Borries left B there ...'.

Wednesday 10 – '... after refitting men started today rather late'.

Thursday 18 – '... start and follow Tuapeka ... Davy and Bowlen's hut, shepherd boy there ... found matukuru [matagouri] 4–5ft high mixt with cabbage trees ...'.

Saturday 20 – '... went with B up to the mouth of the Tuapeka – while I was taking bearings from the top of the dividing stream left him to try the gravel – found scale gold similar to that found in the Clutha above and plenty even on the surface – a quantity of about 2 handfuls from the very top produced 11 specks'.

Monday 22 – '... found trace of gold in the Waitahuna but very slight'.

Tuesday 23 – '... leave McGl to look after the horses start up river with B about 8 miles up river to the main fork of the [?] the Wakatipu and Wanaka appear about the same size. Find scale gold pretty plenty – a handful of gravel washed in a pint pannikin producing several specks ...'.

Thursday 1 April – '... follow down the Waikaka and cross about a mile from the junction of the Pukerau ...'.

Tuesday 20 – '... start for Kuri Bush and then travel along the sea beach ... stay at Wm Taylors all night ...'.

Wednesday 21 – '... westerly gale and heavy showers – started as soon as the tide Crossed the mouth of the Kaikorai now shut up – round by Green Is and home'.

These brief extracts from Garvie's journal provide evidence of Buchanan's activities during February, March, and April of 1858. His field book of the *Reconnaissance Survey of the South Eastern Districts by Alex Garvie Asst. Surveyor*

1857–58 covers the same period, but does not note the days (LINZ, Dunedin). Along with descriptions of the country, it is filled with little pencil landscape sketches following the sequence of the trig station numbers.

Buchanan's sketches (ATL) with the titles *Serpentine Vallies 1856 – first sketch ever made of this place*, *J.B. of the Reconnaissance Survey, Terrace Plains on the Clutha 1856*, and *Junction of the Kawarau and Clutha Rivers [first sketch ever made] Reconnaissance Survey, 1856* would have been made not in 1856 but in 1858 at the same time as Garvie's.

1859 – In this year Garvie was 'principally directed to surveying and making main lines of road through the Otago Hundreds' (*Otago Provincial Gazette* 3). His Field Book No. 69 (Field Book 69, LINZ, Dunedin) is titled *Road Traverse from Dn to south Taeri ferry from Kaikorai Mill to Waipori and compass survey from Dn to Port Chalmers and Blueskin 1859*. Buchanan was apparently employed on this survey, but the only certain locality for this year is provided by his watercolour painting of Portobello Bay, dated April 1859 (private collection).

1860 – There is as yet little known of Buchanan's whereabouts for this year apart from a single collection of mosses labelled 'Mt Cargill 1860'. He was probably in Dunedin living on his property in North East Valley and ranging over the hills surrounding the town, most of which were still forested. That he had been collecting mosses is confirmed by the letters from his friend Dr John Ross of Busby written on 9 and 21 May 1860 (ATL):

I received your three letters containing the Mosses, Ferns and Hepaticae but in consequence of being confined to bed at the time I could not write to you sooner. I have transmitted to Mr Wilson the mosses of which he particularly wished specimens telling him it was all you had at the time but when those growing were ripe you would send him a plentiful supply.

Allowing for the time it would have taken Buchanan's letters to reach Scotland and Dr Ross's delayed answer, the collections were probably made in the spring of 1859. Dr Ross's second letter of 21 May contains a request on behalf of Dr Arnott for:

Such small seaweeds as he finds on the rocks, especially those which are called dirty, that is not dirty with mud but with microscopical parasites

Dr Ross ended the letter by saying:

Between Wilson and Arnott you will soon be (if you are not already) the best Cryptogamic Botanist in New Zealand.

The letter of 9 May 1860 has the following postscript:

I think I mentioned to you that Mr Keddie read your Geological letter and showed your photographs. He was to write to me and give me an account of the discussion which followed which he has not done

This information from the Buchanan papers held in the Alexander Turnbull Library opens up a completely new aspect on Buchanan's activities not confirmed from any other source. First that he was interested in geology at least three years before Hector's arrival in New Zealand and before Lauder Lindsay's visit of 1861 and, secondly, that he had either his own 'photographic apparatus' or was associated with a fellow enthusiast.

There are a number of unattributed photographs in Buchanan's guardbooks that probably span several decades. It is certain that Hector instigated photographic records in 1862, but the possibility that Buchanan was also taking photographs has been overlooked.

1861 – After the dramatic announcement in May of the discovery of gold by Gabriel Read on the Tuapeka at 'Gabriel's Gully', the Chief Surveyor, J.T. Thomson, was sent to ascertain the truth of Read's claim early in July. He reported that about 150 men had already collected there and that he was shown a bag of native gold weighing '9lbs 4oz' (Hall Jones 1963). It is possible that Buchanan either accompanied him or arrived very soon afterwards, as one of two undated drawings (Buchanan guardbook, ATL), *Gabriel's Gully, Tuapeka by moonlight*, shows only about 20 tents and two carts. This suggests that he was on the gold field very shortly after its discovery and before the rush of prospectors in August. When Thomson revisited the Tuapeka in September, he was astounded at the transformation of the valley. Buchanan's second sketch is titled *This stream heads Gabriel's Gully and runs into the Waipori River*. There is certain evidence that Buchanan was on the Tuapeka gold field as a prospector, for a Miner's Right, No. 1735 (Te Papa), was issued to John Buchanan for the Tuapeka field from 11 September 1861 to 10 September 1862 (Fig 1).



Fig. 1. Miner's right No. 1735 issued to John Buchanan for the Tuapeka gold field, 11 September 1861 to 10 September 1862.

In December Buchanan also organised a party to work for gold above the Manuherikia, but owing to very severe weather on the Lammerlaw Ranges, their horses straying, and the difficulty of reaching the place the party split up (National Archives).

During the time Buchanan was engaged in gold prospecting, Dr Ross was active on his behalf to secure botanical employment for him. Ross had heard that a fellow Scottish doctor, James Hector M.D., had been appointed to undertake a Geological Survey of the Province of Otago. By coincidence, Dr Ross was treating a consumptive young man, Mr Patrick Graham, who had been a college companion of Hector's. Graham immediately wrote to Hector, whose reply below shows unequivocally that Hector first became aware of Buchanan solely through the efforts of Dr Ross (ATL):

44 Northumberland St.,
Edinburgh
Oct. 25th 1861

My dear Graham,

You are right in supposing that I am going to New Zealand to another Geological Survey of the Province of Otago and thank you heartily for your congratulations. I shall only take out one assistant from this country and any other I shall require for the service I shall trust to get out in the Colony.

You may tell Dr Ross that I shall keep his friend Mr John Buchanan in mind but that I must feel my way out there a little before I propose or offer appointments to anyone.

I am extremely sorry that you are in bad health but I trust you are past the worst of it now.

I return to London shortly and expect to leave England before the end of the year.

Ever yours sincerely,
James Hector

Meanwhile Dr Ross had written to the bryologist William Wilson, who had contributed the section on New Zealand mosses for J.D. Hooker's *Flora Novae Zelandiae* (Hooker 1855). Wilson's reply, written from Paddington, London, on 14 December 1861 (ATL), says:

I wrote to Dr J.D. Hooker on the same day that I received your last and I have no doubt he will do all he can to secure Mr Buchanan's appointment.

The Geological Survey of Otago

1862 – Dr Ross's letter of 22 February, written from Busby, confirms that Buchanan's name had been brought to Dr Hector's attention (ATL):

My dear Sir,

I received your note from Tuapeka Creek with the small fern. It is a small variety of the *Ophioglossum coriacea* of Allan Cunningham You appear not to have received my two last letters containing the steps which I took to get you appointed as one of the party for the Geological Survey of Otago under Dr Hector. As Dr Hector left London for New Zealand at the end of December beginning of January last I think you should endeavour to see him as soon after he lands as you can. In that case there is little doubt of your being appointed one of the staff. As you may remain for a few months at Tuapeka Creek perhaps I should direct you there. The likelihood however is that you will have returned to North East Valley before my letter reaches New Zealand.

Hoping to hear from you soon.

I remain yours very truly,

John Ross

On April 14 – James Hector M.D. arrived in Dunedin following his appointment with the Otago Provincial Government to undertake a Geological Survey of the Province. He at once began to employ a small staff that Buchanan was soon to join (Te Papa). Thus, from being a small farmer, part-time survey assistant, and amateur botanist, Buchanan became a member of the well-organised scientific team that Hector first assembled in Otago. Firm friendships were made and maintained amongst the men Hector employed on the Geological Survey: Gomer Williams, Richard Gore, William Skey, John Rayer, J.W. Sullivan, T.R. Hackett, and Peter Boers. The names of some occur over many years in the Hector correspondence.

April 18 – In the last part of a long letter about the ferns Buchanan had sent, Dr Ross concluded:

I hope by the time you receive this you will be on Dr Hector's staff of explorers and making many discoveries both botanically and geologically.

May – After numerous reports of small quantities of gold having been discovered in Central Otago, Hector decided to visit the Manuherikia Valley. He left Dunedin on horse-

back and travelled up the coast to the Shag River. He then went inland by the Shag Valley, crossed the upper Taieri Plains, and went into the Manuherikia Valley. He followed this river to its junction with the Clutha River, which he also followed for a short distance upstream (R. Burnett pers comm). It is tempting to speculate that Hector may have already met Buchanan and from him received a first-hand account of his early discovery of gold in the area and the routes he had taken when prospecting on the Manuherikia in 1861, but Buchanan was probably still seeking his fortune on the Tuapeka field.

August – Hartley and Reilly reported the presence of a rich deposit of gold on the Clutha. On 22 August this news prompted Buchanan to write, unsuccessfully, claiming recognition of his earlier official report 'now entombed in a Government Gazette' and a share of the reward of £2,000 for the discovery of a payable gold field. He noted that he was the first to find gold in the Clutha and some of its tributaries, including the Tuapeka (National Archives, 22 August 1862).

By August Hector had also returned to Dunedin and Buchanan was back from the Tuapeka. He appears to have returned to town before the expiry of his miner's right. A remark made in a letter from Dr Ross written from Scotland on 25 September 1862 suggests that Buchanan may have suffered from the freezing conditions on the gold fields in the severe winter of 1862. Dr Ross ended his letter:

Hoping this will find you again restored to your usual health and as able to look for mosses on trees sixty feet high as formerly.

September 1 – Hector, in a letter to J.D. Hooker, wrote:

As spring has begun I have set a collector at work to gather the Cryptogams privately until the matter is taken up by Govt. I have engaged Buchanan the person you may perhaps remember you recommended to me at Mr Wilson's desire. He seems to be a capital hand at it, and I am making him write full notes with any specimens that require them He shall have the best opportunities I can find for him. Until December he will be working in the North East Valley close to Dunedin which is one of the best and richest spots in the Province. (Kew Archives Correspondence Vol. 174)

September 25 – Buchanan made a pen and watercolour drawing of the ground orchid *Corybas trilobata*, which was growing at North East Valley, as well as a mistletoe. These

are the earliest of his dated botanical drawings of native flowering plants yet found.

October – While Buchanan was left to collect in North East Valley, Hector again journeyed inland in order to investigate a possible route or pass to the West Coast. He left Dunedin on 28 October carrying only the barest necessities 'man and horse but lightly packed' (Hector Field Book No.23, Hocken Library, Dunedin). About a week after leaving Dunedin he reached the Matukituki River. As it was too swollen to cross, he climbed Black Peak in order to obtain a wide view of the mountains to the west. The locality 'Black Peak 6,000ft. alt., Hector & Buchanan, 1862' is noted in Buchanan's account of the alpine flora (Buchanan 1882) and, in the same paper, the year 1862 is incorrectly given for Mt Alta and Hector's Col. There is no suggestion in Hector's field book that he stopped to collect plants on Black Peak. The alpine plants from these localities were collected by Buchanan in February and March 1863 on Hector's second visit to the Matukituki Valley. It is interesting to note that on 4 October Hector purchased 'photographic apparatus & chemicals' from Joseph Perry, Dunedin, as is shown by a receipt for £10 sterling (Te Papa). There is every possibility that unattributed photographs from this and the following expedition still survive. There were also paintings by contemporary artists of these mountains dated 1863, when it is probable that the only party in the Matukituki Valley was Hector's and the only artist was Buchanan.

To the West Coast Overland

1863 – As a result of his November visit to Black Peak, Hector was convinced that a low alpine pass providing a route to the West Coast might be found in the headwaters of the Matukituki River. Therefore, early in January his party assembled in Oamaru prior to travelling inland by the Waitaki River Valley. J.W. Sullivan, who had been with Hector in British North America as secretary to the Palliser expedition, accompanied them and it is his despatches to the *Otago Daily Times* of 9 February and 18, 19, and 20 March 1863 that provide the narrative of the expedition. Sullivan's account makes no mention of the number in the party, but apart from Hector, Sullivan, and Buchanan, Gomer Williams and John Rayer also travelled up country from Oamaru, as is shown by receipts for clothing and provisions from Messrs Traill and Roxby (Te Papa). These goods included:

Shirts and mole trousers for Rayer,
 watertight boots for Sullivan,
 3 dozen boxes of sardines, vinegar, mustard, curry, sauces
 3 bars Soap
 5lbs Tobacco and a case of Geneva

Buchanan has also noted the contents of his handbag as:

Drawing book and glasses, thread, penknife, compass,
 matches, needles etc. in-housewife, looking glass, soap, hat string,
 thimble, paper collars, binocular glass, bottle of potass, cyanide.

There is nothing about 'Peter' recorded until 25 January at Wanaka where a receipt for extra expenses is made out in Hector's hand to Peter Boers (Te Papa). Ten horses, including 'Dr's grey mare', were described in the 'list of horses and brands taken when starting for trip to West Coast overland'. As botanist to the expedition, Buchanan made plant collections that can be traced from the following route extracted from Sullivan's newspaper account.

January 8 – The party camped 5 miles from Oamaru on their way up the Waitaki Valley to the interior. 14 – They were camped at McLean's outstation where Dr Hector, acting as Coroner, authorised the interment of Mr McMurdo, who had been killed by a kick in the chest by a young horse. From there they followed the road to Otematata, then through the low saddle to the Ahuriri River. They followed the Ahuriri River to Robinson's Saddle and into the gorge of the Lindis Pass. They camped on Sunday 18 and began the descent by the Passburn Creek to the plains of the Clutha on Monday 19. They crossed at Norman's ferry (Albertown) where the Hawea branch joins the mainstream of the Clutha. Their camp was set up close to Roy's station at Lake Wanaka where pemmican was prepared for mutton.

Our camp has the appearance of a small butchery establishment at present, each man assiduously working in his special department; one slicing meat, another drying, a third melting fat and a fourth keeping the kettles boiling with an unlimited supply of wood.

Eighteen years later Buchanan revisited this site, referring to it as 'Dr Hector's old pemmican camp'. The party remained at Wanaka until 30 January preparing their provisions and refitting their boat, which had been damaged during one of the sudden storms they experienced whilst on the lake. 31 – Three of the party with the heaviest of the baggage and four live sheep went up the lake in

the boat to the mouth of the Matukituki River, the remainder travelled with the horses round the base of the mountains to the same destination.

February 1 – The party proceeded up the Matukituki Valley and camped for the night at 'Thompson's Cattle Flat'. 2 – 'Sent Buchanan and Williams up Mt Alta' is noted in Hector's Field Book (No.23, Hocken Library, Dunedin). This was Buchanan's first ascent to the alpine herb fields. As the party kept meteorological records, we know that the day was fine, the barometer was at 29.110, and the temperature reached 60°F. 9 – Central camp on the left bank of the Matukituki River. This point was reached by the party after several days of arduous travel in bringing their horses and supplies through swamps and across numerous small creeks as well as 'tracking the boat 18 miles upstream in order to convey the instruments and appliances necessary for Dr Hector's work'. Buchanan remained in this camp during the next four weeks botanising in the beech forest and on the open tops of the mountains above the valley. He also prepared a vegetation map of the area. 11 – Hector, Sullivan, and Rayer set off up the west branch of the Matukituki River to Cascade Flat. 17 – They reached Hector's Col and then crossed into Westland via the headwaters of the Waipara River. Meanwhile Buchanan collected alpine plants and on 20 February made watercolour sketches of *Ranunculus pachyrrhizus* and a small *Dracophyllum* from an altitude of 6–7,000ft.

March 2 – Buchanan continued to make watercolour drawings of alpine plants, including the newly discovered *Ranunculus buchananii*, which was collected from an altitude of 6,000ft. 8 – Hector, Sullivan, and Rayer returned to the central camp. Probably on the return crossing of the Col, now the Matukituki Saddle, Hector would have collected the *Epilobium purpuratum* described by J.D. Hooker from this gathering and later attributed to Hector and Buchanan. There is no evidence to suggest that Buchanan reached Hector's Col on this expedition. 10 – Buchanan made collections and drawings of alpine plants. 15 – The whole party returned to Lake Wanaka. Dr Hector returned to town on business. Sullivan's narrative (*Otago Daily Times*, 20 March 1863) ends with Hector's departure for Dunedin bearing the last despatch, which describes their alpine journey and mentions Sullivan's intention of investigating a prospector's claim on the Motatapu River. From 18 March until the end of the month, Buchanan was drawing the alpine plants (Buchanan notebook M1 603/1,

Hocken Library). His field notes take up the narrative at Lake Wanaka at the end of March. 30 – ‘Collecting grass seeds. 31 – Went up 3 Lake Mountain. Drawings of alpine plants from Lake Mountain, 5,000–7,000ft.’ On 31 March as well, Buchanan was officially appointed to the staff of the survey at a salary of £252 per annum (*Otago Provincial Gazette*).

April 1 – Buchanan at Lake Wanaka was ‘drawing plants and landscapes. 2 – Finishing drawings and mapping. 3 – Rain all day. Peter in a fit of natural or assumed madness threatens Williams’ life. 4 – Cutting specimens of wood. 5 Sunday – Dr arrives.’

Hector was back again at Lake Wanaka en route to Lake Wakatipu where, with the runholder, Nicholas von Tunzelmann, he was to make a hurried investigation of the west branch of the Greenstone River (Hector to Gore, 4 April 1863).

Buchanan was left at Wanaka with Rayer, Williams, and the horses to pack and prepare for the return journey to Dunedin. On 6 April he continued collecting live plants. 7 – ‘Dr left with Sullivan and Peter for Wakatipu. 8 – Preparing to start, planted 2 frying pans, 1 pick, 1 shovel, 1 saw, 1 small billy, 1 camp oven, 1 American axe, 1 candle lamp. 9 – Started down and made small creek at mouth of Motatapu drenched with rain. 10 – This morning horses went back 4 miles, 12 o’clock before we got started. Camped at swamp 4 miles from Roy’s’ (Buchanan to Gore, 4 April 1863).

At this time Hector wrote to R.B. Gore from Lake Wakatipu that:

Buchanan, Williams and Rayer are on their way down by Oamaru I wrote you by Buchanan who with Williams and Rayer has gone down by the Lindis Pass with the dray. You will get this long before they arrive. I have instructed you in the letter to pay off Rayer and Williams.

The letter continues on 12 April:

I am just about to start up the lake in a boat leaving my horse here in charge of Peter. (Peter Boers).

Buchanan’s account to Gore resumes at Lake Wanaka on 12 April. 12 Sunday – ‘Sold one Mexican pack saddle for £1 sterling. Went up Mt Iron, disappointed again in getting the horses shod probably will have to start without getting them shod. 13 – Stockman shod horses this morning.

Started at 12 noon. Horses working badly. Shaft mare weak in consequence of being tied up so often, must get some oats if possible, got the dray and things across but not the horses. Camped beside Pringle’s store. Got a cheque of Dr Hector’s cashed at Pringle’s today £5. 14 – Got the horses this morning tied up on a gravel bank on the Cardrona evident that the shaft mare has had nothing to eat so must buy oats or stick. Got the horses across – bought £1 worth of oats. Got a cheque for £5 of Dr Hector’s cashed with Norman. Started at 11 o’clock am Camped on old camping ground coming up below Lindis Peak. Horses beginning to work better. 15 – Started and made within 6 miles of McLean’s home station. Chestnut mare very troublesome at many places on the road, always leaping and brought up by the chains, came in lame this morning and looked serious after her first leap standing on three legs, stronger by night.’ [Description of work on the road omitted]. 16 – ‘Started and made old camp on height of Lindis Pass very heavy day on the horses. Road decidedly worse than when we went up with the Doctor.’ [Description omitted]. 17 – ‘Started and made near old camp on the Ahuriri opposite clay cliffs ... horses stray much at night went back 3 miles to McLean’s for them this morning. 18 – Started and made over Ahuriri pass. Showers of snow with cold winds. 19 Sunday – Started and made MacLean’s Creek [old camp coming up] oats £1. 20 – Went back this forenoon and collected fossils at Gillies Creek started and made creek at next blacksmiths, mutton 13 shillings.’

Buchanan’s account ends here, but apparently his troubles with the horses continued. In a memorandum to Dr Hector, Gore passed on a request from Mr Logan that:

He write a letter about the lost horses, stating where left, brands and other information and recommending that a reward be offered.

The horses listed included the troublesome chestnut mare.

To the West Coast by Sea

At the end of March 1863 approval had been given to Hector by the Provincial Government for ‘the extension of your preliminary survey of the West Coast by the aid of a sailing vessel’. The schooner *Matilda Hayes* was commissioned on 8 May at Port Chalmers, she was the property of Mr David Hutchinson of Oamaru. The Master appointed

was John Falconer. Hutchinson himself joined the party as a crew member as did Peter Boers, who was described as 'seaman and coxswain'. Gomer Williams was engaged as Hector's assistant 'for six months for the sum of £125'. J.W. Sullivan sought to be included on the voyage; permission was given provided he 'had no connection whatever with any newspaper' (Provincial Secretary to Hector, 27 March 1863). Apparently these terms were unacceptable to Sullivan.

The *Matilda Hayes* sailed from Port Chalmers on 19 May and, in an unpublished paragraph of his report, Hector wrote on 20 May, their first night at sea:

We might at last consider ourselves as fairly started and settled down to make everything snug and handy for the work before us. On board we are as follows: Self, Assistant Gomer Williams, Skipper John Falconer, David Hutchinson, John Walsh, John Jackson, Peter Boers, William Walker, Joseph Teeny.

Boers identifies the crew as:

J. Walsh, Chief Mate; Mr Jackson, Carpenter; W. Boers, Coxswain; Henery Paremata, Pilot; W. Walker, Able Seamen and Joe, an Italian Cook.

On the advice of the Harbour Master Captain Howell at Riverton, Hector engaged a crew of eight Maori and their whaleboat as well as an experienced Maori whaler, Henry or Henare Paremata, as pilot. According to the Document of Agreement signed at Riverton on 8 June 1863, five of the Maori crew, Murphy, Simon, Abram, Holopapera [*sic*], and Taununu, agreed to remain with the *Matilda Hayes* for the duration of the voyage, whereas the other three were free to rejoin their kinsfolk when they reached the West Coast. All those on board the schooner, including the Maori sailors and particularly Henry Paremata, were to become very much involved in the exploratory work that Hector set out to accomplish.

The voyage was to take nearly eight months. In his speech on the occasion of Buchanan's retirement, Hector mentioned the five or six months they had both shared 'in the dingy cabin of a small schooner when exploring the West Coast Sounds', but, in fact, Buchanan was on the schooner for less than three months on the return voyage only.

Hector made a wealth of observations on the vegetation in his very important report (*Provincial Gazette*,

1863) covering the outward voyage and his trip overland from Lake McKerrow to Queenstown. In the introductory letter to the Provincial Secretary covering the narrative of the voyage dated 19 October, Dunedin, Hector wrote:

The season was unfavourable for making botanical collections; but I now take back with me Mr Buchanan, the botanical collector for the survey, and during the next few spring months I have no doubt a most valuable and exhaustive gathering will be made.

Hector's report of the outward voyage is summarised below in order to give a complete picture of the expedition. The return voyage is covered by Buchanan's own account (Buchanan notebook M1 603, Hocken Library) alongside extracts from Falconer's Abstract of the Log of the *Matilda Hayes* (ATL). Long descriptive accounts of the vegetation and lists of species have been omitted from Buchanan's notes.

May 19 – The *Matilda Hayes* sailed from Otago Harbour. 20–24 – Otago Heads to Bluff. 25 – Bluff. 'Williams, Hutchinson and the said cook have all been in delicate health poor chaps since we started,' Hector reported to Gore. 26 – Bluff to Invercargill. 27 – Invercargill to Riverton. 28 – Dr Hector with Mr Francis set off on horseback to Lake Te Anau. 29 – They continued to skirt the Longwood Range to the Waiau River and Mr Cuthbertson's station. 30 – Waiau River terraces. 31 – Mr Aylmer's station on the Wairaki River.

June 1 – At Mr Ligar's station, they climbed Big Hill for a view of Lakes Manapouri and Te Anau, then rode on to Gillow's station. 3 – From the Mararoa River, they crossed a northern spur of the Takitimus and ascended Mt Hamilton. They travelled down a branch of the Oreti River and then by the Aparima Valley to reach Riverton on 5 June. 5–10 – Puripurikino and Howells point. 11 – Riverton to Port William, Stewart Island. 15 – Port William to Paterson Inlet, anchored in Glory Cove. 16 – Ashore in morning, sailed for Preservation Inlet, but entered Chalky Inlet and rounded the Garden Islands to Southport. 17 – Southport. 20–24 – Exploring Cunaris and Edwardson Sounds. 25 – Investigating Red Head cliffs. 26 – Preservation Inlet, Coal Island, anchored under Steep-to-Island. 28 – Cuttle Cove, the bay west of Cavern Head, Cording Island. 30 – Coal Island.

July 1–14 – Exploration of Preservation Inlet. 14–18 – Preservation Inlet to Northport in Chalky Sound. 19–21 –

Chalky Sound. 22 – To sea between Passage Island and Chalky Island, reached Thompson Sound, and anchored at Deas Cove. 28 – Sailed up Thompson Sound to Doubtful Inlet and Crooked Arm.

August 5 – Doubtful Sound to Thompson Sound and Deas Cove, then to Milford Sound and Anita Bay to Freshwater Basin. 10 – Cleddau Valley. 11 – Deepwater Basin. 17-23 – Cleddau Valley to the precipices at the head of the valley. 24 – Anita Bay to Yates Point, then on to Martins Bay in the whaleboat as the *Matilda Hayes* was becalmed. Hector's whaleboat entered the mouth of the Hollyford River and landed on a gravelly point where a Maori party was camping. 25-26 – Exploration of the lower Hollyford River and charting the entrance. 27 – *Matilda Hayes* entered the Hollyford River and anchored. 28 – Lake McKerrow, exploration by boat.

September 10 – *Matilda Hayes* brought up the river to anchor in Gravel Cove on Lake McKerrow. Hector explored the area. 18 – The schooner sailed up to the upper end of Lake McKerrow and anchored in Warp Cove. Hector and his party – Mr Hutchinson, Peter Boers and Henry Paremata – then proceeded up the Hollyford River in the rowboat until they were stopped by the rapids. They then continued on foot up to Key Summit, and travelled past Lakes Howden and McKellar and down the Greenstone River to reach Lake Wakatipu using an ancient Maori route probably known to Paremata.

October 4 – At Queenstown. Hector and Hutchinson then proceeded to the Dunstan by 'the ordinary route' and from there took the coach to Dunedin. Hector's report, dated 19 October, was submitted to the Provincial Secretary from Dunedin.

Buchanan's narrative (Buchanan notebook M1 603, Hocken Library) of the return journey begins earlier in October in the Dunstan Gorge. As Rayer and Hacket were also working in the Dunstan it is likely that they and Buchanan travelled together. Buchanan listed the plants flowering there including a 'Myosotis yellow flowered with whitish leaves', which was the original gathering of the now rare *Myosotis albosericca*. He then described the route through the Kawarau Gorge to Arrowtown.

Sunday, October 18 – 'Arrow township country lately burned. 19 – Wakatipu Lake. 20 – Swamp at Queenstown. 21-23 – Queenstown. 24 – At Von's (von Tunzelmann's station). 25 Sunday – Mountains behind von Tunzelmann's, Dr arrives with Hacket and Rayer. 26 –

Started from Von's and made old hut on Marrarua Flat, this is a fine flat of some extent, good grass with spear grass. 28 – On the Greenstone. 29 – Rain. 30 – Still rainy continue camp on the Greenstone. 31 – Ditto.'

At this time they were waiting for Peter Boers and Henry Paremata, who had been left to cut a track during Hector's absence in Dunedin. When Hector returned he found them with insufficient provisions and sent them to Queenstown to replenish their supplies. They rejoined the party on 4 November and thus caused a delay of seven days. **Sunday, November 1** – 'Started at 12 o'clock and made 3 miles. 2 – Remain in camp waiting now for 4 days on men. 3 – Still raining, remain. 4 – Started and camped below height of land. 5 – Started and went over height of land up through birch bush on to ridge and then descended to Ratling Fall Creek. Camped on Kakapo Creek. 6 – Bush mixed birch and pines.'

On this day they crossed the Kakapo [Hollyford] River without difficulty and later met the Skipper, who was on his way up the Hollyford Valley with one of the hands because he was uneasy about the protracted absence of Peter and Henry. When the party reached the dinghy lying about 10 miles upstream, they put their swags aboard and, with a couple of hands, Hector shot the rapids whilst the others walked through the woods. Hector's letter to the Provincial Superintendent (11 November 1863) was taken out for him by a prospecting party.

Buchanan notes that, after they made the schooner on 7 November, they spent the next day, a Sunday, walking the beach. 9 – 'In the bush around Schooner Cove. 10 – *Metrosideros* one tree in flower. 11-12 – Rain. 13 – Gravel Cove, Kakapo Lake. Rich alluvial flats red and white pine grow to a great height. 14 – Gravel Cove.' Dr Hector, Buchanan, and Falconer went up the lake by boat. 15-16 – No entry, but on this day the schooner entered the Kaduku River.

17 – 'Sandspit at harbour mouth very similar to Dunedin sandhills'. Dr Hector and Mr Buchanan proceeded down the river in the dinghy and returned at 5 pm.

18-19 – 'Mouth of the Kaduka. 23 – Round by Awarua Bay.' Dr Hector visited Big Bay and returned to the schooner.

24 – 'Went out to sea. 25 – Anchored in Milford Sound went to head of Sound in small boat.' At 11 am they anchored at Anita Bay. Dr Hector and Mr Buchanan, with two others, proceeded up the Sound by boat.

Only one and a half days were spent at Milford. They were perhaps the most significant of Buchanan's life. During this short stay he made eight pencil sketches and one small watercolour. From two of these sketches he later composed the famous panorama of *Milford Sound from the Freshwater Basin* as well as another equally fine painting known only from a small photograph in the Buchanan papers in the Otago Early Settlers' Museum.

26 – 'At sea'. Dr Hector and party returned.

There is a discrepancy in Buchanan's account with the log of the *Matilda Hayes*. She did not sail from Anita Bay until the following morning.

27 – 'In Blighs Sound'. They sailed from Anita Bay, half past eleven entered Blighs Sound to Bounty Haven. Dr Hector proceeded up the Sound by boat.

28 – 'Moved to Middle Anchorage. 29 – Put to sea, anchored at dark 7 miles up George Sound, bush mixed, red birch prevails.' 30 – No entry. There was stormy and wet incessant rain and thunder.

December 1 – 'Shift anchor and go up North Arm'. 2–3 – No entry. Dr Hector went up SW Arm with boat on 2 December. Incessant rain was noted by Falconer on 3 December.

4 – 'Went up Kakapo Peak 3,800ft. Kakapo tracks well marked. 5 – Attempted to go to sea but put back again to Anchorage Cove.' 6–9 – No entry. The schooner was stormbound in George Sound for 4 days.

10 – 'Put to sea. 11 – Made Breaksea anchored in Duck Cove, Dusky Bay. 12 – Duck Cove.' 13 – No entry. 14 – 'Shifted anchorage behind Anchor Island. 15 – Petrel Island. 16–17 – On board. 18 – Shifted anchorage to Cascade Cove. 19 – Went up mountain. 20 – On board. 21 – Went to fine lake.' 22 – No entry. 23 – 'Shifted anchorage to Pickersgill Harbour. 24 – Detention Cove, Long Island, Dusky Bay with long boat.' 25 – No entry. 26 – 'Shifted anchorage to Seal Islands behind Anchor Island'. 27–30 – No entry, but Buchanan made two sketches of the whaleboat at Seal Islands. Dr Hector returned with the boat from Shelter Cove and South Shore on 30 December. 31 – 'Put to sea, Chalky Inlet, Southport. They spent New Year's Day in Southport and the following day sailed and made Bluff Harbour same day'. Buchanan's account ends here.

Dunedin – Exhibition and Completion of Survey

1864, January 6 – The *Matilda Hayes* entered Otago Heads at daylight. The Pilot, Captain Thompson, came aboard at Port Chalmers and 'they proceeded up the harbour to the Stewart's St. jetty where Dr Hector and Captain Thompson went ashore' (ATL).

With the return of the *Matilda Hayes* to Dunedin, Buchanan would have had a great deal to do in preparing botanical specimens and attending to the other collections made on the voyage. 1864 must have been a year of consolidation for him. Not only did he prepare maps, geological sections, and fossil and plant drawings but he also worked up the beautiful watercolour panoramas from his field sketches. His important essay on the botany of Otago, which embraced all that he had observed since 1852, would also have been completed in this year. As yet no documentary evidence has emerged of any major field trip that he made in 1864.

February 16 – From Palmerston, Rayer wrote to Gore again reporting on lost horses:

I have not yet found Daphne or the colt. From all I could learn the grey mare was at Coal Creek Old Aunt Sally I sold for £19 ... the price seems low but her feet were gone. Little Dick is the same old thing I got him shod at the Dunstan.

Buchanan's two pencil sketches, entitled *J.B's pack mare* and *Aunt Sally, Black Peak*, remain as a memento of this survey horse.

October – Hector, Hacket, and Rayer were all active in the field. Even Peter Boers was engaged in collecting moa bones and fossils at Oamaru, Moeraki, and Shag Point. During August, September, and early October, Hector undertook a six-week trip by whaleboat between the Molyneux and Mataura Rivers collecting fossils that were illustrated by Buchanan. Hacket and Rayer were at Wakatipu and sending boxes of geological specimens to Dunedin.

By mid-October, Hector reported progress on the arranging and classifying of the fossil and mineral specimens, and the preparation of an herbarium of plants collected during the Geological Survey (Hector to Provincial Secretary, 21 Oct. 1864). At the end of the year Dr Lauder Lindsay wrote to Hector from Perth, Scotland, about the publication of *Hooker's Handbook of the New Zealand Flora*:

A model of a Colonial Botanical Manual ... you will find yourself immortalised therein and deservedly so – in the form of one genus and at least several species bearing your name. I am glad to find also your assistant, Buchanan, has had his efforts rewarded by having his name attached to a few new species of Otago plants.

1865, January 12 – The New Zealand Exhibition opened in Dunedin. The success of this exhibition was, in no small part, due to Hector's organising abilities and the efforts of his staff. A large number of the geological specimens, maps and sections, and natural history material that resulted from his surveys was on display, including the collection of plants prepared by Buchanan. Buchanan also exhibited paintings and drawings of plants and landscapes. The exhibition ran until the end of May. After that, the survey collections, which were intended to form the nucleus of a Provincial Museum, were to be handed over to the Trustees.

The Geological Survey of New Zealand

In April 1865, at the end of his three-year term as Otago Provincial Geologist, Hector accepted the Directorship of the Geological Survey and the Colonial Museum recently constituted by the Central Government in Wellington. His staff, also appointed in April, was to consist of: Buchanan, draughtsman and botanist; R.B. Gore, clerk; W. Skey, laboratory assistant; and A. Donald, office keeper, all of whom had served on the Otago Geological Survey. In August, Hector wrote to the Provincial Secretary that it was necessary for him to proceed at once to Wellington and that he had left instructions with Mr Gore to deliver the maps, sections, and views as per inventory, 'which have been removed from the Exhibition building on account of the damp'. The last of the survey's horses, Dick and the grey mare, had been 'given over to the Police Department' in June.

August – Buchanan visited Shag Point and Cape Saunders. In a letter to Gore he mentioned arranging his steamer passage to Wellington and that 'I am doing a hurricane in the Mosses and will finish up by Cape Saunders'. The building for the Colonial Museum was completed in September, by which time the staff were ready to move in. J.W. Rayer and Peter Boers were both employed as labourers on the Museum grounds (Colonial Museum Ledger, Te Papa). In

June 1866 Rayer was appointed Museum Assistant, T.R. Hackett was re-employed in the field in the Maitua district, and within two months Hector and Buchanan were once again in the field, this time on a trip to the far north. **November** – After spending two weeks in Whangarei they travelled by way of Hikurangi, Whananaki, and Whangaruru Bay to camp two nights at Waikari River and then on to Kawakawa.

December 21 – Russell. They left their horses at Paihia and crossed by ferry to Russell. Some details of the trip are provided by a letter written at Russell by Buchanan to Gore.

... we have arrived at this place after some rough travelling from Whangarei with horses, after remaining at the latter place about a fortnight the Doctor bought three screws or strictly speaking two, as he has engaged a young gent [Henry Mair] who speaks Maori and he bought his own. We travelled by way of Hikurangi then struck for the East Coast at Whananaka passed along the coast to the north end of Whangamumu Bay over the vilest track that ever horses were taken in sweltering hot weather – every drop of water taken out of your body by day and the blood by night by mosquitoes. With the exception of a good climate there is nothing else to tempt settlement in this part of the North Island from Whangarei to the Bay which we reached by the Waikari River camping on the classical ground of the first War and I must say the army had a heavy job. They took nine months to cut a road to reach Heke's Pah on Whangapekepeke. The Doctor has remained on Kawakawa examining the coal field and myself and companion have gone on with the horses to Paihia and put them in Bishop William's paddock thence we have come across in the ferry three miles to the chief town Russell, where I have been sketching the bay from the Flagstaff ... I was very sorry to hear Mr Mantell was badly and glad to hear you are making such progress in the Museum. I think it is very judicious in opening it to the public I don't see the use of Museums else. I hope Rayer is still in a job. I wish he was with us ... wishing you good health without the exercise of leading a £5 screw over Maori tracks and swamps.

I remain yours hurriedly,

John Buchanan

During the following year, 'the young gent', in a letter to Hector, asked to be remembered to 'old Bucky'.

1866 – A second letter to Gore written on 14 January describes their progress during the first fortnight of the New Year:

... previous to leaving Russell we helped at the delivery of a New Year, at least my association was more of the nature of an audience than a performer although the Doctor and his interpreter

took a very active part as performers at balls and otherwise ... I attended the races at Russell where all the beauty and fashion of both races with the crossings were present On leaving the bay we went to Paihia, Waitangi falls, Kerikeri falls and Waimate, a very fine settlement being a mission place.

They went on to Whangaroa arriving on 8 January:

I went with the Doctor at this place to an island three miles from the coast. I expected to have made a haul but got nothing all the vegetation is the same as the Mainland. From Whangaroa we came to this place.

From Mangonui the party then travelled on to North Cape. In an attached note to Gore's letter Buchanan wrote:

I forgot I am out of money would you be kind enough to send me some – an order for £10 on the Bank of New Zealand, Russell will do.

He explained that:

Before I get back from North Cape I will be much in need of clothing, in the meantime I must borrow from the Doctor.

The money was sent to Russell on 5 February, as well as a letter to Auckland, where Buchanan spent a short time before returning to Wellington.

March 7 – 'We expected Buchanan today by the *Lord Ashley* but he has not arrived'. Two days later Mantell reported to Hector that:

Buchanan has arrived very seedy, taking into account that twice he might have to wait for a chance to the Kaikoura the season may be considered too late to explore it for alpine plants. He says you had some idea of sending him to Greymouth fossil hunting but is not sure....

There is no record of Buchanan's going to Greymouth despite the existence of the watercolour paintings of Grey River Lagoon, Grey River on the Beach, and a third untitled one with the same calm, reflecting water and dark, bushed hills.

April 4 – Buchanan was instructed to proceed to Wanganui to collect Tertiary fossils, of which 250 were accessioned on 24 April. Buchanan's field expenses amounted to £11-1-6 (Colonial Museum Ledger, Te Papa).

May 11 – Hector informed the Colonial Secretary of Alexander Donald's resignation and requested that:

William Rayer who has been in my employment on the Geological Survey of Otago, be appointed on the 1st Proximo.

In January, Peter Boers had also applied, without success, for Donald's impending vacancy. Buchanan listed plants growing near 'the Powder Magazine on the cliffs'. This was the site of the Dominion, and later the National, Museum, successors to the Colonial Museum of Hector's day.

August 31 – Plants on the Old Road to Porirua were listed.

October 7 – Rhodes Hill and Kaiwarrawarra [*sic*]. 22 – A request was made for a collector to accompany His Excellency, Sir George Grey, 'to the Taupo District this summer'. Buchanan was recommended but did not go, as he was already about to leave for Kaikoura and the Governor 'was unable to delay his departure until later'.

November 8 – Gore reported to Hector that 'Buchanan goes to Picton today in the small boat with Rayer'. From Blenheim, Buchanan wrote to Gore that:

I had to stop nearly three days in Blenheim trying to get a horse, the races taking place today made everything valuable in the horse flesh line. I was successful at last and got out of the place yesterday ... after all the best comparison I can give you of this quiet little town is a Beaver Village, for of all the vexations to a stranger is the difficulty of reaching a place although you see it within a few yards of your nose. I wanted to reach a store staring me in the face and found I had to go round half a mile and cross two bridges. The natives live a good deal under water like the Beavers as every flood transfers the street traffic to boats ... I believe there are 30 bridges communicating with the outer world.

Buchanan went on to describe his route across a shingle plain on his way to the Awatere and said:

I have seen no place so poor in grasses ... Sir George Grey was talking about illustrating the N.Z. grasses in a work, I don't think I can add much to it here, talking about plants I saw this morning an extraordinary form of the kowhai, it must prove a new variety it is only six inches high spreading over the ground and forming a rigid mass of branches that you can walk on, the flowers are hidden under the leaves and you have to forcibly lift up the stiff branches before you can see them, it can hardly be called subalpine being found at 1,200ft alt. ... I have seen the kowhai at greater altitudes a tree of 2ft diameter in the trunk, it has the same yellow flowers as the tree kowhai but smaller. I am perforce here at present the river being up, but that matters little as much work can be done here

A second letter describes the continuing bad weather and rivers in flood with fords impassable:

Every traveller is stuck up somewhere, I started on Thursday for a run up the Awatere River before going on to Flaxbourne and reach Mouatt's station 10 miles (20 miles from the sea) being pretty well soaked by that time. I called and got a bed under a roof, they are very kind people, there were another two stuck up here the next ford being too high, I remained here two nights and seeing no appearance of the weather improving I turned back with the intention of going to Flaxbourne ... on reaching my old quarters at the accommodation house I found the ford there impassable

Buchanan's day by day account of this trip (Buchanan notebook M1 603/A, Hocken Library) begins Thursday, 9 November – 'Picton. 10 – Massacre Hill. 11 Sunday – Blenheim. 12 – Awatere River via Taylors Pass. 13 – Awatere. 14 – Star Hill and Blairich Creek. 15 – To Mr Mouatt's in the afternoon. 16 – Fords high, cannot cross river. 17 – No change in weather barometer 28.50 intend returning to coast. Spent nearly all yesterday looking for the horse, got it in at night. 18 Sunday – Barometer 29.30. Kaikouras in cloud. 19 – On getting up before 6 am found my mare had broke her tether and bolted, started up river and found her on Blairich station on coming back and mounting her bareback got thrown amongst the stones and hurt a leg. Rain in the afternoon. 20 – Not fit to travel leg blue. 21 – Rain, got up as far as the reserve in afternoon went up to vein of Serpentine. 22 – Up river to make the Grey – impossible got into burnt manuka and had the pack torn off several times, country fearfully rough, made the Mullin Creek and found burnt manuka turned back to shed. 23 – Started early and came down by the fords [collecting fossils]. 24 – Got a box away by Mr Mouatt. 25 Sunday – Weather very hot, hills behind Taylors Pass. 26 – Start south and make Kekerengu, Titley's station 35 miles. 27 – Clarence River by 2 o'clock and find mare must spell. 28 – Started to ascend Mt Kaitarau 8,700ft after passing over some low hills to McCrae's station, spent night at saddle of leading range.' In another entry he mentioned that the climb started from the Ferry House at the Clarence and described finding a leafless *Clematis* [*C. afoziata*]. 29 – 'To Kaitarau [summit?] in the morning 12 noon started back 2 pm and made McCrae's. 30 – Started McCrae's and made Lyford's accommodation house. Made 2 sketches in the afternoon.'

December 1 – 'Started from Lyford's and made Dickenson's 18 miles over the worst track in New Zealand, first four miles heavy sand the rest alternating with stones. 2 – Rain; hills obscured, Dickenson's property. 3 – Started

from Dickenson's keeping to the beach for Kaikoura Peninsula. 6 – Raining. 7 – Started and made Monk's accommodation house on the Conway. 8 – Rain out towards Amuri Bluff. 9 Sunday – Amuri Bluff. 10 – Went with pig hunters am 11 – Rode as far as Waiau over hills behind Mr Caverhill's house. 12 – Rode to the beach and went south 4 miles. 13 – Up the Leader in one of its tributaries. 14 – Rode up the Conway on road to Green Hills. 15 – Rode up the Leader 4 miles. 16 Sunday – Not out, rain. 17 – Started with Mr King for Mutton Howe [Motunau] at 2 pm 37 miles made the cave outstation, 5 miles short at 1/2 past 8 pm stopped the night. Country from Hawkewood to Mutton Howe well grassed. 18 – Started early for Mutton Howe. 19 – Rode to Sanderson's on the Waikari. 20 – Started back to Hawkewood.'

In a memorandum to Hector, Buchanan said:

I continued into Canterbury and hearing that I was within 10 miles of Haast who was collecting Moa bones at a place I meant to have visited [Moore's station at Glenmark] I turned back at Mr Sanderson's station on the Waikari.

21 – 'Started back to the Reserve on the Green Hills but went up wrong creek. 22 – Started 5 o'clock with a red sky Keen's Flat very swampy bogged the horse – made Dickenson's. 23 Sunday – Rain heavy. 24 – Rain heavy. 25 – Christmas stop by invitation at Dickenson's and pass Christmas with a large party. 26 – Start and make the Clarence, Lyford's. 27 – Start from Lyford's to sand patch Kekerengu. 28 – Start from Flags and make Templeton's on the Awatere River.' 29–31 – No entry.

1867 – In his memorandum Buchanan also explained that:

... there was no improvement in the weather so I pushed on to the Awatere intending to get up the highest Kaikoura but the weather continuing bad I have come back to Wellington.

January 3 – 'Go to Blenheim. 4 – Massacre Hill and Wairau Valley. 6 Sunday – Go down to Picton.' Buchanan's field notes end here. Buchanan later published the results of these visits (Buchanan 1867b). On 8 January, Gore informed Hector about Buchanan's return to Wellington:

I enclose some letters also a note for Mr Buchanan who returned yesterday he was obliged to come back in consequence of the wet weather I am going to speak to Mr Richmond about getting the old laboratory fitted up for Buchanan as you desired Buchanan's expenses will not exceed £23 and this includes everything. This is not much out of the £100 grant.

February 2 – ‘Mr Buchanan has gone out on the hills towards Lowry Bay for a day and he goes to Taranaki on his return’. Buchanan’s field notes begin 7 February, Thursday – ‘Left Wellington by the *Tanarua* for Taranaki 6 pm arrive at Nelson 7.30 am 8 – Nelson all day, rain, left 10 pm arrive Taranaki 12 noon. 9 – Showery, petroleum wells and Sugar Loaves. 10 Sunday – Rain all day, afternoon to Hendry’s garden. 11– Sugar Loaves. 12 – Woodleigh for *Vitex lucens*. 13 – Started for Egmont and made the swamp. 14 – Cross swamp to near patch of snow vegetation over 5,000ft camped at Rocky River. 15 – Bells Falls and springs on Little Creek. 16 – Started and made town at night. 17 Sunday – *Rangitira* for Wellington 6 pm 18 – Wanganui 12 noon. 19 – Sail for Wellington 10 am arrive 11 pm.’

In a report to Hector, Buchanan described the party as ‘Mr Richmond, Mr Hursthouse, Mr Hendry, nurseryman as guide and a man to carry our provisions’. They travelled to the mountain by the Carrington Road through a series of bush clearings until they reached Code’s Hut at the last clearing. Here they left the horses and continued on foot. They climbed the mountain ‘beyond the limit of vegetation’ within 600 or 700 ft from the summit, at which point Buchanan turned back ‘in order to search for plants 1,000ft below’. The results of his visit were published in the *Journal of the Linnean Society* (Buchanan 1867a).

23 – Gore asked of Hector ‘... do you wish Mr Buchanan to go again to the Kaikouras [*sic*] before you return? Will you let him know – in the meantime he is going to take a trip to the Tararuas.’

March 19 – ‘Buchanan is working at the lists of plants and botanical notes of Kaikoura and Taranaki and will have them ready to send to Dr Hooker by next mail (8th prox.) as you desire’. In the meantime a parcel of plants and seeds had been sent to Hooker from Mt Egmont and Nelson.

May – ‘Forty specimens of Crustacean, rocks and a few fossils from the Waiau (Mr Buchanan)’ were accessioned (Te Papa). There is no other record of a May visit to Marlborough.

While Buchanan was away on his field work, changes to the working areas at the Museum were taking place. With Hector absent for several months in the Collingwood area, Richard Gore kept him abreast of the day-to-day Museum matters in his almost weekly letters. Gore detailed the plans for having the old laboratory fitted up as a drafting room for Buchanan, as Skey’s new laboratory was, in

December 1866, well under way. In January 1867, Gore reported that:

Mr Hales gave me an estimate for the cost of repairing the old laboratory and making it fit for a drafting room but when Mr Richmond saw it he did not think it wise to spend so much on such a shaky affair as £57.

He went on to suggest that:

Buchanan can work in it until you return when if you think proper you can recommend that they build a new house 12ft x 20ft for a drafting room in front of the old house which latter will answer admirably for a store ... a new drafting room of that kind would only cost £92.

But a new room was not to be. Ten days later Gore wrote that:

Mr Hales is going to have the cottage at the back of the Museum property sloped and the ground below drained.

£70 was requisitioned to cover the expenses of having the old cottage made fit for a temporary drafting room. The cost included a new floor and cutting the large drafting table in half.

On 5 March, Gore wrote:

Of course Mr Buchanan was consulted about the fitting up of his room for drafting and approved of the arrangement.

Skey was apparently also happy with his new laboratory, but Gore reported on 15 March:

I believe Mr Mantell is very much annoyed about the new closet that has been erected at the back of the Museum lying so near his fence or because it appears over the top of his fence.

Gore hoped a compromise might be reached by boarding up the inside of the fence to hide the affair ‘for there is absolutely nowhere else to put it’. Hector was by then on the West Coast and laid up at Hokitika with a badly injured shoulder. Accidents to the field staff were not uncommon: Buchanan was injured by horses, McKay fractured his thigh, Hackett a leg, and Davis was drowned in Westland four years later. Considering that the men often travelled alone in rough country and sometimes in very bad weather, their long service, and, with the sad exception of Davis, their longevity, they were a tough and resourceful

group. On the following trip Buchanan was to strike terrible weather, floods, and his share of misfortune when carrying out the instructions that Hector drew up for him on 22 October. He was to investigate:

1. Mataura district – coal seams and relation of sandstones at the Falls to strata in hills to eastward.
2. Waikawa district – cross from Mataura to Waikawa collecting specimens and fresh specimens from the fossil beds as marked on the harbour map. Pass round the coast from Waikawa to Mataura.
3. South Clutha district – visit Shaw's Bay south of the Nuggets where Dr Lauder Lindsay got ammonites and other [indecipherable] fossils.
4. Shag Point district – see Hutchinson and lay down the new seams of coal – visit Moeraki Bay and compare the marl and the septaria clays with what you saw last year. Get particulars of Glasson's well.

A summary of Buchanan's account (Buchanan notebook M1 603/B, Hocken Library) of this unpleasant trip follows:

November 4 – 'At 3 o'clock pm sail on the *Wellington* steamer from Wellington to Otago. 5 – Arrive Lyttelton 9 o'clock am walked over the hill to Christchurch, called on Dr Haast but did not see him, told Holmes I had brought a box of fossils to the Port which arrived by carrier at Christchurch that night. Sounded Holmes on the chance of seeing the moas but found as far as he was concerned there was none. Dr Haast had refused members of the Govt admission ... went away considerably disappointed but went in search of Fowler. Found him in another wing of the building among his birds' He took J.B. to see the moas. The description of skeletons and displays has been omitted. 6 – 'Sailed 3 o'clock pm for Dunedin. 7 – Arrive quarter past 12 noon go up by 2 pm steamer to Dunedin, deliver barometer to Skey all right and get out to the [North East] Valley at 5 pm 8 – Went into town saw Mr Reid who advertised for a horse and trap, day rainy. 9 – Rain again went to town bought a mare for £25 continued showery blasts all day. 10 Sunday – Holy day [*sic*] in town intended to have gone up Mt Cargill but a continued rain prevented anything, looked over dried plants, very few worms, all in fair order. 12 – Hail and rain squalls, roads everywhere else splashy ... (?) can get nothing done cannot hear of a trap yet. 13 – Went to Survey Office and traced maps of Mataura district. 14 – Tracing maps in Survey Office. Got a 2 wheeled trap some repairs needed a tilt

[awning] etc. Harness for horse still wanting. 15 – Rain all day. 16 – In town trap not finished. 17 – Sunday. 18 – Got mare shod bought harness and riding saddle. 19 and 20 – Rain. 21 – Rain in morning barometer still very low, state of the country with mud and water is very bad, so it is better than the unsettled state of the weather and also to prevent being stuck up somewhere on the road to remain a day or two in Dunedin. 22 – Bar. 28.5 storm of wind and heavy rain very cold. Went to town in the morning when showery, got soaked and nearly frozen in the afternoon coming out, there seems to be no end to this weather which everyone says they never saw the like before although I have myself, there is great fears about the crops. The new moon may produce a change. 23 – Rain. 24 Sunday – Very heavy rain causing floods. Bar. reading 28.6. 25 – Rain in the morning cleared up in afternoon. 26 – Start and make the Tokomairiro put up at Goodall's. Bar. 29.4. 27 – Start and make Wallace's at Popotunoa had an accident at the Clutha punt, horse startled, plunged forward and bruised my foot with its foot, bled freely, dressed it at the hotel and started without the boot on. Barometer falling fast just reached the Kakihu [Kaihiku] when the storm broke, cold heavy rain and thunder, rained all night. 28 – Foot not so bad as I thought quantity of blood lost has prevented bad consequences, can do nothing at any rate for the weather. 29 – Weather better, barometer 29.3 hopped about a little with a boot on cut away in the front. 30 – Rained all night barometer back to 28.7.'

Sunday, December 1 – 'Barometer rising again went to Waiwero Gorge. 2 – Went to J. Anderson's upper station on the Wyndham. Heavy showers at night barometer 29.3. 3 – Examined the hills opposite the upper Wyndham station. Rain in the afternoon 4 – Examined Wyndham Hill at creek rain in the afternoon. Barometer 28.9 rose again before dark. 5 – Rain all day. 6 – Went down to lower station Mrs Anderson, rain at night 7 – Examined district around lower station, fine day weather appears settled fine. 8 Sunday – Fine day. 9 – Went down to capital hut on Waikawa River. Rode Mr Anderson's old horse Troy as my own would never have got down very bad swamps. 10 – Hung up the saddle and sent the horse adrift and humped the swag myself as it is impossible for a horse to make the Harbour the distance is said to be 4 miles took 2 hours, many take 2½ hours. 11 – Went up Rocky Point and searched for fossil plants, but failed to find any. My toe has got so bad had to give up – nail off and raw flesh.

12 – Crossed over to north side made a collection of *Pecopteris* and amongst them a few *Taeniopteris* visited and stopped with Mr Haldane. 13 – Collected the whole at one place and intended to have got them over but came on heavy rain, crossed over myself to south side. 14 – Went to South Head 5 miles where Dr Hector got *Taeniopteris* found both this fern and *Pecopteris* associated together, in fact they are always found together, showers all day. Got stuck up coming back by the tide arriving at the first creek at high water and had to wait 3 hours then take the water up to the hips at dark, 3 creeks to cross this way and carrying 1 cwt of fossils. 15 Sunday – Rain all day went up again to Rocky Point at low water 16 – Raining in the morning started for the North Head. [Note on fossils omitted.] 17 – Employed the whole day getting boxes, sawdust, nails etc. and packed up 3 boxes of fossils for the *Caledonia* which sails this week perhaps may get another ready before she leaves, heavy rain and showers during day and sandflies very bad. 18 – Packed another box ... rainy day thunderstorm. 19 – Showery, hail, gave up all idea of doing anything more at this time, foot swelled impossible to get on a boot. If a man can be got to take Anderson's horse back, intend myself to go back to Dunedin by the *Caledonia* or steamer if it should come in. 20 – Confined to the house vessel may leave tonight. 21, 22, 23, and 24 – Bar. bound rain every day more or less, foot looking bad, anxious to get to Dunedin. This is a very bad harbour to trade with Dunedin by sailing craft the *Caledonia* has now been a week waiting on a wind 25 Wednesday – Christmas. The mills not at work but a silence prevails, the steamer is now due 3 weeks and there is not a drop of grog in the place. 26–27 – Bar. bound. 28 – Got out at 4 am and reached Port Chalmers next day a very pitch and toss sea all the passage awfully sick. 29 Sunday – Land at 12 noon and walk over the hill [from Port Chalmers to North East Valley]. 30 – Went to town and settled with Skipper for boxes, passage money etc. bought some clothes. 31 – Commenced writing to Dr Hector.'

1868, January 1 – 'All day at report for Dr Hector. 2 – All forenoon at report went to town 3 pm thinking to get my swag every place still shut, rained all afternoon. 3 – All day drawing sections for Dr Hector, raining all the interval. 9 – Started by coach for the Clutha ferry having waited till this day for a coach taking passengers on to Popotunoa but all communication stopped by the punt in the forenoon

from a high flood. The coach started for Popotunoa before we got across, so here is another day lost at this place. It looks as if it meant to rain all this month also. Rained in showers all day today and miserably cold on the coach must hire a horse here cannot carry my swag without.' Buchanan's account ends here. In early February very severe floods occurred in Marlborough and Otago. It seems that this trip coincided with the terrible weather leading up to these floods. That Buchanan eventually reached Waikawa is evidenced by a collection of mosses dated January 1868. Later in the year, probably in reply to Buchanan's description of this awful summer trip, William Purdie wrote from Dunedin:

Do not forget Dr Sinclair's fate and be cautious.

Despite the difficulties he encountered Buchanan's collection amounted to '521 specimens of rock, fossil, coal etc.' (Colonial Museum Accessions Register, Te Papa). In a report on the Maitua District, Hector gave the dates for Buchanan's trip as November–December 1868 and January 1869, when in fact it took place a year earlier.

On the 4 April, Gore reported to Hector that:

Buchanan has done the fossils nicely and he is busy at ticket writing.

October 10 – Buchanan collected on Tinakora Hill, Kaiwarra Hills, Kaka Hill. 17 – Kaiwarra Hills. 24 – *Discaria* from Te Aro Hills. 28 – Harbour side. Buchanan's spellings of Tinakori, Kaiwharawhara and Kaukau are variable and have been left as he wrote them. During the spring of this and other years, Buchanan and his colleagues made observations on the native plants flowering in the vicinity of Wellington. A chart dated 1868 (Buchanan notebook M1 603/A, Hocken Library) notes the plants in flower or fruit, the observers' names, localities, and 'native or settlers' names. The contributors named are Hector, Holmes, Hamilton, Huntly, Gore, Rayer, Mantell, and Captain Battersbie.

November 16 – The expenses for Dr Hector and assistant for two months' geological survey of the eastern and central ranges of Nelson were entered in the Colonial Museum Ledger. Hector's field assistant was H.H. Travers, but Buchanan may have been with the party at some stage as there is an undated watercolour sketch showing men

and horses crossing the Waiau-ua River. W.T.L. Travers's cattle station at Lake Guyon was reached by travelling up the valley of the Waiau-ua.

The New Zealand Institute

December – The Trustees of the New Zealand Society held a meeting in the Superintendent's Office in Wellington in October 1867. From this meeting the New Zealand Institute, now the Royal Society of New Zealand, came into being under the Act of 1867. Those interested and 'who had paid a subscription of one guinea on or before Tuesday, 15 October 1867' became original members. Hector was appointed Manager and four of the Colonial Museum and Survey staff – Buchanan, Gore, Hacket, and Skey – are marked as paid (New Zealand Institute Papers, Te Papa). By December 1868, Buchanan was hard at work preparing the lithographs to illustrate the first volume of the Institute's publication. Gore wrote to Hector:

I send you proofs of the sections which Buchanan is working at for the Transactions the one of Arid Is. is his first attempt with the crayon.

With Hector as Manager of the Institute, Buchanan's time was to be increasingly taken up with the preparation of lithographed plates. Volume 1 was issued in May 1869 and, for the next eighteen years, Buchanan prepared most of the illustrations and was to be a regular contributor of botanical papers. One of these was his essay on the botany of Otago that was originally written for the New Zealand Exhibition in 1865 (Buchanan 1869).

1869, January 5 – Buchanan collected in Wellington and Wadestown bush. 30 – Harbour side.

February 1 – Terrace Hills. 6 – Terrace Hills. 7 – Botanic Gardens. 8-28 – Wanganui, 'a personal examination of the cliffs of the Wanganui River near the township and continued 6 miles on No. 2 road in the direction of Wangaeahu and 6 miles on No. 3 road up the river; also as far north as Patea'. It was at this time, during the Hauhau wars, that Buchanan surveyed and drew plans of Titokowaru's stronghold, Tauranga Ika, which was abandoned early in February 1869 (Belich 1996).

On 23 February – Hector requested a sum not exceeding £30 'to collect fossils from the Amuri and

Waipara districts on which service I propose to send Mr Buchanan when he returns from Wanganui where he is at present collecting'. The reason for this trip is given in Hector's letter to Gore, in which he wrote:

I hope Buchanan will soon be off to the Amuri as Haast has heard of something wonderful in the way of fossil reptiles.

There is no evidence of a trip to Amuri, nor of any other trip in 1869, however it seems unlikely that Buchanan remained in Wellington for the whole of the year. R.L. Holmes may have been sent to Amuri instead of Buchanan. In a note to Hector written on 5 March, Haast reported that:

I am starting tomorrow morning by the coach my men and horses having already left last Wednesday.

March 9 – Gore reported to Hector, who was in Otago, that:

Mr Buchanan has just returned and is busy at the request of Col Haultain, in making plans of the Turangihika [sic] fortification which will take him some days. But he will proceed on his South trip as soon as possible.

Gore also mentioned that:

Young Hooker has returned with Buchanan.

19 – Gore again reported to Hector that:

Buchanan has not yet gone to the Kaikouras in fact up to the present he could not have left for he has been occupied with drawing plans of the pah which he surveyed when he was in the North and now he is lithographing it for Government to send home. Another thing is that there has been no communication between this and the Kaikouras for some time and there is no prospect of any as the wool season is over and until he sees his way of getting back again he does not like to start.

31 – Gore sent Hector 'some copies of the plan of Taurangaika Pah which were done by Buchanan ... Buchanan is now working at the fossils he got on his trip north cleaning them etc. The plants have arrived from the ship *Cambodia* several of them dead and only a few unimportant ones living – Buchanan has seen to them. Ross [Hector's housekeeper] has left your house, she was obliged to go to keep her engagement I believe. Rayer sleeps

in the house and young Hooker. The Judge is I understand looking after Hooker.' The presence of 'young Hooker' is explained in an earlier letter written to Gore on 4 January by Hector, who was on his honeymoon in Nelson:

My dear Gore,

I have had letters from Dr Hooker telling me that his son a lad of 15 has been ill has been sent out to us by the *Matoaka* to Lyttelton. Keep a lookout for her arrival, though I don't anticipate it can take place before my return to Wellington. Telegraph at once to Wm Hooker on board the ship and tell him to come on to Wellington as soon as he can. Tell Ross to put him up and make him comfortable till we come over which I hope will be no later than the 20th inst. In any case don't let the poor boy go adrift. He is consigned in Canterbury to Dr Haast but with instructions to put himself medically under my advice.

April 23 – In a letter to Hector, Gore wrote:

I have given Buchanan your instructions regarding the maps etc. for Thames Rept., there are 5 altogether and they will take some time especially if coloured. I enclose a litho. by Buchanan of Ngatapu which I think you will like

Gore then described the visit to the Colonial Museum of H.R.H. Prince Alfred, Duke of Edinburgh:

The Prince visited us and was pleased with the Museum. I had everything in order and Rayer got some live ferns which we put in the small cut barrels and placed them in the lobby and about the floor.

From Kew, Dr Hooker in a letter to Hector said:

Thank Buchanan for his kindness to him.

Willie Hooker had been visiting in Wanganui and had travelled with Buchanan on his return to Wellington.

The Colonial Botanic Garden

Apart from his duties at the Museum and his lithographic work for the Transactions, Buchanan had an increasing responsibility in the organisation of the Botanic Garden that, in 1868, had been formally constituted under a Board with Hector as Manager. At that time the hillside sloped from the ridge where the observatory and meteorological station (which were also maintained by the

Museum) were situated towards the grounds of the Museum and Dr Hector's residence next door. W.B.D. Mantell's large property lay behind both. As the present day Bowen Street had not been cut through to Tinakori Road, the northwest corner of the Public Land of the Cemetery, Botanic Garden, and Wesleyan Reserves almost adjoined these properties. A letter drafted by Buchanan on 19 March reveals one of the many difficulties that had to be overcome by a small staff when the wilderness was gradually being cleared and planted:

... some persons are in the habit of permitting their cattle to trespass on the Botanic Garden Reserve and that portion of the Wesleyan Reserve which was fenced in with the consent of His Honour, The Superintendent.

Buchanan's sketch shows the bare upper slopes with cattle and standing bush in the valley. Buchanan's duties were described in a draft memo as:

Lithographs Institute, Maps geological. Arrangement of Herbarium comprising plants New Zealand & Foreign collected during the past 10 years. Work at the Botanic Gardens from time to time surveying roads etc. Miscellaneous work in connection with Museum & Geol. Survey.

During Hector's frequent absences when Mantell was sometimes acting director, both Gore and Buchanan were responsible for the day-to-day running of the Museum, meteorology, and the Garden and Institute business, as is shown in the almost frantic letter Gore wrote to Hector on 9 March 1869:

My dear Dr Hector,

I received your letters and took one about Dr Haast to Mr Gisborne immediately ... I will telegraph. I enclose an account of the Field Vote as you requested. I have been very busy since you left so much so with other things that I have not been able to touch the catalogue, it was not possible. The Weights & Measures have given a good deal of work and I have been over to Mr Gisborne three times about them and twice with him to the Attorney General about certifying as to their correctness A Mr Smith [S. Percy Smith, later Surveyor-General] a Govt. Surveyor who has been making a map of the Chatham Is for the Genl. Govt., brought a large collection of specimens from that place ... he offers to give the collection which is very nice, to the Museum if we give him a list of their names As Mr Buchanan was away of course the unpacking of these specimens and putting numbers on them took up my time. Then I had to get the Meteorological

Return in order as Didsbury wanted it to go on with. I took it over this morning. Now I must get a duplicate list of the fossils etc. for England ready which will take up time. I merely mention these matters in case you should wonder why the Report or rather Catalogue was not gone on with. For the last week or so I can assure you I have not had a moment to spare and though I should like to have tackled the Catalogue ... I could not possibly do so and attend to the office and Museum work as well ...

Mr Gisborne has sent me over a lot of Reports ... to be forwarded to the principal Medical Officers on the use of Carbolic Acid. Mr Buchanan has just returned and is busy at the request of Col Haultain ... Sullivan arrived today, poor fellow he looks rather down. He took some notes about the Museum and I set him up in stationery, pens, paper and etc....

Young Hooker has returned with Buchanan I have seen him once or twice but he does not often come here, his health has certainly improved since his arrival. I have just received Cap. Hutton's Report on Thames Nothing has come in the way of letters either by the *Ashley* or *Goschenburgh* ... I will send this to the care of the Supt. of Otago as I know of nothing better to do and have not received any instructions and I cannot miss another mail.

It is apparent that the work that was required of Gore and Buchanan went far beyond their normal routine. At any time the administration from the Superintendent down, and sometimes the Governor, called upon Hector and his staff to carry out a variety of official duties.

Botanical Matters

1870, April – Two papers of Buchanan's were published in the Transactions, the first described three new species, including two collected by H.H. Travers in the Nelson Mountains (Buchanan 1870). The second, which was on plants from Northland with Thomas Kirk as co-author (Buchanan & Kirk 1870), was to be the subject of some disagreement.

24 – In a lengthy letter to Hector written from Auckland, Kirk discusses the paper on the Northland plants then in proof:

... I am glad the North lists are printed although somewhat regretting the mode. It appears as a joint paper by Mr Buchanan and myself but if any voice in its preparation had been allowed to me I should have objected to the publication of *Gaultheria rupestris* and some other of Mr Buchanan's plants as indigenous in the North. ... did you or Mr B. really gather *Adiantum formosum* at Whangarei?

Kirk goes on to discuss his disagreement with Buchanan's treatment of *Pittosporum* species and their affinities, and concludes the botanical part of this letter thus:

'The value of individual authority as to the occurrence of plants in particular districts in N.Z. will in a very few years be of as great importance as it now is in Britain and should be jealously guarded.'

He later published some of these differences (Kirk 1871).

This is not the only occasion when the opinions of better-trained botanists came into conflict with those of Buchanan. Earlier, Lauder Lindsay had been critical of Buchanan's identification of Otago plants in a report appended to Garvie's Survey of the South-Eastern Districts, but conceded that in the absence of herbaria and botanical literature it was difficult for Buchanan to place the plants accurately:

It is but fair to the reputation of an excellent Naturalist who has since done good service to the Botany of New Zealand and whose good services have been commemorated by Dr Hooker by the attaching of his name to not a few new species of plants, to explain that as far as I am aware, his essay was the first that had been written on the Botany of the Districts referred to; that it was not published; and that under the whole circumstances of its production it is not fairly open to ordinary scientific criticism as a botanical 'guide' or 'Florula'.

(Lauder Lindsay 1869).

Despite the existence of a sketch of a Maori pa near Masterton dated 1870 (Buchanan guardbook, private collection), there is no record of any field work undertaken by Buchanan in the Field Expenses Ledger. This may well have been the year in which he visited the mountains of eastern Nelson. An undated watercolour with the title *Nelson E Coast Ford on the Waiau-ua River* shows two horsemen crossing a wide river. Another painting, which is untitled and of high tussock-covered hills, distant mountain peaks, a river, and a lake, appears to be of the country further inland. Buchanan perhaps accompanied either W.T.L. Travers and/or H.H. Travers up the Waiau-ua Valley on a visit to Lake Guyon, the country referred to by W.T.L. Travers as:

A cattle station which I hold in the Valley of the Upper Waiau, a large river rising in and flowing along the eastern base of the Spencer [*sic*] Mountains.

The Travers Run included Lake Guyon.

In Kirk's herbarium there is a specimen of *Senecio laxifolius* with the label 'Waiiau-ua 3,000ft Nelson, Mr Buchanan'. This species was described by Buchanan in the paper published in April 1870 from plants collected earlier by H.H. Travers in that area. Buchanan's notebooks contain a list of plants introduced into Nelson and 'Grasses on the Travers Run'. W.T.L. Travers's botanical specimens were accessioned as 'Lake Guyon Run' on 17 March 1870 (Te Papa). Buchanan's watercolour of the Buller River, which was apparently painted near Lake Rotoiti, might also have been done on the same trip. A Buchanan specimen of *Pittosporum patulum* from Lake Rotoiti, cited by Cheeseman, may have been gathered at this time if the party had travelled north through the mountain passes to Lake Rotoiti and the outlet of the Buller River.

November 23 – Buchanan offered to collect ferns from Otago for Cheeseman 'very shortly' (Auckland Museum), suggesting that he was about to take his annual holiday at North East Valley.

1871 – There is no record in the ledgers, letterbooks, or registers of any field work undertaken by Buchanan during this year. From the undated and usually slight information on plant specimens, it would appear that Buchanan collected in coastal and inland Canterbury on one or more occasions. The localities Timaru, 70 Mile Beach, Ashburton Mountains, Rangitara, and Rakaia suggest an unrecorded visit or visits. Two plant drawings, a pencil sketch of mountain ribbonwood marked 'Rakaia 3,000ft' and a watercolour painting of a perfect flowering specimen of *Veronica linifolia* marked 'Rakaia Valley', support this. The latter suggests that Buchanan found the plant himself, as its delicate flowers would not have survived consignment to Wellington by another collector. It is also surprising that no evidence exists for Buchanan ever having travelled over Arthur's Pass, a journey that became the mecca for botanists (many of whom visited J.D. Enys's Castle Hill station in the Trelissick Basin) from the time the alpine route was discovered in 1864.

Buchanan visited the mouth of the Grey River and the West Wanganui Inlet at unknown dates. He made several watercolours of the lagoon, shore, and bush. With a regular system of coastal vessels plying between minor ports, visits to the West Coast could have been made in a

very short time. Perhaps Buchanan would have accompanied Hector when E.H. Davis of the Geological Survey was drowned while attempting to cross the flooded Ten Mile Creek near Cobden, where an inquest was later held. Records show that Hector travelled from the West Coast to Dunedin between 17 and 19 March (Colonial Museum Ledger, Te Papa). He most probably travelled over Arthur's Pass into Canterbury. If Buchanan were with him, a visit to Haast's famous sites in Canterbury, particularly the 'Curiosity Shop' on the Rakaia River, may have occurred.

May – Buchanan sketched some fungi collected in Wellington (Buchanan notebook, Auckland Museum).
July – Plants flowering in the Botanic Garden and around Wellington were listed. 6 – Buchanan's paper describing new plants, including those recently collected by H.H. Travers at Lake Guyon, was read at the Wellington Philosophical Society's meeting.

August – Plants from Evans Bay and the Hutt Valley were listed. 14 – In his Presidential Address to the Wellington Philosophical Society Dr Hector, in discussing moa bones in the interior of Otago, said that:

I applied to my friend Mr John Buchanan who is as distinguished for his powers of observation as he is for the skilfully executed lithographs which illustrate our Transactions and Natural History publications.

Hector went on to describe the exploration of Garvie's party in 1856 [1858], the route they took, and the appearance of the country and its vegetation, birds, and animals, including wild dogs, as recounted to him by Buchanan (Hector 1872).

September – Mosses and lichens were collected by Buchanan from Tinakora Hills; Kaka Hill; Mt Johnson, Karori; Crawford's Peninsula and on 17 from Trig Hill.

October – Mosses from Tinakora Hills were collected by Buchanan and in the following areas in or near Wellington:

November – Porirua Road; Kaiwarra Creek below college; Tinakora Hill – all bryophyte and lichen collections.

December – Tinakora Hills; Kaiwarra and Kaka Hill; Hutt; Lourie [Lowry] Bay; Mungaroa.

A letter from David Wallace of Popotunoa to 'Dear John' is mostly about farming matters. It includes a mention of 'your sheep', which suggests that Buchanan's property at North East Valley was stocked. If this were so, it seems certain that Buchanan would have spent some time

there probably during the summer. Wallace also mentions success with 'the tree seeds you sent' and gives news of the Russell family of Ryal Bush (Buchanan papers, Hocken Library). From this and other letters it is clear that Buchanan had a number of friends in Otago and Southland who were mostly pioneer farming people. It seems he met some of them when on the early surveys. The tree seeds would have been Californian, some of the large consignments received by the Colonial Museum, Botanic Garden, and Geological Survey. These early introductions included *Cupressus macrocarpa*, *Pinus radiata*, and other pine species that were widely distributed to parks, schools, and Government properties throughout New Zealand.

1872 – Once again the months of January and February are blank except for a single plant collection made in Karori and a collection of lichens made at Okarito, possibly by T.R. Hacket, who was working in Westland.

March – Lyall Bay; Kaka Hill. 21 – The result of H.H. Travers's '8½ months residence on the Chatham Islands' was received at the Museum – 'a very extensive and valuable collection of every branch of natural history'. 6,000 botanical specimens, and natural history and ethnographical items were purchased (Colonial Museum Accessions Register, Te Papa). Much of the botanical material was worked on by Buchanan, who published an account of the Chatham Island flora (Buchanan 1875).

April – Buchanan collected at Karori, Kaka Hill, Hunter's farm, and Signal Hill. He made sketches of fungi from Sydney St., and Tinakori Hill.

May – Buchanan listed plants in the Botanic Gardens and also made sketches of fungi from Kaiwarra. He wrote to 'A. Haldane' of Waikawa asking for a 'Prince of Wales fern from up the river for our Garden'.

June–July – Buchanan noted strong frosts in Wellington, listed the plants in the Botanic Garden, and sketched more local fungi. These lists and sketches continued into August and September, with the addition of fungi from the Porirua Road.

September 25 – Buchanan's paper on the plants of the Miramar Peninsula (Buchanan 1873) was read at the meeting of the Wellington Philosophical Society.

October 14 – Crawford's Peninsula.

November – Harbourside near Kaiwarra. A fungus from Otari Hill was collected and some lichens from Tinakora Hill.

December – Lichens from Tinakora Hill.

1873, January, February and March – Plants from Wellington, including lichens from Kaka and Tinakora Hills, were noted with no days mentioned, and for each subsequent month there is at least one collecting locality recorded from near Wellington.

April – Wainuiomata.

May – Wellington.

June – Miramar Peninsula.

July – Cow [Kau] Bay.

August – Wainuiomata; Karori; Kaka and Tinakora Hills.

September – Karori.

October – Botanic Gardens.

Buchanan's list of the plants of the Wellington Province (Buchanan 1874) was presented for publication on 16 January 1874. It was compiled from collections and observations that must have been made on many excursions that are undocumented. Most of the Wairarapa records would have resulted from the following trip summarised from his field notes (Buchanan notebook M1 603/D, Hocken Library).

November 6 – 'Started from Wellington. 7 – Went to Scandinavian settlement 40 Mile Bush and back to Masterton. 8 – Examined Tirahanga Hill on the Ruamahanga River and up to Scandinavian camp and Masterton. 9 Sunday – Bennetts Hill. 10 – At cliffs on Ruamahanga at Denham's went up to the limestone cave on the Taueru at Robinson's. 12 – Went up the Waingawa River 2 miles above Crompton's. 13 – Went up to Gilligan's station. 14 – Came down from Gilligan's and went up in the afternoon to Tirohanga. 15 – Rained all night, river rising, crossed in time and made back to Masterton. 16 Sunday – Rained all day went into bush near Masterton. 17 – Rained all day went to junction of Waingawa on a report of coal from Mr Masters, found none, river high. 18 – Rained in forenoon too heavy for going anywhere. In the afternoon packed up. 20 [19?] – Started with coach from Masterton arrived at Wellington 5 pm Expenses for 14 days in the Wairarapa from 6-19 November 1873, £12-19-0' (Colonial Museum Ledger, Te Papa).

Although this trip was primarily for geological observation, Buchanan made detailed lists of the plants he saw at Masterton, the Scandinavian settlement, Tirohanga, between Featherston and Greytown (stony vegetation), Taratahi Plains, Bennetts Hill, Rangituma Hill, the bed of the Waingawa, and on the Taueru and the Rimutaka Hill.

1874, January 16 – At the same time as Buchanan's paper on the flora of the Province of Wellington was read at the meeting of the Wellington Philosophical Society, Dr Stirton, a Scottish botanist, presented a paper on the lichens collected in the vicinity of Wellington by Buchanan (Stirton 1874). Buchanan maintained a correspondence and continued to send lichens to Stirton for at least a decade.

The visit to New Zealand during 1874–75 of Dr Sven Berggren, a Swedish botanist from the University of Lund assisted by the Auckland, Canterbury, Otago, and Colonial Museums, appears to have rekindled Buchanan's interest in seaweeds (Bagnall 1970a, b). He accompanied Berggren on local collecting trips and, in a letter to T.F. Cheeseman (Auckland Museum), he said:

I think Dr Berggren is one of the most amiable men that I ever met in with. I had several rambles with him near Wellington.

Berggren arrived in New Zealand in January 1874 and had visited the 'Canterbury Alps', part of Westland, Banks Peninsula, Otago Peninsula, Bluff, and also the neighbourhood of Wellington by the middle of July. When writing to the Colonial Secretary, Hector also mentioned that Berggren's collections 'have been very extensive about 15,000 specimens already having been sent away'. In a second letter Hector said that 'Dr Berggren wishes if possible to visit the Scandinavians' settlement in this country' and mentioned that, on July 1874, 'Dr Berggren [is] here at work with Buchanan'.

In Buchanan's guardbook there is a newspaper clipping that describes a visit to Kapiti Island on the *Stormbird* by a party that included Henry Logan and Buchanan, with lists of plants and animals and an account of the vegetation. The article has been attributed to Buchanan and appeared in the *New Zealand Times* of 5 May 1874. Apart from the observations on natural history and the records of plants and animals, the style in which it is written seems to preclude Buchanan as the sole author. The mention of 'Hot Cross buns' suggests an Easter visit. An important observation on the forest trees was made:

The scarcity of all the pines, either in a young or old state, was marked, and that there is not a totara tree on the island now, whatever there may have been previously.

The conifers they did see were rimu, kahikatea, miro, and matai. In his account of the vegetation of Kapiti Island, Esler (1967) says that the only record of rimu and kahikatea on the island was made by Dieffenbach after he visited in 1839 (Dieffenbach 1843). It seems that this article, 'Notes on a ramble at Kapiti', may be the only account of the vegetation between 1839 and 1902.

December 3 – John Munro of Whangarei Heads began a series of letters to Buchanan (ATL), which substantiates an anonymous note in the Te Papa archives that states that 'Buchanan lodged with John Sutherland of Pipitea St., Thorndon for 23 years' is substantiated. In more than one letter Munro enquires after Sutherland. As Munro was a Member of Parliament for a number of years, it is possible that he might have lodged nearby or even in the same establishment while the House of Representatives was in session.

1875, February – Buchanan was in Wellington, where he sketched some fungi from the Tinakori Hills. Dr Hector was about to leave for England and then home via the United States. In his absence, the Hon. W.B.D. Mantell acted as director from March 1875 until September 1876. The frequent letters he wrote to Hector, relating daily events, administrative matters, and a good deal of gossip, are entertaining reading (Hocken Library).

23 – Charles Knight wrote to Mantell about the publication of a new lichen (New Zealand Institute papers, Te Papa):

My dear Sir,

Mr Buchanan tells me that Hector wished me to make an analysis with drawings of Dr Stirton's Lichen the *Stereocaulon buchananii* – I had done this years since. I have handed the drawings to Mr Buchanan and now send a few notes on Stirton's paper which I understand is about to be printed in the Transactions of the N.Z. Institute. If you see no objection these might follow Stirton's paper. Buchanan can crowd the drawings into one of the other Plates now in preparation. I dare say he would like the child baptised in his name to be properly presented to the scientific world. The Lichen is an interesting one and no doubt Nylander & Stirton will have fight over it!

Yours very truly,

Charles Knight

This lichen is now known as *Psoroma buchananii* (C.Knight) Nyl. (Galloway 1985: 470)

March – The first report to Hector on Mantell's directorship was given by Walter Buller when he wrote (Hocken Library):

Fortunately I have secured Barraud's house on The Terrace for two years. Everything is much the same as when you left. The Museum building makes very rapid progress. Mantell sits closely in your office from 9.30 to 4.30 and gets through any amount of work. You could not have made a better arrangement than you did.

April 9 – Bothamley reported to Hector that:

Buchanan has been up the Landslip Hills opposite in order to forestall old Kirk who intended to go to print. Said 'Kirk and his son are laid up with influenza which may develop into measles'.

April – Buchanan noted Wainuiomata plants and there are undated lists of the plants of the Orongorongo River and the Landslip Hills, the vegetation covering the landslips, and also 'the principal plants on Sinclair Hill, Wainuiomata 3,200ft'. These lists were probably the result of several visits to the area, which was heavily forested at that time. It was also one of the haunts of the now extinct huia (Phillips 1963). As Buchanan made several undated pencil and watercolour drawings of these birds, he may have observed them on his excursions into the Orongorongo Ranges. 22 – In a letter to von Mueller (Hocken Library) in answer to a request for the minute pondweed *Wolffia*, Buchanan said that he had 'Searched carefully within a radius of twenty miles all around Wellington' but had failed to find it.

He may have made the pencil studies of raupo, [*Typha*] heads from Wainuiomata at this time.

June 18 – Buchanan reported on the 'new cut track' in the Botanic Garden. He said that it was, except in a few places, 'done according to contract being cut 4ft on the solid'.

July – He sketched some fungi from the Botanic Garden.

August – By far the greatest number of specimens with localities and dates with Buchanan named as collector are to be found in Thomas Kirk's herbarium. In the absence of records it is pointless to conjecture as to when and how this material was obtained, but there is no doubt that Kirk had access to the Colonial Museum herbarium. From both direct and veiled comments in the letters between Mantell and Hector, it seems that Kirk might have been guilty of helping himself. From London on 3 August 1875, Hector wrote (Hocken Library):

I do not understand what he Kirk, is doing in the herbarium – long before I left I told him we could spare no more plants and told Buchanan to keep what was left out of reach of everyone.

October 4 – Buchanan's paper 'Notes on the Colonial Botanic Garden' was read by W.T. L. Travers at the meeting of the Wellington Philosophical Society. The paper was not published in the *Transactions*, but the manuscript of this botanical survey (New Zealand Institute papers, Te Papa) has provided valuable information on the native forest species in the original reserve, which was an area that had been used as a common and thus subjected to grazing and the cutting of firewood for at least thirty years. During October Buchanan collected on the 'top of Porirua Road'. This is probably in the watershed bush at Johnsonville where the streams flow down the Ngauranga Gorge to Wellington Harbour on one side and through Tawa to the Porirua Harbour on the other.

November 18 – 'Buchanan has gone to Kawau with Sir George Grey to forage for us I expect them back shortly' (Hector papers, Hocken Library). Buchanan made a careful investigation of both the native and introduced plants growing on Kawau Island, the residence of Sir George Grey (Buchanan 1877a). 13 – Kawau. 14 – Small island opposite North Harbour. 15-23 – Kawau. 24 – Arrived Auckland from Kawau. 25-27 – 'Auckland *Ladybird* 10 o'clock sharp' appears to be his departure time. Buchanan's expenses on Kawau for 6-29 November amounted to £26-2-6 (Colonial Museum Ledger, Te Papa).

December 6 – Mantell wrote to Gore from Dunedin:

'Buchanan expected but not yet turned up perhaps not recovered from seasickness or its antidote.'

In December Buchanan listed the plants of 'Brothers Rock, Cook Strait', but it is not clear whether he landed there himself. 14 – Mantell, writing from Caversham, Dunedin, reported to Hector that:

Buchanan is also here on leave – collecting and working away like anything.

January – During the first two weeks Buchanan was on holiday in Dunedin. 15 – Mantell reported to Hector on a stranding of blackfish at Lyall Bay, Wellington:

20 blackfish ranging from 8-20ft and they are now being buried at Lyall's Bay awaiting your orders – Buckie who returned

yesterday from Furlough says they are the sort of which no skeleton has yet been got only 2 skulls you have. They will cost £25 to £30 buried. I sent Buckie out today (this is Burton's 3rd day there) to take bearings of the graves

16 – '7.30 am Sunday – Burton and Robert Nairn came back about 9 last evening having stayed to bury the last of the 23 a sizeable one which had been [mutilated?] but the head of which is reported good. They reported that Buckie had made a sketch so I sallied forth at 6 in search of B as there is a Suez-sidal mail at 10 am today. After waiting ¾ hour I at last roused B and bore hence his sketch which I have done on the nearest approach to tracing paper available so early on a Sabbath morning'.

February – An undated slip of paper in Buchanan's hand (Colonial Museum papers, Te Papa) is an indication of the turmoil that must have been taking place in the Colonial Museum circles over the Sumner Cave controversy between Julius Haast and Hector concerning Alexander McKay's part in putting up for publication his own observations on the excavations whilst he was in the employ of Haast (H. Haast 1948). In the local scientific community, the bitter accusations reached such a point that Sir Joseph Hooker, as President of the Royal Society, was asked to make a formal judgement on the matter. His opinion, dated 15 December 1875 and marked 'Not intended for publication', would have been received in Wellington early in 1876. Buchanan seems to have obtained some idea of its contents, as shown by the following note in his writing (Colonial Museum papers, Te Papa) headed:

In re Haast versus McKay – I gather that Hooker's opinion is to the effect, that if a man is employed to dig as a labourer and paid for this, you do not pay for his brains and have no controul [*sic*] over them. If you employ a man for his brains, the results of his brain work are yours, and must not be given to the public by him.

It is an accurate if homely summary that was probably quickly circulated 'below decks'.

April 10 – Buchanan reported on the state of a large consignment of plants for the Botanic Garden shipped on the *Penshaw* from Kew on 30 December 1875 in twelve Wardian cases:

When opened at Wellington 88 of this number were dead. All cases were found to have been over-watered. Cases II and V showed water above the pots, thus the majority of the plants

have, owing to their roots being so long under water, acquired a sickly appearance making it uncertain how many will live.

At Easter Buchanan visited Dunedin, where he listed plants at a number of localities – Green Island, Kaikorai Stream, Corner Bush, Flagstaff, Ocean Beach, Andersons Bay, Mt Cargill, and North East Valley.

May 6 – Mantell wrote to Hector:

Did I tell you that the old herbarium was opened during Buchanan's absence at Easter with a strange key which was left in the lock which it has so modified that the proper key will no longer operate. I ordered an enquiry but without result – Buckie however has no doubt of the culprit.

June – A drawing of the earthstar fungus, *Geaster*, dated June 1876 from 'Titoki-waru's Pah, Taurangahika' (Auckland Museum sketchbook) suggests that Buchanan might have again visited the Wanganui district. He may also have collected in the Horowhenua or Manawatu, as a letter from James Stirton written in February 1877 acknowledged a packet of lichens gathered about 30 miles from Wellington (Te Papa). 12 – Buchanan answered a letter from Rayer, who wrote from Upper Hutt asking how much he should give for huia skins. The reply was that:

Huia birds at the present time are generally bought for 7/6 each (skinning done here).

July – In his paper read on 29 July he mentioned the visit to 'new cleared bushland near Mt Cargill, North East Valley' (Buchanan 1877b). As Buchanan concluded the sale of part of his land to Mrs Anderson in June 1876 [Transmission No. 2172], this third visit within 5 months may have been because of this transaction.

October – A 'scientific ball' held in the newly extended Colonial Museum was 'a vast success' according to young Bothamley. Gore reported to Hector that:

Members have at last departed, but before going they gave a fine ball and as they got to the Museum for the purpose it was very grand. The best thing of the sort ever given in Wellington. Dancing downstairs in the centre and north wing and supper upstairs in the lecture room it looked very nice all lighted up and decorated with flags.

There is no hint that Buchanan attended. From other sources it can be inferred that, because some necessary facilities in the Museum were non-existent, the Mantell's

kitchen was pressed into service. In the same letter Gore wrote:

We are all getting on alright here in the most harmonious and friendly manner – Mr Mantell is very kind to us all. You will be very glad to know all this.

1877, February 23 – J.W. Rayer, of Rayer & Malin, received an advance payment for the contract to fence the Botanic Garden (Treasury Voucher No.281, Botanic Garden papers, Te Papa). Rayer was, therefore, still associated with the activities of his old companion Buchanan, who was supervising this work even to the counting of the posts and rails erected.

May – Hector referred to 'Mr Buchanan F.L.S.' in a paper read to the Wellington Philosophical Society during 1876. This indicates that the Fellowship of the Linnean Society was bestowed before and not after the publication of Buchanan's folio volumes of *The Indigenous Grasses of New Zealand*, the first of which was published at Wellington in June 1878 (Buchanan 1878, 1879, 1880a, b).

July 21 – The members present at the Wellington Philosophical Society meeting (New Zealand Institute papers, Te Papa) included Buchanan and most of the staff and close associates of the Museum, Geological Survey, and Botanic Garden: J. Hector, T. Kirk, T.W. Kirk, W.T.L. Travers, H.H. and H.A. Travers, A. McKay, R.B. Gore, and Captain Edwin. They made up 10 of the twenty-one present.

September – Buchanan made drawings of the fungus *Hirneola* growing on whale bones on the Wellington coast. This fungus is usually found on trees and is widely known as "Taranaki wool" because it provided an income to pioneer settlers clearing farms in bush settlements. Between 1877 and 1878, 330 tons of this fungus were exported to China. He also drew a slug-like creature from 'below the bark of a fallen red pine, Mungaroa Bush' in September. **22** – Buchanan and his friend George Wilson attended the Wellington Philosophical Society's meeting.

October 4 – A fish, *Upenioides vlamingii*, from Blind Bay was exhibited at the next meeting by Mr Buchanan.

November – Plants were recorded from 'Sinclair's Hill, Wainuiomata' by Buchanan.

December – Buchanan went on a month's voyage on the Government Steamer *Hinemoa*, which was visiting and supplying lighthouses on the North Island coast. On these voyages, depots of provisions were replenished and remote

parts of the coast inspected for survivors of shipwrecks. The following itinerary has been extracted from Buchanan's notes (Buchanan notebook M1 603, Hocken Library). 13 – Half 6 left Wellington. 14 – Napier. 15 – Portland Is. 16 Sunday – Napier. 17 – At sea. 18 – At Kawau. 19 – At Kawau. 20 – Waiwera Springs and Auckland. 21-22 – Auckland. 23 Sunday – Kawau. 24 – 7 pm left Bay of Islands after coaling for the second time to Cape Maria. 26 – Cape Maria and Three Kings. 27 – Mongonui, Whangaroa, Mohikinu [Mokohinau?]. 28 – Kawau, Mullet Point, Auckland. 29 – Auckland, Thames. 30 – Auckland. 31 – Auckland, Waiwera.

1878 – On New Year's Day, Buchanan was in Auckland and at Thames on 2 January. 3 – Coromandel. 4-5 – At sea. 6 Sunday – Tauranga. 7 – Tauranga, Hicks Bay. 8 – Poverty Bay. 9 – Portland Is. There are lists of plants seen (and perhaps collected) from a number of localities, including the Three Kings Islands. Buchanan made a very carefully drawn map of 'Manawa-tawi', with soundings and showing a dotted route from Cape Reinga to South East Bay, Great Island. There is also a profile sketch of the islands titled 'Three Kings 12 miles'. Buchanan listed 23 plants, which were probably seen alongside the route from the shore of South East Bay to the ridge where the cast-away store was situated (G.T.S. Baylis pers comm.). On the return voyage down the North Island's East Coast, they landed on one of the islands of the Hen and Chickens group and visited Gate Pah, Tauranga. Buchanan's collections of natural history and geological specimens appear in the Accessions Register on 11 January and were probably entered on the day of his return to the Museum.

February – The wages voucher for the 10 men employed during February at the Botanic Garden was certified by Buchanan at the end of the month (Botanic Garden papers, Te Papa).

March 9 – Buchanan reported that:

The whole work (building the Botanic Garden gate) is finished and on the ground except hanging the large gate which is delayed on Blacksmith's work.

18 – James Dall, writing from Nelson to Hector, said that he had called at the Museum and 'was requested by Mr Buchanan' to forward a list of the plants available for sale. At least some of Dall's long list of exotic ferns, cycads,

conifers, and flowering plants were purchased for the Botanic Garden.

July and August – Buchanan collected at the Kaiwarrawarra Mill. This locality was probably Chew's Steam Saw Mill. It was operated by John Chew, who was milling the forested valleys in the Kaiwharawhara catchment.

October 8 – 'Three eggs common fowl very small gift Mr J. Buchanan' (Colonial Museum Accessions Register, Te Papa). There is no doubt that, during the spring and summer of 1878 and 1879, Buchanan would have been very much occupied in preparing the text and lithographs of Volume 2 of his *Indigenous Grasses*. Flowering and fruiting specimens of native grasses were probably collected by or for Buchanan during the summer season.

1879, March 26–27 – Alexander McKay wrote two letters to Buchanan from Nelson that describe the drying and despatching of a collection of plants from Mt Arthur. These specimens were found a century later in their original papers in a brown paper package marked by Buchanan 'Mt Arthur plants per A. McKay, cleaned June 1883'.

June – Publication of the second folio volume of *The Indigenous Grasses of New Zealand* (Buchanan 1879).

July – T.R. Hackett was in Wellington trying to get support for the 'Johnson Stratum' copper mining venture at Reefton, a scheme that Hector felt unable to recommend. Possibly Buchanan was persuaded to subscribe. It was said that he lost some of his savings in West Coast mining.

September 5 – Signal Hill plants were noted, including *Discaria*, which is now considered to be extinct on the Wellington coast and hills.

October 10 – Wellington plants noted particularly grasses in flower.

November – Plants on a paddock at Otari lately cleared from bush were listed. 20 – Coastal grasses listed.

December – Wellington plants noted. At the Sydney International Exhibition, Buchanan received a First Award for 'Illustration of Grasses Drawn on Stone' as did the Colonial Museum and Geological Survey for 'Geology and Natural History of New Zealand'. It is certain that the Museum staff, including Buchanan, must have devoted much time to the preparation of these exhibits during the earlier part of the year.

1880, January – A trip to Nelson is outlined in Buchanan's notebook (M1 603/E, Hocken Library). No year is mentioned, but it took place in 1880, when 12 January fell on a Monday. At this time Buchanan was corresponding with,

and receiving plants from, Alexander McKay, who was surveying in Nelson. A specimen in Kirk's herbarium collected by Buchanan from Dun Mountain confirms 1880 as the year of Buchanan's visit.

January 12 Monday – 'Sailed in the *Waitaki* for Nelson at 2 pm 13 – Arrived Nelson 7 am went to Panama House. Weather raining since leaving Wellington. Rain all day remain indoors – went up Maitai Valley, afternoon visit Cemetery. 14 – Forenoon fair heavy rain afternoon till 10 pm Went up Brooke St., Valley to the city dam. 15 – Morning bright sunshine bar. rising. Went up Dun Mt Tram track getting very bad in places, reach old workings on the open hill 2 pm whole country enveloped in mist unsafe to leave the track above 50ft, found the whole open country had been recently burned. Botany consequently very poor also too late in the season. One or two *Veronica* still in flower [short list omitted]. 16 – Went up the Maitai Valley to the gully below the Saddle of the telegraph route. Valley in a waste state over run by scrub strange development of prickly plants such as furze, dog rose, toumatakuri, thistles and hills still covered with fern. Strange in the immediate neighbourhood of Nelson land should be of so little value. This valley belongs to a Dr Richardson in England. 17 – Went out to the Richmond Road turning down by Paddy Staffords. 18 Sunday – Went out to Drumdruan with Mr McKay a very beautiful situation with high hills in the rear magnificent views of the opposite mountains such as the Mt Arthur Range and up the Wangapeka. Went along part of the Boulder Bank and beach towards Cable Bay heavy walking on loose gravel nothing of interest botanically, went up one of the wooded gullies some good specimens of ferns, nothing new, slept at McKay's cottage. 19 – Started early for Cable Bay over the hills, reached Cable station at 10 am, shown over station etc. etc. Left at 12 o'clock for town 15 miles (on foot) forded creek several times passed through a bush valley 5 miles to Happy Valley then rest beach road to Nelson, scorching hot day. 20 – Motueka by steamer at 10 am arrived there at 7 pm made tracks for Riwaka Hotel. 21 – Started up river with Wolff and after a hard day's work failed to reach Travers Bluff. Got bogged in Nigger Head Swamp and had to wash clothes in river, arranged with Wolff to go up again next day, ordinary mixed bush, saw only one specimen of *Senecio hectori*. 22 – Went up Riwaka River again with Wolff and no doubt reached Travers Bluff 8 miles up, could not see anything like *Equisetum* but

found *Dawsonia* which is no doubt the plant Travers mistook for it. Day oppressively hot, bush heavy walking 16 miles equal to 30 on a good road. Bush here very much mixed [species listed]. 22, [23] – Knocked up remain in hotel. 24 – Start early and take coach from Motueka Hotel to Richmond thence to Nelson by railway. 25 Sunday – Morning raining afterwards dull and warm, went round by beach and Paddy Stafford's. 26 – Morning heavy rain all day reading. 27 – Fine morning went round sand hills at head of bay. 28 – Went to Foxhill by railway, sailed for Wellington at 10 pm'

Between February and May there is no record of Buchanan having left Wellington again.

June – The third and last folio volume of Buchanan's *Indigenous Grasses* was published in Wellington. On 1 June he wrote to Cheeseman from the Colonial Museum, saying:

I send specimens of all the grass species which you advised me you wanted of which I have the smallest bit left. Of those contributed I never had much, in fact 3 species are described from very small bits. I have been promised by Mr Petrie and others abundance but I believe the only way to get that is to go afield yourself which I hope to be able to do next season

This trip 'afield' was to be with Alexander MacKay's survey party, which also included James Park and Cameron. Buchanan stated that the purpose of his visit was to collect and illustrate alpine plants in order to assist in naming them because the specimens from Hector's journeys of 1862–64 had been sent to J.D. Hooker at Kew. In the following summary of Buchanan's field notes (M1 603/S, Hocken Library) descriptions of vegetation and plant lists have been omitted. Apart from his pleasure in seeing the alpine herb fields once again, it is obvious that he was saddened by the changes that had occurred since his visit in 1863.

December 17 – 'Depart Wellington by steamer *Wanaka*. 18 – Christchurch, Oamaru by train. 19 – Duntroon. 20 – Omarama by coach arrive 8 pm Stewart's Hotel. 21 – Lake Ohau. 22 – Camp on Station Creek. 23 – Station Mountain 6,000ft. 24 – Mountain on opposite side of creek 5,000ft. 25 – In tent changing plants. McKay got numerous specimens of *Notothlaspi* from shingle slides opposite tent. 26 – Terraces behind tent, recently burned. 27 – Camp to Ben More station. 28 – Ben More to Omarama. 29 – Stewart's Omarama. 30 – Omarama to Dr Hector's old camp one mile from Saddle.'

1881, January 1 – 'Start from camp from middle of Lindis Pass, little left from burnings. Camp on Lindis Creek below gorge. 2 – Gorge, old rich vegetation gone. Camp on creek 7 miles from Albertown, 1 pm 3 – Arrive Norman's [Lake Wanaka]. 4 – Up to the lake, grasses of Mt Iron. 5 – Plants of the beach at Dr Hector's old pemmican camp. 6 – Went up to Roy's Range 3,000ft. Mt Iron in the evening. 7 – Matatapu Creek, camped. 8 – In camp near Dr Hector's old camp, collected in bush. 9 Sunday – Ascended Three Kings Mountain, climbed to 6,000ft, alpine botany very rich. 10 – In camp, drying papers. 11 – Started along base of hill to the river. Dismal, swamp still impassable. Green bush in gullies – tall beech. 12 – Went up to make Buchanan Peaks but in mist found myself ascending Mt Alta about 5,000ft in a glory of alpine vegetation, reached base of peaks at 2 pm, in really grand alpine vegetation, away 6 am to 7 pm, 12 miles. 13 – Lay-to for want of boots. *Poa exigua* found by McKay on Mt Alta range this week. 4,500ft–6,500ft Mt Skey. 14 – In tent. 15 – Buchanan Peaks. 16 Sunday – Changing plants. 17 – Went up to the left branch [Matukituki River]. 18 – Camp at entrance of left branch, up creek with Cameron, rain. 19 – Shingle beds of Matukituki River. McKay up left branch. 20 – Up river camped near bush 12 miles, went up left branch to Dr Hector's camping ground 12 miles up from last camp. 21 – Wet, botanised creek bank. 22 – Start for Hector's Col. 23 Sunday – Remain in camp on small flat. 24 – Start for Col, make bed below a large rock. 25 – Rain, rain, rain, up towards Col. 26 – Start for Col, foot of Col, top of Col very dangerous. 27 – Start from camp below rock 8.30 am, camp close to bush next Cascade Creek Camp. 28 – Start through bush for Cascade Camp, arrive 11.30. 29 – Start for camp on forks. 30 Sunday – Started for Pembroke early, walked 32 miles to catch coach on Monday. 31 – Started with coach 6 am made Herons Hotel 7 pm'

February 1 – 'Made Dunedin at night, went out to North East Valley, stopped three days and took steamer to Wellington.' Buchanan's expenses from 17 December 1880 to 11 February 1881 amounted to £48-1-0 (Colonial Museum Ledger, Te Papa). The Director's Report (Colonial Museum, 1881–82) gives the number of specimens collected as 25,000, but this figure must be misprint. Even allowing for duplicate material, a figure of 2,500 may be nearer the total. A considerable number of these specimens have recently been found in unopened packages

marked by Buchanan personally. Buchanan gave both McKay's and Park's names to new species discovered on this survey.

December 24 – Buchanan and Henry Logan visited Mt Holdsworth in the Tararua Mountains. They left Wellington by train on Christmas Eve for Masterton. **25** – Two assistants from the Botanical Gardens were to join them on Boxing Day when they reached the upper camp at 2800 ft. **27** – Logan and Buchanan set off for the summit to collect alpine plants. **28** – They made a second ascent delayed until noon by bad weather. **29** – The summit was reached for the third time. **30** – Logan and the two assistants set off down the mountain leaving Buchanan to continue botanising above the bushline. From this excursion he collected and described two new plants, *Raoulia rubra* and *Haastia loganii* – the latter plant now known to be of hybrid origin.

1882, 21 January – Hector reported to the meeting of the Wellington Philosophical Society that 'Mr Buchanan in company with Mr H. Logan and party had obtained about 1,500 live plants.'

These were destined for the Colonial Botanic Garden, but some were sent to 'various domains in the colony' and a portion to Kew. Some dried specimens were retained for the herbarium. Expenses for 'collecting in the Tararua Ranges, Mr Buchanan' were £31-11-11 (Colonial Museum Ledger, Te Papa). The collections were carried out by two assistants from the Botanic Gardens.

The newspaper account of this expedition shows that, contrary to the statement made by V.D. Zotov, it was Buchanan and not Cockayne who was 'the first botanist to ascend the mountains'. (Zotov *et al.* 1939). In fact, H.H. Travers, a knowledgeable collector, had preceded Buchanan by six years. The surveyor Mitchell collected plants from Mitre in May 1872, the nurseryman Henry Budden in February–March 1875, and H.H. Travers in January 1876. Botanical specimens from all three were received by the Colonial Museum. By 1882, with Buchanan's contribution, there would have been an appreciable number of Tararua plants in the herbarium.

April 18 – A consignment of plants sent by Thomas Kirk from Lincoln was received by Buchanan and taken to the Botanic Garden. At this time Hector's idea of a teaching garden had been fulfilled. A fenced area near the entrance had been laid out in beds edged with low box hedges and

arranged by plant family (Shepherd & Cook 1988). Entry was given only to those with a genuine interest in botany in order to avoid the vandalism and theft of rare plants and those that had been obtained with some difficulty. Buchanan's collections of 1883 from the subantarctic islands would have been destined for this special garden.

August 3 – 'One case of samples of tin ore, Queensland, gift, J. Buchanan' was accessioned. This material probably came via Buchanan from T.R. Hacket, who had been tin mining in 'the country between Queensland and New South Wales'. Hacket described this country to Hector as 'like Rough Ridge and on the old Dunedin to Dunstan [route] all with tin ore'. It was country that Hacket and Buchanan had traversed together in October 1863, and that had taxed Hector's newly acquired horse earlier the same year.

There is no direct evidence that Buchanan accompanied the plant collector James Dall on any botanical excursions to the mountains of north-west Nelson. Both had an interest in the local flora. Buchanan had described or recorded plants collected by Dall and had named *Celmisia dallii* (Buchanan 1882). That Buchanan visited the district is certain, as he painted a watercolour of *West Wanganui Harbour miner lagoon*. This was probably painted at the time the coal seams were investigated in the 1870s. He visited the area again in 1883 as 'field expenses in North Nelson, J. Buchanan, 18–30 May' appear in the Colonial Museum Ledger (Te Papa). It would have been surprising if he had not seen Dall and perhaps botanised with him. The 'new species of *Erigeron*' described by Buchanan (Buchanan 1885) came from Collingwood and, as no collector was named, it may have been Buchanan himself, especially as Cheeseman, when he transferred this plant, *Erigeron novae-zelandiae*, to the genus *Celmisia*, named Buchanan as the collector.

Another reason for a visit to the district could have been his old companion, Hacket, who at that time owned land in Collingwood and at Pakawau, where he considered, among his many other projects, growing oysters. Buchanan drew a number of plant fossils from Pakawau, although they could have been collected by colleagues at an earlier date.

On 13 October, H.C. Field wrote from Wanganui inviting Buchanan to make a trip to the Volcanic Plateau saying that:

Ruapehu is now easily accessible from here there being a good bridle-and-pack track right to its base, so that a horseman

can comfortably get there in two or three days, and the journey between the Murimoto plains and Wanganui is often completed in a day by a good rider.

Buchanan's detailed pencil drawing *Taupo, Ruapehu & Tongariro* shows that he did go to the area, but when and with whom is unknown.

During September, October, and November, Buchanan noted the plants flowering in Wellington. On 15 October, he sketched at Sinclair Head on the South Coast. **December** – Buchanan visited the subantarctic islands on the Colonial Steamship *Stella*. 15 – They departed from Wellington for Port Chalmers. 20 – They sighted Campbell Island in the morning. One day and two half days were spent ashore collecting (Buchanan 1884b). 23 – They called at Auckland Island, where the Castaway Depot at Camp Cove, Port Ross, was inspected. They also called at Sandy Bay, Enderby Island. 27 – The *Stella* arrived back at Port Chalmers (Godley 1970). Buchanan made profile sketches of the islands that were later published by Judge Chapman (Chapman 1891, 1895).

1884, January – Dunedin. Buchanan spent a short time at his home in North East Valley before returning to Wellington. 10 – Buchanan reported on the loss of his collection of live plants thrown overboard by a zealous steward when the *Stella* berthed at Lyttelton.

February – H.C. Field again invited Buchanan to accompany him on a trip to Tongariro and Lake Taupo.

March 31 – James Park's collection of plants from Mt Franklin, Nelson, was received and identified by Buchanan (Park 1885). A substantial part of this collection was recently found in a package marked by Buchanan 'Park's collection on Mt Franklin'. Park in a note to Buchanan wrote that he 'Addressed the parcel of plants to the Dr to save postage.'

August 6 – T.R. Hacket died at Nelson after a brief illness. He was buried on 8 August at the Nelson Cemetery. It is not known whether his funeral was attended by Buchanan or other old colleagues.

December – Wellington. The attendance book shows that Buchanan was at work in the Museum, except for 31 December (Hector to Hooker, No. 676, Kew Archives):

I'm afraid that poor old Buchanan is failing fast – but he will persist in working away as hard as ever and I believe he will drop in his collar.

Retirement

1885, January – Apart from 1 January, Buchanan was at the Museum during the whole of this month.

March – Buchanan was at North East Valley, Dunedin, where he noted plants in flower and made pencil sketches of the fruits of *Fuchsia excorticata* and *Aristotelia racemosa*, probably during his leave at Easter.

June 12 – The Council of the Wellington Philosophical Society voted a sum not exceeding £10 to purchase a present for Mr John Buchanan. He was elected an Honorary Life Member of the Society with a certificate to be made out.

June 24 – The presentation to mark Buchanan's retirement was held at the meeting of the Wellington Philosophical Society (Hector 1886). On behalf of the Society, the Chairman, Dr Hector, handed him an illuminated diploma of life membership accompanied by a present of several valuable books. It was reported that he was 'quite taken by surprise, and was, in consequence, too much moved to reply at any length' (New Zealand Institute papers, Te Papa).

A letter of appreciation of his friendship and long association on the occasion of his retirement from the New Zealand Geological Survey was signed by William Skey, Richard B. Gore, Alex McKay, T.W. Kirk, S.H. Cox, and James Park (Buchanan papers M1 603/N, Hocken Library). Skey was also to write a poem to Buchanan titled *Gentle Jock*. This comprised 35 four-line verses and was later published in *Zealandian Poems*.

July – Buchanan was granted a year's leave on full pay, hence the official date of his retirement was June 1886. His salary of £325 pa was the same as that received by the resident surgeon at Wellington Hospital.

August 18 – The thanks of the Board to Buchanan were recorded in the minutes of the Botanic Garden Board meeting.

October 30 – At the Council meeting, it was resolved 'to obtain a portrait of Mr John Buchanan from Mr H.M. Gore at a cost not exceeding £10-10' (New Zealand Institute papers, Te Papa). This portrait (Fig 2), painted in oils by Henry Moreland Gore, son of R.B. Gore, was to hang in the Colonial Museum. Buchanan was the first of Hector's foundation staff to retire after completing twenty-two years of continuous service, twenty of which were in Wellington at the Colonial Museum and two with the Otago Provincial Geological Survey in Dunedin between 1863 and 1865. On 13 October he was 66 years of age.

Hector reported to Hooker (No.681, Kew Archives) that 'Poor Buchanan has retired on a pension so we have lost a valuable help'.

November 25 – Buchanan's paper on the coniferous trees in the Colonial Botanic Garden (Buchanan 1886b) was read by Dr Hector at the Wellington Philosophical Society meeting. In this paper, the growth of 76 different conifers was recorded the oldest of which had been planted just 15 years previously. The tallest at this age was a *Pinus radiata* that had attained a height of 42 ft. Most had been grown from imported seed and had been watched over by Buchanan and the garden's staff. A number of these conifers are now magnificent mature trees in the Wellington Botanic Garden.

1886, February 24 – A paper on *Cyttaria purdiei* (Buchanan 1886a) recorded for the first time this fungus on New Zealand beeches. He illustrated a cluster of fructifications on *Nothofagus fusca* that were apparently from the vicinity of Dunedin. His species has since been merged with the Tasmanian *Cyttaria gunnii*. In December 1885, Mrs Georgina Hetley had arrived in New Zealand to undertake an illustrated book on native plants. Buchanan was in Dunedin when Mrs Hetley visited him in the summer of 1886. In the introduction to her book, she mentions that he was 'a martyr to rheumatism'. (Hetley 1888). In April she wrote to thank him for:

Painting and sending me the flowers which I have received from Mr Barraud.

She added that:

I shall feel still more indebted to you if you will kindly send a line or two expressing your opinion of my drawings to show to Sir Joseph Hooker and have inserted in the book.

Her letter was written from Auckland, care of Mr Cheeseman at the Museum.

May 3 – Buchanan bought six guardbooks from Messrs Ferguson & Mitchell, Dunedin. It would appear that, at least from this time and probably during the next ten years or so, he gathered together plant specimens, sketches, mementos, and newspaper and magazine articles and illustrations, and placed them into a number guardbooks. The books of plant specimens constitute the Buchanan Herbarium bequeathed to the Otago Museum. On the other hand the books containing the sketches and other

miscellanea have been little known outside the institutions that hold them; another has recently been found in private ownership. In many respects they are a great deal more important than the plant books. Not only do they contain much botanical information but they are also full of original sketches and paintings of considerable interest. These are sometimes dated and are usually localised, especially the landscapes. The newspaper clippings provide an insight into events and subjects that were of interest to Buchanan.

June 30 was the official date of Buchanan's retirement, from which time he received a pension of £127-1-6 per annum. From then on, his name virtually disappears from the Museum records. With the publication of his last paper in the Transactions (Buchanan 1888), his botanical contributions ceased. Very little has been written about his last years. Fortunately, the Buchanan papers in the Mitchell Library (New South Wales) contain personal letters. A number of these were written to Buchanan in the 1880s. It seems certain that these papers were in his possession at his death and were retrieved by his brother, Peter, and taken by him when he returned home to Sydney.

These letters show that, far from being alone and inactive, he was busily engaged in a number of pursuits. In July 1887, his friend John Wallace, formerly of Popotunoa, wrote from Clinton declining Buchanan's suggestion that he Chair a political meeting for the Clutha candidate, MacKenzie. There are letters from Mrs E.H. Featon of December 1886, January 1887, and January 1888 concerning the production of her *Art Album of New Zealand Flora* (E.H. & S. Featon 1889). More botanical letters from von Mueller, Thomas Kirk, and James Dall, as well as from his old colleagues Skey and Park, indicate a continuing correspondence. Alan Burn's nostalgic letters from Scotland and Nova Scotia detailing his wife's hopeless illness provide many descriptions of conditions past and present in the printworks. He wrote:

You are correct in thinking that the firm of Henry Montheith & Co. failed. It is entirely wiped out now so is Bartholomew & Co., Dalmanoch, both seemed to die for want of vitality they dried up and were blown away,

and added that:

some of the ... printworks at the Water of Leven still flourish, I notice lately the death of John Orr Ewing leaving a large amount of money.



Fig 2. Portrait of John Buchanan by Henry Moreland Gore



Fig 3. Staff photo, Colonial Museum 1874 (left to right – Mantell, Skey, Bothamley, Gore, Kirk, (unknown), Cox, Hector, Buchanan, Burton)

Burns had taken his wife to Britain for medical help and said:

I spent a few weeks in Edinburgh it is a beautiful city and extended since you and Dan Munro visited it 45 years ago.

George Wilson's letters from Gisborne suggest a lively and agreeable correspondence between two friends. His letter of 9 February, 1887 is the only one referring to Buchanan's health. In it he said:

I am glad to know that you are still able to take long walks although you say your memory is poor. Well at 67 years of age you shouldn't complain of that.

Apparently Buchanan intended to visit Stewart Island, as Wilson wrote:

When you do go to Stewart Is. you will give me an account of it I daresay.

1890 – In July, James Dall sent Buchanan a yellow flowered rata from Collingwood, apparently for his garden. During the following October, Donald Petrie collected specimens of native plants from 'Mr Buchanan's garden', including *Senecio hectori* and *Brachyglottis repanda*. There is no doubt that Buchanan was intensely interested in horticulture as his guardbooks contain many clippings on the subject gleaned from various magazines and newspapers. He also sent plants, seeds, and fern spores to his brother James, who grew ferns and cabbage trees in his Glasgow greenhouse. As early as 1856, Buchanan transplanted a small *Pseudopanax ferox* from Andersons Bay to his North East Valley property (Buchanan 1877c).

In a lecture written for the Young Men's Christian Association of Dunedin in 1862, Dr Lauder Lindsay mentioned Mr Buchanan of North East Valley, Mr Martin of Saddle Hill, Mr Matthews of Dunedin, and Mr Bower of Andersons Bay as 'men so admirably qualified by experience and taste as to act as committee men' for promoting a Botanic Garden in Dunedin. To have gained recognition on the same footing as Martin and Matthews, Buchanan must have had an excellent garden. Lauder Lindsay also quoted various observations made by Buchanan, for example, the use of the native *Parsonsia* vine trained over a bower instead of jasmine.

Dr Lindsay's lecture was published shortly before Hector's arrival in Dunedin for a visit that resulted in

Buchanan's permanent employment. At the time of Lindsay's visit, however, Buchanan was prospecting on the Tuapeka gold field after the land surveys were completed. It is possible that he contemplated a future as a nurseryman and had been planting his property with that in mind. The section was surrounded by standing bush and, with 'a burn' flowing through it, would have been suitable for this purpose. There is, however, no doubt that he would have enjoyed at least a decade of gardening during his retirement.

1895 – In the series on men of note in Otago, three articles on 'John Buchanan F.L.S., Designer and Botanist' appeared in the *Otago Witness* under the initials I.M.I. (McIndoe), accompanied by a crude engraved portrait. From these articles, much of the information for later biographical notes has been extracted. Some of the incorrect dates, particularly the date of Buchanan's arrival in New Zealand, may be put down to his failing memory. It is certainly not the only date over which he made a mistake. There is confusion over to whom and when parcels of botanical collections were sent to Britain and somehow Macquarie Island has been substituted for Campbell and Auckland Islands. These mistakes have been faithfully copied ever since. Nevertheless, a careful study of the articles reveals a fairly true account of Buchanan's career that is concealed by the author's many interpolations of extraneous subjects and his very verbose manner of writing.

1898, October 18 – Gore received a telegraph at the Museum at 3.20 pm from Walter Hislop with the message 'Buchanan died this forenoon'.

Dr Hector in a letter to J.D. Hooker wrote that:

... poor John Buchanan died nearly 2 years ago of progressive paralysis he was a great friend of mine and we frequently botanised together attending him in his last long illness ... the latter months of which were beclouded through extinction of mental faculties

'John Buchanan, Surveyor' died at Maori Hill, Dunedin, on Thursday, 18 October 1898. He was unmarried and no next-of-kin were recorded. Buchanan's funeral took place on Saturday, 20 October, leaving the residence of Mr Campbell, City Road, Maori Hill, at 2.30 pm for burial at the Northern Cemetery.

His grave, in Lot 2 Block 86, is in good order, although the lettering on the iron-fenced slab is now badly eroded. Buchanan's remaining land, part of No. 45 in

North East Valley, was bequeathed to his brother, Peter, 'of Sydney, in the Colony of New South Wales, Printer'. It was purchased by Buchanan's friends and neighbours, the Andersons (J.G. Blackman, pers comm). Peter Buchanan, who became Assistant Government Printer, New South Wales, had a family of eight and it is from John's nephews and nieces that the Buchanans' line has been continued in Australia (D. Saunders pers comm).

Buchanan, Friend and Colleague

The impression that any present-day reader might form of John Buchanan is sure to be coloured by McIndoe's articles in the *Otago Witness*, in which he implied that the subject of his interview was dour except when discussing botanical matters. As the author had obviously had conversations with Buchanan, his opinion cannot be ignored, but it was formed when Buchanan was getting old and infirm, his memory was failing and probably his patience too.

Fortunately, the surviving letters to Buchanan from family, friends, and associates show him to have been otherwise. That a degree of reserve seemed to exist between Buchanan and some of his colleagues may be explained by the difference in age, as they were all considerably his junior. By the standards of the day, these younger men would be deferential and formal in their address to the older 'Mr Buchanan'. Even so, flashes of humour, some of them quite earthy, illuminate the pages of their letters. Skey, a well-known wag, admitted that he had 'often laughed at your pithy humour in the matter' when writing to Buchanan in his retirement. The matter was Buchanan's offer to 'p--s on my [Skey's] garden'. And there is, in Buchanan's writing, the little conundrum of 'what Julius [Haast?] went for and what he returned with'. The numbers 709-2219 when read in reverse provide the answer. The most surprising of all is Buchanan's note dated Wellington 1884:

Another damned scoundrel discovered afterwards he borrowed the money to buy a silk dress for a whore called the Chestnut filley.

In fact, such robust expressions should not be unexpected between friends who had spent much time in the company of the tough men of the gold fields and in the primitive hostelrys where the survey teams sought food and shelter. Buchanan was known to his associates as 'Buckie' or, in the

case of Henry Mair, 'old Bucky'. In a letter to Hector of 26 June 1866, Mair said:

Tell old Bucky that interesting (half a cat) he saw at John Foxes in the Bay (Miss Jones) has gone and got married, out of spite it is said, for his desertion.

Even the Hon. W.D.B. Mantell refers to 'Buckie' and the 'Buchanical Gardens' in some of his highly indecorous letters to the absent Hector. Skey's verse on the occasion of Buchanan's retirement is addressed to 'Jock'.

McIndoe's inference that botany was Buchanan's only deep interest is not strictly correct. The letters from two of his fellow expatriates who were writing to him twenty years (forty years in the case of Alan Burns) after they had been together in Scotland are full of family news, gossip, and reminiscences of the old days. Buchanan's other friends in Scotland, Otago, and Southland wrote of their families, farms, and politics and included a good deal of local gossip too. He maintained a lengthy correspondence with John Munro, a northern politician who lived at Whangarei Heads, and George Wilson from Gisborne. Politics, poetry, and Highland mythology and history are some of the topics that are covered in their letters. Items cut from newspapers and magazines show that Buchanan was deeply interested in Scottish history, tales of Rob Roy in particular, as well as verse, jokes, articles on farming, animals, horticulture, and, of course, botany. Buchanan's brothers, Peter in Sydney and James in Glasgow, and his sister, Agnes in Thornhill, wrote affectionately to their elder brother and sent him newspapers for many years.

Nowhere in all these letters does any strong religious belief on the part of the writers or from Buchanan emerge. Nor does he appear to have been averse to strong drink, in fact mentions the lack of 'grog' at Waikawa over Christmas week in 1867. Certainly the survey parties were well provisioned in that respect – a case of Geneva on the Wanaka expedition and the *Matilda Hayes* carried 10 gallons of rum, a case of brandy, and a cask of Tennant's ale. Nor was tobacco left out, 5lbs were taken to Lake Wanaka in January 1863. There is no mention of a pipe in the descriptions of Buchanan nor by him. His photographs show him to be rather well dressed in an informal fashion, he certainly did not sport a silk hat, such as those worn by Cox and Gore on the occasion of the staff group in 1874 (Fig 3). Later photographs show him wearing a sombre tweed suit of clothes, with a white collar and dark tie. He

had neither moustache nor beard, but grew the conspicuous side-whiskers seen in all the known photographs. His eyes were blue and his complexion bright. He was of slim build, apparently was not tall, and was unmistakably Scottish in appearance.

There is no doubt that Buchanan fitted comfortably into a colonial life. He appears not to have aspired to social position and yet was on easy terms with some of the leading men of the day, including the Governor Sir George Grey, The Hon. W.B.D. Mantell, W.T.L. Travers, Dr Charles Knight, Dr Thomas Hocken, and above all, his mentor, Sir James Hector. His friends, John Munro, William Purdie, Andrew Russell, David Wallace, and George Wilson, were all men of position in town and country, as were Dr John Ross and Roger Hennedy in Scotland and Alan Burns in Nova Scotia. In every way Buchanan was truly a product of his homeland imbued with the honesty, simplicity, and industry that characterised the nineteenth-century Scottish colonist.

Epitaph

North Gisborne
Poverty Bay

Oct. 25/98

Sir James Hector,

Sir, it is with sincere sorrow I have just heard of dear J. Buchanan's death. Kind good-hearted old friend of mine, with whom I have passed many a pleasant long day, rambling the hills and other interesting localities of picturesque Wellington. His conversation, interesting, closely observant, gentle, loving and eminently intrusive.

We parted 20 years ago to our mutual regret, but to me – indeed I do truly say, irreparable loss. He had a brother living in Dunedin he has told me. May I ask you Sir, for a few particulars of his last days. Who were with him at the last, friends or strangers? And his age. He gave up corresponding with me some years ago. Did he complete his studies microscopic drawing etc. on N.Z.'s Mosses?

I am Sir your most obt Servt,

George Wilson

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Appendix

The Fate of John Buchanan's Botanical Collections

Although many of the comments made by Sir James Hector at the time of Buchanan's death concerning the care of his notes, manuscripts, and drawings do not now apply, there still exists a considerable gap in our knowledge of Buchanan as a person, in our knowledge of his drawings, and particularly in our knowledge of the herbarium specimens that he was said to have amassed during his active collecting days. For instance, Hector several times mentioned that Buchanan had sent parcels of plants to Kew, resulting in Dr Hooker recommending him as a suitable person to employ as a botanical collector on the Geological Survey of Otago. There is no evidence that such collections were ever sent to Kew. Dr Lauder Lindsay, following his visit to Otago between October 1861 and January 1862, mentions in his Preface (Lindsay 1868) that 'several collections (from Otago) have been made, and some sent home I am aware, but they were lost to Science from not having been sent to the proper quarters for utilization'. At the time of writing, Lindsay had already searched for Otago plants in several herbaria, including Kew and Edinburgh. Buchanan himself is reported to have said that he began making plant collections in the vicinity of Dunedin soon after his arrival in New Zealand. Nevertheless, it is evident that the first plants collected by Buchanan that were received at Kew came from Hector's 1863 expeditions to the mountains and lakes of west Otago and the West Coast sounds. These are fully acknowledged by Hooker (Hooker 1864–67).

The mystery of the destination of Buchanan's early collections has been partly solved by the discovery of a series of letters from Dr Ross of Busby, near Glasgow, in which he acknowledges the receipt of packets of bryophytes

and ferns received from Buchanan from 1860 to 1862 with a mention of a specimen sent 'a number of years ago'. Dr Ross passed some of the mosses on to the bryologist, William Wilson of London, who had collaborated with J.D. Hooker in writing up the sections on the mosses in the *Flora Antarctica* (Hooker 1845–1855). Dr Ross was a medical practitioner and friend of Buchanan's, apparently both shared a common interest in ferns and bryophytes. His letters (Buchanan papers, Mitchell Library, University of Sydney) confirm that it was he, through Mr Wilson, who brought Buchanan's name to Hooker's notice as a careful and enthusiastic local botanist who might be included on Dr Hector's Geological Survey of Otago. After receiving Dr Ross's recommendation, Mr Wilson replied that 'I wrote to Dr J.D. Hooker on the same day that I received your last and have no doubt that he will do all he can to secure Mr Buchanan's appointment'.

The whereabouts of the mosses and other plants sent to Dr Ross who died in the early 1870s is, as yet, unknown. That he considered the collections to be important is expressed in a letter to Buchanan written from Busby on 15 June 1867, at the time of the publication of the last part J.D. Hooker's *Handbook of the New Zealand Flora* – 'I am sorry that Mr Wilson was unable to undertake the revision of the New Zealand mosses as the Handbook would have been much more useful to me and have done more credit to your discoveries.'

Until a search is undertaken, especially in the collections of Glasgow and Edinburgh, our knowledge must remain as fragmentary as the known Buchanan specimens that have survived in New Zealand, mainly in the herbarium of the Colonial Museum (Te Papa) and the Otago Museum. The latter collection has been deposited by the Trustees of the Otago Museum in the herbarium of Te Papa (WELT). Unfortunately, it sheds little light on Buchanan's activities as the specimens rarely have localities or dates. This paucity of information is surprising considering the very descriptive labels and drawings that were provided for the specimens sent to J.D. Hooker by Hector and Buchanan from their 1862–63 expeditions, particularly those accompanying the original collections of alpine plants from the west Otago mountains.

It has been generally understood by those concerned with the taxonomy of the New Zealand flora that the bulk of Buchanan's collections, including type specimens of the plants described by him, are to be found in the herbarium

previously housed at the Otago Museum. However, a recent effort to mount and number parts of the herbarium at the National Museum, including bulk field collections, duplicates, and unattributed specimens, has revealed much Buchanan material that has hitherto been unrecognised. Although the information on the sheets is scanty, sometimes only a single word, Buchanan's writing is quite distinctive and, in many instances, specimens can be related to published and unpublished accounts of trips that he or his colleagues made. Even before Buchanan retired in 1885 from the position of botanist and draughtsman to the Colonial Museum and Geological Survey, there appears to have been a steady deterioration in the botanical collections of the Colonial Museum. In a letter of December 1882 to T.F. Cheeseman, Buchanan wrote 'I had a very good collection at one time, but an herbarium that is open to general plunder cannot remain long of much value....' (Cheeseman papers, Auckland Museum). Moreover, due to inadequate storage space, the ravages of insects, mice, and damp were ever present. In 1906, Cheeseman, in a letter to Augustus Hamilton, Hector's successor to the Directorship of the Colonial Museum, wrote 'I am glad to hear that you are doing something with the herbarium, but I fancy that you will find that most of the specimens are so much damaged as to be valueless – at any rate that was the opinion I formed when I saw it last, about three years ago' (Cheeseman to Hamilton, Sept, 1906, Te Papa). More than 50 years had elapsed by the time the renamed Dominion Museum was built and the herbarium rehoused. It seems that successive waves of acquisitions, including the large and important herbaria of Kirk, Petrie, and Cockayne, had completely submerged the dusty pages and packages of the Colonial Museum herbarium and that, in an effort to curate the material of known collectors, the poorly documented specimens from Buchanan's day were put aside. Thus several packages only recently opened were marked in Buchanan's hand as 'cleaned 1883' or '1884'. They contained suites of loose specimens in the newspapers of the time, and included plants from Buchanan's and McKay's trip to the Otago Lake District of 1880–81, Henry H. Traver's collection from the 'Nelson Mts', Alex McKay's from Mt Arthur in 1879, James Park's from Mt Franklin in 1884, and Buchanan's from the 'Tararua Mts'. Many other specimens have been found throughout the herbarium in their correct folders but unmounted and unrecognised. Although these can be

attributed, on the evidence of handwriting, to Buchanan in general and the Colonial Museum in particular, there is now little possibility of ascertaining whether the material was collected by Buchanan or only labelled by him. A further important holding is the bound volume of grass specimens that were inked and nature-printed on stone for publication in three folio volumes (Buchanan 1878–80).

The Otago Museum collection consists of 21 guardbooks, of which 10 contain native flowering plants: 1 Subantarctic Islands' plants, 1 introduced weeds, 1 New Zealand ferns, 2 New Zealand bryophytes and lichens, and 1 New Zealand algae. The remaining 5 foreign plants include ferns, lichens, and bryophytes. An inventory of the pages of each of the ten books of native flowering plants has been made (Adams, unpub., in Te Papa). The total number of pages in the books is 674, often with several specimens on each, and sometimes with specimens affixed to the reverse of a page. Those who have had occasion to examine the books have commented on the number of specimens missing. Whilst some specimens have certainly been removed, rearranged, or dislodged, my conclusion is that, after writing in the name of a species, Buchanan left spaces for those not then available to him. A close examination of such pages or spaces shows that the surface of the paper is undisturbed. Thus the accusations that have been levelled at contemporary and later botanists appear to be mainly unfounded. It seems that Buchanan himself, in his retirement, sought occupation in compiling and reorganising these books of plants.

There remains, however, a question concerning the whereabouts of the 'Cabinet containing a herbarium of 650 species of plants arranged according to Dr Hooker's recently published Handbook'. Buchanan also exhibited '73 species of ferns of Otago well-mounted and carefully classified' and sheets of mosses and seaweeds (Catalogue of Exhibits, New Zealand Exhibition, 1865). These plants were deposited in the Otago Museum, but the Buchanan herbarium, as it is currently known, consists only of the 21 guardbooks bequeathed to the 'Otago University Museum' in 1898 (Cheeseman 1906).

The history of the Colonial Museum herbarium and of Buchanan's collections in particular is a sorry one. There is no doubt that, from the time that he arrived in New Zealand, every effort was made by Hector to make the vegetation better known and to provide for posterity a well documented botanical collection. To this end he

employed Buchanan first on the Otago Provincial Geological Survey and later on the Geological Survey of New Zealand based at the Colonial Museum. The first priority of these botanical endeavours was quite clearly to provide J.D. Hooker with a much wider range of plants than had been previously available to him. At the time Hector came to Otago, Hooker was well advanced in the preparation of 'the Handbook' and before Hector left England he had been briefed by Hooker on the need for more collections, particularly of alpine plants. 'Dr Hooker is only waiting for more complete materials before undertaking work on the Flora of New Zealand. The Botany of the West Coast will be especially interesting and in any arrangements for an exploration of that region a properly qualified person should be included whose whole time may be devoted solely to forming a collection of plants, as from the great humidity of the atmosphere their preservation will be a difficult task requiring constant attention' (*Otago Provincial Govt. Gazette* 5, 1862). Buchanan was hired and instructed to provide full information on the vegetation with the plant specimens, which he supplemented with sketches, maps, and notes. How carefully he had previously annotated his plant collections is uncertain, as very few prior to Hector's arrival have been found and those that have been appear to be numbered duplicates retained for reference. These are all bryophytes, yet the lists returned by Dr Ross from Scotland indicate that Buchanan had sent him ferns, seaweeds, and perhaps some flowering plants.

Some of the mosses were passed on to Mr William Wilson in London, others to Professor Walker Arnott in Glasgow. It would be surprising if Buchanan had not sent plants to Roger Hennedy, his friend and author of the *Clydesdale Flora*. Letters and other accounts make it possible to indicate the sequence of Buchanan's collections and to give some idea of other plant material that was later accessioned for the Colonial Museum herbarium.

1852–56 – Buchanan said that he commenced collecting soon after his arrival in Dunedin. Ferns and the localities 'Leith Valley' and 'Pine Hill' were mentioned; 'regular collection of local plants began at once' (McIndoe, *Otago Witness*, 1895).

1857–59 – Only fragmentary collections were made on the overland Reconnaissance Surveys due to lack of time and pressing materials (Lauder Lindsay 1869). Perhaps better collections were made by Buchanan during

the less arduous Survey of the Otago Hundreds in 1859.

1859–60 – Collections of mosses, liverworts, and ferns were sent to Dr Ross at Busby near Glasgow, some of which he forwarded to Mr William Wilson and Professor Arnott for identification. Thirteen ferns were listed in Dr Ross's reply of May 1860 and the mosses numbered at least 53. In a second letter of 21 May, Dr Ross discussed ferns and passed on a request for seaweeds from Dr Arnott. He also included the identifications of 8 species already sent. His letter of October 1860 has further lists of mosses and a mention of a specimen 'you sent to me a number of years ago'. The acknowledgement of moss packets continued until March 1861; in August 1861, there was also a mention of the 'parcel of trees and ferns you sent to Dr Arnott'. The collections probably came from the Dunedin area, in particular, Mt Cargill and North East Valley.

1861–62 – In Dr Ross's letter of 18 December 1861, the number of moss collections mentioned reached 99. On 22 February 1862, Dr Ross discussed *Ophioglossum* from Tuapeka and, on 18 April 1862, he thanked Buchanan for the ferns sent and reported on what Dr Arnott had said about them and supplied additional identifications. On 25 September 1862, Dr Ross acknowledged *Botrychium* specimens. On his return from the Tuapeka goldfield, Buchanan was employed by Hector to collect mosses in North East Valley from September until December 1862.

In 1867 in a Memo to Hector, apparently intended as an enquiry to J.D. Hooker via Hector, Buchanan wrote 'There were certain mosses sent to Mr Wilson six or eight years ago which he named several as new: Has Dr Hooker given these Mosses other names or has further examination proved them not to be new or has Mr Wilson forgot all about them as there are none of them noticed in the Handbook. I have no specimens of them and they were collected in the interior of Otago Province where there is little chance of getting them again.' Hooker's note in reply was 'I invited Mr Wilson's attention and expertise in preparing the moss part of the Handbook and should have been delighted to have had it, or indeed to have handed the whole department over to him – but he is old and is in bad health and did not respond to my appeal nor did Mr Wilson say anything about the mosses referred to by Mr Buchanan nor send me specimens.'

1863 – On Hector's expedition 'to the West Coast overland', Buchanan's role as a plant collector was fulfilled.

In March 1863, after three months in the mountains at Lake Wanaka, including Black Peak, Mt Alta, 'Three Kings and Lake Mountain', the Matukituki Valley, and later the Lindis Pass and the Waitaki Valley, Buchanan listed the plants sent to Hooker as '328 species of which 110 are alpine from above an alt. of 3000 ft., the highest 7500 ft.' These reached Kew in January 1864: 'Last Saturday arrived your and Buchanan's very fine collection from Otago via Port Phillip and very good they are, I had just printed 40pp of N.Z. Flora and today have sent to stop progress till I work up these things. *Ranunculus Buchananii* is a very fine thing (white flower and cut leaves) quite new – I had *Lyallii*, the great peltate leaved one before. The seed I am distributing better to insure their vegetating: they look good and are extremely well put up. The collection does Buchanan infinite credit. I have called a most curious little Portulacaceous plant – (*Donatia* of the collection) *Hectorella caespitosa*. The grasses are very fine but not much novelty. They will require systematic collecting especially the smaller ones, finer Cyperaceae and especially Carices' (J.D. Hooker to Hector 18 Jan 1864, Te Papa). In addition to the dried plants and seeds, Buchanan provided watercolour sketches of the living plants, habitat notes, and a vegetation map of the Matukituki area (Kew Archives). Probably no other major New Zealand collection has been better documented.

In May, Hector set off on the exploration of the West Coast Sounds. 'The fore and after schooner *Matilda Hayes*, in which Dr Hector proposes visiting the West Coast, has undergone considerable transformation by having her hold converted into cabins, with berths adjoining, sufficient height being given to both by the construction of a sort of deck-house extending nearly the full length of the vessel. She has been further delayed in the completion of her outfit by receiving new spars and rigging, but expected to be ready in a few days' (*Otago Daily Times*, 11 May 1863). Buchanan did not embark on the *Matilda Hayes* voyage until November. On his way up country to Lake Wakatipu, where he was to join Hector, plants were collected and notes taken on the vegetation. These continued for the remainder of the overland journey to the West Coast and in the Sounds on the return voyage. Buchanan's plant collections, as Hector had predicted, apparently suffered seriously from mould in the constantly damp atmosphere. A large collection of lichens and algae was lost, but the total was given by Hector as 250 species of flowering

plants and 350 cryptogams, exclusive of fungi (*Otago Provincial Gazette*, 1864). In the same report Hector said that the 'botanical collection which has been obtained in the Province by Mr Buchanan comprises over 4500 specimens embracing about 650 distinct species of plants.' The majority were sent to Dr Hooker, but a complete set was 'retained to form a herbarium for future reference in connection with the Museum.' The number of species for the Province as given above was considered to comprise 350 species of flowering plants, 80 ferns, 160 mosses, and 60 lichens and algae.

This very substantial collection seems to have virtually disappeared. What little remains entirely lacks the kind of label that Buchanan had supplied for at least some of the alpine plants, such as that for *Ranunculus pachyrrhizus*: 'Black Peak, Otago Lake District, alpine growing in large patches where snow has newly melted, forming close masses of underground stems or stolen roots interlacing, flowers April, alt. nearly 8000ft. petals numerous cor. yellow, turning whitish, covers a ¼ acre Hector & Buchanan 3, 1863.' At first glance the flowering times given for some of the plants seems very late. Considering the very cold winter of 1862, a late season is not surprising, nor was April the date on which the plants were gathered, which was February and March 1863.

1864–65 – By the end of 1864 it seems certain that plant collection for the Geological Survey had ceased and the collections already made had been prepared for the Exhibition in January 1865. Hector's last parcels of Otago plants apparently reached Kew in time for Hooker to add some extra records from Lake Wakatipu and the West Coast Sounds. The Otago Provincial Survey was disbanded in April 1865 and its staff transferred one by one to Wellington. The herbarium remained in Dunedin. An inventory of the 'Cases boxes etc sent from the late Geological Office, Dunedin to Wellington', which was probably made about June 1865 before Gore left for Wellington, does not mention an herbarium or even a package containing plant specimens. It is, however, likely that Buchanan retained for himself some specimens for future reference. In September 1865 from Wellington, Buchanan requested the loan of 'three sheets of Otago Mosses mounted with glass which were left in the Museum as they form only a small part of a collection which cannot be finished and named until the arrival of Dr Hooker's handbook of the New Zealand Flora which is expected

from England in a few months. The mosses left in Dunedin are necessary for reference and I shall be obliged if the Trustees can allow me to have them for some months and on the completion of the collection a full set will be returned to Otago.'

In 1870, J.S. Webb wrote that the 'first thing to be noted about the herbarium [of the Otago Museum] is that it is essentially a collection of western plants made I presume during the expeditions of the Geological Survey staff to the Lake District and West Coast' he added that 'a majority of the rarer plants are represented by beautifully prepared specimens' (Webb 1871). This confirms that the bulk of Hector's and Buchanan's collections were retained by the Otago Museum and that the material was divided between Kew and the Provincial collections. In a Memorandum to His Honour the Superintendent of Otago of 2 September 1866, Hector stated that 'the Geological and Natural History collections which I left in Dunedin' consisted principally of 1. Collections of Rocks and Fossils, 2. Birds, 3. Herbarium of Dried Plants, 4. Woods.

He expressed particular concern over the storage of the herbarium and the valuable collection of birds. The Colonial Museum herbarium, therefore, must be presumed to have had its genesis in the collections made in the summer of 1865–66, when Buchanan accompanied Hector on a geological survey of Northland. Long lists of plants found were prepared by Buchanan from 'the extreme point of Cape Reinga, North Cape, Mt Camel, Hokianga, Bay of Islands, Whangarei, Whangaroa, and Kaitaia'. In a report to Hector dated May 1866, Buchanan wrote

'The Cyperaceae etc. etc. of this journey were all sent to Dr Hooker, but no notice having been taken of them further than there was nothing new.' Living and dried plants were despatched to Wellington by Buchanan, 'the dried plants I hope Donald places in dry paper without delay as they will want it very much'. As this collection, sent from Mangonui on 14 January, did not arrive at the Museum until 1 March, it is likely that many of the plants were destroyed by mould. The boxes sent from the Bay of Islands were reported by Mantell as 'containing dry or rather, moulded plants' (Mantell to Hector, 23 March 1866).

Buchanan's second trip in 1866 to the Kaikoura mountains was dogged by constant rain and flooded rivers. The botanical results of this trip, which was undertaken primarily for geological purposes, were few. 'The Alpine plants is as yet a great disappointment I have only been

able from mists to get up one mountain about 8000ft. I walked along the sharp ridge 3 miles and got nothing it is too dry. There was little snow at that altitude a little in the gullies below. In some places it is very dangerous' (Buchanan to Gore, 12 December 1866). Buchanan, heavily committed with the geological collections, said in the same letter written from Mr Caverhill's station that 'I got Mr Boiler's letter an addition of a gun to my swag would involve another horse and a man to look after it. I have left a large part of my things already at the Awatere of course he is right and I would take pleasure in shooting birds, but I don't think Dr Hector would approve the additional expense. Otherwise it is perfectly impracticable.'

The trip to Mt Egmont in February 1867 following Buchanan's return from Marlborough appears to have been more productive. Once again, parcels of specimens and seeds from Marlborough and Mt Egmont were sent to Kew.

Buchanan's next field trip to south-east Otago from November 1867 to January 1868 was made for geological collections. It was an arduous one with bad weather and injury frustrating his efforts. There is no record of anything but a few bryophytes having been collected and possibly some shrubs from Mataura, Wyndham, and Waikawa. This was Buchanan's last major field trip for almost ten years, although he collected and noted the plants of the Wellington Province. The herbarium was, however, supplemented by the collections of others, particularly H.H. Travers from Nelson in 1871, the Chathams in 1871–72 and the Tararuas in 1876. In this, Travers continued Hector's tradition of having a botanical collector working in conjunction with the Geological Survey. After Henry Travers, the collecting was taken over by McKay and Park, who were both geological field men. Thomas Kirk collected with Hutton and was also commissioned by Hector to make specified collections, namely the plants of the thermal areas and, later, the Nelson mountains. While Haast was working for the Geological Survey, he collected plants in the Canterbury mountains, as did McKay. In South Westland, Hackett collected at Okarito. In 1873, another hired collector, Morton from Invercargill, went over the Dore Pass into the Eglinton Valley and to Lake Te Anau. Hector himself made small collections from a number of localities, including the Buller and Lake Brunner as well as on the Luna trip to Fiordland in January 1873, when he was accompanied by T.H. Potts and J.D.Enys, again creating confusion with

the Hector and Buchanan collections of 1863–1864. A few plants came from Hector and Sir George Grey from the Taupo district and from Gilbert Mair from the Urewera, followed by Buchanan's considerable collections from Kawau Is, Auckland, and the *Hinemoa* voyage.

Therefore, by 1879, the staff of the Colonial Museum had built up a herbarium of plants from a very wide range of localities to which numerous others had contributed – W.T.L. Travers, Colonel Haultain, Holmes, Green, Robson, Dall, Enys, and Armstrong. After Buchanan's extended trip with McKay and Park in the summer of 1880–81 and his voyage on the *Stella* in 1883, little appears to have been collected. When Buchanan retired in June 1885, it seems that absolutely nothing was done to the herbarium and the attrition by whatever means had begun. The last gift of Buchanan's specimens to Kew was acknowledged by Hooker in March 1882. The plants received were from McKay's survey in the Otago mountains. Except for those collected at Lake Ohau, they duplicate the localities that Buchanan visited in the summer of 1863, thus adding to confused attributions. Much of this 1881 collection remained in packages laid in contemporary newspapers and tied up by Buchanan.

How the Colonial Museum herbarium was arranged is uncertain. In the 1870s, Hector reported that the British and New Zealand plants were being mounted in books and placed in the library for reference. This suggests that Buchanan had already embarked on the guardbook system in which the plant specimens were arranged in family order by name, often with little further information on locality, collector, or date. Some surviving specimens from his day, apart from the parcels of bulk collections, were found on pages apparently torn from books, eg Traver's Chatham Islands' seaweeds. Only the grasses he described and nature-printed have remained in their volume. In 1906, Augustus Hamilton told Cheeseman that he had found seven of Buchanan's books and one of Chatham Island plants (H.H. Travers's) in a cupboard and that 'A large number of specimens are in bad condition but it would be as well if you looked them over. When you return the collection from this Museum I should be glad if you would be so kind as to send a report on the collection as you received it and on its present condition. I think I mentioned to you that when I got this information I proposed to make enquiries as to certain groups or parts of it which are said to be missing' (Colonial Museum, 28

August 1906 06/537). In reply Cheeseman said that he had not known of the existence of Buchanan's volumes of plants at the Colonial Museum 'and should be glad to look through them'.

The missing collection referred to by Hamilton was apparently Thomas Kirk's that Cheeseman had already mistakenly returned to the Education Department. It had been sent to him by Hector in 1898 shortly after Kirk's death, along with other material needed for the *Flora*. Other missing material from the herbarium might well have been the plant specimens mounted in the 21 guard-books that were in Buchanan's possession after his retirement. They contain native plants, not all of which are of Buchanan's collection (many are Kirk's), and a considerable number of foreign ferns, mosses, lichens, and flowering plants; introduced weeds; and a special volume of sub-antarctic plants comparable to the volume of Chatham Island plants mentioned by Hamilton.

It seems quite likely that Buchanan removed unfinished plant books from the Colonial Museum in order to complete them in his retirement, as well as the specimens needed to do so. Certainly, in a number of instances, unique specimens, including types that should have remained in the Colonial Museum, are to be found in the Buchanan books long held by the Otago Museum. An example is the specimen of *Bulbophyllum tuberculatum* collected by Dahl in 1883 and recorded by Buchanan (1884a) when he was still employed at the Colonial Museum.

Kirk examined these plant volumes either in Wellington or Dunedin as he corrected some names and supplied others. Specimens were requested or discussed in Kirk's letters to Buchanan in June 1887, February and May 1888, January 1889, and probably on Kirk's Dunedin visit in November 1892. In Kirk's large 'Private Herbarium', that is, not the one purchased by the Government in 1898, a suite of mountain plants with Buchanan's localities was found. They are without collector or date and the annotations are in neither Buchanan's nor Kirk's writing (Petrie's?). The altitude is usually given, eg 'Black Peak 6000ft.' Aneroid readings were required by Hector from his survey staff and were routinely noted by Buchanan.

Although the fate of part of the Colonial Museum herbarium and the plant collections of the Otago Provincial Geological Survey remains uncertain, it does seem that, at some time and for an as yet unknown reason, at least some of the specimens were distributed. The

frequent occurrence in the herbaria of Petrie, Hamilton, Martin, and Aston of specimens bearing localities visited by Buchanan and labelled in his style, but not his writing, strongly suggests such a distribution. Those presumed to have been made on the Otago Provincial Geological Survey or earlier bear labels such as 'Chain Hills, rare, more common in the interior as at Lake Wakatipu' or 'Shag Point, this grass grows only near the sea'. A number of ferns in Petrie's and Augustus Hamilton's collections without dates from the Leith, Swampy, Pine Hill, and Mt Cargill may be the some of the '73 species of ferns of Otago' displayed by Buchanan in 1865. From the Colonial Museum era are 'Tauranga: this was collected in the graveyard where the soldiers killed in attacking Gate Pah were buried'. Tauranga, Waiwera, and Grahamstown were amongst the places visited by Buchanan in 1877–78.

The presence in the Petrie Herbarium of these specimens accounts for some of the anomalies noted in Petrie's itinerary by Hamlin (1958) for the period between 1874 and 1884. All the available evidence suggests that plant material associated with Buchanan was distributed in Dunedin, probably by Petrie prior to 1894. The labelling seems to be in Donald Petrie's handwriting, additional annotations are initialled 'D.P.', and some of the specimens were certainly collected by Petrie himself.

Buchanan also retained a number of Colonial Museum lichen and moss collections that were most probably amongst the material bequeathed to the Otago Museum in 1898. The lichens are mainly duplicates of specimens he collected near Wellington and sent to James Stirton during the 1870s. The first of these (numbers 1–23) were mailed to Glasgow in August 1872 and, out of the entire collection of over 180 numbers, Stirton described at least 66 new species, the holotypes of which have remained in Britain (Galloway 1985) with isotype material in the herbarium at Te Papa (WELT). As only a few lichens collected by Buchanan survived from his Colonial Museum period, it would seem that they too were taken to Dunedin in order to make up his plant books.

A comparable situation exists with the mosses. The 100 or so packets appear to have been the material Buchanan used to extract specimens for the moss guard-book. The localities and dates are much the same as those for the lichens, ie mostly from Wellington in the 1870s with some from Dunedin and elsewhere in Otago from his earlier collections. This packeted material has now been

deposited by the Trustees of the Otago Museum in the herbarium of Te Papa, thus filling a century-old gap in the cryptogamic collections.

That specimens were extracted from the Colonial Museum by Buchanan for the purpose of completing the plant books seems to be the most likely explanation for some later appearing in other herbaria. With at least 600 specimens of native flowering plants mounted in the guardbooks as well as the ferns and cryptograms, a significant gap must have been left in the Colonial Museum herbarium. With the material sent overseas or exchanged under Hector's name and severely damaged or destroyed by insects, not to mention the continuing extraction of specimens, by the end of the century the herbarium must have been a pathetic remnant of its former extent. For nearly forty years, Buchanan had endeavoured to serve the enthusiastic recipients of New Zealand plants in Britain and fulfil Hector's vision of a representative herbarium in this country. The end result of his efforts was disappointment. Not only were the best of his plants destined for Kew and other far-off institutions but also the fine collections of birds, moa bones, fossils, and other material that had passed through his hands. He lived to see what remained neglected, fragmented, and dispersed. Paradoxically, he compounded the loss by failing to provide adequate labels for the plants he so carefully salvaged during his last years.