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TRANSPORT INNOVATION AND AREAL ASSOCIATION  
IN THE MANAWATU DAIRY INDUSTRY

(The Role of Transport from before 1880  
to the Present Day and the Impact of  
Innovation on the Areal Association  
between Supplier and Factory and  
between Factory and Factory)

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PREFACE

For the New Zealand dairy industry, "the principal - one might say the only important disadvantage - was the obstacle of distance...." (Philpott, 1937:11) Although concerned here with the difficulties of overseas transport, (he suggested that time and invention had largely overcome the obstacles of distance) the comment is equally applicable to the difficulties of internal transport. Transport is an important element in dairying but appears to have attracted little attention from researchers. A review of the history of dairying reveals a series of development phases, each of which appears related to transport developments.

The first part of this thesis, then, is an historical review of the period from before 1880 to the present day with particular emphasis upon transport methods and innovations. Emphasis has been given, however, to developments at the factory rather than the farm level. From a consideration of these historical developments, it becomes increasingly evident that each phase has been associated with distinctive patterns of land use and the development of specialised dairying "regions".

The second part, therefore, is an investigation of the changing distribution of dairying activity in the Manawatu. Changes in the distribution of and in the areal associations between suppliers and factories are examined in terms of changes in transport technology. Although transport is not the only variable contributing to change, its importance in contributing to development and change warrants special attention.

This study is concerned primarily with transport developments, particularly with tanker transport, and the effects of these developments on the spatial organisation of dairy factories. Philpott (1937:12) noted, "... there was not a decade which was not crowded with event...." The decades since the 1930's have been equally crowded with event.

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ABBREVIATIONS AND TERMS

Abbreviations

<u>A. &amp; P. Stats.</u>	Before 1921, <u>Statistics of the Dominion of New Zealand</u> (sections referring to agricultural and pastoral production). 1921 to 1954, <u>Agricultural and Pastoral Production Statistics of New Zealand</u> . 1955 to the present day, <u>New Zealand Farm Production</u> .  (Note: each of these three series of publications are presented with variations of publishing authority and title.)
<u>A.J.H.R.</u>	<u>Appendices to the Journals of the House of Representatives.</u>
<u>Annual List of Creameries</u>	New Zealand Department of Agriculture, <u>Annual List of Creameries, Factories, Private Dairies, and Packing Houses.</u>
<u>Annual Reports</u>	The Annual Reports, Balance Sheets and Accompanying Accounts of <u>dairy companies</u> only. Annual Reports of other organisations such as the Department of Agriculture and the New Zealand Dairy Board are specifically referred to where used.
C.D.C.	Co-operative Dairy Company.
M.T.S.	See under Terms.
N.Z.F.D.U.	New Zealand Farmers' Dairy Union.
<u>N.Z.O.Y.</u>	<u>New Zealand Official Yearbook(s).</u>

Terms

Cheese Factory	A dairy, the milk supply of which is manufactured into cheese.*
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Creamery	<p>A dairy, the milk or cream supply of which is manufactured into butter.*</p> <p>(Note: there is much confusion in the use of this term. It should be used only in regard to butter manufacture, and not, as is often the case, to the skimming of cream from wholemilk at a skimming station.)</p>
"Creamery System"	<p>The practice, whereby wholemilk is received by a skimming station, is separated and the cream sent to a creamery for manufacture into butter.</p> <p>(Note: there are variations to this general pattern. Transport methods were such, that before 1920, the usual radius of supply was two to four miles. If cow densities were low, it was necessary to draw supply for a single creamery from a number of similarly sized collection areas. Suppliers would send their wholemilk to a skimming station and the cream was then sent on to the creamery. Where cow densities were high, however, a creamery could draw sufficient supply from a single collection area about the creamery in which case there was no need for associated skimming stations.)</p>
Collection Centre	Any factory, creamery or skimming station receiving wholemilk or cream either by supplier delivery or by factory collection.
Dual-plant factory	A dairy, manufacturing both butter and cheese.
Dairy factory	A collective term denoting all dairies manufacturing dairy products. Skimming stations are specifically excluded.
M.T.S.	Milk Treatment Station.
Milk Producers' Company	<p>The Manawatu Co-operative Milk Producers' Company Limited.</p> <p>The Milk Producers' Company is concerned with the production and collection of wholemilk for town supply. Wholemilk is collected by a contractor (the tankers are owned by the company) and is delivered to the M.T.S. for treatment and bottling.</p>

Multi-factory company	Any dairy company operating more than one factory for the manufacture of dairy products.
Multi-plant factory	A dairy manufacturing a variety of dairy products.
Packing House	A dairy in which butter manufactured elsewhere is mixed or blended into milled butter.*
Skimming Station	A dairy, the milk supply of which is separated only.*
Tanker (milk tanker)	A collective term denoting any unit or combination of units designed for the transport in bulk of wholemilk and milk by-products.
Tractor trailer	A milk tanker consisting of a tractor unit and a trailer unit which may be towed only by a tractor unit.
Tanker trailer	A unit which may be towed either by a tractor trailer or a conventional truck.

\* Definition of term based on Annual List of Creameries, 1906.

PART I AN HISTORICAL REVIEW OF TRANSPORT DEVELOPMENTS IN  
THE NEW ZEALAND DAIRY INDUSTRY WITH PARTICULAR  
REFERENCE TO TANKER COLLECTION

## CHAPTER ONE

### INTRODUCTION

Although many of the observations in this thesis are applicable to dairying anywhere in New Zealand, and some of the examples have been drawn from Taranaki, Waikato and North Auckland, the main area of investigation has been the Manawatu. County and Riding divisions have formed the initial basis for the boundaries of the area to be studied.<sup>1</sup> Consideration of the distribution of suppliers to the Manawatu C.D.C. indicated that some areas should be excluded, particularly areas of forest reserve along the eastern margin of Pohangina, Kairanga and Horowhenua Counties, while the supplier map for the Whangaehu C.D.C. suggested that suppliers along the Whangaehu River towards Mangamahu should be included. The northern limits were demarcated by a combination of County, Riding and Cadastral Map divisions. The area thus defined (fig. 1) comprises 1810.07 square miles and will be referred to as the Manawatu area.<sup>2</sup>

Two main avenues of investigation have been followed, i.e., a) historical and b) statistical. Part I, the historical section, deals with the role and importance of transport in dairying. Emphasis has been given to the phases of development and to the changing relationship between supplier and factory. In Part II, the nature of the changing distribution of dairying is investigated. Variations in the areal association between supplier and factory are discussed in terms of changing transport technology.

As was noted in the preface, the main themes of this study

fig. 1

# LOCATION



are concerned with the transport of wholemilk and cream from supplier to factory, and with changes in the spatial organisation at the factory level. Inter-factory transport and changes at the farm level, however, form a relatively minor part of the total investigation.

Transport is an essential link between supplier and factory, between factory and port, and between New Zealand and her overseas markets. Obstacles within these flows can be seen to have impeded progress in the dairy industry, while the overcoming of these obstacles by transport innovation has been followed by periods of rapid development and change.

Refrigeration was the first of these major transport innovations. It enabled dairy produce to be shipped to distant markets in larger quantities and with greater success than previously. Refrigeration also facilitated the internal transport of produce from factory to port. The resulting changes in the organisation and scale of dairying, particularly the adoption of the factory system of manufacture, led to rapid development. Inadequacies in internal transport facilities for raw materials, however, were an impediment to progress. The "creamery system" can be seen as partly a response to internal transport limitations under conditions of high external demand.<sup>3</sup>

Motorisation and home separation, transport and transport-modifying innovations comparable in magnitude to refrigeration, eased some of the limitations on internal transport. In response to these innovations the relationships between supplier and factory were modified. The amount of change is indicated in Part II of this thesis by the variations in areal association.



Between 1920 and 1950, dairying became more localised and regional specialisation, evident before 1920, became increasingly apparent. By 1950 the advantages of larger-scale factory operation were evident but developments in this direction were slow. Limited quantities of milk by-products, mainly buttermilk, were being transported in bulk between factories. It was not until the 1960's however, following the lead of the New Zealand Co-operative Dairy Company, that tanker collection of wholemilk (and transport of milk by-products) was adopted on a wide scale. Tanker collection made practicable larger-scale factory operation and facilitated company amalgamation with subsequent closure of uneconomic factories.

These changes may be summarised in terms of the varying relationships between supplier and factory and between factory and factory. Prior to the 1920's, supplier delivery of wholemilk predominated. Motorisation was largely accompanied by a change to factory collection of cream.<sup>4</sup> Limited inter-factory movements of by-products were initiated and the dairy industry became less specialised. Whereas butter and cheese had been the predominant products before the 1920's, during the 1930's and particularly after World War II, casein and dried milk powders gained an important position. In addition, individual factories became less specialised while dual-plant factories, and the production of buttermilk powder and whey butter in creameries, became increasingly common.

The introduction of tanker collection, a third major transport innovation, has resulted in an increase in wholemilk collection with a corresponding decrease in cream collection. Inter-factory movements of wholemilk and milk by-products have also expanded. While some companies continue to specialise in the production of a single

commodity (particularly cheese factories) the general pattern is now one of multi-plant factories and multi-factory companies producing a wider range of dairy products.

It is expected, in view of the importance of the transport link between supplier and factory, that changes in transport technology will be associated with changes in supplier - factory relationships. Poor transport facilities are expected to be accompanied by a close areal association between supplier and factory. As transport technology is improved, increasing the potential supply area and often giving rise to greater competition for supply, the areal association is expected to become more tenuous. It is postulated, therefore, that there is an inverse relationship between transport technology and the areal association between supplier and factory. This postulate is the basis for the working hypothesis considered in Part II.

Notes

- 1 The counties and ridings considered were as follows:  
 Waitotara County - Brunswick Riding only  
 Wanganui County - Upokongaro, Kaitoke, Kaikatea,  
 and Purua Ridings, and part of Mangamahu  
 Riding  
 Rangitikei County - Otakapu, Rangitoto, Pukepapa,  
 Porewa and Rangitira Ridings, and parts of  
 Otaire, Te Kapa, Awarua and Wangaehu Ridings  
 Pohangina, Kiwitea, Manawatu, Oroua and Kairanga  
 Counties - all ridings  
 Horowhenua County - Tokomaru Riding only.
- 2 The Manawatu area as defined must be distinguished from the supply area to the Manawatu C.D.C. although the two correspond closely and for most purposes are taken as the same. Less than one percent of the suppliers to the Manawatu C.D.C. lie outside the Manawatu area, these being either west of Kai Iwi, or in the vicinities of Raetihi and Taihape, or south of Shannon.
- 3 Differences in cow density must also be considered as important causitive factors in the development of the "creamery system". (See definitions of abbreviations and terms, page ix).
- 4 Supplier delivery of wholemilk to cheese and casein factories continued in most areas until the adoption of tanker collection although some of these factories did adopt factory collection during the 1920's and 1930's.