From Field to Table: The Pukekohe Dehydration Factory in the 1940s

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ABSTRACT: In August 1943, the New Zealand Government's Internal Marketing Division announced plans to construct a vegetable dehydration factory in Pukekohe, on the outskirts of southern Auckland. The factory was built with urgency, to dehydrate, quick-freeze, can and cool store large quantities of vegetables to assist in providing food for United States troops, stationed in the Pacific. The factory consisted of a large, long main factory building, a boiler house and machine shop, a cafeteria, a chemical building, a vinery building, a laboratory, and an administration block. It incorporated the most modern equipment and processing methods of the time, with much of the machinery supplied from the United States. To supply the large quantities of vegetables required under direction from the Department of Agriculture, produce was grown through a combination of state gardens and commercial market gardeners. To meet the demand, the factory operated long hours, becoming a significant local employer, particularly for women. Workers were also deployed from further afield to achieve the necessary processing outputs. This paper examines the development and operation of the Pukekohe Dehydration Factory in the 1940s, its role in supporting the war effort during the Second World War, and its utilisation throughout the remainder of the decade.

Introduction

New Zealand, as an ally to the United States of America (US) during the Second World War (the war), played an important role in assisting with the counteroffensive against the Japanese in the Pacific. Between 1942 and 1944, US troops utilised New Zealand as a staging post. Military camps established, were predominantly throughout the Auckland and Wellington regions for US soldiers stationed in the Pacific. The camps were a base for military preparations and a place to recuperate upon return. With several camps established in Pukekohe,1 the area became a significant hub for US troops.

Due to the war, there was a significant drive to increase vegetable production to feed troops stationed abroad and those in New Zealand. It became evident, however, that new processes would need to be investigated to efficiently utilise as much of the produce as possible, retain freshness, achieve a long shelf life, and create compact transportation. The dehydration of vegetables had been utilised during the First World War; however, the results were unsatisfactory.²

US authorities requested the New Zealand government to assist with supplying produce to their troops.³ In 1942 and early 1943, the

Department of Scientific Industrial Research, in their Plant Chemistry Laboratory in Palmerston North, began to trial methods to help achieve successful dehydration of vegetables and fruit.⁴ In 1943, the government sent an officer of the Internal Marketing Division to the US to investigate the latest techniques in dehydration and quick-freezing. Plans and specifications were brought back to assist with designing the factories in New Zealand.⁵

Throughout 1943 and 1944, the Internal Marketing Division established four processing factories across the country, to

¹ Camps for US troops in Pukekohe were situated at Rooseville Park, Moult House for senior officers, Pukekohe Racecourse, Wesley College, Paerata, and several camps in Helvetia.

² Anon. "Dehydration of Vegetables: Big Undertaking" p

 $^{^{\}scriptscriptstyle 3}$ Anon. "Development of "Quick-Freeze" Method " p 4.

⁴ Anon. "Dehydration of Vegetables: Big Undertaking" p

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⁵ Morris Franklin Remembers p 112.

dehydrate, quick-freeze, cool store and can vegetables and fruits.⁶ The factories were situated in Hastings, in Pukekohe on the outskirts of southern Auckland, Motueka near Nelson and Riccarton in Christchurch.⁷ The factory locations were strategically selected for their proximity to well-established rural production areas for vegetables and/or fruit growing. While the factories were built specifically to assist with the war effort, there was some intention for continued use after the emergency period of the war had passed.⁸

Construction of the Pukekohe Dehydration Factory (the factory)⁹

On 6 August 1943, the Internal Marketing Division formally announced its plans to construct a vegetable dehydration factory on Subway Road, Pukekohe. The factory would have the most modern plant and processing methods. In addition to dehydrating at least 16,000 tons of vegetables, one section of the factory would handle between 25,000 to 30,000 tons of fresh green vegetables a year, to be

packed in cases, ready for dispatch to the armed forces. 10

Robert Adams Patterson, appointed as chief Government Architect in 1941, oversaw the design of the factory. The project was one of many wartime facilities across New Zealand that Patterson was involved in. Construction of the factory was undertaken by the Public Works Department, on behalf of the Internal Marketing Division, with assistance from the Waikato Associated Builders. 12

The factory site covered approximately eight acres. It was well positioned near the Pukekohe train station, and a siding was constructed adjoining the factory for prompt loading of vegetables onto freight trains for transporting to the port of Auckland for shipping.¹³

Given the restrictions under the Timber Emergency Regulations 1939, acquiring the timber to construct the factory required a request be made to the Timber Controller. The Commissioner of Works emphasised that, given the magnitude of the job, native timber alone would be insufficient to supply the quantity of timber required for the factory's construction. The Commissioner of Works sought that a portion of the Oregon timber recently brought into Auckland, be used for the factory's construction. In particular, with a large section of the factory to be used for cool stores, the Commissioner considered Oregon more appropriate than native timber. The factory's roofing sheets and much of the cladding boards were made of asbestos.¹⁴

The project was urgent, needing to be operational for the upcoming vegetable season.¹⁵ By November 1943, construction was progressing well, with many of the materials for the new factory on-site. Metal from the Stevenson Quarry in Drury was trucked in for the concrete foundations and other metal

⁶ Anon. "Dehydration of Vegetables" (26 November 1943) p 4; Anon. "May Expand" p 4.

⁷ Anon. "[Untitled]" p 2; Anon. "Development of "Quick-Freeze" Methods" p 4; Anon. "For Motueka" p 4.

⁸ Anon. "Dried Vegetables" p 2; Anon. "Vegetables for Forces" p 2; Anon. "Dehydration" p 3; Anon. "Factory at

Pukekohe"p 2.

⁹ Colloquially known as the Dehy.

¹⁰ Anon. "Vegetable Dehydration" p 2; Anon. "Pukekohe First" p 4; Anon. "Vegetables for Forces" p 2.

 $^{^{\}rm 11}$ Dehydration Factories: Equipment Memorandum.

 $^{^{12}}$ Grattan Official War History of the Public Works

Department p 934; Street, letter (9 December 1943).

¹³ Anon. "Vegetables for Forces" p 2.

¹⁴ Commissioner of Works, letter to Timber Controller (27 August 1943).

¹⁵ Grattan Official War History of the Public Works Department p 934.

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Upon completion, the factory comprised a large main building, measuring 498 feet by 150 feet (150m x 45m), a boiler house and machine shop, a cafeteria (including lockers and showers), a chemical building, a vinery building, and laboratory and administration block (including a strong room). Other key features included a weigh bridge and a large chimney flue. The factory premises covered a total floor space of 95,400 square feet (approximately 8,860 square meters).17 The administration block, cafeteria, and laboratory buildings had concrete foundations with timber framework and external walls clad in weatherboards on the lower portion and asbestos sheeting above. The floors were made of timber and the roofing was asbestos sheets.¹⁸

A considerable amount of the mechanical and electrical equipment was supplied under Lend-Lease by the US and installed under the supervision of the Public Works Department.¹⁹ The total expenditure in association with erecting the factory facilities cost £239,594.²⁰

 16 Anon. "New Enterprise" p 2; Flynn *Growing up on the Hill* p 103.



Figure 1: Birds-eye view of the Pukekohe Dehydration Factory, including railway siding and surrounds. L.R Butland Limited Pukekohe, Franklin District, Auckland City. 14 May 1958, Whites Aviation Ltd: Photographs. Ref: WA-46107. Alexander Turnbull Library, Wellington, New Zealand. /record/32054416

 $^{\rm 18}$ District Engineer, letter to the Public Works Head (16 February 1944).

¹⁹ The Lend-Lease Act 1941 established a system that allowed the US to lend or lease war supplies to nations it

deemed to be vital to the defence of the US. Lend-Lease Act (1941). National Archives (US); Anon. "May Expand" p 4.

²⁰ Smith *No Job Too Hard* p 107.

¹⁷ Grattan Official War History of the Public Works Department p 934.

Operating the large complex required considerable water and electricity. Steamgenerated electricity powered the factory, but at peak production, which was greater than originally anticipated, a supplementary supply of electricity was needed from the Franklin Electric Power Board.²¹ Water predominantly obtained from the Pukekohe Borough Council town supply. Additionally, a special arrangement with the Borough Council was made for the construction of a 200,000gallon (approximately 757,000 litre) reservoir on the corner of Kitchener and Anzac Roads, Pukekohe.²² The agreement stipulated that the council would acquire the site and handle the construction of the reservoir and related infrastructure as an ordinary "local work," as defined in the Public Works Act 1928. This was subject, however, to general supervision, and all possible assistance from the Public Works Department.²³

Services Vegetable Production Scheme gardens

Pukekohe and surrounding areas such as

Patumāhoe, with its rich alluvial soils, had a significant established market garden industry by the early 1940s. However, it soon became clear that vegetables would need to be grown on a larger scale to adequately help feed the troops in the Pacific, as well as the US forces stationed in New Zealand. In June 1942, the New Zealand Department of Agriculture implemented the Services Vegetable Production scheme, also known as state gardens and SVPs, to supply vegetables to the US troops.²⁴ Under the scheme, 27 state market gardens projects were established across New Zealand, covering more than 4,000 acres.²⁵ In the southern Auckland area, a substantial state garden was established in Patumāhoe, as well as state gardens in Mangere, Papatoetoe and Onewhero.²⁶

The state garden scheme, established in Patumāhoe, covered 900 acres of gardens, and provided some of the produce for the factory. The land was acquired from its original owners for the wartime purpose of vegetable production, much of it previously used for

dairy farming.²⁷ Alongside the Services Vegetable Production scheme farms, commercial growers were also contracted by the Department of Agriculture to supply a significant portion of the vegetables for the factory.²⁸

Extensive building operations in connection with the Services Vegetable Production scheme were undertaken in Patumāhoe. These included hutments for the workers, sheds for housing equipment and fertiliser, and large buildings resembling mess and social rooms.²⁹ The majority of the scheme workers were women, known as land girls. In an instance in November and December of 1943, both US and New Zealand troops assisted the land girls in the fields in Patumāhoe, as crops were being threatened by an overgrowth of weeds, which civilian labour alone could not manage.³⁰

Deployment of workers

Operating the factory required the establishment of a workforce. As with the gardens, the limited number of working-age

²¹ Grattan Official War History of the Public Works Department p 934.

²² Anon. "New Reservoir" p 3.

²³ Anon. "An Extension Scheme" p 3.

²⁴ Anon. "Garden Produce" p 2.

²⁵ Anon. "Vegetable Farms" p 1.

²⁶ Anon. "Production from State Gardens Stepped Up" p

²⁷ Anon. "Girl Labour" p 3; Anon. "General News" p 6; Anon. "Waste Alleged" p 2.

²⁸ Anon. "Busy Time Ahead" p 3.

²⁹ Anon. "Patumahoe News" p 3.

³⁰ Anon. "Saving Crops" p 2.

men available due to wartime deployment meant that a significant portion of the employees were women. Some of the workers were also older men and university students. The predominance of women at the Pukekohe Dehydration Factory reflected the broader national trend in the labour force composition at that time. While some local women volunteered to work at the factory, this alone was not enough to provide the necessary workforce. The Manpower Authorities directed women and other people to work at the factory in order to meet the processing demands.³¹

When the factory first opened, which appears to have been by March 1944, it operated 24 hours a day, working in shifts, but by August 1944, the factory operated approximately 16 hours a day.³² The factory had between 600-700 employees over the 1944-45 season.³³

Housing the workers

By mid-1944, the US troops had predominantly left New Zealand.³⁴ The recently vacated US troop camp in Rooseville Park provided a suitable location for accommodating the



³² Anon. "Busy Time Ahead" p 3; Morris *Franklin*



Figure 2: Workers crating cabbages on the vegetable packing line in the factory in Pukekohe, ca 1945. Auckland Libraries Heritage Collections 1631-ALB-319-31-01, Hitchcock, J.H. et al.

Remembers p 114.

33 "Internal Marketing Division Annual Report and Accounts p 22.

³⁴ Hinton & Hinton *Commemorative Booklet* p 5.

factory staff from beyond the local area who could not commute daily.

The camp, built for US troops, was completed in August 1942. When first built, it included 53 four-man huts, 11 two-man huts, two cookhouses, a mess room and four ablution blocks. The camp was also used as accommodation for New Zealand troops returning from the Pacific.³⁵ A residence, known as Moult House, located on the corner of East Street and Totara Avenue in Pukekohe, was utilised as the headquarters for the Rooseville Park Camp by the US troops. This was also utilised as accommodation for workers at the Pukekohe Dehydration Factory.

Fletchers Construction modified and extended the camp to provide more comfortable accommodation for the factory staff.³⁶ The camp was positioned on a commanding site with panoramic views and within walking distance from the factory. It was described as a model camp, containing almost every modern amenity to be found in such institutions. Lined huts, each to be occupied by two girls,

contained electric lights, comfortable beds, a dressing table with mirror and drawers, and two wardrobes. Amenities included hot and cold showers, baths, drying and ironing rooms and a mess hall capable of seating 220 people. The cookhouse was modern in every detail. An indoor games room provided for leisure activities such as ping pong. The camp also included a medical hut, a medicine supply store, and a four-bed hospital.³⁷

The camp opened on 16 June 1944, with a dance held for workers in the social hall.³⁸ Although the camp was not quite complete, 81 people, predominantly women, were already in residence. The camp had an estimated capacity of 150 people.³⁹ By late February 1945, the camp was at full capacity. As a result, the District Manpower Office shifted its focus to obtaining workers from in and around Pukekohe, rather than from further afield.⁴⁰

The factory in action

The development of dehydration and quickfreeze technologies on such a vast commercial scale was new in New Zealand in the early to mid-1940s. The dehydration process enabled vegetables and fruit to have a long shelf life by removing the natural water content, thereby inhibiting the growth of bacteria and mould. Initially the factory in Pukekohe only accommodated the dehydration of vegetables and cool storage, however, by the end of 1944, quick-freezing and canning equipment were added.⁴¹ The quick-freeze process rapidly reduced the temperature to zero, but not so rapidly that the cell membrane was destroyed. The result was vegetables which retained their freshness for at least a year.⁴²

Along with significantly increasing the longevity of the produce, dehydrated vegetables saved on cargo space. For example, a 45-pound (approximately 20-kilogram) crate of cabbages shrank, when dehydrated, to a six-and-three-quarter pound (approximately three kilograms) tin. While two pounds (approximately 0.9 kilograms) of carrots dried down to 2 ounces (approximately 56 grams). 43 The cannery was capable of tinning 30,000 tons per day, and the quick-freeze plant could process roughly half that number of

³⁵ Morris *Franklin Remembers* p 65.

³⁶ Smith *No Job Too Hard* p 107; Anon. "Busy Time Ahead" p 3.

³⁷ Anon. "More Fertiliser" p 9; Anon. "A Happy Family"

p 3.

³⁸ Anon. "Camp Opened" p 2.

³⁹ Anon. ""Hay Fever" Cancelled" p 2.

⁴⁰ Anon. "Girls for Pukekohe" p 2.

⁴¹ Anon. "For Freezing Vegetables" p 3.

⁴² Anon. "New Process for Freezing Vegetables" p 3.

⁴³ Morris Franklin Remembers p 112.

packages.⁴⁴ In October 1944, it was anticipated that, in the following year, over 200,000,000 pounds of fresh vegetables would be sent to troops overseas.⁴⁵

The main factory building consisted of an array of conveyors and processing lines. Multiple steps were required for processing the vegetables in their various forms. The steps for dehydrating carrots, for example, involved tipping them out of bags into a mechanical soaker, where an automatic system transferred them to a washer. From there, they went automatically to a peeler, then another washer, and finally into the dehydration chamber after they had been mechanically cut into cubes or squares and partially cooked. The drying machines then reduced the moisture to four per cent. The finished package was packed in four-gallon containers. which hermetically sealed (airtight) for shipment.46

The processing of peas followed a similarly methodical chain of steps, which were described in detail in a December 1944 newspaper article:

The peas are grown by the broadcast system – they are scattered by machine and not sown by hand. They are

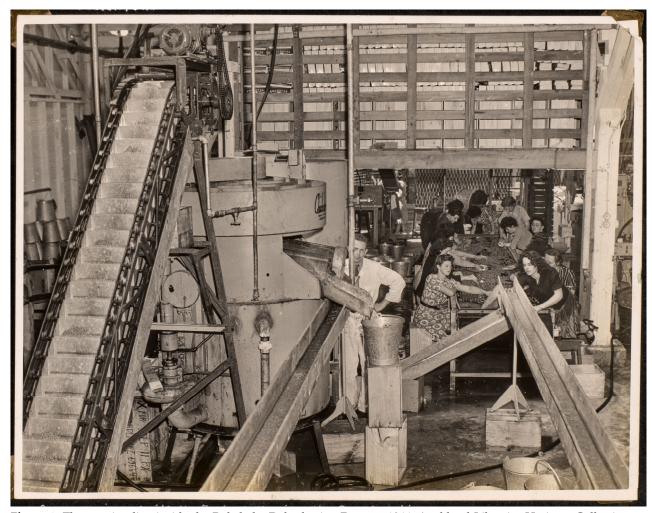


Figure 3: The canning line inside the Pukekohe Dehydration Factory, 1944. Auckland Libraries Heritage Collections 1631-ALB319-29-05, Hitchcock, J.H et al.

⁴⁴ Anon. "In Operation" p 6.

⁴⁵ Anon. "Pukekohe Plant" p 3.

⁴⁶ Anon. "Fresh Vegetables" p 4.

harvested by mowers and the vines are removed to the factory, where a contrivance known as a pea viner shells them. Conveyors take the peas through a clipper cleaner, removing chaff and dust, into a special type of washer and then into a water blancher which inactivates enzyme action, thus ensuring the preservation of vitamin content. The peas are next water flumed to an inspection table, where girls expertly remove by hand any blemished ones among the thousands continually passing before them. At this point the flow of peas is divided into two sections. One section passes to the quick-freeze division, where they are packed into two-and-a-half-pound wax containers and reduced in about two hours in a freezing cabinet to zero temperature. The other peas are filled into cans, sealed by a machine, and retorted for cooking. The whole process is continuous and rapid. 47

The factory following the end of the war

With the war ending in September 1945, the factory had served the core purpose for which it had been established and began to scale down production. In September 1945, discussions were underway to convert the Rooseville Park Camp into a transit camp to assist with the imminent post-war housing shortage.⁴⁸ The Services Vegetable Production scheme in Patumāhoe continued operating until the end of January 1946, after which the

land was laid down in grass and returned to its former owners.⁴⁹

Unlike other war assets that were often liquidated, the government adapted the factory to compete with the canneries operating under private ownership.⁵⁰ By November 1945, additions to the factory were underway. New plant equipment was on its way for installation, the boiler capacity was being extended and additions were being made to the cafeteria.⁵¹

In 1946 and 1947, the factory continued to process quick-frozen vegetables and canned beans and peas, but on a much smaller scale than in 1944 and much of 1945. However, there was no longer a market for the dehydration component of the factory.⁵² As of January 1947, part of the factory in Pukekohe diversified to drying and crushing casein for dairy companies in the Waikato.⁵³

The Internal Marketing Division entered into contracts with commercial growers for the

1946-47 season for 350 acres of peas and approximately 100 acres of beans, to meet the capacity of the cannery.⁵⁴ As of September 1946, the Minister of Lands, Mr. Skinner, noted that he "thought all would agree that such a food producing factory should be kept in operation, situated as it was in the centre of a vegetable growing district."⁵⁵ The Internal Marketing Division continued to promote the factory as "the most modern canning and food processing plant in New Zealand, and probably included Australia."⁵⁶

In 1949, there was a move from the private sector to force the government to sell or grant a long-term lease of the factory to a private enterprise. A Franklin Growers' Co-operative company and a processing and marketing company were formed. The intention was for growers to earn 98 per cent of the shares in the processing and marketing company.⁵⁷ However, the plan did not come to fruition. By the end of the decade, the factory remained in operation under the Internal Marketing Division, but at a much-reduced capacity than

⁴⁷ Anon. "In Operations" p 6.

⁴⁸ Anon. "Transit Housing: Scheme for Pukekohe" p 2.

⁴⁹ Anon. "Dehydration of Vegetables" (11 October 1943) p 2.

 $^{^{50}}$ Anon. "Unfair Competition Alleged" p 3.

⁵¹ Anon. "Transit Housing: Government's Indecision" p

⁵² Anon. "Dehydration Factories" p 4.

⁵³ Anon. "Dominion News: Dehydration" p 8.

⁵⁴ Anon. "Pukekohe Plant for Canning" p 3.

⁵⁵ Anon. "Dehydration Factories" p 4.

⁵⁶ Anon. "Pukekohe Plant for Canning" p 3; Anon. "News of The Day" p 4.

⁵⁷ Anon. "Private Ownership of Dehydration Plant" p 3.

from 1943 to 1945.

Beyond the 1940s

The decade to follow the 1940s was marked by a shift away from the direct operation of the factory by the Internal Marketing Division. At the end of 1950 and early 1951, the Ministry of Works advertised the factory, including its plant and machinery, for lease.58 In 1953, the New Zealand Packing Corporation took over the running of the factory in Pukekohe. The corporation was formed to operate the factory on behalf of the government, taking over the factories in Pukekohe and Motueka, as well as an office building in Auckland.59 agreement stipulated that, within four years, a public company would be formed to take over the three operations. It was further agreed that 25 per cent of the shares in the company would be offered to growers.⁶⁰ This arrangement was strongly opposed by the directors of J Wattie Canneries Limited in Hastings. They argued that the New Zealand market for canned peas and tomatoes was being oversupplied, leading to fierce competition, price-cutting, and disorderly marketing. They believed the situation was largely brought about by the government sponsoring the production of canned peas in the state-owned factory in Pukekohe.⁶¹

In 1957, as agreed, the factory was transferred to the ownership of New Zealand Packing Corporation Limited. At this time, the factory was described as "leaking, machinery rusted, and the unlined building not conforming to the Factories Act." Under New Zealand Packing Corporation Limited, the factory did not operate for long. By 1960 the Corporation discontinued the processing of vegetables at the factory in Pukekohe, with production transferred to the Motueka factory.

Fast forward several decades, the factory had long ceased operating as a vegetable processing facility but remained a local landmark for some, as a reminder of the war years. The former Pukekohe Dehydration Factory was destroyed by fire in November 2001.⁶⁴ The site has subsequently been replaced by commercial development.

Conclusions

In conclusion, the Pukekohe Dehydration Factory, while significant on its own, was part of a larger landscape of interconnected, supporting places. This landscape included the state and commercial market gardens, as well as the Rooseville Park Camp and Moult House. Additional supporting features were the establishment of a new municipal reservoir for extra water and a railway siding alongside the factory. Without these interconnected places, it is unlikely the factory would have been able to fulfil its task of supplying such large volumes of vegetables to the US troops in the Pacific during the later part of the Second World War.

Alongside this physical landscape was the significant social and economic fabric which developed around the factory. The factory, as well as the gardens, provided employment and fostered social cohesion, with people coming together for a common cause. The factory and state gardens were also examples of the significant role women played in the workforce during the war.

⁵⁸ "Ministry of Works [advertisement]" p 8; Anon.

[&]quot;Ministry of Works" p 1.

 $^{^{59}}$ NZPA "Pukekohe Factory Stops Processing of Vegetables" p 14.

⁶⁰ Press reporter "Apple Packaging Plant" p 14.

 $^{^{61}}$ "The Press" Special Service. "Unfair Competition Alleged" p 3.

⁶² NZPA "Parliament Mr Gotz Defends Sale of Packing

Corporation" p 12.

⁶³ NZPA "Closing of Factory" p 6.

 $^{^{64}}$ Anon. "Old Auckland warehouse destroyed by fire" np.

While the Pukekohe Dehydration Factory only served its original purpose of assisting in feeding US troops for a short period in 1944 and 1945, the establishment and operation of the factory represented a significant chapter in the history of Pukekohe and further afield, related to the war efforts in the 1940s.

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