

**DIFFUSION OF MILK AS A NEW FOOD TO TROPICAL REGIONS:
THE EXAMPLE OF INDONESIA, 1880-1942.**

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DIFFUSION OF MILK AS A NEW FOOD TO TROPICAL REGIONS:
THE EXAMPLE OF INDONESIA, 1880-1942

PROEFSCHRIFT

TER VERKRIJGING VAN DE GRAAD VAN
DOCTOR IN DE LANDBOUWWETENSCHAPPEN,
OP GEZAG VAN DE RECTOR MAGNIFICUS,
DR. C.C. OOSTERLEE,
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S T E L L I N G E N

1. Gezien de betere houdbaarheid van zure melk onder tropische omstandigheden is het jammer dat zure melk als onderdeel van de gezondheidszorg na de onafhankelijkheid van Indonesië geen navolging meer heeft gevonden.
Dit proefschrift.

2. Bij het geven van een oordeel over de plaats van zuivel in ontwikkelingslanden wordt in Nederland onvoldoende aandacht geschonken aan het feit dat men te maken heeft met melkgebruikende en niet-melkgebruikende volken.

3. "De heersende omstandigheden in Dar es Salaam (en in menig stad in andere ontwikkelingslanden) maken de combinatie van werk en moederschap tot een van zwoegen. Deze combinatie is nauwelijks mogelijk zonder een toevlucht te nemen tot een niet-op-moedermelk gebaseerde zuigelingenvoeding. Melk van de koe is in onvoldoende mate aanwezig en moeders maken gebruik van welk melkproduct dat ook maar beschikbaar is. Het helpt niet deze oplossingen die door de omstandigheden zijn opgelegd van de hand te wijzen als iemand van het project suggereerde. Er zijn zeer reële tegenstrijdigheden in de doelstellingen van Westerse activisten en de behoeften van Derde Wereldvrouwen die met de harde realiteiten van het leven worden geconfronteerd. Eenieder die het ernstig neemt en deze realiteiten wil verbeteren, kan er niet aan ontkomen om deze tegenstrijdigheden onder ogen te zien".

Bantje, H.; Yambi, O. Influences on infant feeding in Dar es Salaam. Food and Nutrition Bulletin, 1983, 5, no. 3, p. 10.

4. Degenen uit de geïndustrialiseerde landen die de oplossing van de huidige over- en ondervoedingsproblematiek van de wereld uitsluitend of hoofdzakelijk bepleiten door middel van productie van plantaardig voedsel dienen bij het volgende even stil te staan:

"Verscheidene (van onze) voorouders zouden zich in hun graf omdraaien als ze wisten dat sommige groepen nu voor een vegetarisch dieet durven pleiten. Allerm minst uit principe gingen zij immers als vegetariërs door het leven. Ze waren het uit noodzaak, gewoon omdat vlees en zuivel voor hen een onbetaalbare luxe vormden".

Vandenbroeke, Ch. Vlaamse Koopkracht, gisteren, vandaag en morgen. Leuven, Kritak, 1984, blz. 269.

5. Voedselhulp aan ontwikkelingslanden en sociale uitkeringen in Nederland hebben enige overeenkomsten. De beide maatregelen lossen de oorzaken van het probleem niet op doch maken het leven van de betrokken personen minder ondraaglijk.
6. Het is noodzakelijk, gezien de huidige wereldvoedselsituatie, het concept van voedselhulp te vervangen door voedselsamenwerking. Immers donor- en ontvangende landen hebben te maken met haast ondraaglijke economische en sociale lasten van een ondoelmatige voedselproductie, zodat verdere samenwerking geboden is om het probleem van over- en onderproductie op te lossen.
7. De met België, Frankrijk en Italië vergeleken eenvoudige Nederlandse keuken is niet zo zeer uit het Calvinisme te verklaren als wel eens wordt beweerd. Een onderliggende oorzaak is de afwezigheid in onze streken van een rijke hofcultuur met een overvloedige voedselaanvoer en een geringe bekommernis voor de primaire zorgen om het dagelijks bestaan.
8. Gezien het belang van zo lang mogelijk zelfstandig kunnen wonen van de bejaarde mens, is het te betreuren, dat in de studie "Ouder worden in de toekomst" geen aandacht is geschonken aan de zogenaamde rijdende winkels met primaire levensbehoeften en instellingen met warme maaltijdbezorging aan huis als onderdeel van (gezondheids)zorgvoorzieningen.

Ouder worden in de toekomst, scenario's over gezondheid en vergrijzing 1984-2000. Leidschendam, Stuurgroep Toekomstscenario's Gezondheidszorg, 1984. 272 pp.

9. Het overvloedige Nederlandse voedselpatroon valt niet alleen af te leiden uit de bruto verbruiksgegevens, voedselconsumptieonderzoek, het aantal verschillende artikelen op de schappen in de supermarkten, maar ook uit de stortvloed van kookboeken. Zo zijn een 670-tal kookboeken uit binnen- en buitenland voorradig in een grote boekwinkel of direct leverbaar waaraan nog een 200 titels toegevoegd kunnen worden op het gebied van wijn, dranken met en zonder alcohol¹⁾,

1) Gebaseerd op kookboeken 1984-1985, Katalogus Scheltema, Holkema & Vermeulen, Amsterdam.

10. De aanwezigheid van omvangrijke etnische minderheden met hun sterke culinaire tradities in Nederland heeft een verrijkende invloed op de Nederlandse kookkunst.
11. In verband met de maatschappelijke implicaties van de problematiek rond over- en ondervoeding, kan sociaalwetenschappelijk onderwijs en -onderzoek naar de voeding van de mens niet geheel los worden gezien van de fysiologische behoeften.
12. Internationalisering van het onderwijs aan de Landbouwhogeschool is een goede zaak. Uit culturele en economische overwegingen mag internationalisering niet ten koste gaan van het reguliere wetenschappelijk onderwijs in de Nederlandse taal.
Lodewijk de Raet (1870-1914), Vlaams statisticus en econoom, wees in verband met de noodzaak van de vernederlandsing van de Gentse Universiteit op het feit, dat een wetenschappelijk elite niet gevormd in de Nederlandse taal onmachtig is kennis en techniek onder grote lagen van de bevolking te verspreiden.
13. Van de verschillende vormen van onderwijsvernieuwing en -verandering sedert de invoering van de mammoetwet, heeft het dagonderwijs voor volwassenen het meest bijgedragen aan een verdere emancipatie van vrouwen.
14. Het succes van de glasbak valt mede te verklaren doordat er voor de gebruiker een ludiek genoegen aan verbonden is: door het wegwerpen van het glaswerk werkt men zichtbaar en hoorbaar mee aan een positieve daad voor het milieu en wellicht ook in de hoop dat de rondspattende scherven geluk zullen brengen.

Proefschrift Adel P. den Hartog

Diffusion of milk as a new food to tropical regions: the example of Indonesia, 1880-1942.

Wageningen, 9 september 1986.

From the point of view of political economy, gourmandism is the common bond which unites the nations of the world, through the reciprocal exchange of objects serving for daily consumption.

(Jean-Anthelme Brillat-Savarin, 1755-1826).

ABSTRACT

den Hartog, A.P. (1986), Diffusion of milk as a new food to tropical regions: the example of Indonesia, 1880-1942.

The problem was analysed of why and how milk and milk products spread from industrialized countries with a dairying tradition to tropical countries with no such tradition. This interdisciplinary study uses the social sciences, nutritional sciences and social history in an approach to the diffusion of food. Early in the colonial period, the Dutch began producing fresh milk on Java for their own needs, but by the 1880's sweetened condensed milk products were being imported. It were these condensed milk products that reached part of the Indonesian population. The study describes how this came about, in particular for infant feeding, and the importance of the sweetened skim milk question. Milk and milk products, once an exotic element, gradually became Indonesianized. In a postscript (1945-1985) reference is made to Indonesian efforts after independence to continue a milk industry based on both imports and locally produced fresh milk.

Free descriptors: agricultural history, food habits, condensed milk, food policy, nutrition policy, food diffusion, food innovation, infant feeding, milk-using habits, tropical dairying.

Cover: Hugo F.F. Albers

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Trefw.: distributie ; zuivelprodukten ; Nederlands-Indië ; geschiedenis.

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ABBREVIATIONS

A.R. Min. v. Kol.	Algemeen Rijksarchief Ministerie van Koloniën.
A.Z. Melkhygiënisch Weekblad	Algemeen Zuivel en Melkhygiënisch Weekblad.
C.C.F.	Coöperatieve Condensfabriek Friesland.
F.N.Z.	Federatie Nederlandse Zuivel
H. v.d. Vr.	Handelingen van de Volksraad.
M. v. O.	Memorie van Overgave.
Verb. no.	Verbaalnummer

GLOSSARY OF SELECTED TERMS

Dairy products	Category of preserved milk which includes cheese, butter and ghee (see also milk products).
Diet	The ways and total of foods consumed by a population.
Evaporated milk	Concentrated full-cream milk product (unsweetened). When reconstituted with water it comes close to cow milk.
Food	Solid and liquid substances that are perceived as edible by a population.
Food control	The law and organization which governs the production, handling and marketing of food with the object of protecting the health of the consumer and of protecting him against fraud.
Food habits	The ways in which a population in response to cultural, economic and ecological pressures chooses, consumes and makes use of available foods (adapted from Margaret Mead).
Food innovation	The actual process of how a new food is adopted in the food pattern of a population.
Food labelling	Any written, printed or pictorial matter relating to and accompanying the food.
Food pattern	The, for a population, specific combination of foods consumed and ideas and values on this food.
Lactose intolerance	Malabsorption of milk due to a deficiency of the intestinal enzyme lactase (see further Chapter 1, p.12).
Milk	In this study milk refers to cow milk unless otherwise stated.
Milk products	Category of processed milk which includes various products such as sweetened condensed milk, sweetened condensed skim milk, evaporated milk, sterilized milk and dried milk (see also dairy products).
New food	Food that is perceived as new by a population and which is not a modified or processed form of an already known food.
Sour milk	Milk where the milk sugar or lactose has been converted into lactic acid by the action of acid forming micro organisms.
Sterilized milk	Full-cream sterilized milk product.
Sweetened condensed milk	Concentrated full-cream milk product with the admixture of sugar.
Sweetened condensed skim milk	Concentrated milk product prepared from skim milk with the admixture of sugar. It does not contain vitamins A and D which, together with the butterfat from the milk, have been eliminated. It is a dangerous food for infant feeding, particularly because of the lack of vitamin A.

Toko	Shop in Indonesia of differing size with a great range of articles for sale.
Traditional food	Food that is considered by a population to be part of their own food pattern, regardless of its place of origin.
Warung	Small open shop or stall in Indonesia with a varying range of the primary necessities of life.

PREFACE

This study has its origin in a project entitled "Improvement of Food and Nutrition Programmes with reference to dairy food aid".

The aim of the dairy food aid project was to assist staff of nutrition projects improve the nutrition of vulnerable groups in areas of Africa and Asia. For this purpose, practical field guides were prepared on the use of Dried Skim Milk and local foods, and sent for use to staff of nutrition projects. Needless to say these field guides stressed the importance of local foods and considered food aid only as a temporary means of overcoming local food shortages.¹ The dairy food aid project was carried out by the Netherlands Nutrition Foundation in close collaboration with the Department of Human Nutrition of the Agricultural University, Wageningen. It was made financially possible by a grant from the Netherlands Interprofessional Organisation for Dairy Products (Het Produktschap voor Zuivel).

Field work was carried out in some African and Asian countries in connection with the preparation and evaluation of the field guides, particular attention being given to the place of milk in the local food habits. Three types of communities were distinguished; communities with no tradition of using milk and which are mainly but not exclusively situated in the humid tropics, traditional milk-using communities, and those communities where milk is not traditionally part of the diet but where however some acceptance has found place.

One aspect which emerged was that fresh milk and milk products in regions with no milk-using tradition had been present much longer than had been thought, dating back to the colonial era when Europeans with their dairy tradition had large tropical regions under their control.

In view of this it was felt to be of importance to parallel the dairy food aid project with a study on the origin and early diffusion of milk and milk products to those tropical regions where there was no tradition of milk usage, in particular Indonesia.

ACKNOWLEDGEMENTS

I should like to warmly thank all those kind people and institutions that helped me to complete this study. Most of all I want to affectionately thank Frida for the effective help and unflinching encouragement which she always managed to give me, despite her own much demanding professional duties and family responsibilities. My thanks also go to Katelijne en Rosanne. Further it

is very gratifying to me that my parents have been able to witness this publication.

It has been said many times before by others, but it can not be said enough, that any study is possible only with the help and work of others. I am much indebted to all those working in the Department of Human Nutrition of the Agricultural University, Wageningen for creating the stimulating environment which made an interdisciplinary study of nutrition possible. I would especially like to thank Mrs J.C.M.M. Nooij-Michels and Drs S.K. Kroes-Lie both social science research assistants, who helped me finding my way in the almost endless number of documents and files and who provided me with material that had escaped my attention. Likewise many thanks are due to the secretariat and in particular Mr M.B.A. van Leuteren who made the necessary administrative and technical arrangements and who succeeded in putting my manuscripts (and there were many) in an orderly way on the word processor. All three were instrumental in helping me to accomplish my study.

I should like to express my thanks to Professor J.G.A.J. Hautvast, of the Human Nutrition Department, for the help and encouragements he gave me in undertaking this type of study and to Professor A.M. van der Woude, of the Agricultural History Department, who guided me through the complex field of social history, for which I am very grateful. Thanks are also due to Ir J.S. Wigboldus for his constructive criticism and helpful suggestions on the history and sociology of agriculture and livestock in South East Asia.

I received much help from Mr. B.A. Scholte who made the conversion of the text on the discet to the programme of the printer possible, from Mr. C. Rijpma and his colleagues for the graphs and maps, from the staff of the photographic unit, and from the staff of the libraries of the Agricultural University, particularly the Biotechnion, Leeuwenborch and the Central Library. Here I want to thank the students with whom I have had the pleasure of working with for their ideas and views on the study of nutrition in both the industrialized and developing countries.

For my study of milk, milk products and tropical countries I owe much to those involved in the project "Improvement of food and nutrition programmes with reference to dairy food aid", and to Ir J.C.T. van den Berg, expert in tropical dairy.

The Coöperatieve Condens Fabriek, Friesland kindly allowed me to study

archival material concerning their activities in Asian countries in the years before the Second World War. Many thanks are due here to Dr Ir J.M.P.

Papenhuijzen, Director of Research, Mr H.A. Verkley, Public Relations, and Mr P.J. Hondema and Mr P.J. Baggelaar of the CCF Archives. CCF also gave me permission to reproduce illustrations kept in their archives.

Special mention must be made of the late Dr J.H. de Haas and Mrs J.H. de Haas-Posthuma who shared with me their extensive knowledge and experience in nutrition and child welfare in late colonial and early independent Indonesia. My first knowledge on food and nutrition of that period began while I was still working with FAO and had the opportunity of meeting people like Dr A.G. van Veen, the late Dr Ir G.J.A. Terra and the late Dr H.A.P. Oomen.

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REFERENCES - Preface

- 1 Hiel, A.M.M.; Hautvast, J.G.A.J.; den Hartog, A.P. L'Alimentation des Jeunes Enfants, guide pratique pour l'utilisation des aliments locaux et du lait écrémé en poudre en Afrique. Wageningen, Fondation Néerlandaise de la Nutrition (NIVV), 1982. 75 pp.

Ibid. Young children and supplementary feeding programmes: a field guide on the use of local foods and dried skim milk. Wageningen, Netherlands Nutrition Foundation (NIVV), 1984. 104 pp.

Valdecañas, O.; Bouman, W.; Ruiten, Th.; Hautvast, J.G.A.J.; den Hartog, A.P. A field guide for the use of local foods and dried skim milk in nutrition programmes in Asian countries. Wageningen, Netherlands Nutrition Foundation (NIVV), 1983. 41 pp.

van de Briel-van Ingen, T.; den Hartog, A.P. (Eds). Leidraad zuivelvoedselhulp. Wageningen, Nederlands Instituut voor de Voeding (NIVV), 1984. 67 pp.

Ibid. Guidelines for dairy food aid. Wageningen, The Netherlands Nutrition Foundation, 1985. 54 pp.

1. THE STUDY

1.1 Aim of the Study

A great variety of foods, such as bread, biscuits and other wheat products, all sorts of sweets, tinned meat and fish, condensed milk and milk-powder, ice creams, beer and soft drinks, coming from the industrialized countries of Western Europe and North America are increasingly accepted in the regions of tropical Africa and Asia. In most of these countries foods are now produced locally, but still much of the raw material has to be imported from abroad. It is obvious that these new foods have economic, social and nutritional consequences for the consumer and the country as a whole. This is particularly the case when most of the food cannot be easily produced in the tropics because of ecological conditions (e.g. wheat or milk).

Processed foods, in the sense of industrially processed, have now found a place among the traditional foods in the diet of the higher and middle income groups of tropical Africa and Asia. To a certain extent the low income consumer, particularly if living in urban areas, has also incorporated some processed foods into his diet, and income is the limiting factor in consuming more. With an expenditure ranging from 60-70% of income on food for survival only, there is little room left for other foods. Nevertheless there is some competition between foods needed for survival such as the staple food and foods which satisfy other needs.

The basis of the present diffusion and acceptance of processed foods to tropical Africa and Asia was formed long before the World War II process of decolonization and the emergence of modern states. It was formed in the era of modern colonization.

The aim of the study is twofold.

- (1) To contribute to the knowledge and insight of the early stages of the process of diffusion of foods, in particular processed foods from the industrialized countries to developing countries, with particular reference to the late colonial times.
- (2) To show why and how milk and milk products, initially developed to satisfy consumers of the industrialized countries, spread into tropical regions with no tradition of milk usage, in particular Indonesia, and the nutritional and socio-economic consequences of this.

The hypothesis is that the origin of the present use of milk and milk products in tropical countries such as Indonesia can be found in the 19th century when West European nations with a dairy tradition brought huge territories under their administration and control. Milk is a highly perishable product which cannot be transported over long distances without a food preservation technique. Modern technology and the invention of milk condensing in the middle of the 19th century made mass transport of milk technically possible to those areas where ecological conditions meant that milk had not developed as a traditional food.

Several aspects were examined.

- (1) The early development of milk condensing in Europe and the Netherlands and the export of condensed milk to other countries.
- (2) When and how condensed milk and other milk products arrived in Indonesia, the consumers and the relation to efforts by the Dutch to begin modern dairying under tropical conditions.
- (3) The main change agencies and the way in which milk and milk products were diffused in the Indonesian society, its extent and its limitations.
- (4) The view of the health authorities and the colonial Government on milk imports.
- (5) The policy and marketing efforts of the dairy industry to reach the local population.
- (6) The nutritional and social significance of early milk imports for the local population.

1.2 Methodology

This study is a cross-disciplinary approach based on the social sciences, nutritional sciences and social history. The introduction of a new food in a tropical country is analysed from a social scientific point of view and within a social historical perspective. Because of the complex nature of the development, diffusion and adoption of a new food, the study is limited to milk and milk products within the context of one particular country, Indonesia.

Milk products, and in particular condensed milk, were selected for a variety of reasons.

- (1) Milk is a highly perishable product with a short shelf-life. It cannot be transported over long distances without some form of processing. Modern technology and the invention of milk condensing in the middle of the 19th century made mass transport of milk technically possible.
- (2) The Netherlands is a dairying country and has been a major exporter of dairy and milk products for a long time. Milk is considered as an essential element of the Dutch food pattern, and where the Dutch established themselves they wanted to maintain their milk-using habit. The Dutch and other Western Europeans, like the British, while staying in the tropics made efforts to develop tropical dairying to meet their demand for milk despite unfavourable ecological conditions.
- (3) Milk is an important food for infants and young children. When breast-feeding fails or is given for a very short period, milk and milk products are good alternatives, provided they are produced and given under well-controlled hygienic conditions. With the rise of the modern dairy industry at the end of the 19th century in Europe, physicians and nutritionists stressed the importance of high quality milk as a popular food. As a result, educated Europeans became convinced that dairying was an absolute necessity for maintaining good health and that no alternative approaches were possible.
- (4) Another equally important reason for focussing the study on milk products was that export to tropical countries is now highly criticised. At the end of the 1960's some nutritionists and non-governmental organizations were worried about the infant food promotion activities, particularly of milk-powder as a substitute for breast-feeding. Jelliffe introduced the term "Commerciogenic Malnutrition".¹

The study focusses on the example of Indonesia for the following reasons.

- (1) Indonesia with a few exceptions belongs largely to those regions where there was no milk-using tradition. In the beginning of the 16th century when the Dutch established themselves in Indonesia, there was no tradition of milk usage despite the Hindu influence from India, a country with strong dairying traditions.

- (2) Indonesia was colonized by the Netherlands, a country in which dairying plays an important role in its economy and food pattern.
- (3) There has been a long standing nutrition research tradition and interest in the nutrition of the population by the health authorities.² When the science of nutrition was still in its infancy basic research on beri-beri (Vitamin B1 or Thiamine deficiency) begun in 1886 by scientists such as Eijkman and Grijns. Interest in the nutrition of the local population culminated in the creation of a Nutrition Institute (Instituut voor de Volksvoeding) in 1934.³

The period of time covered by this study comprises chiefly the period 1880-1942. As an introduction some attention is given to dairying in the early colonial era. Around 1880 the export of sweetened condensed milk and other milk products had developed to such an extent that the products were known, at least by Europeans, in various parts of the archipelago. At the same time a modest beginning was made to introduce modern dairying. With the Japanese occupation of Indonesia in 1942 the extensive dealings of the Dutch with dairying came to a standstill. However, dairying and milk imports as such resumed after the War. An outline in the form of a postscript is given for the period 1945-1985 on the Indonesian efforts to continue the development of the milk industry.

The data collected for the study were obtained from the following sources.

- (1) Published material in the form of studies, reports, scientific and popular articles on agriculture, livestock, food and nutrition in various professional and non-professional Dutch language journals of Indonesia during the colonial era. The Central Library of the Agricultural University of Wageningen has an extensive collection in this field, in particular for the years 1880-1940. Some complementary data were obtained from the Royal Tropical Institute in Amsterdam.
- (2) Material on marketing of milk products in the former Netherlands Indies available in the archives of the "Coöperatieve Condensfabriek Friesland" in Leeuwarden. This covers the period 1929-1940.
- (3) Material available in the State Archives of the Ministry of Colonies, The Hague, (Algemeen Rijksarchief, Den Haag, Ministerie van Koloniën, 1901-1945).

Information was also obtained from informants who had lived in Indonesia during the colonial era and who are conversant with food and nutrition matters of the period. Of particular importance was an extensive interview with the late Dr. J.H. de Haas (1900-1985) and Mrs. J.H. de Haas-Posthuma, in August 1980. Both had been actively involved in the infant care of the Indonesian population in the 1930's.

The study is based on data available in the Netherlands, nearly all of it in Dutch. It has however its limitations as these data in the first instance reflect Dutch reactions to and interpretations of the Indonesian society.

1.3 Framework of the study

The study consists of two parts, a first part dealing with changing food habits and the arrival of condensed milk and a second part, the core of the study, on the diffusion of milk and milk products to Indonesia.

Part I, Changing food habits and the arrival of condensed milk

This section begins with some theoretical considerations on changing food habits and the place of milk in the diet. Reference is given to technological innovations and food habits (Chapter 2). This is followed by an analysis of the arrival of sweetened condensed milk in the middle of the 19th century for the urban consumer in Europe and North America. The social and nutritional aspects are discussed, as are the export of milk products from the Netherlands to other countries (Chapter 3).

Part II, Diffusion of milk and milk products to Indonesia

The setting up of dairying and the use of fresh milk are analysed in chapter 4 and chapter 5. First the early influence of the Indian subcontinent on dairying in the Indonesian archipelago is discussed. This is followed by a study of the desire of Europeans to maintain their habit of using milk, by beginning dairying under tropical conditions. In chapter 6 the early export of milk products, particularly sweetened condensed milk is discussed. An analysis is given of why and how it reached Indonesians who were not traditionally consumers of milk. Likewise the role of the health institutions and the marketing activities of the condensed milk

industry are discussed. This is followed by the sweetened skim milk question whereby the nutritional, political and food marketing aspects are looked into (Chapter 7). In a postscript (Chapter 8) an outline is given on milk and dairy development in modern Indonesia covering the years 1945-1985. Finally, summary and conclusions are presented in Chapter 9.

Part I, CHANGING FOOD HABITS AND THE ARRIVAL OF CONDENSED MILK.

2. SOME THEORETICAL CONSIDERATIONS ON CHANGING FOOD HABITS AND THE PLACE OF MILK IN THE DIET

2.1 Milk and non-milk users

Looking at the present food habits of the populations of the world, a distinction can be made between populations with a long standing dairy tradition and those where dairy and milk-using habits were, until recently, absent. Those with no tradition of milk usage are the autochthonic inhabitants of the American continent, populations of humid tropical Africa, South East Asia, the Far East and the autochthonous inhabitants of Australia and the Pacific Islands. However, the food habits of a society are never static but alter either with changes in the socio-economic system of which they form a part, or as a result of external influences. Food habits can change for the better or for the worse.¹

The question we should be asking, as Margaret Mead proposed, is not only "How do we change food habits", but "How do food habits change".² It is with a knowledge of existing trends and of the interrelation of food habits with other development trends that one can hope to introduce those changes which, from a nutritional point of view, are desirable and necessary. In those regions where there is no milk-using tradition, the attitude towards milk is changing.³

Europeans introduced dairying and the local production of fresh milk, and stimulated the imports of milk products, first condensed milk and later, milk-powder. At present milk products and a little fresh milk are available for the upper and middle classes of humid tropical Africa and South East Asia. Further milk products have been made available through food aid programmes.

This brings us to the question of what constitutes a traditional food. The term refers to the perception of a population that a food is indigenous and considered as an integral part of the diet. The time factor is also important as many foods once alien are now considered to be indigenous. How Irish are the Irish potatoes and how English is English tea? These foods originating from different ecological zones are now part of the national diet. Coffee is likewise such an integral part of the food habit of the Dutch and other Western Europeans that nobody considers it as alien.

Milk along with its unique sugar lactose and the enzyme lactase which allows its digestion appeared with the first mammals 500 million years ago.

The only milk consumed by early man was human milk. After having been breast-fed he lived from fruit gathering and by hunting.⁴

The habit of populations to make use of milk as a food gradually developed 10,000 years ago in the neolithicum, when man started to cultivate plants and domesticate animals for his food supply. Domestication took place as a response to natural ecosystems and led to two generalized agricultural systems: seed agriculture, dependent primarily upon seed reproduced crop plants, and root and tuber agriculture or vegiculture, dependent mainly upon vegetative reproduction.⁵ Seed agriculture appears to represent the indigenous mode of agriculture in the drier tropics and sub-tropics of the Old and New Worlds. Root and tuber agriculture is most highly developed as an indigenous agriculture in the humid tropical lowlands of America, South East Asia and Africa. In the highlands of the Andes with a cool temperate climate, root and tuber agriculture is based on potatoes and some minor root crops. Sauer points out that with the development of the two agricultural systems different kinds of animals were domesticated.⁶

With a vegiculture system the dog (Canis familiaris), pig (Sus scrofa), fowl (Gallus gallus), duck (Anas platyrhynchos) and goose (Anser anser) were domesticated, all more or less being kept within the village. As with the plant cultivation, the domestication can be attributed to the care and arts of the women who managed the household.

With seed agriculture however, which developed in the Middle East, herd animals were domesticated. Cattle raising and pastoralism are closely connected with seed agriculture. Pastoralism arose from seed agriculture and was practised by people who lived on the margins of agriculture.⁷ The pastoralists did not break their relations with the farming communities from where they originated. Even in present days pastoralists have close ties with farming communities for their livelihood. It is possible that dogs may have been the first animals to be domesticated. Both sheep (Ovis sp) and goats (Capra sp) were kept by proto-Neolithic peoples of the Middle East around 9000 B.C. Cattle (Bos sp) and pigs were reared slightly later, probably they became associated with man through the raiding of these crops.⁸

Mixed farming began very early in the Middle East. Stubble left after reaping the cereals would have provided good grazing for animals which would in turn have benefitted the crops with their manure. It is most

likely that they were first valued for their meat and hides then, as they became more docile, for milking and finally, as pack and draught animals. Common cattle or Bos taurus descend from wild aurochs, Bos primigenius.

In a study on the antiquity of dairying, Simoons comes to the conclusion that probably representations of dairy scenes in Mesopotamia can be found around 3200-3100 B.C. (in Uruk times). Although there are some questions about dating, evidence does not support the view that dairying in Mesopotamia was older than in Egypt or the Sahara.⁹ Dairying, compared with other uses of cattle by man, was a relative late development. At the beginning of domestication, the animals secreted just enough milk to feed their own young or very little more. Small children may have sometimes shared the milk of a goat or ewe with the animal young, but this was not a basis to start dairying.¹⁰ Domestication of herd animals such as the goat, the sheep and in particular the cow are associated with ceremonial practices.

The cow was originally a sacred animal used in moon cults in the Middle East, their horns symbolizing the crescent moon. Milking and castration were part of fertility rituals.¹¹ Man must have had a strong motivation to domesticate the cow, since the wild aurochs was a powerful intractable animal. In order to have a supply for sacrificial purposes, the animal was kept in a captive state. Economic uses of the animal such as milk for food would then have been a by-product of a domestication primarily religious in origin.¹² There is some evidence of dairying in Middle Europe among the Bandkeramik or Linear pottery culture as early as 5300 B.C.¹³

One of the descendants of the Bos primigenius is the Bos namadicus, which inhabits Southern Asia and the Arabian Peninsula. The zebu or the Bos indicus may have descended from the Bos namadicus, which was first depicted in India more than 6000 years ago.¹⁴ Most likely the zebu was domesticated in Western Asia and not in India as is often thought to be the case.¹⁵

Dairying may have been introduced to the Indian subcontinent rather late, around 1500 B.C., by the Indo-European Aryans when they invaded and settled in the northwest in what is now the Punjab. Most likely dairying and the use of milk as a food spread from the Middle-East and North-Africa to Europe, Western and Eastern Africa, Central Asia and the Indian subcontinent.¹⁶ In the high mountains of Central Asia the yak (Bos grunniens) plays an important role in daily life as a pack and draught

animal, as a supplier of leather, of hair for the making of ropes and canvas, and of meat and milk. Generally speaking dairying did not reach South East Asia, the countries of the Far East (China, Japan and Korea), humid tropical Africa and the pre-Columbian civilisations of America.¹⁷ These regions may be characterised as those parts of the world which have no milk-using tradition. Because of the absence of cattle, dairying and milk use was unknown in pre-Columbian America. The indigenous livestock of the civilisations of the Andes, the il lama (Lama glama) and al paca (Lama pacos), were used as pack animals and for wool and meat. Probably the use of butter, sour milk and cheese must have quickly followed the regular milking of animals, for by accident alone these dairy products must have occurred again and again. Fermented milk has surely been consumed by many peoples from the earliest Neolithic times, but little remains as direct proof of this.¹⁸ Fermented milk and cheese making were obvious practical means of preserving a surplus of milk when it could not directly be used or distributed.

Cow milk is by far the most important milk of mammals being used as food by man. Less extensive is the utilization of goat and ewe milk. In the Indian subcontinent the milk of the buffalo (Bubalus bubalis) is widely used. Other kinds of milk used are camel (Camelus bactrianus) dromedary (Camelus dromedarius) in Central Asia, the Middle East and North Africa. In Central Asia the milk of mares is also consumed. A well-known fermented mare milk product of the steppes of Central Asia is the Kumiss of the Kazak pastoral peoples. Since a mare gives little at one milking, they are often milked six or more times a day and Kumiss is nearly always a luxury food.¹⁹

Reindeer (Rangifer tarandus) milking is found among the Saami of northern Scandinavia and some of the peoples of the taiga and tundra zones of northeastern Siberia such as the Tungus.²⁰ The milking of reindeer by the Saami is derived from the Scandinavian dairy traditions. It is of interest to note that not all those who keep reindeer use milk. There is in actual fact a large geographical gap between the milk-using Saamen and the other reindeer-keeping peoples of the Baikal region of Siberia. Most likely the domesticated reindeer was first adapted for drawn sledges in imitation of the dog-drawn sledge and only later for riding and milking.²¹ It is known that sometimes the milk of the ass (Equus asinus) was used.²²

Despite the diversity of different milks, cow milk has become the most important for man. However, this does not exclude the fact that in some

regions other types of milk may be of greater significance. Studies carried out in the 1960s focussed attention on problems related to malabsorption of milk among populations who were not traditional milk users, by lactose intolerance.

Primary lactose intolerance results from an apparently normal decrease in the activity of the intestinal enzyme lactase and can occur between the ages of two and five years.²³ This condition is present in 75-80% of the world population and can possibly be ascribed to the fact that among these peoples milk is not used after infancy. However, young children can usually tolerate a certain intake of lactose as is present in breast milk. Small but nevertheless significant quantities of milk other than breast milk taken throughout the day can be tolerated by older children and adults as well. It should be remembered that the interpretation of symptoms of discomfort associated with milk-drinking and intolerance is not easy. Intestinal infection which often results in malnutrition may sometimes cause temporary secondary lactose deficiency.²⁴

In those communities where sanitary conditions are poor, intestinal infections and diarrhoea are common. Studies carried out on lactose intolerance suggest there is a genetic basis for primary lactose intolerance among those with no tradition of milk-drinking. Probably during a late evolutionary development dairying populations developed a tolerance over many generations by the use of a lactose-rich diet in the form of cow milk. It is based on the presence of higher levels of the enzyme lactase in adult man.²⁵ Despite the prevalence of lactose intolerance, the habit of making use of milk has spread in contemporary times into the traditional non-dairying regions of the world. Populations who are truly intolerant to milk can often tolerate small but nevertheless significant amounts of it. Also, in dairy products such as the fermented kinds of milk and cheese the lactose is already partially degraded.

Until 1500 the people of the world could be clearly divided into milk and non-milk users. This was no static situation, and very gradually, dairying expanded. The diffusion of a food to other parts of the world is not a simple linear process. New foods may be adopted but disappear after a certain period and even sometimes may appear again. China which has always been regarded as a society of traditional non-milk users is a good example. It seems however, that after the Han period, in the years 200-1000 A.D. the customs of the nomads on the northern border with their dairying traditions became intermingled with Chinese customs. Milk and dairy products were then

adopted by the upper classes. This change must have been due to the close relation between the aristocracy of North China and the noble families of the border nomads.²⁶ Most likely milk usage disappeared with the decline of the influence of the nomads and the increase of population, followed by competition for land between man and cow. In this context a rejection of milk may also be seen as a way of differentiating the Chinese habits from those of the border nomads, by which means they could remain independent for their food.²⁷

Another example is the Indian penetration into South East Asia during the first millennium, when the use of milk as food and for religious purposes was introduced. Apparently only a very limited part of the society adopted the use of milk and it disappeared quickly after the decline of the Indian influence.²⁸ A second diffusion of milk into areas with no milk-drinking tradition took place during the period of European expansion. It seems that a strong dairy tradition is necessary for maintaining the milk-using habit in what are unfavourable ecological zones for dairying.

2.2 European expansion

Although dairying originated in the Middle East, Western Europe became an area with a strong habitual use of milk and other dairy products as integral parts of the diet. With the Western European expansion, which increased rapidly in the 16th and 17th centuries when Europe began to "discover" the world, the habit of using milk spread into other areas. Through trade, conquest and migration over the past 400 years, the spread of different foods from their original zone to other regions has been very extensive. Maize (Zea mays), "Irish" potatoes (Solanum tuberosum), sweet potatoes (Ipomoea batatas), cassava (Manihot utilissima), cocoa (Theobroma cacao), tomatoes (Lycopersicon esculentum), lima beans (Phaseolus lunatus), ground nuts (Arachis hypogaea) and turkeys (Meleagris gallopavo gallopavo) were introduced into Europe, Africa and Asia from the Americas. Products like rice (Oryza sativa), tea (Camellia sinensis), sugar cane (Saccharum officinarum) and several fruits spread from South and South East Asia to other tropical and semi-tropical regions of the world.²⁹

It is interesting to note that in many countries these important foods are so deeply rooted that the people consider them as indigenous and not foreign. In Africa, about 45% of the major cultivated food plants

originated from the Americas.³⁰ On the other hand the mass migration from Europe to America was accompanied by the spread of wheat (*Triticum* sp) and dairying. Present-day North America inherited the dairy traditions of North-Western Europe, while in Latin America dairying is less usual as the Hispanic settlers had less of a dairying tradition. The spread of dairying in Latin America was mainly determined by the extent to which the pre-Columbian civilisations with their non-dairying traditions were still present and by ecological conditions. Humid tropical zones are less favourable to cattle raising.

British and Irish settlers introduced dairying into Australia. Dutch settlers took dairying with them to the Cape province of South Africa in the 17th century. Here they settled in the territories of the hunters-gatherers the Ikung Bushmen. There they also came into contact with the Hottentot and Bantu pastoral peoples who had milk-using traditions.

The spread of dairying and the use of milk accompanied European settlers who considered milk an essential part of their food habits. However humid tropical Africa, South East Asia and the Far East remained basically untouched by the European expansion of the 17th and 18th century as far as dairying was concerned. Trade was the driving force behind this expansion and only a few Europeans settled there on a more permanent basis. The situation changed when, after the middle of the 19th century, the industrial revolution and technological innovations in food processing meant that milk could be preserved in large quantities with a long-lasting keeping quality. At the same time the European colonial powers were bringing most of Africa and Asia under their direct administration so as to take out raw materials and to export their industrial products.

2.3 Technological innovations and diffusion of food

The complex phenomenon of the industrial revolution caused major changes in food habits. It began in England and between 1760-1860 transformed the country from an agricultural and trading nation to the leading industrial nation of that time. Belgium, especially Wallonia, was the first of the countries of the continent of Europe to become industrialized. Technology, although present in pre-industrial methods of food processing, expanded rapidly.

It is still not fully understood why the industrial revolution began in England rather than in other European countries. It is astonishing to see

the sudden production boom of industrial goods as part of the English technological revolution. At the end of the 18th century and into the 19th century early mass production was able to develop without bottlenecks or breakdowns.³¹

The transformation of the predominantly agricultural and artisan economy of Western Europe into an urbanized industrial society created new demands for food. It also led to an agricultural revolution with an increase of food availability so that eventually mass poverty and hunger disappeared. These were not the result of the industrial revolution as is often believed, but were in fact already characteristic of pre-industrial Europe.³² It will always remain a point of discussion as to whether modern technology changes food habits or whether food habits change technology.

This brings us to the question of technological innovation. Technological innovation rests on the available technical and scientific knowledge and on new demands from a changing society. For four new demands can be distinguished.³³

- (1) Cheap food for the working class living in the fast growing cities.
- (2) Luxury foods for a new developing and expanding urban middle class.
- (3) Foods that can be better kept and preserved, because of an increasing distance between food production centres and the consumers.
- (4) Foods that can be easily stored and prepared under new housing and working conditions.

Are inventions the results of the work of one person, a genius in a certain field, or the result of a sequence of a number of smaller inventions? The theoretical discussions on inventions focus on two different approaches; one is what Flinn calls a "heroic" approach, the other being a "systematic" approach.³⁴

The "heroic" school of thought emphasizes the role of the individual inventor. Schumpeter puts less emphasis on the inventor as such but more so on the entrepreneur, thanks to whose leadership the invention may be put into practice, the actual innovation. "As long as they are not carried into practice, inventions are economically irrelevant. And to carry any improvement into effect is a task entirely different from the invention of it, and a task, moreover, requiring entirely different kinds of aptitudes. Although entrepreneurs of course may be inventors just as they may be capitalists they are inventors not by nature of their function but by

coincidence and vice versa".³⁵

The "systematic" school of thought sees invention as the culmination of a regular process. Representatives of this way of thinking were the sociologists Ogburn and Thomas and Gilfillan.³⁶ They point out the dependence of an invention upon its constituent elements. These are in turn each dependent on their constituent elements, and so on. Indeed, the invention of condensed milk by Gail Borden (1856) was dependent on Nicolas Appert's invention of food preservation by heat treatment in a permanent sealed container of glass (1806). It was Bryan Donkin (1812) who managed to change the breakable glass for tinned containers. It is not so much the work of one determined individual, but the culture of a society that produces the invention; necessity does not automatically lead to invention.³⁷ Supporters of the systematic approach see the inventions of the industrial revolution as being generally the work of artisans. They point out that industrialists were quite often of humble origin.³⁸

It is of importance to note that many inventions were never actually applied. There is a time lag between an invention and its adoption, although with the development of modern communication this is probably shortened. From the sociological point of view it is more important to know when the invention is generally applied (innovation) than it is to know the time of the invention as such.³⁹ An invention is not an unique event but in most cases it is a sequence of a number of bigger and smaller inventions. It is not justified to speak for instance of the invention of condensed milk or milk-powder.

A number of preconditions are required before an invention becomes adopted and a commercial success. Buchanan believes there are three main conditions needed for creating a favourable environment for innovations.⁴⁰

- (1) There must be "key groups" within a society prepared to consider innovations seriously and sympathetically. This was true of Britain and later of other Western European countries when a new industrial middle class was willing to cultivate new ideas. Society appreciated the labour of the inventor and gave him honour and respect.
- (2) Innovations have to match social needs. As far as food technology is concerned we have already mentioned the need for processed foods for the growing urban populations.
- (3) Closely linked with this is the transition from a traditional to a modern pattern of culture. In the modern pattern of culture change is,

in principle, positively appreciated. A society which believes in the possibility of improvement by means of change, is prepared to look into the possibilities of change and to rate it at its true value.⁴¹ In this context, there is an appreciation of new ideas and products of science and technology.

Industrially processed foods were originally developed to meet the needs of urban consumers in Western Europe and North America. With the modern European expansion after the middle of the 19th century, processed foods reached Africa and Asia. In his study on diffusion of innovation Rogers distinguishes four main elements.

- (1) The innovation which may be an idea, practice or object that is perceived as new by its adopter.
- (2) The channels by which the innovation is communicated.
- (3) The time or duration involved in the diffusion.
- (4) The social system in which the diffusion occurs.⁴²

Likewise the process of diffusion and adoption of an innovation will involve two levels;⁴³ a geographical diffusion which is the spread of the innovation from its place of origin to other parts of the world, and a social diffusion which is the rate in which a technique or product is adopted among various groups of the society. As far as the adoption of an innovation is concerned, several adopter groups that can be classified are the earlier adopters, early majority, late majority, and the so-called laggards.⁴⁴ The question of who adopts an innovation earlier or later cannot be answered only by finding out the innovativeness of individuals or groups of a society. The diffusion of an innovation is a selective process and not all groups can be equally reached. The rate of adoption depends also on the degree of access which potential adopters may have to resources such as income, formal education or land.⁴⁵

In a study on the mechanism of food innovations, Wiegelman distinguishes two basic types of food innovations; an expensive innovation and an emergency innovation.⁴⁶ Expensive food innovations are first adopted by the upper class of a society. Through close contact and imitation they often move down the social scale to the lower classes. This process will be strengthened in periods of increasing prosperity with improved production and mass transport techniques. Finally the food will lose its exclusive character and becomes a part of the diet of the lower classes. This is what in general terms happened and still is happening in Africa and Asia with

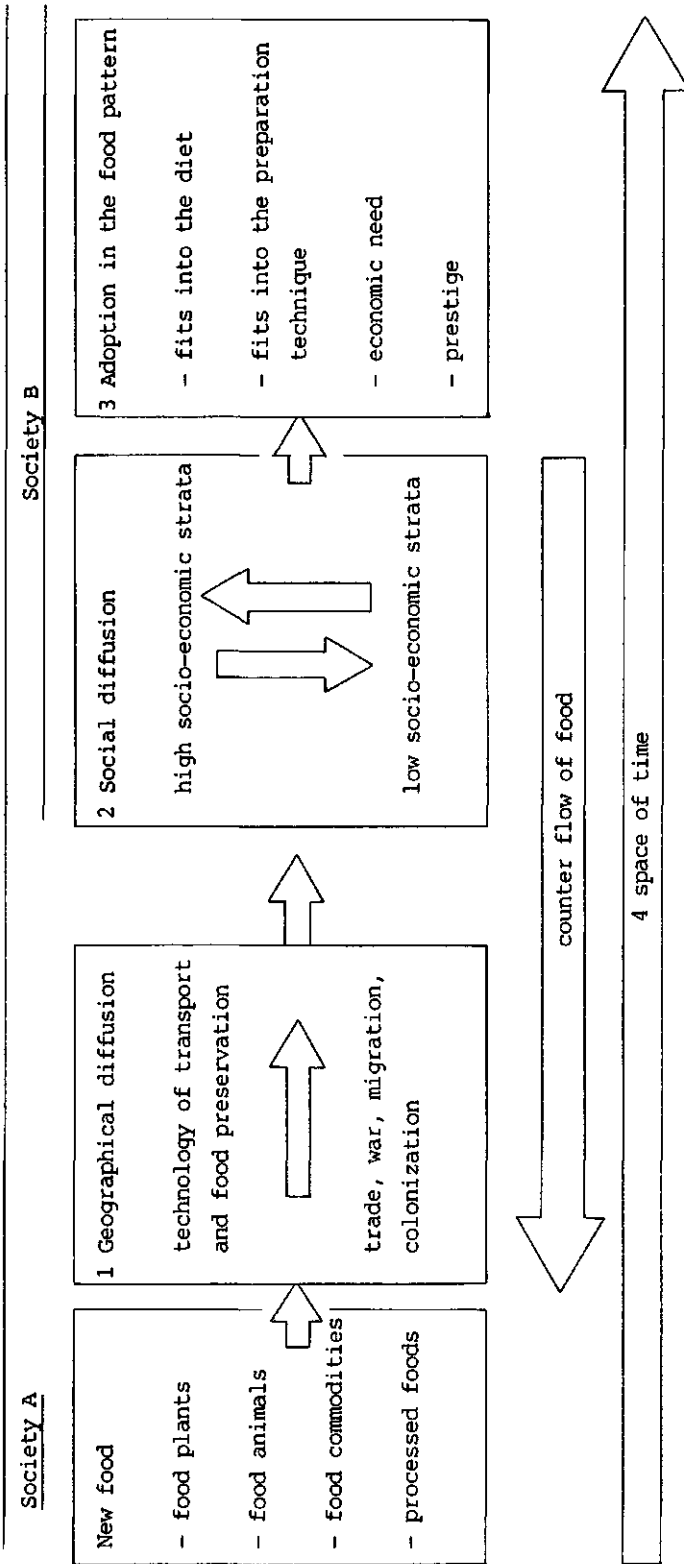
imported foods from Europe. Typical examples are bread, biscuits, milk products and beverages such as beer and soft drinks.⁴⁷ The demand is continuously expanding and because these foods have become such an integral part of the local diet, shortages can be the cause of hardship and complaints.⁴⁸ On the other hand innovations may also occur in times of economic distress and the food may gradually move up on the social scale and be adopted by the higher classes. Because of population pressure and increasing food scarcity cassava and maize with their higher yields have replaced indigenous cereals such as sorghum and millet in Africa. In Asia, maize gradually replaced some of the rice on the island of Java, after 1880 because of problems with the food supply.⁴⁹ In regions with a food deficiency the upper classes were also gradually forced to adopt maize in their diet.

The following generalized model of diffusion of a new food from one society to an other society is presented in Figure 2.1. It comprises four main elements; the geographical diffusion, the social diffusion, adoption into the local food pattern, and the element of time.

The diffusion of food from one society to another is, in most cases, not a one-way process. Often a counter flow of new foods takes place simultaneously. Because of its possibilities and limitations for adoption it is necessary in studying food diffusion to take into account the form it took. Is it in the form of plants and animals, or of food commodities or of processed foods? Technological innovations in food processing and mass transport meant that large quantities of foods were now available far beyond their original ecological zones. It began when a colonial elite wanted to maintain their own food habits by importing some of their plants and animals for local production and consumption. Different ecological conditions meant that not all European foods could be sufficiently produced locally. Milk is a typical example. When, around 1860, milk processing in the form of milk condensing became a fact, it was then possible to ship large quantities milk to the milk deficient regions of the world. In these regions the rejection of milk gradually weakened. Commenting on China in present times Goody writes: "Faced with that key products of early industrial cooking, namely condensed sweetened milk, the attitude is changing rapidly".⁵⁰

Figure 2.1

A generalized model of diffusion of a new food from one society (A) to another (B): 1. geographical diffusion; 2. social diffusion; 3. adoption in the food pattern; 4. the space of time.



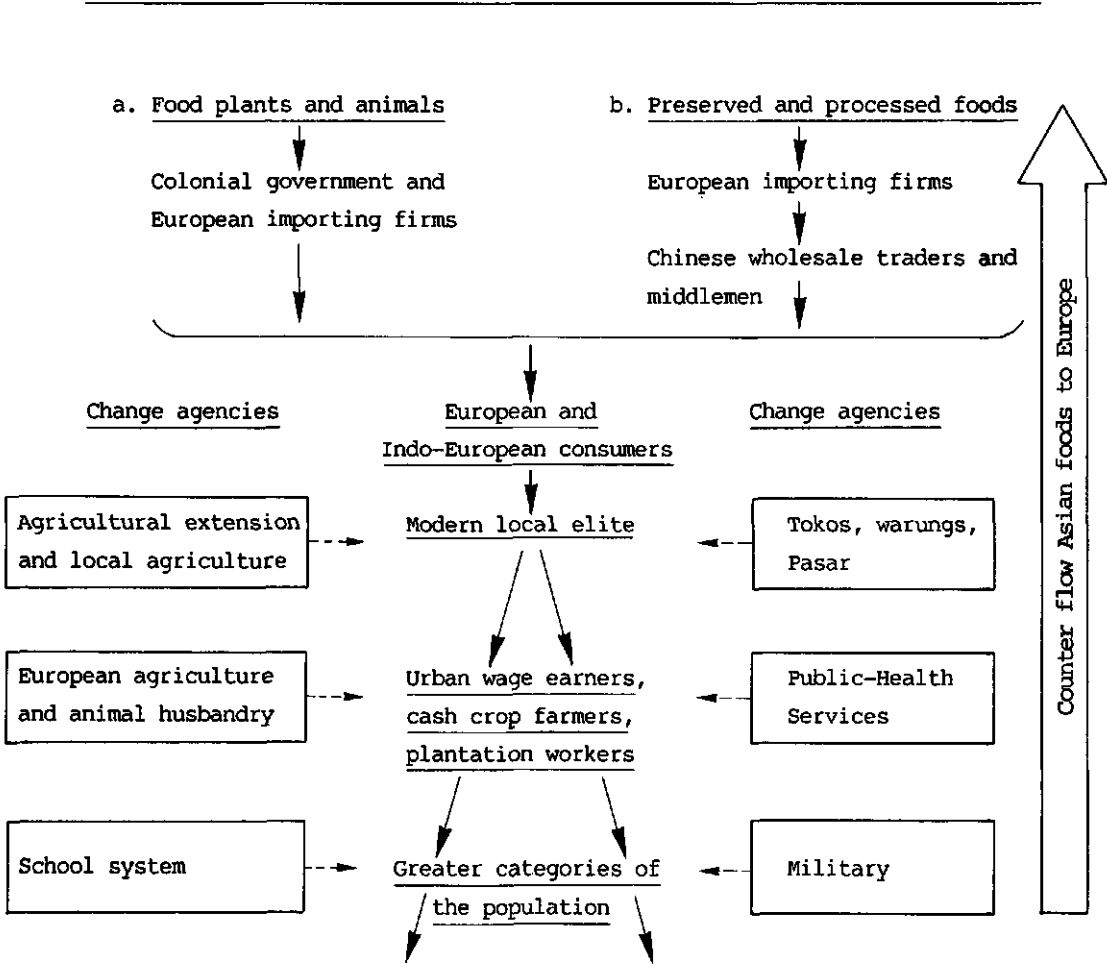
A generalized model of the social diffusion of new foods in late colonial South East Asia and its main change agencies is presented in Figure 2.2. Food plants and animals were in the first instance imported by the Colonial Government and European firms for the development of European dominated agriculture. On the whole, preserved and processed foods were imported by European importing firms and Chinese wholesale traders and middlemen, and were distributed to both European and local consumers. A gradual diffusion of new foods took place from the colonial elite to the local population. In this case the early adopters were the modern local elite who were in close contact with the colonial administration and European enterprises. From there new foods were further diffused to urban wage earners, cash crop farmers, plantation workers and even larger groups within the society. In this process a wide variety of institutions acted intentionally and unintentionally as change agencies; agricultural extension services, European agriculture and animal husbandry, European oriented school systems, the military, public health services and the retail outlets (tokos, warungs, pasars).

Many of these agencies were by nature not primarily concerned with food for the Indonesian population, but nevertheless they acted as food innovators. Some of the agencies, at least in principle, did have food innovations for the benefit of the population as one of their objectives. Agricultural extension services may have promoted the cultivation of cassava or maize because of pending food shortages, and health services may have promoted certain foods for infant feeding. Needless to say the importing firms and "retail outlets" sole aim was to sell the new foods. On the other hand, the Dutch language school, and the military, although food innovation was not part of their objectives nevertheless acted as food innovators.

One major element of food diffusion which should be studied is the adoption of new foods into the local food pattern. Figure 2.3 is a generalized model of the adoption of a new food into the food pattern and its main limitations. The adoption of a new food depends on how it fits into the diet, what the food preparation techniques at household level are, whether there is an economic need for a new food, and also whether it contributes to the prestige of its adopter. In fact these main factors are a cluster of variables all influencing food adoption. How for instance a new food fits into the diet depends on the cultural acceptability of the

Figure 2.2

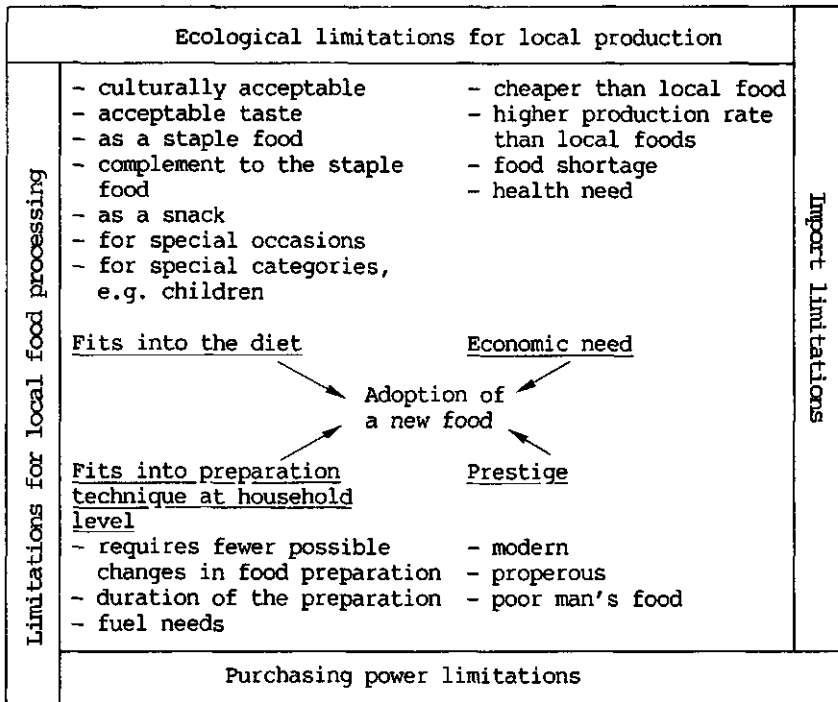
A generalized model of social diffusion of new foods in late colonial South East Asia and the main change agencies.



food, its taste, its suitability as a staple food or complement to the staple, its suitability as a snack, or for special occasions, its suitability for special categories such as infants, children. The adoption of a new food into the food pattern is often limited, however desired the food may be. Four main limiting factors can be distinguished; ecological limitations for local production, limitations for local food processing, import restrictions, and limitations of the purchasing power of the population.

Figure 2.3

A generalized model of adoption of a new food into the food pattern and its main limitations.



Not all food innovations can be classified as either an expensive or an emergency innovation. Beer and later, the carbonated beverages or soft drinks were indeed expensive food innovations. The example of condensed milk is somewhat different. It was an expensive food innovation for Africa and Asia, but it also had an aspect of emergency. Some mothers started to use condensed milk for infant feeding when they were not in a position to give or to continue with breast-feeding. Apparently condensed milk was adopted to such an extent that, in the 1930's, some health authorities in tropical Africa and Asia grew worried about its inappropriate use.⁵¹

3. A NEW FOOD FOR URBAN CONSUMERS: CONDENSED MILK

3.1 Food preservation in connection with long distance transport

As a perishable product, milk as such cannot be transported over long distances or over a long period of time. A surplus of milk that is not required for immediate consumption should be preserved in one way or the other like butter, cheese, curds, or yoghurt. Until recently milk was unsuitable as a food for travellers. The drying of milk products is not a 19th century novelty. It has for instance been done for a long time by the Mongols, and in Mongolia today there are many types of milk curds.¹ They are not only eaten after preparation, but are also dried and prepared for storage for later use. One of the most common means of preparation is to let the milk set until the cream rises and then skim it off. The milk is then boiled until a curd begins to form, after which the water can be removed. Butter and sugar are then added. In the 13th century, travellers to central Asia like the Fleming Willem van Rubroek and the Venetian Marco Polo reported the preparation of dried milk. They observed that the Mongols used dried milk when during winter the supply of fresh milk was limited, or took it with them when going on an expedition.²

In the 19th century the supply of milk posed many problems for the fast growing cities of Western Europe as distances between producers and the consumers increased. The urban milk supply in the middle of the 19th century had two sources.

- (1) Town cowkeepers who kept their cows in sheds, half-underground dens and cellars. The animals were brought into their sheds as soon as they had calved and were milked until they ran dry. Then they were sold and new cows bought. The hygienic conditions of these town dairies were appalling. Drummond and his associates give as examples of London and Manchester where cows were kept and milked in sheds with no ventilation and which were full of filth.³ In the city of Amsterdam more than a thousand cows were kept and milk was on sale for the general public. The cattle were fed with hay and grass, potato peels, old bread and leftovers from restaurants.⁴
- (2) Milk vendors who came daily from the countryside to sell milk at the doorsteps of the urban consumer. The share of these milk vendors in the total urban milk supply was probably more important in the smaller towns. For a large city such as the London metropolitan area, the

development of railways made it possible to bring in milk in larger quantities from the rural areas to the urban consumers. In the Netherlands the situation was somewhat different. Major cities like Amsterdam and Rotterdam were relatively smaller in size, but the existing system of waterways allowed a modest bulk supply of milk by boat.⁵

Apart from the unhygienic aspects of the milk being supplied to the cities, food adulteration was common practice. Watering down the milk and removing the fat was very common. Milk of a good quality was expensive and out of reach of the working class.

Another mass demand for food came from the merchant fleet, the navy and the army. The nature of the voyages meant that much emphasis had to be given to foods that could be preserved for a long time. Apart from grits, wheat flour, dried peas and beans, typical preserved foods on board of 17th and 18th century Dutch East Indiamen were bacon, salted meat, stock fish, sauerkraut and ship's biscuits. Also dairy products such as butter and cheese were taken on board. Cheese was coated with a thin layer of tar to prevent flies from laying their eggs.⁶ Because of the suffocating heat of the ship's hold foods deteriorated quickly. Standards of general hygiene on board and that of the victuals were considered even by contemporaries as poor. Armies at war did not take sufficient quantities of food with them and often roamed the countryside as a swarm of locusts. It is obvious that milk as a perishable product was not a suitable provision for the army or navy.

In order to satisfy the demand of passengers it was not uncommon to have some cows on board for fresh milk. This was often a nuisance, fodder had to be taken on board as well and in stormy weather limbs could easily be broken. The hygienic and nutritional conditions on board declined with the duration of the voyage. The quality of water and food deteriorated and fresh food was lacking. In the long run, the diet usually consisted of ship's biscuits and dried or salted meat. Scurvy was not uncommon on board.

It is not surprising to note that the authorities were concerned with food supply and food preservation.

(1) The Dutch United East India Company (VOC) throughout its existence issued a number of regulations concerning the preservation of the victuals. Foods such as peas taken on board had to be well dried, and meat and bacon had to be salted and pickled again from time to time. In order to prevent scurvy, lemon juice, tamarind, horse-radish (Armoracia

rusticana) and scurvy grass (Cochlearia officinalis) were used.⁷ Small livestock like sows and sheep were taken on board. Sometimes on the poop deck, small vegetable gardens were kept with lettuce, cress or parsley.⁸ In 1652, the Dutch East India Company established a refreshing station at the Cape of Good Hope. A vegetable garden was kept there for the benefit of sick sailors.⁹ Not only lemons and oranges were cultivated but also horse-radish and scurvy grass.¹⁰

- (2) The British Admiralty showed much interest in the problems of scurvy. In 1753 James Lind, a naval surgeon, published his classic book, "A Treatise of Scurvy". It was Lind's view that oranges and lemons were the best antiscorbutics. However it took many years of endless discussions before the Admiralty accepted the recommendations of Lind and other medical doctors. In 1795 it decided to adopt lemon juice as the principal antiscorbutics, and rations were issued after the sixth week at sea.
- (3) Another example of a major concern with food supply was the setting up (in the 18th century) of baking establishments in the dockyards at Deptford, Portsmouth and Plymouth for the British Navy.¹¹ This was to ensure an adequate supply of ship's biscuits since the demand rose very sharply in wartime and then fell back just as drastically once peace returned.

When the French confectioner Nicholas Appert (1749 or 1752-1841) was experimenting in his factory on the preservation of vegetables, fruits and meat, Europe was in a state of war. During the Napoleonic era mass transfer of people took place in the form of armies all over Europe. Napoleon was well aware of the importance of a good and efficient food supply; hence his dictum, "An army marches on its stomach". Army and navy authorities were once again interested in methods of keeping food fresh. Appert developed a method whereby a glass jar filled with meat or vegetables was carefully sealed after as much air as possible was removed. This was done before the jar was heated. It is of interest to note that Appert believed that it was the air that caused the spoilage, and so glass was chosen as the material least penetrable by air. Jars of glass were already being used by housewives of the well-to-do classes for storing pickles and other delicacies. The jars were closed with glass lids and wax or glue.¹²

Appert also used the same method to preserve milk in bottles. The French Navy, impressed by his work awarded him a prize of 12 000 francs. Despite this success the new preserved food in glass could not easily be utilized on a larger scale. Apart from questions of taste and price there were two other problems. Sealing the wide mouthed jars, which were filled with fish, poultry or meat, was in practice very difficult. In his book on food preservation published in 1810 Appert wrote:

"It is chiefly on the corking that the success of the process depends".¹²

Jars of glass are breakable and were therefore not fit for large-scale supplies under the transport conditions of that time.

Britain's interest in food preservation may be illustrated by the fact that Appert's book was translated into English and published within a year in London. Drummond and his associates mention that in 1807 a somewhat similar process was used by the Englishman Thomas Saddington for preserving fruits.¹⁴

Problems with the fragility of glass jars were eventually overcome when in England Appert's methods were adapted to tin-plate canisters or cans. The first patent for using tin-plate was taken out in 1810 by Peter Durand, but there is no evidence that he took part in the business of canning.¹⁵

The making of tin-plate dates back to the 14th century when Bohemia and southern Germany already had a flourishing domestic industry.¹⁶ Iron bars were forged and hammered into thin iron sheets, which were rinsed and then dipped in molten tin, thus protecting the thin iron sheets against corrosion.¹⁷ From this material, in the course of time tinsmiths formed and soldered all sorts of durable household utensils.¹⁸

In the 18th century two properties of the tinned container became highly appreciated by its users. In the first place compared to earthenware, tin was easily decorated by paint or varnish, so that colours and motifs made it an appealing product. Secondly, tinned containers were more suitable for storing certain kinds of foods.¹⁹ From 1730 on, the British dominated the tin-plate industry. This domination lasted until the end of the 19th century.²⁰ In the Netherlands, prior to the Industrial Revolution, tinsmiths could be found in all major cities using tin-plate imported from Germany. The 18th century tinsmiths made canisters, boxes, jugs and funnels. Canisters and boxes were generally used to store dry and therefore less perishable foods like tea, coffee and spices, and sometimes

also oil-rich foods such as chocolate tablets and oils. On board of ships, tinned boxes were used to store bread and ship's biscuits.²¹ By the end of the 18th century tinned containers for food were sometimes sealed by soldering. In 1775 a consignment of salmon enveloped in sheep fat and also put into sealed tins was sent to the East Indies.²² It is obvious that without a technique of sterilization the content of the tins were often tainted. The British Navy also contributed to technological innovations in the field of food preservation because of its high demands for food supplies in periods of war and because of its task of safeguarding the empire.²³

In view of the wide spread use of tinned containers to store food it is not surprising that it was soon regarded as a possible alternative for food preservation in glass. In England it was Bryan Donkin, partner of the firm John Hall, who realized that tinned containers could be used instead of glass. After some trial and error, a factory for the preparation of tinned food was established around 1812 in Bermondsey. The Admiralty took supplies of these preserved foods to form part of the medical store for distribution to sick men and also for use as rations on exploratory expeditions.

According to Morris (1958) the development of the canning industry around 1850 was characterised by some important difficulties. The manufacturer Goldner, who canned foods in Moldavia as well as in England, was accepted as a contractor to the Admiralty. When a larger contract was granted Goldner tried to fulfil this contract within the agreed time. He obtained permission to supply the soups in larger cans than those originally specified. Unfortunately much of this consignment went bad. The resulting inquiry by a Royal Commission showed that the change of can had been ill-advised. The situation worsened when, in 1850, 49 tonnes of Goldner's tinned meat was condemned. A correlation was traced between the introduction of large tins (4-15 kg) instead of the common ones (1-3 kg) and the sudden increase in spoilage. The trouble was ascribed to the difficulty of eliminating air from such large containers, and to inadequate cooking. With our present knowledge, there is no doubt that Goldner's process had not sterilised the innermost layers of the meat.²⁴ The Goldner drama had a long negative effect on the popularity of tinned foods, and consumers regarded these foods with suspicion.

In the 1860's the attitude of the consumer towards tinned foods changed. The cattle epidemic of 1863-1867 in England stimulated a demand for cheap

tinned meat coming from Australia and the U.S. as a substitute for local fresh meat.²⁵ From 1868 onward, first in the United States and later Europe, cans were generally superseded by machine-cut types. In Chicago and Cincinnati giant meat-canning firms like P.D. Amour emerged. The product was not very appetizing, big, thick and clumsy red tins which on opening disclosed a large lump of coarse-grained lean meat, fibrous in texture, with a large piece of unpleasant looking fat on one side of it. However, it was cheap. In England the imported tinned meat cost sevenpence a pound, which was approximately half the price of local fresh meat.²⁶

For many years the flavour of tinned foods left much to be desired. On the other hand, it should be realized that for instance tinned peas and salmon were usually sold to consumers on the American prairies or in the urban slums of Manchester, who had no access to or perhaps had never eaten the fresh product.²⁷ In Germany, preserved vegetables, meat and fish changed between 1870-1914 from rare foods used by travellers and rich people to popular foods among the working classes in the cities.²⁸

Although the Netherlands in the first half of the 19th century was economically and technically far behind its neighbouring countries, there were nevertheless some small-scale modern food preserving factories. The demand for modern preserved foods in glass and tins was determined by the needs of the urban populations, by the supply of provisions for the merchant navy, and increasingly also for Western foods in the colonies.²⁹ Likewise the Departments of War and Colonies became important customers of the new food-preservation industries.³⁰ In Amsterdam some victuallers like Alberdingk Thijm & Co were engaged in small-scale food preservation in containers of glass and tin. This firm which existed from 1830-1870, preserved foods by the "removal of oxygen", probably by following Appert's method.³¹

Glass was the most popular material for making containers and for hermetically sealing jars of preserved foods, for a very long time during the 19th century. Only for long-distance shipments was preference given to tins. In the last part of the 19th century however most of the preserved foods were packed in tins.³² The method of processing tinned foods remained basically the same during the 19th century. After the food and liquid were put into the tin by hand, a small tin plate with a pinhole in it was soldered over the opening. The tin and its content were then boiled until steam began to escape through the pinhole. A drop of solder was placed over the pinhole, and the cooking of the food continued until the processing was

completed. The tins were further provided with an embossed metal or a paper label.³³ The successful application of one-colour lithography on tin plates in the 1870's and that of the chromo lithography in the early 1890's made it possible to have elegant pictures on the tins in order to attract the attention of the consumer.³⁴ A further improvement was the replacement of iron by steel in the manufacture of tin-plate, giving a much lighter and harder product.³⁵

In the early beginning of the 20th century a new method of food preservation in tins was developed. The Sanitary Can Company was formed in New York in 1904 and began to manufacture the so-called sanitary tin can as it exists today. This sanitary or open-top tin, was constructed during a completely mechanical, double seaming operation that required no soldering, a rubber compound holding the lock-and-lap side seams together. The top of the container was completely open, the lid being crimped on automatically after the tin was filled with food.³⁶

Thanks to the work of Louis Pasteur (1822-1895) and Robert Koch (1843-1910) in the field of microbiology, problems confronting the process of canning could be better dealt with. The process of assimilating this knowledge was slow and for a long time sterilization methods were arrived at entirely by trial and error. Losses due to spoilage by micro-organisms remained high. At the end of the 19th century work at the Massachusetts Institute of Technology in Boston, U.S.A. on the most satisfactory processing times and temperatures for different foods became more widely known.

Two major developments, the rise of the liquid milk industry and the condensed milk industry, helped in the supply of milk after 1850. The growth of fresh milk output for direct consumption was not only dependent on a wealthier population in the growing cities, a better hygiene an increase in the yield of milk per cow and an increase in the number of cows. The spread of railways allowed farmers in Europe to sell their milk in distant cities. Further, the liquid milk industry was dependent on the provision of adequate roads for taking milk from the farms to railway stations, on pasteurisation, on methods of keeping milk cool in transit and on the rise of wholesale organizations which collected milk from farmers and resold it after treatment to retailers.³⁷ With the increase in the supply of fresh milk the condensed milk industry was established, preserving milk in the form of sweetened condensed milk, evaporated milk

and sterilized milk. These milk products had certain advantages over fresh milk. They could be transported over much longer distances and could be stored for a longer period. Besides, in a time when fresh milk was frequently adulterated, tinned milk was often a safe alternative. The main disadvantage was that of taste.

3.2 The arrival of condensed milk

Nicolas Appert succeeded not only in preserving milk in bottles but also in preparing a dried milk product in tablet form. After his invention several attempts were made to preserve milk by evaporating the water and keeping the product in sealed bottles or tins.³⁸ This product was far from being attractive to the consumer. Two main difficulties were encountered.³⁹ The prolonged heating converted some of the milk constituents such as proteins and calcium salts into insoluble substances. On reconstitution with water, this material formed a sediment which was disliked by the consumer. Another difficulty was that preserved milk was liable to decompose on storage. This, though unknown at the time, was due to the survival of heat resistant micro-organisms.

Until the 1860's the victualling authorities and the consumer had little interest in this type of product. This despite the fact that the American Gail Borden considerably improved the technique of condensing milk. In 1853 he applied for a patent of his method in the United States. This was at first not accepted. In 1856 however, the Patent Office accepted the originality of his claim and granted a patent.⁴⁰ The air in the tins used for packing the finished product was partially evacuated by an airpump before the tins were hermetically sealed. Despite the fact that the patent granted to Borden claimed "producing concentrated sweet milk by evaporation in vacuo without the admixture of sugar or other foreign matter", Gail Borden manufactured condensed milk, which was sweetened.

Adding sugar before condensing was necessary when using Borden's technique, because a high concentration of sugar inhibits bacterial growth. The production of unsweetened condensed milk remained a problem. In the early 1880's, John B. Meyenberg developed a method of preserving milk without the addition of sugar. The basic principle of the process was the preservation of unsweetened condensed milk by heat sterilization, by steaming under pressure.

The introduction of condensed milk to the consumer was a slow process. In the United States, Gail Borden made a first effort to produce his improved product, the sweetened condensed milk, on a commercial basis in 1856. The story is that he first became interested in preserving milk when, during a rough crossing from London to the United States, he was confronted by the problem of immigrant babies who could not be fed with milk as all the cows on board were seasick.⁴¹ His first milk condensery in Walcottville, Connecticut was a failure, but in 1857 he made a new effort at Burrville a few miles distant from his first factory.

Morris (1958) states that the condensed milk industry was established at about the same time as the factory system of butter and cheese making, although as early as in 1835 a British patent had been taken out by Newton. In 1849 Horsford prepared condensed milk by adding lactose.⁴² Condensed milk could now be introduced on a limited scale to the main economic and urban centre of the United States in the 19th century, New York. Because of financial restrictions and also the lack of a railway connection between the location of his factory and New York, Borden looked for better opportunities. With the financial support of Jeramiah Milbank, a condensery on a more extensive scale was established at Wassaic, New York in 1860, operating under the name of New York Condensed Milk Company.

The demand for condensed milk was at first limited, but during the American Civil War (1861-1865) it was introduced on a large scale. The army had to be fed and firms were contracted by the government to supply food. This gave the New York Condensed Milk Company a chance to provide ten thousand of soldiers with preserved milk. In combat, in the camps and barracks, and in the hospitals, people learned to appreciate that condensed milk under very difficult circumstances is a tasty and nourishing product. The Civil War contributed to a further popularizing of condensed milk and tinned foods in general.⁴³

In Europe, the United States Consul in Switzerland, Charles A. Pages, together with his brothers George, William and David established a small condensery, the Anglo Swiss Condensed Milk Company in Cham by Lake Zug in 1866. During the War of Secession, Charles Page, a war correspondent for the New York Tribune, wrote a number of articles pointing out the healing effects of condensed milk for the wounded. The Anglo-Swiss Condensed Milk Company grew rapidly. In the 1870's it had three factories in England and later in Norway, Germany and the United States. In 1905 the Anglo-Swiss Condensed Milk Company amalgamated with another giant, the Société Farine

Lactée Henri Nestlé. In 1868 Henri Nestlé had launched a milk food for sale in Switzerland at Vevey and Lausanne and in Germany in Frankfurt-am-Main. The tinned milk food was based on concentrated milk mixed with flour for use as a baby food when a mother could not feed her child herself. Working class mothers could not afford to buy cow milk nor could they feed their infants under hygienic circumstances. Infant mortality was very high in Europe at this time.⁴⁴ When a mother could not breast-feed her child it was difficult to find cow milk of a good quality. Nestlé's milk food was used in many countries of Europe, and in 1873 500 000 tins were being sold annually.⁴⁵

A new element in the development of condensed milk was the introduction of brand names. The consumer had been unable to distinguish between milk supplied by different traders. This changed with the preservation of milk in tins. The manufacturers of condensed milk introduced a brand name by which the consumers could easily recognize the product.

By 1900 a number of large companies were operating; the Anglo-Swiss Condensed Milk Company with its brand Milkmaid, Nestlé with Nestlé Condensed and, on the other side of the Atlantic, the New York Condensed Milk Company with the well-known Eagle brand, the Helvetia Milk Condensing Company and the newly established Pacific Coast Condensed Milk Company with the brand known as Carnation. Condensing proved both commercially and technically a successful method of preserving milk.

Throughout the 19th century, efforts were made to preserve milk by a drying process. The first patent for dried milk-powder was granted in England in 1855. Grimwade invented a process whereby sodium carbonate was added to fresh milk, and further evaporated in an open steam-jacket pan to a doughlike consistency. After adding cane sugar, the dough was pressed to a ribbon between rollers, dried further and finally ground into powder. The alkali was added to make the casein more soluble, the sugar was added to cause granulation in the final stages.⁴⁶ A later improvement was the use of vacuum pans instead of open pans for evaporating the milk. In 1883 another form of dried milk was invented by William Horlick. This malted milk was placed on the United States market in 1887. It consisted of dried milk with a proportion of malt extract and wheat flour. The convenience, nutritive value and digestibility of malted milk-powder attracted favourable attention from the medical profession.⁴⁷ Dried milk without any additions appeared on the American market in 1898 and patents were taken out for

various types of film (roller) driers at about the same time. Spray driers followed and together with improved methods of packaging, the quality of the milk-powder continued to improve.⁴⁸ In spite of these efforts, milk-powder was hardly used at domestic level. The impact of milk-powder was very limited on the working classes in England, preference being given to condensed milk.⁴⁹

Milk powder was used for industrial purposes. Around 1910, the main users of this product in Europe were the biscuit factories (skim milk-powder) and the chocolate industry (partially skim milk or full-cream milk-powder). Some manufacturers issued cookery books with recipes on how to prepare various foods and drinks using milk-powder.⁵⁰ The medical profession sometimes recommended the use of milk-powder for infant feeding, not so much at the domestic level, but more under controlled conditions such as in mother and child centres.

During the 1890's in France in a number of cities the "Gouttes de lait" and the "consultations des nourrissons" were developed, child health centres which aimed at reducing infant mortality by means of educating the mothers and by providing, on medical indication, milk of a good quality to infants. Different kinds of milk were used in these centres, pasteurized and sterilized milk and later also milk-powder.⁵¹ These centres stressed the importance of breast-feeding and made use of other milk only when the mother was not in a position to breast-feed her child. The Netherlands followed the French example, and the first Zuigelingen Consultatie Bureau or Child Health Centre was established in 1901 in the Hague by Dr. Plantenga. No use however was made of milk-powder.

3.3 Consumers of condensed milk

Who were the consumers of condensed milk? As has been already discussed the development of condensed milk was connected with attempts to provide large institutions such as the navy, merchant fleet and army with preserved milk. This was, however, not everywhere the case. In Germany, for instance, Teuteberg (1981) mentions that the army provisions of the German troops in France in the years 1870-1871 did not include milk.⁵² This is quite remarkable as these provisions for the army in France were designed on purpose to be an exemplary combination of desired foods.

The supply of fresh milk to towns and particularly to large urban settlements posed many difficulties. Milk of a good quality was at first

expensive and out of reach of the working classes. In England, the main industrialized nation of Europe, condensed milk came onto the market in considerable amounts round 1870. As a relatively cheap milk product its consumption rapidly increased. It was to a large extent used for feeding infants and young children.⁵³ For the poorer urban consumers condensed milk was not only a cheaper kind of good quality milk, but it could also be better stored. The importance of condensed milk for infant feeding may be illustrated by the fact that in the 1880's Nestlé acquired an enviable place on the British market, thanks to a publicity campaign directed at mothers and stressing the value of condensed milk for infant feeding.⁵⁴ In order to reach poor consumers a cheaper product was brought on the market, condensed skim milk.

Removing fat from milk also means removing the fat soluble vitamins A (Retinol) and D (Calciferol). This was of course not known at the time. It was only in 1913 that McCollum and Davies published their experiments pointing out that some fats contain a substance which is indispensable for the maintenance of life. This was, as McCollum stated, a surprising discovery since up to that time it was believed that all fats were useful in nutrition only as a fuel in food.⁵⁵ In 1917 Bloch described cases of Xerophthalmia in Danish infants who were fed on diets based on skim milk during the period 1912-1916.⁵⁶ Denmark had a substantial butter export to England and for economic reasons the skim milk was used in institutions like infant homes. In 1922 McCollum and his associates demonstrated the existence of a second fat-soluble vitamin. It was named vitamin D and was shown to be essential for the normal ossification of the skeleton.⁵⁷

It is obvious that condensed skim milk was not an ideal food for infants and children, particularly those from poorer households living in overcrowded quarters of urban areas. Rickets (Vitamin D deficiency) prevailed among the dwellers of slums and crowded suburbs. Even earlier some physicians had not been pleased with the use of condensed skim milk. In 1875 in England Dr Daly, writing in the *Lancet*, pointed out that although children grew fat on this milk and looked well, he had reason to think that their vitality was reduced "below par to a very dangerous degree".⁵⁸ In 1894 the Select Committee on Food Product Adulteration discussed the matter fully. Shortly afterwards legislation was introduced, making it compulsory for containers of condensed skim milk to carry a label clearly showing its character and stating that it was not suitable for the feeding of infants and young children.⁵⁹

England was in this respect ahead of other nations. In Part II, Chapter 5 I discuss the question of the suitability of condensed skim milk for infant feeding. The question was raised in the Netherlands Indies in the 1930's and provoked sharp discussion. Despite the warning, mothers in England continued to use this type of milk, partly out of poverty and partly from ignorance.⁶⁰

Condensed milk, whether skimmed or not, remained a product for households which were not in a position to buy fresh milk on a daily basis. In 1896 the margarine manufacturer Van den Berg established a milk condensery in Rotterdam. The larger part of its production was sold to the British and German industrial cities. Condensed milk was particularly used by those living in the poorer neighbourhoods, where the supply of fresh milk was limited.⁶¹ In London sweetened condensed milk was cheaper than fresh milk, when diluted to the same consistency, and it also kept longer which was an important matter in houses with no larders. Condensed skim milk was even cheaper and therefore much used for infant feeding.⁶² Besides, many families had never tasted fresh milk; as Wetham wrote, they took their milk already sweetened out of tins "thick or thin" according to their family income.⁶³

As well as in the larger industrial towns and cities, condensed milk was also extensively sold in village shops. As around 1900 in many English villages the supply of fresh milk was still limited.⁶⁴ Tins of condensed milk were even seen on farmer's tables. Groceries formed the retail outlet for condensed milk. In the populous neighbourhoods of the cities the corner shop played a key role in the food supply. Here customers could buy on tick after careful judgement by the shopkeeper as to whether or not the suppliant was reliable or not. The very poor never fell into debt; nobody allowed them any credit. Paying on the nail they bought in minimal quantities.⁶⁵

Roberts, born in Salford slum as the son of a corner shopkeeper, describes the appreciation of tinned foods at the turn of the century as follows:

"Among us there was still a great deal of prejudice against canned beef and boiled mutton in tins (not shared by the very poor), though condensed milk and tinned salmon were readily accepted".⁶⁶

Consumers were used to the sweet taste of the condensed milk. In 1885 in

the United States, Meyenberg managed successfully to produce a preserved milk product without the admixture of sugar. This unsweetened variety of condensed milk became known under the name evaporated milk. It was to be a long time before consumers grew to appreciate it. Gradual perfection of equipment and processing, together with the control of viscosity and heat stability greatly improved its properties. These developments practically eliminated the cooked flavour, the objectionable darkening of colour and the instances of fat separation and curdiness.⁶⁷

3.4 Condensed milk in the Netherlands

In the Netherlands the industrial revolution took place much later than in England, Belgium, Germany and France. It was also far behind its neighbours in industrial technology. Until after the middle of the 19th century, nearly all knowledge on industrial production had to be obtained elsewhere.⁶⁸ It is still a point of debate when industrialization began, but the period 1890-1920 is most likely.⁶⁹ On the other hand, Dutch agriculture at the beginning of the 19th century was modern and very productive and had a netto export of agricultural products.⁷⁰ Poverty, which may have been less than in other countries, was nevertheless widespread, particularly among labourers in the cities of the provinces of North and South Holland and in the regions between the great rivers.⁷¹

Between 1870 and 1910, the income of labourers increased. In 1850 a working class household in Amsterdam was spending about 70% of its income on food, but by 1900 this percentage had fallen to 50%.⁷² An economic revival of the Netherlands occurred which was based on three factors.⁷³

- (1) The exploitation of the Netherlands Indies, particularly the transfer of the credit balance, enabled recovery of the financial position of the state and the improvement of the infrastructure with the construction of roads, canals, ports and railways.⁷⁴
- (2) The creation of a modern industry first for the domestic and later for the international market.
- (3) The development of the harbours of Rotterdam and Amsterdam as transit ports to Germany and the activities connected with them.

Gradually the Netherlands economy changed from an agricultural-commercial to an industrial-commercial structure. Up till 1870 agriculture played

a central role in the national economy. It was one of the major foundations of the relatively high level of income in the Netherlands. After 1870 its role became less important due to growing urbanization and industrialization.⁷⁵ Liberalization of international trade and an increasing demand for luxury food products in the industrializing countries, in particular the United Kingdom, strongly influenced agricultural production and export.⁷⁶ Specialization and technical change took place, with meat, butter, cheese and horticultural products as major export commodities. As for dairy products, the making of butter and cheese shifted from the farm to dairy factories. Of particular importance was the improved centrifugal separator invented by Laval in 1879. This allowed an efficient and large-scale butter production at factory level.⁷⁷

In 1878 Dutch agriculture underwent a severe crisis. The opening up of the North American prairies and improvements in railway and sea transport meant that cheap grains flooded the European market. This was followed by grains coming from Russia and Argentine.⁷⁸ The agrarian crisis of 1880 was not, as is often stated, a starting point for modernization of Dutch agriculture. Before the crisis many innovations were already rapidly being diffused. At the same time the labour surplus in agriculture was being absorbed into the growing industrial sector of the economy.⁷⁹

Two industrial developments now threatened dairy farmers.

- (1) The invention of margarine and its manufacture in the Netherlands as a substitute for butter. It is of interest to note that the two well-known Dutch manufacturers of margarine, Jurgens and Van den Berg, were originally butter dealers.⁸⁰
- (2) Industrial entrepreneurs were entering into the industrial manufacture of cheese and butter, and into the liquid milk industry, supplying and distributing fresh milk on a modern and hygienic basis.

Between 1880 and 1914 the rise of cooperatives was a striking phenomenon in the Dutch agriculture. There are two basic causes for the development of cooperatives. In the first place there are the economical benefits for farmers, and in particular smaller farmers, in the joint purchase of needed materials and in the joint processing and sale of agricultural products. Secondly is the desire of farmers to get a better share of the market in view of the activities of private entrepreneurs.⁸¹ Among the most active in developing dairy cooperatives were the Frisians. In 1886 in the village of Warga a cooperative dairy factory for the production of butter and cheese

was set up. After a number of initial difficulties the venture proved a success. Other cooperative dairies appeared in other parts of the country.⁸²

One aspect of the dairy industry where the cooperative movement did not take a lead was in the condensing of milk. Here the initiative was taken by private entrepreneurs who seeing the success of condensed milk as a new dairy product in Switzerland, Britain and the United States, became interested in the idea of manufacturing such a product in the Netherlands. One of these was the army officer C.H. Hummelinck.⁸³ He believed that the Netherlands with its livestock and favourable situation near England, the main market for condensed milk, was a good place to set up a milk condensery. He resigned from service and in 1881 went to Switzerland to study modern dairy and milk condensing techniques. He managed to find the necessary financial support for his idea.

In 1882 the N.V. Hollandia, an enterprise for the production of milk products was founded and in the same year opened a factory in Vlaardingen (Figure 3.1). The site near the Nieuwe Waterweg, the waterway connecting Rotterdam with the sea and on the edge of pasture lands, was well chosen. The manager of the factory, Hummelinck, began the first condensery in the Netherlands with a staff of ten in a former margarine factory. Thanks to an article in a popular journal of the period we have a contemporary description of the making of condensed milk in that factory.⁸⁴ The manager is quoted as saying that the factory could be viable if all the condensed milk produced could be used in the Netherlands for infant feeding. The enterprise proved to be successful, and in 1894 in Bolsward in the dairying province of Friesland, a new milk condensery was opened and in 1896 Hollandia took over a less fortunate competitor in Purmerend.⁸⁵

According to Hummelinck (1886) the success of condensed milk was because it was able to be used in several ways.⁸⁶

- (1) As victuals on board ships and as an export to tropical regions which had a shortage of milk.
- (2) For daily and culinary use, particularly in other European countries.
- (3) For infant feeding as a substitute for breast milk when needed.⁸⁷
- (4) For the ill and convalescents who needed a nourishing and easily digested food.
- (5) As a food in times of epidemics and during digestive disorders and diarrhoea because it was free from germs.



De fabriek "Hollandia" te Vlaardingen.

1. Voo-gevel der pakhuizen aan de haven te Vlaardingen; de fabriek ligt achterwaarts. 2. Het vóórproeven der melk.
3. Het laboratorium van den directeur. 4 De vacuumpom. 5. De blikmakerij. 6. De vulling en sluiting der bussen. 7. De hoterbereiding.

Figure 3.1

The first milk condensery in the Netherlands (1882), the N.V. Hollandia in Vlaardingen in a picture from 1884.

Preservation of milk in tins in the Netherlands however can be dated back as early as the 1840's. Source: Eigen Haard, 1884.

Several other condenseries were established in the years which followed. The margarine manufacturers Van den Berg enlarged their interests by entering into the condensed milk industry. This proved to be very successful and factories were founded in Rotterdam (1896), Uithoorn (1904) and Leeuwarden (1906).

Skim milk was used in the manufacture of margarine of good quality. This was originally bought only from dairy factories. In order to control the quality and supply of milk contracts for its delivery were made with farmers in the region of Rotterdam. The milk was skimmed for the manufacturing of margarine and the cream used for making butter. In certain periods of the year farmers produced more milk than could be used and the idea was born to use this surplus for the manufacture of condensed milk.⁸⁸

J.E. Scholten, son of the well known industrialist A.W. Scholten, set up in Leeuwarden in 1912 the LIJEMPF Company which developed into one in the major condenseries of the Netherlands.⁸⁹ In 1910 the giant in the international dairy and food industry, Nestlé, acquired substantial interest in the Galak Condensed Milk Company of Rotterdam. The Netherlands was considered to be most suitable as some condenseries had already been established and because there was an abundant supply of milk. The Nestlé's main interest was the production of sweetened condensed milk. However, the advent of sweetened condensed skim milk, a cheaper product, compelled Nestlé and Anglo-Swiss to reluctantly alter their basic policy of giving preference to full-cream products.⁹⁰

In Asia the consumption of sweetened condensed skim milk which was used in tea had risen to substantial proportions.⁹¹ In 1912 Nestlé, on behalf of the Galak Company, set up a skim milk condensery producing entirely for overseas markets. In this way Nestlé and Anglo-Swiss protected themselves against the potentially dangerous situation of fierce competition with producers of skim milk.

Some dairy farmers realized the necessity of not only producing cheese and butter industrially, but also the necessity of producing new milk products such as condensed milk. Private industry already had a lead in this field so that it was very difficult to break in.⁹² Around 1914 there were 18 condenseries in the Netherlands three of which were operating on a cooperative basis.⁹³ The decision of Frisian cooperatives to venture jointly into the making of condensed milk in the long run changed the situation in the Netherlands. In 1913 a cooperative association for the preparation of milk products was set up in Leeuwarden. The very energetic

Sietze Hepkema, son of a dairy farmer, was appointed as director.⁹⁴ He undertook study tours in the Netherlands and abroad in Britain, Switzerland and Germany to deepen his knowledge in the technical aspects of the production and marketing of condensed milk. The outbreak of the First World War delayed the building of a condensery, but in 1916, under difficult circumstances, the first condensed milk was produced by the "Cooperative Condensfabriek Friesland", the C.C.F.⁹⁵

The production of milk-powder in the Netherlands began about 1905 in several dairy factories. As in other countries, the products were made for industrial use and not for direct consumption at household level.

Who were the consumers of condensed milk in the Netherlands? Oddly enough the condensed milk produced was basically destined for export and not for home consumption, Britain being the main consumer. In the material analysed for this study, no evidence could be found to indicate that sweetened condensed milk was widely consumed in the Netherlands, although it was available for sale.

In 1895 the Hollandia milk condensery established the Hollandia Shops in several cities. In these clean and attractive shops dairy products such as butter, cheese and condensed milk could be bought.⁹⁶ In the beginning, as in other European countries, Dutch physicians accepted the sweetened condensed milk with enthusiasm as a means for infant and child feeding. They followed the praise for this food made by the famous chemist Liebig (1868). However the early enthusiasm disappeared when, in the 1870's, some physicians observed that infants fed on sweetened condensed milk often could not tolerate it and suffered from diarrhoea.⁹⁷ Gradually physicians became aware that sweetened condensed milk might be useful under certain circumstances as a supplementary food for child feeding, but not for infant feeding in general and in particular not as a replacement for breast-feeding.

Why was condensed milk so little consumed in the Netherlands? Several reasons may account for this. The spread of dairying over the country, including the arable regions theoretically made a supply of fresh milk possible. Despite the process of urbanization towns were still of a size which allowed a supply of milk from the neighbouring countryside. This together with efforts to improve the fresh milk supply and the late start

of the industrial revolution, hardly created a demand for this type of milk product.

The First World War brought some changes. Neutral, but surrounded by warring countries, the Netherlands became confined within its own borders as far as the supply of food and raw materials was concerned. The reduction, and in 1917 the cessation of imports of animal feeds and fertilizers, was fatal for the livestock industry. Initially, the number of poultry and pigs were drastically reduced by forced slaughtering. This was followed by the slaughtering of cattle. The supply of milk and dairy products became scarce, and the condensed milk industry was faced with many problems such as how to maintain and balance the export to both the Allies and the Central Powers, and the difficulty of getting sufficient milk, sugar and tins.

It was in this period that both condensed milk and milk-powder, up till then mainly produced for export, were first introduced in the Netherlands.⁹⁸ At the request of the Minister of Agriculture, Industry and Trade, F.E. Posthuma, the Association of Manufacturers of Milk Products was created on 28 September 1915.⁹⁹ The aim of the association was to ensure, in close collaboration with the government, an adequate supply of milk for home consumption and the export of milk and milk products as agreed upon by the government. Other associations were established for butter and cheese. All these associations were placed under a governmental supervisory commission.

Faced with a failing milk supply, in the summer of 1917, the government made it obligatory for the condensed milk industry to prepare large amounts of sweetened condensed skim milk and milk-powder as a winter stock (Table 3.1).¹⁰⁰ There was already a shortage of sugar, and from then on the government regulated the sugar supply for the manufacturing of condensed milk both for winter storage and for export.

Table 3.1

Amount of milk preserved in milk products in the summer of 1917 at the request of the Dutch government for the benefit of a winter stock 1917/18.

Amount of milk preserved	Milk product
15 000 000 litre	sweetened condensed skim milk
3 000 000 litre	full cream milk powder
12 000 000 litre	skim milk powder

Estimated value f 5 000 000.

Source: Wagenaar, 1924.

In December 1917 the supply of fresh milk became so limited that there was not enough for children or the ill. It became rationed and could be bought officially only on coupons against fixed maximum prices. In Amsterdam milk, skim milk, sweetened condensed milk and evaporated milk (both prepared from whole and skim milk), dried whole milk and dried skim milk were all for sale in this way.¹⁰¹

In the winter of 1917 the Governmental Bureau of Food Supply issued the producers and distributors of milk with a communication on the household use of condensed milk and milk-powder. It stated that because of milk shortages, many housewives would turn to milk products, and it was therefore desirable to give some instruction on their use. Milk-powder was recommended as being suitable for dishes where normally milk, or skim milk was used. The preparation of liquid milk from full cream milk-powder was not recommended as the taste was different. More important, but not clearly stressed was the mention of the fact that because of the absence of fat, condensed skim milk was not suitable for infant feeding.¹⁰² The government, however, was optimistic on the consumers demand for milk products. Consumers became interested in condensed milk but the government stock of milk-powder remained unsaleable.¹⁰³

On the 5th June 1918 the Association was dissolved, to be replaced by the Governmental Bureau for Milk and Cheese (Rijksbureau voor Melk en Kaas). In 1919 the government allowed the remaining stock of condensed milk to be exported. In the meantime the condensed milk industry had experienced a considerable loss calculated at f 648000, caused by deterioration of both quality and market prices.¹⁰⁴

In 1919 the situation to a certain extent returned to normal, with hardly any consumer demand for condensed milk and milk-powder. For the first few years after the armistice in 1918 the Dutch agriculture benefited from an increase in demand for food. The development of the Dutch condensed milk industry meant that the share of condensed milk in the total dairy export increased considerably. Butter and cheese remained of course very important, but condensed milk became an export product of equal importance (see also Figure 3.2).

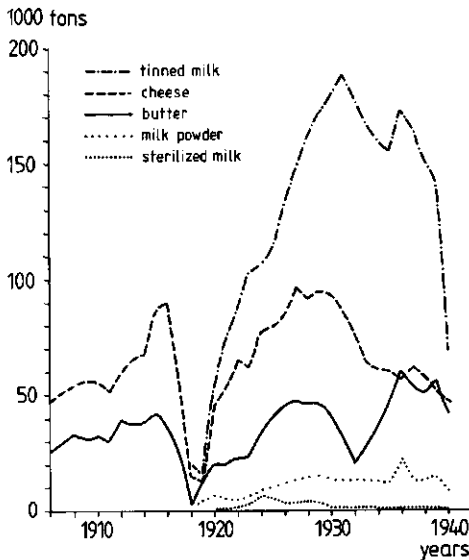
The economic crisis of 1920 in North America and Europe affected both industry and agriculture. After 1923 industry recovered and developed steadily until the collapse of the American Stock Exchange in New York in October 1929, which marked the beginning of the economic depression of the

thirties. Agriculture however, did not improve greatly after 1923. The agricultural slump was caused by over-production in the United States and protective agricultural policies in various European countries.¹⁰⁵

Dutch export of condensed milk was confronted with several difficulties. Germany closed its borders and in Britain, the main customer, the value of the pound decreased. At the same time the American condensed milk industry expanded its export to Europe, Canada, Australia and New Zealand followed. Efforts were made to exploit the domestic market. In 1932 the CCF introduced evaporated milk in tins onto the Dutch market under the name of Koffiemelk (Coffee milk) with the slogan "everyone can have his own cow in the cow shed". The idea of using evaporated milk as a coffee creamer instead of cream or fresh milk as was then the habit was developed by one of the sales managers, Mr. van der Werff. He got the idea when using tins destined for export for his personal use during weekends on his boat.¹⁰⁶ In the beginning the idea was not very enthusiastically received and until the outbreak of the Second World War there was hardly any domestic market for tinned milk products.¹⁰⁷

Figure 3.2

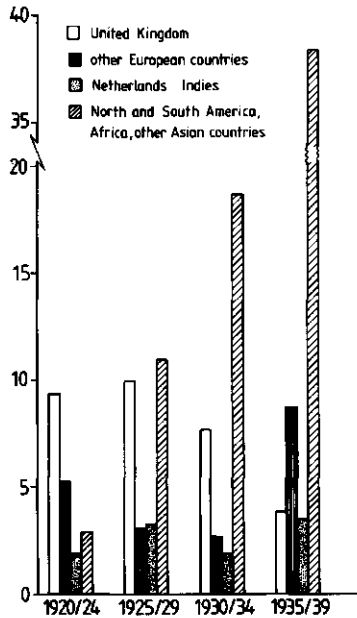
Volume and composition of Dutch dairy export in 1000 tonnes, 1906-1940.



Source: based on Centraal Bureau voor de Statistiek, 1906/40.

Figure. 3.3

Destination of Dutch export of sweetened condensed milk in 1000 tonnes, 1920-1939 (means of 5-year intervals).



Source: based on Centraal Bureau voor de Statistiek, 1920/39.

3.5 Dutch export and the question of sweetened condensed skim milk in the United Kingdom

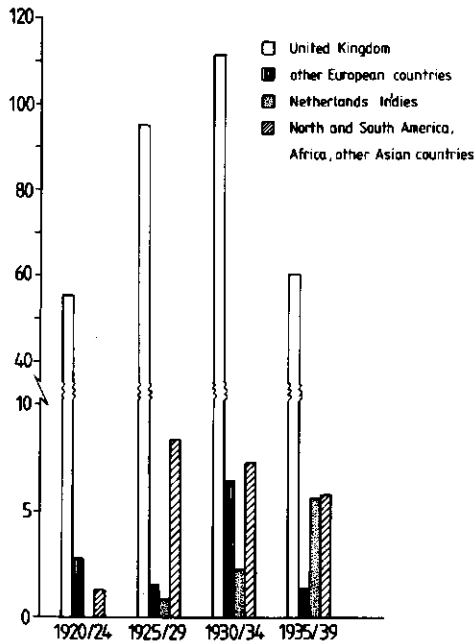
Before turning to the topic of the diffusion of milk products to tropical countries, I first want to give some attention to the question of the export of sweetened condensed skim milk to the U.K. and its use as infant feeding. Discussions on sweetened condensed skim milk as infant food in the U.K. resulted in health authorities in a great number of tropical countries becoming suspicious of imports of skim milk products and, in a number of cases, even caused import prohibitions.

After 1870 Dutch cheese and butter lost their primary position in trade with the U.K. The range of food export was widened to include cattle and meat, horticultural products and sugar.¹⁰⁸ One sector where the Dutch

managed to get a stronghold in the British market was the export of condensed milk and milk-powder. By 1900, 65% of the imported condensed milk and milk-powder in the U.K. came from the Netherlands.¹⁰⁹ After the First World War Britain was the most important food market in Europe, and continued to be a major outlet for Dutch milk products (Figures 3.3 - 3.5). Milk consumption in Britain was lower than in other industrialized countries.¹¹⁰ In 1930 it was 100 litres per head, which was two-thirds that of the American and one-third that of the Finnish consumption.¹¹¹ Through intensive publicity campaigns stressing the importance of milk for health, the British dairy industry tried to increase the consumption of fresh milk. They were well aware of the fact that condensed milk and other products could be used instead of fresh milk, and that any relative fall in the cost of these "competitive" articles would tend to restrict the market for fresh milk.¹¹²

Figure 3.4

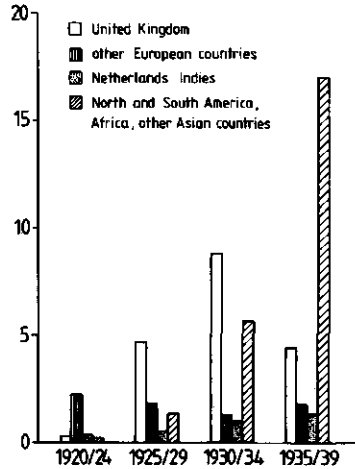
Destination of Dutch export of sweetened condensed skim milk in 1000 tonnes, 1920-1939 (means of 5-year intervals).



Source: based on Centraal Bureau voor de Statistiek, 1920/39.

Figure 3.5

Destination of Dutch export of evaporated milk in 1000 tonnes, 1920-1939 (means of 5-year intervals).



Source: based on Centraal Bureau voor de Statistiek, 1920/39.

Milk imports to the U.K. underwent some remarkable changes during the period 1910-1925. An Imperial Economic Committee on Dairy Produce report for 1926 summarizes the situation as follows.¹¹³

"Over 70 percent of the imports of unsweetened condensed milk came before the war (1914) from Norway, which country has now been almost wholly replaced as a source of supply by the United States of America and Canada. Nearly 70 percent of the whole-cream sweetened condensed milk was obtained from Switzerland before the war. The contribution of that country, which was the original home of the industry, has now fallen to some 30 percent, its place having been taken by the Netherlands, and in a smaller degree by Denmark and Canada. The supplies of sweetened condensed skim milk come in the main from Holland, which before the war supplied 90 percent of the total quantity imported, and now not less than 70 percent. The actual quantity shipped has, however, more than doubled".

As already mentioned, condensed milk and in particular the cheaper varieties, were used by low income consumers and in places where the supply

of fresh milk was inadequate or expensive. It has been estimated that in the early 1920's the yearly consumption per head of fresh milk in England was about 90 litres. The amount of condensed milk consumed was equivalent to rather over 9 litres of liquid milk per head per year.¹¹⁴ It is hardly surprising that the British dairy farmers were not very pleased with these imports of skim milk products. The National Farmers Union consequently took action against their import. It is of interest to note that both economic and nutritional arguments were used; the competition between sweetened condensed skim milk and fresh milk, and the unsuitability of skim milk products for infant feeding.

In the meantime a Departmental Committee on Condensed Milk Standards was established by the Ministry of Health. Under pressure from parliament the Minister was prepared to consider the drafting of regulations for appropriate labelling of condensed milk products.¹¹⁵ This led to the Condensed Milk Regulations of 1923 which laid down rules for the labelling of condensed milk. The most important one concerned sweetened condensed skim milk, making it compulsory to state on the label that it was unfit for babies (see Figure 3.6).¹¹⁶ It re-enforced in fact the provisions of the Sale of Food and Drugs Act of 1899 making it compulsory to state on every tin of skim milk that it was machine-skimmed milk.¹¹⁷

These condensed milk regulations caused alarm in the Dutch dairy world. The weekly journal of the Dutch private dairy industry published the whole regulation in English.¹¹⁸ In a commentary it considered the measure a "heavy gun" policy against a peaceful export activity. It commented that Dutch producers would prefer to condense full-cream milk, rather than skim milk, but that large groups of the British population needed cheap milk products. If artificial impediments were put in the way of imports into Britain then it would be the British people who would be unable to satisfy their needs.¹¹⁹ Managers of the Dutch Cooperative Dairy, however, did not pay so much attention to the Condensed Milk Regulations, probably because the share of the market of the cooperative condensed milk industry was still limited. They were of the opinion that these measures would probably not encounter difficulties from the genuine trade. At the same time they were pleased to note that an earlier proposal to label tins as "unfit for infants" was not implemented and that the word "babies" referring to the very young child was used instead. "Doubtless an improvement as through this change the sale of skim milk will suffer less damage".¹²⁰

Although one may agree with the arguments of the threatened Dutch dairy

export interests, the lack of understanding of the dairy world on the nutritional aspects of the problem is less convincing. Certainly the British dairy industry exaggerated the nutritional arguments against skim milk products. From a study of the two main dairy periodicals in the Netherlands for the years 1919-1940, one thing which is apparent is the lack of understanding of the nutritional implications of skim milk for infant feeding, caused by removing with the butter fat also the very important fat soluble vitamins A and D.¹²¹ This is even more surprising as nutrition research in this period was very much oriented towards the discovery of vitamins, and that their deficiency could cause derangement of physiological processes and result in disease.

Why was there a belief that all dairy and milk products were basically healthy foods and why was there a rather short sighted outlook on the importance of dairying in the overall nutrition of certain categories of consumers? What were the reasons for a lack of understanding of the progress made in nutrition research?

Quite illuminating is the reaction of the Dutch condensed milk industry to a paper on the nutritive value of condensed skim milk which appeared in 1927 in the journal of the British dairy industry. The paper was in fact an extensive excerpt from a report by Dr. F.J.H. Coutts, entitled "Machine-skimmed condensed milk and infant feeding", made in 1911 for the Local Government Board. Dr. Coutts argued that a diet consisting largely of skim milk practically represented fat starvation, and was likely to lead to injurious results in the growth and development of the child.

"... In various parts of the country shopkeepers have stated that there has been a large increase in the sales of machine-skimmed condensed milk, and that they have reasons to believe that such milk is largely used among the poor for feeding babies, as well as for ordinary household purposes. It will be asked how it is that parents give their babies milk from tins bearing the words - machine-skim milk - plainly printed on the labels. From personal conversation with mothers I think the answer may be summed up in the words -poverty- and -ignorance-. Some mothers who resort to condensed milk know that the full-cream variety is superior, but not in what respects, and they are tempted by poverty to buy the cheaper article. They would not think of using ordinary fresh skim milk for their babies; but the presence of

sugar in and the viscosity of the condensed variety give a fallacious appearance of richness, and render the food more satisfying to the baby".¹²²

The comment of the Dutch Dairy Weekly was that the Netherlands should follow these movements, despite the absurdity of the arguments of the British Milk Industry.¹²³ Then a full translation in Dutch of the English text was presented.

Another illustration of a lack of nutritional understanding is a paper published in the same journal by Van der Molen, an agronomist. Without referring to the vitamins A and D he considered the nutritional value of sweetened condensed skim milk in terms of energy. He concluded that it had a worthy place among other foods and that one tin had the same nutritional value as about 14 eggs.¹²⁴

Ir. B. Gerritzen, Dutch Government Consulting Agriculturist in London referred in 1929 to an experiment on feeding in Scotland whereby a group of school children received a ration of biscuits, or skim milk or full-cream milk. Children fed on milk showed better results than those on biscuits and no profound differences were found between those on skim milk and those on full-cream milk. These results, Gerritzen concluded, will have a favourable influence on the unprejudiced members of parliament and may prevent drastic measures against our condensed skim milk.¹²⁵ One important aspect Gerritzen overlooked however, is that the feeding of school children is different from the feeding of infants. Nutritional arguments became important in the discussions as to whether or not skim milk products should be allowed to be produced or imported.¹²⁶ Very likely the skim milk question in England caused concern in other countries about what to do with this kind of product. In a number of countries regulations governing skim milk were introduced including total prohibition, excessive duty compared to that on the full-cream variety, and special care in avoiding its use for infants (see also Appendix 1).

In 1922 in the United States the nutritionist McCollum was involved in hearings about the "Anti-Filled Milk Bill", concerning milk in which the milk fats have been replaced by vegetable ones.¹²⁷ This drew attention to the presence of vitamin A and the newly discovered vitamin D in milk fats.

Another threat to the Dutch export of condensed skim milk in the 1920's

Figure 3.6

Rules for the labelling of condensed milk in the United Kingdom in 1923 and 1927.

(excerpt)

1923

Condensed Milk Regulations

Rules with respect to the Labelling of Condensed Milk.

1. Every tin or other receptacle containing condensed milk shall bear a label upon which is printed such one of the following declarations as may be applicable or such other declaration substantially to the like effect as may be allowed by the Minister :-

(i.) In the case of full cream milk (unsweetened) :

**CONDENSED FULL CREAM MILK,
UNSWEETENED.**

THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF MILK.

(ii.) In the case of full cream milk (sweetened) :-

**CONDENSED FULL CREAM MILK,
SWEETENED.**

THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF MILK WITH SUGAR ADDED.

(iv.) In the case of skimmed milk (sweetened) :

**CONDENSED MACHINE-SKIMMED
MILK [or CONDENSED SKIMMED
MILK], SWEETENED.**
UNFIT FOR BABIES.

THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF SKIMMED MILK WITH SUGAR ADDED.

(iii.) In the case of skimmed milk (unsweetened) :

**CONDENSED MACHINE-SKIMMED
MILK [or CONDENSED SKIMMED
MILK], UNSWEETENED.**
UNFIT FOR BABIES.

THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF SKIMMED MILK.

1927

Condensed Milk Amendment Regulations

The following paragraphs shall be substituted for paragraphs 1 and 3 of the First Schedule to the principal Regulations :-

1. Every tin or other receptacle containing condensed milk shall bear a label upon which is printed such one of the following declarations as may be applicable or such other declaration substantially to the like effect as may be allowed by the Minister :

(i) In the case of full cream milk (unsweetened) :

CONDENSED FULL CREAM MILK, UNSWEETENED
THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF MILK.

(ii) In the case of full cream milk (sweetened) :-

CONDENSED FULL CREAM MILK, SWEETENED.
THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF MILK, WITH SUGAR ADDED.

(iii) In the case of skimmed milk (unsweetened) :-

**CONDENSED MACHINE SKIMMED MILK [or
CONDENSED SKIMMED MILK], UNSWEETENED.**
UNFIT FOR BABIES.
THIS TIN CONTAINS THE EQUIVALENT OF
(a) PINTS OF SKIMMED MILK.

(iv) In the case of skimmed milk (sweetened) :-

**CONDENSED MACHINE-SKIMMED MILK [or
CONDENSED SKIMMED MILK], SWEETENED.**
UNFIT FOR BABIES.
THIS TIN CONTAINS THE EQUIVALENT OF
**(a) PINTS OF SKIMMED MILK, WITH SUGAR
ADDED.**

Source: Milk Industry, 1923, 1927.

came from complaints and reports that condensed milk products on the British market were of an inferior quality. The Frisian Flag company for example was confronted with complaints on the quality of the condensed milk, returned consignments of blown tins and claims for the damage suffered. In the factory in Friesland serious efforts were made to get the process of condensing under better control.¹²⁸

In the meantime in 1923 a report was issued in the United Kingdom by the Food Investigation Board of the Government Department of Scientific and Industrial Research under the title: "Studies in Sweetened and Unsweetened (Evaporated) Condensed Milk". Before giving the results of the examination the report reviewed previous findings on contaminated condensed milk in Britain. It concluded that all samples of sweetened condensed milk contained living bacteria. This caused great consternation in British dairy circles and the condensed milk industry. The periodical The Milk Industry interpreted the feelings of the British dairy industry by saying that evaporated, or powdered milks were admittedly only a very poor substitute for liquid milk. Nevertheless the manufacturers of these commodities in all their announcements in the press preached the doctrine of safety first, and claimed that these products were perfectly clean and free from bacteria. The report, written in the measured language used by scientists, stated with perfect certainty that the temperature employed in condensation was insufficient to kill many types of bacteria, and could not be relied on for this purpose.¹²⁹ In a later issue The Milk Industry commented that there was no doubt that the report had dealt a very severe blow to condensed milk manufacturers.¹³⁰

Unfortunately, the writers of the report did not clearly state that the bacteria found in condensed milk were harmless. Probably under pressure from the manufacturers of condensed milk the issue of the report by H.M. Stationery Office was temporarily suspended in order to provide it with an introductory note by the chairman of the Food Investigation Board. The note mentioned that the problem of milk condensing was to eliminate or to reduce to a negligible quantity the number of bacteria or yeasts which found their way into fresh milk as soon as it came from the cow and was exposed to contact with air or other bodies. It further said that most of these bacteria and yeasts were enumerated in the report. They were not pathogenic but their activities, if unchecked, would result in curdling the milk or otherwise changing its delicate chemical and physical balance.¹³¹ Despite

all these alarming reports, the British low-income consumer did not seem to pay much attention.

Agitation against sweetened condensed skim milk continued. The National Farmers' Union made concerted efforts to convince parliament and the government of the necessity of prohibiting its import. Rumours were spread that in the Netherlands and Denmark condensed milk was produced under unacceptably low hygienic conditions. Urged by questions asked in parliament, mostly at the instance of the National Farmers' Union, the Minister of Health, Neville Chamberlain, decided in 1927 to send a commission of British dairy experts to the continent.¹³² The aim of the mission was to enquire into the conditions of the production of milk used in preparing condensed milk in the Netherlands and Denmark. The findings of the mission were published in the form of a Government White Paper. One of the conclusions reached by the commission was that the average cleanliness and purity of milk produced in the Netherlands was as high as that of milk produced in the Britain.¹³³ The British dairy industry was at variance with the findings of the mission, and members of parliament continued to demand that the government take steps against the Dutch product.

The cooperative dairy in the Netherlands commenting on the idea of sending a fact finding mission said that its products met the requirements reasonably well. Nevertheless it pointed out the heavy dependence of the industry on the British market, which accounted for more than 90% of the total export of condensed skim milk.¹³⁴ Despite their confidence in the quality of their milk products, the Dutch were relieved with the outcome of the mission. However they were still worried about what was called sensational news on the issue.¹³⁵ An angry letter from Sir Herbert Matthews, which had been sent to a number of British papers, was published in the Dutch Daily Weekly. Sir Herbert concluded his open letter by saying that the investigators had chosen to give the foreign competitors of the British farmers an unwarranted certificate of merit. He further stated that this would no doubt encourage the Dutch and the Danes to continue to turn their milk surplus into condensed skim milk for export, instead of feeding it to the pigs. The White Paper was not calculated to help the British dairy farmer, who as a taxpayer, would have to pay the expenses of the investigators and the cost of publishing the report.¹³⁶ The only action the government took was to make an amendment in 1927 of the condensed milk

regulation. The essence of the amendment was that the declaration "unfit for babies" should be more clearly displayed on the label (see Figure 3.6).¹³⁷

"Imports of machine-skim milk grow like a cancer", wrote the British periodical The Farmers Express in 1929, "destroying health and injuring the legitimate home trade in milk. Last year's imports were nearly two million cwts of a value over three million pound sterling. Farmer! make a note of it, and at meetings ask prospective candidates: what about it".¹³⁸

Despite all this pressure, the British government was still not prepared to take steps to prohibit imports. After all, the government also had to recognize the basic interest of low income consumers and the need for cheap food.¹³⁹

With the economic depression of the 1930's, the position of the Dutch condensed milk industry on the British market changed drastically. This market, once the stronghold of the Dutch condensed milk export and in particular of sweetened condensed skim milk, eroded. In 1931 a change of government took place in Britain. The newly elected conservative government issued a number of import quotas in successive years. As a consequence import quotas were reduced at the end of 1936 to a 50% level of the situation in 1932. Another heavy blow for the export market was that in 1931 Britain and the Scandinavian countries abandoned the gold standard. The main competitor, Denmark, had fewer problems as the Danish crown was devaluated in the proportion to the English pound.¹⁴⁰ Very much against the wishes of the business world, the Dutch government maintained the gold standard until 26 September 1936, making the Dutch guilder, and hence export products, expensive. Another difficulty was that the Ottawa conference of 1932 established a system of preference within the British Empire. As a result Dutch milk products were not only put in an unfavourable position in Britain but likewise in a great number of overseas countries.

Reaction from the Dutch dairy industry to the criticism was rather emotional. A first more rational approach to the problem was reflected in 1930 in a report to the Dutch Agricultural Crisis Commission by C. Wolmerstett, secretary of the central board of the Association of Dairy

Farmers, an organization closely linked with the private dairy industry.¹⁴¹ Wolmerstett argued that the low price of sweetened condensed skim milk was the result of fierce competition among Dutch exporters, which was causing alarm among British farmers. In order to save the Dutch market position, he said that the chaotic situation of price dumping should be changed. He suggested a close collaboration between exporters to avoid dumping on the British market so as to prevent the market closing in the future. The report concluded that delay in the matter could be fatal.¹⁴²

The cooperative dairy at first reacted rather negatively to the report, considering the matter as exaggerated, and cooperation between private industry and dairy cooperatives as undesirable.¹⁴³ In order to avoid further reduction of the import quotas the Crisis Dairy Office laid down official minimum prices for condensed milk. However action against Dutch imports continued. The British Milk Marketing Board took a number of measures through a central milk fund to support the national condensed milk industry. When in 1934, under pressure from the Dutch dairy cooperatives, the system of fixed minimum prices was abandoned in order to restore the normal market situation, fierce competition broke out. As a result the British government reduced the quotas from 80 to 70%.¹⁴⁴

In 1934, at the instigation of the dairy cooperatives, the Dutch government tried to create an Export Board to cope with the situation. This failed because private industry feared a monopoly of export of milk products.¹⁴⁵ At the same time the government was not in a position to obtain a better agreement with the British government. New efforts were made and the Association of Manufacturers of Condensed Milk was created in 1935, comprising both the private and cooperative condensed milk industry. The "pool" as it was called did not last long and was soon dissolved.

In a report addressed to the Minister of Agriculture and Fisheries in December 1936 on the question of export regulations of condensed skim milk to Britain the Dutch private industry blamed the cooperative industry for having increased their share on the British market by unfair means.¹⁴⁶ According to the report, the number of cooperative condenseries had increased without paying sufficient attention to the quality of the product and the marketing aspects. As a result the cooperative industry could only increase their sale by a considerable reduction of the price. In one instance a cooperative condensery had swindled with non-milk fats and endangered the reputation of the whole Dutch condensed milk industry. Heavy competition between the various producers prices decreased below an

economical acceptable level and created alarm among British farmers and producers of condensed milk.

"Somewhat later (around 1930) and initially at a less larger scale" the report stated, "the same phenomenon appeared with respect to the export to tropical and sub-tropical regions".¹⁴⁷

This complaint was not without foundation. Ten years before, in 1926, A.H. Colenbrander writing in the Official Organ of the Federation of Dutch Dairy Cooperatives had warned that primitive marketing techniques were spoiling the Dutch market in Britain.¹⁴⁸ Likewise Ir. B. Gerritzen, government consulting agriculturist in London at that time stated that the situation of a severe competition between various brands was aggravated by manufacturers who did not care about the quality of the products.¹⁴⁹ He considered this quite risky for the genuine manufacturer. A year later in 1930, Gerritzen said that the call for protection among British farmers was becoming louder because imports were increasingly taking on the character of dumping.¹⁵⁰ The serious allegations against the cooperative industry needed to be answered. Mr L.F. Britzel and Mr J.A. Geluk, the chairman and secretary of the Federation of Dutch Dairy Cooperatives presented a report on this matter to the Minister of Agriculture and Fisheries in May 1937.¹⁵¹

In a letter attached to the report, the Dutch Dairy Federation still insisted on the creation of an import office in Britain under Dutch-Anglo management for a fair regulation of imports within the existing system of quotas and prices. According to the letter, the system then in force was leading to the concentration of the imports in the hands of a few enterprises, which did not correspond with the interests of the Dutch farmers. The serious allegations aimed at the cooperative industry were described in the report as an "abject attack". Malpractices were condemned, but there was surprise expressed that private industry dared to write in such a way.¹⁵² Only in two cooperative condenseries had some adulteration with non-milk fats taken place, due to the "weak character" of the manager concerned. The report denied that one of the reasons for the demands from British farmers and the British dairy industry for import quotas was caused by low prices. The report said that one should take into account the fact that for a long time there had been a milk shortage in Britain, and that the condensed skim milk had found its own market, especially under the poor population and labourers.

In judging the export policies of the Dutch dairy industry in the years 1920-1940 two considerations should be taken into account:

- A general lack of will to understand the nutritional significance of the fat soluble vitamins A and D and that accordingly, skim milk is not desirable for the feeding of young children and therefore should not be used for infant feeding.
- A struggle for survival of the dairy farmers and the with them so closely linked private and cooperative condensed milk industry.

As far as the total world export of tinned milk is concerned, just before the outbreak of World War II the Netherlands still had about 60% of the market.¹⁵³ Because of the rapid crumbling of the British market for condensed milk, particularly sweetened condensed skim milk, at this time, a reorientation of the export took place (see Figures 3.3 and 3.4). New efforts were made to penetrate the markets of tropical countries in Africa and in particular in South East Asia and the Far East.

Part II, DIFFUSION OF MILK AND MILK PRODUCTS TO INDONESIA

4. DAIRYING AND THE USE OF MILK IN TROPICAL REGIONS

4.1 Diffusion of milk to South East Asia

In his classical study on domestic animals Eduard Hahn pointed out that man's enjoyment of milk cannot be justifiably considered as self-evident since in actual fact there are many peoples for whom the use of milk as a food is unknown.¹ If it comes to the point, for many, the drinking of milk is considered as something repulsive. South East Asia is a region which has no milk-using tradition.² Dairying and the use of milk as a food never developed as part of an agricultural system within the South East Asian region. During the Neolithicum in South East Asia, man developed an agricultural system based on the hoe cultivation of roots and tubers such as yam (Dioscorea sp).³ Cattle were absent in this agricultural system. The present-day populations of Malaysia and Indonesia moved down the Malayan peninsula from an area in southwest China, while other migrants went to the Philippines from the southeast China coast.

The development of the oldest agricultural systems of South East Asia is very complex and many questions still remain unanswered, although van Laanen made some effort to review the situation.⁴ Around 1500 B.C. Indo-Chinese tribes penetrated into the Malayan peninsula and the Indonesian archipelago. These "Indonésiens" practised an agriculture based on cereals; various millet species and later, rice (Oryza sativa). As distinct from root agriculture, cattle were known but had only a social and religious function. They were a sign of importance and were used as dowry or as offerings. In their turn, the "Indonésiens" in Indo-China were driven out and/or absorbed by a wave of migrants probably coming from an area in southwest China, the "Malaisiens" (± 1000 B.C.). These new populations not only practised hoe agriculture based on cereals but in the most populated areas Sawahs or irrigated rice fields were developed.

The buffalo (Bubalus bubalis) was introduced in the agricultural system. There is not fully agreement as to the origin of the domestication of the buffalo.⁵ It must have been indigenous to the rain forests of continental South East Asia, and it is likely that wild or semi-tamed buffaloes were first used as sacrifices and as meat. During the Neolithicum the buffalo was introduced into India from South East Asia, probably as an animal for sacrifice.⁶ At a much later stage this resulted in different types of milk buffalo, a major source of milk in the Indian subcontinent of today.

In South East Asia the buffalo was not used for milking. It gradually became used as a draught animal by the Malaysian people.

The banteng (Bos javanicus) is also a member of the bovine family and resembles a small cow. It is however an entirely different species from either European cattle (Bos taurus) or zebu (Bos indicus). Like the buffalo the banteng thrives under hot humid conditions and has likewise a high resistance to ticks and tick-born diseases. It can still be found semi-domesticated or sometimes even wild in Indo-China and Indonesia. It is a poor milker and its udder is almost invisible. It has not been reared as a milk animal.⁷

Dairying was not practised in South East Asia. However it did eventually reach that part of the world. This happened in two different phases and from two different centres with strong dairying traditions; during the first millennium A.D. as part of the Indian penetration in the area, and with probably more lasting effect, as the result of the European colonisation in the latter part of the 19th century.

Wheatley has collected evidence that during the first millennium A.D. dairying spread from the Indian subcontinent into South East Asia.⁸ During the early centuries, a process of brahmanization moved along the principal trade routes reaching across the ocean into the western regions of South East Asia. This led to the formation of Indianized city-states under the sanctified rule of god-kings. Indian culture was transplanted to the old tribal societies. At the core of these city-states was the national temple, axis of the universe, the world and the kingdom, and the seat of the palladium. There was however an enormous gap between the court life with its hierachy and religion, and the rest of the population. In fact ordinary people did not participate in this civilization other than to perform statute labour and to bring in levies.⁹ As the Indian influence moved eastwards it took the humped cattle or zebu with it. The use of milk and dairy products were part of the religious rituals. This is supported by Sanskrit inscriptions found on shrines in Burma and Cambodia. In the other parts of South East Asia, according to Wheatly, the evidence for dairy is meagre.¹⁰ There is evidence of milk being used for ritual purposes in Java.¹¹ Buddhism also reached South East Asia from the Indian subcontinent and was firmly established in Burma, Thailand and Indo-China. Contrary to what is sometimes understood, Buddhism has a positive attitude towards milk as a food. This has lead to a situation whereby in contemporary Thailand imported tins of sweetened condensed milk are popular as offerings to

Buddhist monks both in isolated rural communities and in wealthy Bangkok temples.¹²

With the decline of the Indian influence after 1000 A.D., dairying and the use of milk disappeared. It was in fact a custom related to court life which had not penetrated into the habits of the ordinary people of South East Asia, and despite close contacts with the Indian culture these people had not adopted the habit of drinking milk.¹³

The Arabic and Islamic influence which followed did not bring much of the dairy traditions of the Middle East to South East Asia. This despite the fact that the Koran is very positive on the use of milk as food for man. However in places where Arabs settled they did begin goat raising for meat and milk production. Little evidence has been found for the widespread use of goat milk among the Indonesian population, although it may have occurred on a very limited scale.¹⁴ Arab traders imported the Bengali goat which was already present in the 19th century in places where they had settled. The Bengali goat is used for both meat and milk production and gives a much higher return than the local goats.¹⁵ As far as can be ascertained, no data have been found on the use of ewe milk. The Gujarati and Bengali Muslims played an important role in the spread of Islam into South East Asia. The areas most strongly effected by this process of Islamization were the Malaysian peninsula, the Island of Java, parts of the coastal regions of Sumatra, Sulawesi and Kalimantan.

It seems that the spread of dairying in an easternly direction from the Middle East and from a northwest Indian centre of an agro-pastoral system could not basically effect the agricultural systems of Southeast Asia where the place of livestock was limited.¹⁶ Besides, geographical conditions in the humid tropics do not favour cattle raising. This is possibly because of the prevalence of serious diseases, and because the hot humid climate is unfavourable to the preservation of cattle products like meat and dairy products. Most important however is that tropical pasture of average quality has no great food value.¹⁷

A second and more permanent penetration of dairying began during the early European colonization of South East Asia during the 17th century. It began when Europeans there raised cattle and gradually set up dairies to meet their own demand for fresh milk. Fresh milk production remained limited, but technological innovations at the end of the 19th century made possible a relatively cheap mass transport of milk preserved in the form of

tinned milk from the temperate zones of Western Europe to the tropical regions of Asia.

4.2 Milk-using populations in Indonesia

In Indonesia, before the coming of the Portugese and Dutch in the 16th century, the domesticated banteng or Bali cattle, the Java and Madura cattle, which are hybrids of banteng and zebu, and the zebu, were all to be found there. Although the Indonesian archipelago is without any doubt a typical non-dairying region, there are some peoples using milk long before the arrival of the Europeans.

As far as can be ascertained the indigenous banteng cattle were not used for milking, although there may have been some rare exceptions. The Bali cattle which are descended from the banteng were used as draught animals and as suppliers of meat. However, it seems that the milk sometimes may have also been used. In the strongly Indian-influenced mythology of Bali, milk is mentioned several times and milk oblations also occur¹⁸. Zebu cattle were introduced by the Indians during the first centuries A.D. Breeding took place with the banteng and a new breed was developed, the Java cattle, which can be found mainly on Java, Madura and Sumatra.¹⁹

In Madura the cow was of more importance in the local economy than it was on Java. Just as in Java, the cow was an integral part of the agricultural system as a draught animal and as a supplier of dung. Here however, the raising of slaughter cattle for export to Java was relatively extensive among the farming communities. Due to the drier climate and poor soil conditions, slaughter cattle gave higher returns than crop production.²⁰ The people of Madura take great care of cows, but show less interest in buffalos.²¹ The long breeding history which took place on the island of Madura led to the development of the Madura cattle, a stabilized crossbreed. The Madura cattle are thrifty, hardy and able to perform well under extremes of heat and poor nutrition. On the whole the Madura cow has a poor lactation.²² Milk was not drunk by the people of Madura but some milk was produced for Europeans living on the island.²³

Java and Madura are regions where, despite the presence of the buffalo and banteng, a milk-using tradition was completely absent.²⁴ During his stay in Java (1811-1816) Raffles was surprised to find in view of its Hindu past that dairying did not form a part of the domestic economy. He conjectured that when the Hindus had taken their cattle with them they had forbidden the

use of milk in order that the number of cattle might increase more rapidly.²⁵ However, there are sources which indicate that milk was being used in old Java for ritual purposes. In an inscription from the stone of Dinaya (A.D. 760) it is recorded in Sanskrit that:

"land, cows decorated with flowers together with herds of buffalo, and preceded by male and female servants - (all these things were given by the king to provide for such things as the oblation of boiled rice, the oblation of melted butter, ablutions)".²⁶

It would seem that the oblation of melted butter involved the ritual use of ghee. According to Wheatley, probably the provision of milk for such ceremonies was also the purpose that motivated the gift of 1000 cows by the King of Purnavarman to the Brahmans of Taruma in West Java around A.D. 450.²⁷ It is of interest to note that the Nitiçāstra, an old Javanese didactic poem, refers to the importance of milk.²⁸ The Nitiçāstra was translated from the Sanskrit didactic poem Panniti Sastro of which various versions exist, and written in verse by Javanese learned men. During the period of the Indian influence the Panniti Sastro was translated on various occasions. Although the reference made to milk does not directly imply the use of milk as food among certain categories of the population of Java, at least it does show the spread of the idea of milk as a food. It is also likely that in Java milking disappeared after the decline of the Indian influence.

Scattered over the outer regions on the islands outside Java, a number of populations can be found who make use of buffalo milk (Figure 4.1). This may be summarized as follows.²⁹

- (1) Most of the populations using buffalo milk can be found in Sumatra, the Minangkabau, the Batak, the Gayo and among the people of Aceh. It seems that the use and the importance attached to buffalo milk varies. Among the Karo-Bataks and people in the south of the Batak region, the use of buffalo milk is very limited. As a liquid drink, buffalo milk is hardly used, but it is fermented.
- (2) The Toraja of Sulawesi are well known as users of buffalo milk, both as a food and for religious purposes. It is said that the Buginese inhabitants of Duri, in the southwestern peninsula sell a kind of cake (dangke) prepared from buffalo milk on the local markets.

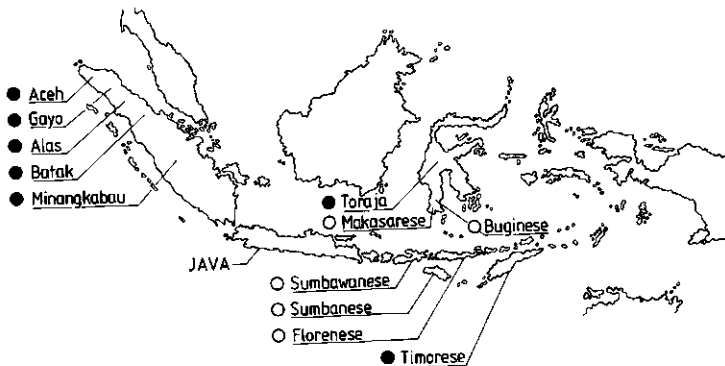
(3) Of the islands east of Java, Timor is a region where the drinking of buffalo milk boiled as well as unboiled is practised. Milk is also coagulated by adding the notched fruits of the Pohon titsusu (Wrightia calycina). Some milk is used on the island of Sumbawa.

Figure 4.1

Populations with a tradition of using buffalo milk in Indonesia in late colonial times.

● major

○ rudimentary or incidental



The question remains whether the use of buffalo milk among these populations are survivals of the old Indian influence or whether they developed separately? However despite some milk-using habits, dairying was non-existent in most parts of the archipelago. It is of interest to note that with the arrival of the Dutch a new diffusion of milk took place, not in the areas where traditionally buffalo milk was used but rather on Java, which had no tradition of using buffalo milk.

4.3 Indonesian and European food patterns

The number of Europeans living in Indonesia has always been small, particularly when compared with the great masses of the indigenous population. The first fixed points of Dutch settlement were the trading posts set up in the Moluccas (1605). A few years later the United East

India Company (VOC) established itself on the island of Java. The town of Batavia, built after 1619 on the ruins of Jayakarta, became the main centre of Dutch penetration into the archipelago. Java became the focal point of the colonial empire. The European population was mainly concentrated there, few sizeable European communities being found in the outer regions. By 1870, 55% of the European population was living in the coastal residencies of Java, Batavia, Semarang and Surabaya; in 1900 this was 53%.³⁰ Even late in the 19th century it was no easy task for Europeans to live outside these areas if they wanted to maintain their own food habits. Communication with the motherland was weak and supply of European food irregular. This was particularly the case for those living in the smaller places of Java and in the outer regions of the archipelago.

Dishes were still very Dutch in the 17th and in the middle of the 18th century. Even in the small trading posts bread was baked and there seems to have been no lack of wine.³¹ Bontius, the first physician appointed by the VOC arrived in Batavia in 1627. He was entrusted with the medical care of the servants of the VOC. He wrote about the availability of bread and its relation to rice as follows:

"If, as usual, a sufficient quantity of wheat was imported to us from Japan and Surat, I would very readily dispense with rice, because the bread made here of wheat flour is nothing inferior to that in our own country, and in my opinion, affords better nourishment than rice. But if there should be a scarcity of wheat then that rice is to be chosen which is the whitest, of a clear (and nearly transparent) colour, and weighs heavy, and when baked, it ought always to be let cool before it is used. For experience evinces, that hot rice is not only hurtful to the stomach, but also to the brain and whole nervous system; and from the gross and dry vapours rising to the head from this aliment, the optic nerves are frequently so much obstructed as to induce a total blindness; of which disorder I have treated in my method of curing the disease in India. Hence you will seldom or never see the Javans or [Maldivians] (Malaians) eat hot rice; because the Indians, of all people, are the most careful of preserving their health, and observe a regular and temperate course of diet".³²

The Dutch communities were largely male societies, and most marriages were with women from the Indo-Portugese society. Girls born out of these

marriages were brought up by their mothers in the Indo-Portugese culture rather than the Dutch culture. The elements of this Indo-Portugese culture were perpetuated and handed down to successive generations. According to Boxer, writing about the period 1600-1800, the Asian elements of this Indo-Portugese culture in such matters as food, dress and the seclusion of the women do not seem to have weakened with the passage of time.³³

The strength of the Indonesian culture on the Dutch may be exemplified by the fact that in 1786 Dutch ceased to be the medium of instruction in the few existing Western schools.³⁴ The Dutch had to adapt themselves to the local situation. These contacts gave birth to a blend of Dutch and Indonesian dishes, the rijsttafel. Probably the rijsttafel developed quite late, possibly in the middle of 18th century. This may have happened when wealthy Dutch merchants and later, less affluent servants of the VOC developed a country way of life on their estates on Java.³⁵ This country life was very ostentatious as the Dutch tried to compete with the court life of the Javanese Kratons.

Indonesian society was hardly touched by European habits, at least by European foods. However, in Javanese Kratons some foreign habits were adopted. For instance, toasts were given and use was made of tables and chairs.³⁶

Likewise in the 19th century, Europeans living in the Indonesian archipelago did not form a homogenous group. First there was the group of Dutchmen who had not been born in Indonesia, but who had come straight from Europe. Many of them returned home after having completed their assignments with the colonial administration, armed forces or trading and plantation companies. There was also a group that stayed on in Indonesia, the blijvers. Some of them had been there for several generations. The largest European group however, was that of the Indo-Europeans. Again this group was far from being homogenous. Among the Indo-Europeans a varying degree of affiliation with the Dutch and Indonesian way of life could be found. They formed the lower strata of the European community, employed as small civil servants by the government and working with the post or railways. Their food pattern was often more Indonesian oriented. It was a typically stratified and class-conscious society where everybody's place was clearly marked and determined by one's position in the administrative hierarchy, by economic success and by ethnic background. Although small in size the European

community exercised a great influence on the socio-economic developments of the archipelago.

The tendency among Europeans to become "Indonesianized" was still strong until the end of the 19th century. In many aspects it was a small male-dominated society resulting in various forms of inter-marriage with the local population. For a long time, Europeans had mixed feelings towards rice as a food. It was considered to be harmful to the stomach, eyes and brain. In his medical topography of Batavia for the years around 1844, Dr. Bleeker reported that although many of these prejudices had disappeared, efforts were still needed to eradicate them completely. Bleeker had a positive view on rice: "It has the advantages of porridge without the disadvantages; it is nutritious and easily digested and corresponds fully with the food requirements of these regions".³⁷ One may wonder if these supposed associations of a rice diet with eye and nerve problems do not reflect the occurrence of vitamin A deficiency and beri-beri (vitamin B₁ deficiency).

The physician Munnich in a lecture in 1847 for the Bataviaasch Genootschap stated that there was a relation between the kind of foods consumed by the different peoples of the world and their respective somatic, spiritual and moral character. He put forward the thesis that the sturdy son of Europe living in the tropics and consuming only rice would, in the long run, take on the character of the local population.³⁸

In the European top layer of Batavia society rice did not appear very often or only as a mere formality on the table. A great variety of European dishes were served as Bleeker puts it, "to compensate the absence of his country of birth".³⁹ He advised his fellow Europeans to follow the indigenous way of feeding; rice with some spices, fish, chicken and vegetables. Such a way of feeding would favour the body and prevent the general occurrence of obesity and predisposition for liver, milt and intestinal diseases. In the 19th century, only the really well-to-do of the Europeans could maintain their own food habits, mainly based on imported foods. Most Europeans however, and of course the Indo-Europeans were neither economically nor culturally in a position to do so.

In 1883, Dr. Van der Burg wrote in his medical handbook for the Indies that most Europeans including the Dutch, continued to maintain their own food habits but combined this with some Indonesian habits.⁴⁰ According to the author, some newcomers to the Indies tried to maintain Dutch food habits but were obliged in the long run to adapt to local conditions. Bread was available in the major towns of Java but was of poor quality. A typical food

pattern of a Dutch colonial household is presented in Table 4.1.

It is interesting to note that the day began with a cup of coffee or a glass of milk. Rice was an important element of the European diet in the tropics. In smaller places and among Europeans with limited income, rice with chicken and vegetables formed the main dish, three times a day. If we compare the European diet with that of the Javanese kampung dweller the difference as far as luxury items was concerned is striking. Van der Burg estimated a daily intake of 617 gram of rice (one Kati) per adult per day (2184 kcal) and considered fish and meat a luxury food for the ordinary Indonesian. This estimation is most likely too high as Scheltema found that in the 1880's the daily cereal intake was around 380 g or 1345 kcal per head a day.⁴¹

At the end of the 19th century a strong process of Europeanization occurred for a number of reasons. With the opening of the Suez Canal and technical developments such as modern steam boats, telegraph and radio, communication with Europe improved considerably. The government and companies intensified their administrative and commercial dealings with the local population. The whole of the archipelago was now under Dutch control and was gradually opened up for the domestic and international market.⁴² In 1901 the Ethical Policy was initiated to stimulate the welfare of the Indonesian population (See further Part II, chapter 7.1). Some newly built European residential areas looked like the typical country house and cottage of Laren or Bussum in the Netherlands.⁴³ At the same time marriage prohibitions were abolished for young employees and civil servants going to the East. As a result the number of European women not born in Indonesia increased. It is most likely that this widened the social gap between Europeans and the Indonesians.⁴⁴ These European women took new ideas and habits with them and caused a process of Europeanization.⁴⁵ European habits and in particular Dutch habits, became much more than before the norms of the colonial society. This affected not only the life of the Indo-European communities, but also those Indonesians who managed, despite all sorts of barriers, to obtain positions in the colonial system.

As far as the availability of European foods is concerned the nutritionist Dr. B.C.P. Jansen summarized the situation in 1938 as follows:

"Nowadays, particularly in the great seaports and nearby cities, the

food available for Europeans differs very little from that which one gets in Europe. Before the supply of these was plentiful, many Europeans were simply forced to take recourse to the native rijsttafel. During the last few decades life has been very much Europeanized, with the result that, at least in the large cities, Europeans can live on a diet they were accustomed to in their native country".

Dr. Jansen made one striking exception:

"There is however, one important article of food which is still much more difficult to get in the Indies than in Europe, particularly in the plains - namely fresh milk".⁴⁶

Table 4.1

Food pattern of a kampung dweller and a Dutch colonial household in Indonesia, Java, around 1880.

<u>Kampung household</u>	<u>Dutch Colonial Household</u>
<u>early morning</u> coffee or water with sugar	<u>early morning</u> coffee or glass of milk, Selters or Apollinaris water
<u>11.00 a.m.</u> rice with salt, lombok and trassi, vegetables	<u>7.00 a.m.</u> bread, eggs, meat, tea or coffee
<u>snacks</u> (if some money is left over) rice cake, kwe kwe, ketupat, gablok, fruits, cucumber	<u>1.00 p.m. - at home</u> rijsttafel, this might be followed by meat, boiled or fried potatoes with vegetables or salad - <u>at work</u> rijsttafel or bread, meat, vegetables
<u>Sunset</u> rice with salt, lombok and trassi, vegetables Dried or salted fish only added to the rice on market days, once every five days. Better-off households consume fresh meat or dried meat (dendeng).	<u>5.00 p.m.</u> tea and biscuits <u>7.00 p.m.</u> European dish, glass of wine.

Source: based on Van der Burg, 1883.

4.4 Maintaining a milk drinking-custom

As already said, Europeans living in colonial Indonesia had, to a certain extent, to adapt their food pattern to ecological conditions by incorporating Indonesian foods and dishes. Nevertheless they continued to eat foods which were considered as essential elements of the food pattern; bread, butter, cheese and milk. These were all foods which were not or hardly available locally. Flour for the baking of bread, and butter and cheese could be and were carried in VOC ships to the archipelago but milk of course could not. At a very early stage the Dutch tried to maintain their milk drinking customs by making use of local cattle and by setting up some dairying activities.

The provisions of VOC ships always included bread, butter and cheese provided of course that the skipper, purser and cook did not divert too many of these rations.⁴⁷ These rations reflected what Dutch workers and small farmers were expected to eat. Generally speaking VOC ships left Europe with precious metal to exchange for Asian goods, the ship holds filled with ballast and a few goods for Europeans living in South East Asia. These goods included beer, wine, dried beans and peas, flour and biscuits.⁴⁸ As early as 1620, reports mentioned the export of cheese and butter from the Netherlands to the East Indies.⁴⁹ It should be realized however that of the total dairy exports, the share shipped outside Europe was of limited significance.⁵⁰ As a result, in the 17th and 18th century, cheese and butter were available for the Dutch living in Batavia, and in the forts and trading posts dispersed all over the archipelago.⁵¹ Fresh cow milk could in principle be obtained in those parts where the population kept some livestock.

The diffusion of cow milk in Indonesia coincided with the extent to which the Dutch penetrated into the archipelago. From the 17th until the middle of the 19th century, two areas with some dairy activities could be found, a smaller one on Ambon and a larger one on Java, particularly West Java. In 1605 Ambon fell firmly into the hands of the V.O.C.. The very profitable spice trade caused the Dutch to penetrate the area and uproot the economy.

In the 17th and 18th century the V.O.C. also kept cattle for milk consumption. In the middle of the 19th century it was reported that on the island of Ambon much care was given to dairy cows by both Moluccans and landowners.⁵² A share cropping system of dairying came into existence. The cowherd kept half of the milk and an indemnity from the owner of the cow

from each calf born. It seems that share cropping of dairying for both buffalo and cow milk was very limited in Indonesia.⁵³

Although a number of Europeans lived in the Ommelanden, the region around Batavia, most of them lived in Batavia itself, which had been built as a Dutch town with canals and a castle. As already stated, cattle were a common part of the agricultural system, but were not used for the production of milk. However, those who wished (and they were all as may be expected non-indigenous) could purchase cattle and raise them for milk production. For instance, in the beginning of the 17th century the important trading town of Jeparu had a lively trade with Portuguese Malacca. The Javanese exported rice, cattle, poultry and horses in their large junks. The cattle exported were not only slaughter cattle, but also dairy cows.⁵⁴ The availability of fresh milk in Batavia, was mentioned several times in the Edict Book of the Indies.⁵⁵

In 1632 reference was already being made to the lease of milk from VOC-owned cattle in order to compensate the cost of the care of the cattle and their housing.⁵⁶ In 1669 milk biscuits (Melck koekjes) were on sale in the market of Batavia.⁵⁷ An authority (1769) to levy toll at the two sluices at Tangerang and Anke mentioned a toll to pay of one duyt (doit) for a proa of grass or milk.⁵⁸ In the 18th century, rich European merchants adopted the way of life of landlords with estates in the Ommelanden. Large herds of cows were kept and milk and butter was for sale.⁵⁹

After the restoration of the Dutch authority in 1816, the number of Europeans gradually increased. This probably created a larger demand for dairy products in the 19th century. According to the report on the state of agriculture in 1829, animal husbandry for milk, butter and meat could be found in regions around major towns, particularly Batavia. Several landowners in Citrap, Tanjung East and West, Pindok tarom, Kampung Malaiyu, Struiswijk and other places supplied Batavia daily with these commodities.⁶⁰ In 1845 Bleeker reported that in the Batavia area only a few Dutch cows were available, insufficient in number to satisfy the need of the Europeans for milk and meat.⁶¹ Javanese cattle or sapi were, according to him, already present in sufficient number to supply them with milk and meat. Butter however, was still imported from the Netherlands. Buffalo milk and goat milk were not often drunk by Europeans, although the Indonesians did sometimes use goat milk. One wonders if Bleeker's observation was fully correct. It is more likely that the author had Arabs in mind, not the people of Java.

The use of milk outside Batavia during the middle of the 19th century was reported in several medical topographies (geneeskundige topographie) for the Regencies of Banten, Anyer and of Pasuruan in East Java.⁶² Likewise a study carried out on live stock on Java in the same period indicated that dairy cattle were kept in places where Europeans resided.⁶³ In other towns like Semarang the physician Muller reported that there was no lack of cow milk, which however, was not rich in fats. It was often diluted by the vendors with water.⁶⁴ Buffalo milk was not consumed by Europeans because it was considered unhealthy. Muller wrote that he could not say whether this was justified but pointed out that Europeans in Padang drank it without any prejudice.⁶⁵ Generally speaking buffalo and goat milk were not liked and hence not much used by Europeans. However in situations where cow milk was scarce, of a very poor quality, or not available at all some Europeans turned to these other kinds of milk.⁶⁶

Writing about the situation around 1880, van der Burg said that on Java fresh milk was available, but that in the outer regions cow milk was often lacking. A greater problem was how to get good and pure milk. Milk was produced under unhygienic conditions and adulteration occurred frequently. Bottles used as milk containers were often not sufficiently cleaned by the milk supplier. Van der Burg reported that even if one kept dairy cows, the cowman (tukang sapi) always tried to sell some of the milk at the expense of the owner. This indicates that fresh milk was popular. It was also, as can be expected, expensive. Because of the absence of special milk bottles, milk was usually delivered in closed wine bottles. In the early 1880's the price of a bottle of milk was 40 cents or about 64 cents per litre in the major towns of Java.⁶⁷

At first cows were zebu, but these were later followed by cows from Australia (Ayshires, dairy shorthorns and Jerseys). Despite high transport costs, in the latter part of the 19th century administrators of plantations occasionally imported dairy cattle from the Netherlands. This was to make fresh milk available for themselves and their European staff.⁶⁸ The Dutch and other Europeans used milk as a drink, as an ingredient in cooking, or added it to coffee or tea. It was used as a food for the ill and for convalescents and as an infant food.

Information on how milk was used can be found in data on hospital and other forms of institutional feeding. In the middle of the 18th century the VOC had a hospital, in fact a kind of convalescent home, for its personnel in Cipanas on the northern side of Mount Gede, at a height of about 1000 m.

Dairy cattle were kept in the neighbourhood. In 1761, the surgeon, Jan de Putt, reported to the Governor General van der Parra that his patients drank mineral water with fresh milk as part of their treatment.⁶⁹ Although cow milk was preferred, the VOC physician Bontius used goat milk as part of the treatment for patients suffering from an atrophy of which he said:

"It is common for people in this country to waste in their flesh and grow lean without any manifest cause; no fever, or at most a very slow one attending".⁷⁰

One of the rules in the Seminarium Theologicum in Batavia in 1745 included for dinner the following:

"The evening meal shall consist out of a good milk food or eggs or such like, in addition to the rest of the foods of midday and together with butter and bread. Further always good white rice should be on the table both during midday and in the evening as well as in the morning".⁷¹

In the Binnen-hospitaal in Batavia, the daily food purchase consisted of vegetables, fish, fowl and cattle, bread, milk, tea and coffee (1754-55). The daily occupancy was an average of 999 patients.⁷² Under Daendel's governorship regulations were laid down for the nutrition of the ill in the hospitals (1810) and among other foods was prescribed:

"Milk soup with bread, consisting of 8 ounces milk with a slice of bread or 2-3 small rusks".⁷³

Milk was also listed as an item in the list of food stuffs for the hospitals in Semarang and Surabaya (1810).⁷⁴ In 1845 Muller reported that in the military hospital in Semarang milk was distributed to those who needed it.⁷⁵ In other military hospitals, milk was used for European patients.⁷⁶ Milk was considered such an important food for the ill and the convalescent that in 1901 two pharmacists from the armed forces in Semarang published a study on milk control and the chemical composition of fresh milk.⁷⁷

4.5 Infant feeding and cow milk

To assure a fresh milk supply it was not unusual for some European households to keep a cow. This was particularly the case when milk was required for infant feeding. When visiting the Indies in 1897 the author Justus van Maurik observed a rather extravagant attachment of an apparently well-to-do colonial household to milk. Staying in a hotel in Batavia (Hotel Wisse) he watched the arrival of a family in an open carriage, followed by the hotel omnibus loaded with their luggage and further by a cow with calf. The cow was taken on this journey to ensure a milk supply for the baby and the rest of the family.⁷⁸ For the European community, milk was not only needed to maintain a milk-drinking custom, but was also of essential importance for infant feeding; In the 19th century, breast-feeding was rare among European women. Probably breast-feeding was already rare among the well-to-do Dutch women in Batavia and other important places in the 17th and 18th century. The rather nastily critical Nicolaus de Graaff, a VOC ship's surgeon, wrote in his Mirror of the East Indies that Dutch women hardly ever breast-fed their infants but made use of a wet nurse, who was a slave.⁷⁹

The Bataviaasch Genootschap der Kunsten en Wetenschappen (Batavian Society of Arts and Sciences) offered a prize for the person who could give an adequate answer to the question of what the best food was for new born infants not being breast-fed.⁸⁰ The prize, a gold medal, was given to the medical doctor Cornelis Terne and the results were published in the proceedings of the Society in 1814.⁸¹ According to Terne most European women did not breast-feed their infants. He considered it a regrettable situation as there was no need for it. Breast-feeding in his opinion was abandoned because of sensuality, laziness, pleasure, inertia or and extreme lack of love for the child.⁸²

Terne was very much in favour of breast-feeding but was willing to give an answer to the question of an alternate food that infants could be given than only either ordinary milk porridges or being wet nursed by a local woman.⁸³ Milk and bread porridges were considered as unsuitable infant foods, because they soon became nauseous looking and sour.⁸⁴ He referred to the well-known Swedish paediatrician Rosén von Rosenstein and his theory that all childhood diseases arose from acidity.⁸⁵

A thin gruel of some hartshorn water with some biscuits or flour were advised for a new born infant during the first 8 to 14 days or even longer.⁸⁶ Further he recommended Professor Camper's pap of wheat flour,

sugar and cow milk, but in the East Indies no milk could be added as it became sour.⁸⁷ Here again hartshorn water was recommended, if necessary mixed with one or two egg yolks or a thin broth.⁸⁸ When thirsty, infants could safely be given a glass of water and milk. There was no fear that the pap would turn sour, because of the added acid-preventing food-stuffs.⁸⁹ Apart from Terne's plea for breast-feeding, his alternative for breast milk does not stand up to modern scientific nutritional ideas.

When breast-feeding was practised by European women in Indonesia it was only for a few weeks or months.⁹⁰ The reasons are not fully understood. Most likely they were following the habits of the sophisticated upper class women of Europe where breast-feeding was declining. For feeding the infant the alternatives were wet nursing, cow or goat milk and condensed milk. Wet nursing was not very usual. Indonesian women were, generally speaking, not available as it did not fit in with their own tradition. If a wet nurse could be found the woman came from the poorer sections of Indonesian society, and had on the whole received an insufficient nutrition.⁹¹ Besides, many European women were very fastidious about the kind of wet nurse to be employed. They also feared that the infant would take in the character of the wet nurse with her milk.⁹² The belief that the milk of a wet nurse conveys the character of the woman to the child is very old, and was much debated in medical circles from the Renaissance till the eighteenth century.⁹³ De Graaff and Terne were also of the opinion that an infant sucked from the wet nurse would imbibe her "character and nature", which had in their eyes all sorts of defects.⁹⁴ On the other hand it has been suggested that Moslim Indonesian women were afraid of becoming polluted by breast-feeding a heathen infant.⁹⁵ In the second half of the 18th century in Europe, enlightened physicians published works critical of wet nursing as a way of raising infants and favourable to breast-feeding. In France, however, wet nursing remained a major way of infant feeding until the end of the 19th century.⁹⁶

Van der Burg considered it a prejudice of European women not to make use of an Indonesian wet nurse. On the other hand he indicated that the employment of a wetnurse was rather expensive. Around 1880 it would cost at least f 100 a month including wages, food and clothing to hire a wet nurse in Batavia.⁹⁷ Cow milk and the newly developed milk product, sweetened condensed milk were the only "realistic" alternatives. Some physicians, like van der Stolk, gave preference to goat milk, not only from a medical point of view but likewise on more practical grounds (See also Chapter 5.2). It

was much cheaper and easier to keep a goat than a cow as a household milk supply. It also meant less dependence on the adulterated cow milk provided by vendors.⁹⁸ In situations where no fresh milk at all was available condensed milk could be used. Van der Stolk also said that only a few infants could be fed for quite some time on condensed milk without suffering any drawbacks.⁹⁹ Generally speaking, in the 1880's sweetened condensed milk was much used by European mothers for infant feeding, the brand "Swiss condensed milk" being widely known.¹⁰⁰

That artificial feeding was very risky even among the relatively better off European households in this period was given by the military pharmacist Cayaux:

"Figures are in this respect terribly convincing. Of the children nursed by their mother, 20% die during the first year of life; of the children fed by a wet nurse 30%, of artificially fed children 60%, thus more than half, during infancy. And how many will be wrecked during the coming years due to the consequences of artificial feeding".¹⁰¹

The infrequent occurrence of breast-feeding meant that the first year of life was a desperate struggle for many children.¹⁰²

5. A DEMAND FOR FRESH MILK AND THE RISE OF MODERN DAIRYING UNDER TROPICAL CONDITIONS

5.1 Beginning of modern dairying

As has already been discussed, the Dutch and other Western Europeans living in the tropics maintained their habit of using milk and attached particular importance to milk for infant and child feeding. How the milk was distributed in the 1880's to European consumers may be illustrated by a description of the daily life in the Indies as seen through Dutch eyes and published in a youth journal:

"...You ask me what kind of a man passes us so early in the morning. This is the tukang susu (milk man). On each side of his pikolan (carrying pole) hangs a basket with some bottles of milk in it. He has to deliver these before 6 o'clock in the morning to his clients, because that is the time when everybody gets up and drinks coffee. Each bottle is provided with a sealed paper cover in order to prevent the man from following the example of the Dutch milk vendors in the Netherlands and adding water.

Such a milk business or dairy is generally speaking run by a Nonya or lady who as a widow tries to make a living out of it. Her livestock consists mainly of indigenous sapis (cows) each of which gives only a little milk. Here a cow giving 3-4 bottles of milk a day, which is equal to about 2.5 litres is certainly one of the best. Fortunately the milk is of a good quality. In places where few cows are available, buffalo milk is consumed. Use is likewise made of the Swiss condensed milk, which is imported in large quantities".¹

In the 19th century and until the 1920's most dairying activities were of a poor quality. In and around towns in Java and Sumatra with sizeable populations of Europeans people could be found who kept a few cows in simple and often dirty cow sheds. The milk produced was not always clean, tuberculous contamination occurred frequently and the consumer had to look out for adulteration with water and other substances. Who kept these dairies?

- (1) In the first place European and Indo-European women, often widows, who tried to supplement their income with the sale of milk. These women,

often, played a major role in establishing dairies in the cities. After the retirement or death of their husband, women had to look for ways of earning a living. The origin of the dairy farms was often to be found in the plantation where the husband was employed. A cow was kept for domestic purposes, but gradually more livestock were purchased and the milk surplus sold.²

(2) Foreign orientals, Indians and Chinese, sometimes kept a few cows.

That the Indians kept cows for milking is not surprising as they came from a region with a long dairying tradition. The group of small Chinese entrepreneurs engaged in these activities, is more striking as they had no dairying tradition.³ Around 1900 in the city of Banda Aceh (Kutaraja) in Sumatra, where many Indians lived, an often heard praise of Indian milk vendors was, "The milk is good". This had a double meaning; not only was there good quality fresh milk for sale, but also it was possible to borrow money from the vendor at a reasonable rate of interest.⁴

(3) Indonesians kept also cows for the sale of milk to European customers.⁵ According to the government veterinarian Vrijburg, much of the small-scale dairy farming around 1900 was done by Chinese and Indonesians.⁶

At the end of the 1930's small, modern dairy farming could be found on the island of Java. In a popular book with various contributions on the daily life of Europeans living in the Indies, some attention was given to the supply of milk. The novelist Madelon H. Székely-Lulofs, when describing a small place on Sumatra, said that milk was supplied by an Indian cow keeper, but that sweetened condensed milk was also used.⁷ In the same book, Dr C.W. Wormser wrote that on Java the Dutch kept cows in the hills around the cities. Friesian cows were kept in clean cowsheds on concrete floors. He further referred to the importance of fresh creamy milk as, "Pure milk for the nutrition of our children."⁸

It is not possible to ascertain when modern dairying and a fresh milk supply began. The report on the state of agriculture on Java in 1829 mentions that trials were already being done with Dutch and Balinese stock to improve the cattle.⁹ In Struiswijk, Batavia, some experiments on feeding animals in the cowshed took place in 1828. According to the report the costs involved were amply compensated for by a higher milk yield. Two Javanese cows grazing in open fields, as was generally practised, only gave two bottles of milk a day. Fed in the cowshed, this could amount to 7 or 8

bottles a day. For fodder, groundnut cakes were advised, to be used in the same way as linseed cakes were used in the Netherlands. A very realistic approach was the recommendation to the government for the importing of bulls from Europe for breeding. It was suggested that these bulls should not be kept near beaches because of the heat and the scarcity of grass. Rather they should be distributed to those engaged in cattle keeping in the cooler mountain regions. The Government however, was not interested in the veterinary care of the livestock, with the exception of horses. The concern for horses was based on their importance for transport of people and goods, particularly for the military and postal services.¹⁰

For the Indonesian population, the cow was, next to the buffalo, of great importance as a draught animal for agriculture and transport. Also on the plantations set up by Dutch entrepreneurs it was indispensable as a draught animal for transport.¹¹ It seems that until 1851 the civilian veterinary tasks were carried out by a small unit of five military veterinarians. In that year two government veterinarians were appointed for civilian duties and this group was extended to seven in 1875 covering, at least theoretically, the whole of the archipelago.¹²

Gradually they became interested and involved in some care for the livestock of the population. This was not always appreciated by the Government. In 1866 it even forbade civil servants to have any dealings with cattle belonging to the local population. These people were to look after their own cattle and it was assumed they were in a position to do so.¹³

A major threat to further development of livestock was cattle-plague.¹⁴ It first broke out in Sumatra, then spread to Java in 1879 and was a disaster for the population. The veterinarian A. Vrijburg reported that during the 1886 plague in Deli, Sumatra, not only were the plantation oxen severely affected but also dairy cows belonging to a certain Mr. G.¹⁵ The outbreak of rinderpest showed the need for a well-organized veterinary service. Rural communities were faced with heavy losses among animals needed for agriculture and transport. The Government was forced to take action and all efforts to combat the pest were laid in the hands of a special Government Commissioner with nearly unlimited power.¹⁶ There was great indignation among the population against the traders who made a profit out of the plague and against the temporary officials entrusted with the task of killing the infected animals. These officials were named by the population as "Tuan dokter Snaphaan".¹⁷

The veterinary corps was further extended and in 1900 an inspector for

the Veterinary Service was appointed. With the creation of the Department of Agriculture, Industry and Trade in 1905, the Veterinary Service became part of it as one of the Welfare Services (Welvaarts Diensten).¹⁸

Towards the end of the 19th century some efforts were made by government officials to improve Javanese cattle, by importing zebu cattle from India. On Sumatra's East Coast, the zebu had already been being imported for quite some time as a transport animal for the plantations but it was also appreciated as a dairy cow. In 1857 on Java the Regent of Wonosobo imported zebu cattle and Chinese traders were likewise involved in other parts of Java. The zebu was also imported for the dairies of Semarang.¹⁹ In fact around 1900 Semarang was a centre of cattle import. Zebu, Dutch and Australian cattle were bought in Semarang by planters, mainly coming from Middle-Java. Crossbreeding took place in the plantations in order to get a suitable draught animal.²⁰

Some Europeans saw a bright future for dairy development. In a paper published in the Journal for Industry and Agriculture for the Netherlands Indies, in 1906 the livestock keepers on Java and Madura were recommended to orient their livestock to the breeding of dairy cattle. Condenseries should be established in the coastal regions and butter and cheese factories in the mountain regions.²¹ Dr 't Hoen, the Government Veterinarian reacted to this ambitious idea. He pointed out that Java was inhabited by an agricultural population of 28 million which needed cattle as draught animals and for slaughter and not primarily for milk. If however, a condensery or a milk factory were to be erected in an area, the keepers of cattle might start to produce milk. Guidance was needed, but it would be possible to make a reasonable living out of it.²²

After 1905 the Government dealt with animal husbandry on a more permanent basis. The main emphasis was on cattle rather than on the buffalo (Carabao). Questions for the new Veterinary Service to answer were not only on how to improve cattle, but also on what kind of cattle should be encouraged; for meat production, as a draught animal or as cattle suitable for dairying.²³ Because of the absence of a milk-using tradition, it is obvious that the government's interest in dairy cattle was primarily for the benefit of the European communities. However, in the mountain region of Java, trials were carried out by the government to develop a breed suitable as both draught and dairy cattle. In 1914 a contract was drawn up for supplying Dutch bulls to the well-known stock farm Generaal de Wet, situated in Cisarua, near

Bandung. The local population did not respond much to these measures, and most of the bulls ended up in the dairies of Europeans in Java.²⁴

Friesian cattle thrive in the mountainous areas of Java, but in the tropical lowlands however the situation was quite different. The difficulty with milk production was that the animals were apparently often not able to keep their body temperature within normal limits. The zebu gave no difficulties in the hot climate, but produced less milk and required the presence of a calf at milking time to let the milk flow. Crossbreeds of European and indigenous cattle, including zebus had no special problems with heat stress but infections of foot and mouth disease were more serious than in the indigenous breeds, whereas brucellosis and tuberculosis imported with the European dairy cattle, sometimes caused considerable losses. From these crossbreeds, the Grati dairy cattle of modern Indonesia was developed, when in 1925, pure bred Friesian bulls born in Central Java were stationed by the Government in the Grati district of East Java.²⁵

5.2 Fresh milk supply

When in 1905 the Veterinary Service as an operational unit within the Department of Agriculture, Industry and Trade officially began its work of taking responsibility for animal husbandry, several modern dairies could already be found on Java in and near major towns like Batavia, Buitenzorg, Bandung, Semarang and Surabaya.²⁶ Many were found in the towns and only had space for their cowsheds and other buildings. Unlike other dairies, for these all cattle fodder and straw had to be purchased. This was economically viable because of the favourable price of fresh milk which lasted until the economic depression of the 1930's. A characteristic aspect of these dairies was that both milk production and distribution to the consumers remained in one hand. The non-Indonesian dairy owner found it very difficult to get land around the towns for fodder production because of the Agrarian Land Law which prevented foreigners from buying land. One difficulty for towns dairies was what to do with the dung. The simplest solution was to throw it into one of the streams.²⁷

Some of these modern dairies were carefully planned. About 1898 in Semarang for example, Swaving, after having carefully studied the various aspects of dairying in Europe, began vegetable and small-scale dairy farming. By 1905 in his farm Getassan on the northern slope of Mount Merbabu (1300 m), he already had an area of 30 hectare. His livestock consisted of

imported Australian cattle (Ayrshire) which were kept in fresh meadows and in a modern cowshed.²⁸

As milk is a perishable product in a tropical climate with a temperature of 27.5°C, it becomes sour after 8 hours. Hence the milk industry was always near the main consumer. Prior to the development of modern cooling techniques and a sophisticated transport system a large milk trade was not possible.²⁹ Places such as Batavia with good railway connections could receive fresh milk from Buitenzorg and Bandung by early train.³⁰

For selling to the consumers, the milk was bottled. Throughout the 19th century and to a large extent until the 1920's, all sorts of bottles were used, including wine bottles of which there was apparently no lack. From the hygienical point of view these bottles were hardly recommended.³¹ The narrow bottle necks as well as the convex bottoms were difficult to clean. The coloured glass obscured the content of the bottle from the consumer. It was a long time before the modern milk bottle of transparent glass with a flat bottom was introduced. Closures of the bottles remained a problem. Bottles with a lightning stopper were not suitable because of the difficulties involved in cleaning them thoroughly.³² On several occasions, veterinarians recommended the hygienic closures of vellum paper or paraffined cartons. The advantage of these was that they could only be used once. The consumer immediately noticed whether or not the closure had been opened during transport from the dairy farm to the various sales outlets.³³

Because of the scarcity of fresh milk, it is not surprising to that adulteration frequently occurred either on the farm or by the milk vendors. The first scientific paper dealing with cow milk appeared in 1901 and was devoted to the problem of adulteration. In 1900 Wetzelaar and Gieben, two military pharmacists in Semarang gave in their study the following list of different ways in which milk could be adulterated.³⁴

- (1) adding of water;
- (2) wholly or partially skimming off;
- (3) skimming off the milk and adding of water;
- (4) mixing with goat, sheep or buffalo milk;
- (5) mixing with santen (coconut milk);
- (6) mixing with condensed milk;
- (7) mixing with rice water;
- (8) boiled milk from the previous day.

It was very common for fresh milk to be adulterated with the imported but cheaper sweetened condensed milk. The use of unsweetened evaporated milk was less usual because of its higher price.³⁵ The only group of milk consumers protected against milk adulteration was the military.

As a result of the decentralisation law of 1903 a start was made with municipal and provincial regulations concerning the production and sale of milk and the bigger towns on Java began to establish their own veterinary-hygienic services. Towns like Surabaya, Batavia and Semarang, and on Sumatra, the town of Medan began in 1911/12.³⁶ Under these regulations one had to apply for a licence from the chairman of the local council before beginning dairying. A government or municipal veterinarian then inspected the dairy, the fields, the health of the cows, and the equipment. No licence was given to those who could not meet the specified qualifications. The applicant also had to undergo a medical check.³⁷ It is difficult to ascertain how seriously these regulations were observed. In Yogyakarta as in other parts of Java, a system of "hiring" a cow was practised. When there was a need to produce more milk, a dairy farmer could hire a lactating cow for a fixed amount a day. Through this system despite municipal control there was danger of introducing contaminated animals into the cowshed as the hirer was unaware of the animal's health situation.³⁸ Complaints on the low professional level of dairy farming were frequently heard in the 1920's and 1930's.

A step forward in milk control was the issue of a codex alimentarius for milk in 1920, prepared by the Food Commission (see further Chapter 7.1). From 1920 on, the Veterinary Service became more involved in the hygienic aspect of milk and meat for human consumption. Milk control and, closely linked with it, control of the dairies, developed more or less simultaneously with meat control.³⁹

Municipal authorities also became involved in supervizing the construction of new cowsheds. Early examples of municipal involvement in this are Surabaya and Malang.⁴⁰ In 1937 a dairy expert was attached to the Veterinary Service for the benefit of the keepers of dairy cattle.⁴¹

Milk control was not only necessary because of the problems of adulteration but also because of the danger of tuberculosis. In the archipelago, tuberculosis among cattle was a disease imported from abroad, notably from India and Australia, which raged almost exclusively in herds of dairy cows. Thanks to intensive measures to combat tuberculosis, by 1937 only a small number of cows were still affected by the disease.⁴²

Places with major dairy activities on Java as indicated by several veterinarians for the years 1920-1940 are presented in Figure 5.1. The largest centres with dairy activities were found in and around Surabaya and Bandung. Likewise Batavia with its relatively high number of European inhabitants had many dairies (see Table 5.1). In 1934 it was stated that due to government measures there were sufficient dairies to ensure the towns of the Residency of Batavia with a good quality milk supply.⁴³

Table 5.1
Number of dairies and cows in the Residency of Batavia, 1933.

regency	dairies	cows
Batavia	28	240
Meester Cornelis	70	688
Krawang	6	61
Total	104	989

Source: based on A.R. Min.v.Kol., 1901-'45, M.v.O. Residentie Batavia, L.G.C.A. van der Hoek, 29-5-1934, p. 75.

The milk supply for the town of Batavia however not only depended on dairies in the Residency, but also on milk coming from Buitenzorg and Bandung. In Surabaya (1923) about 40 dairies were run with a total of 1000 cows, while Bandung (1921) had about 30 dairies.⁴⁴ In the outer provinces, Medan on the East Coast of Sumatra was a major centre of dairying activities because of the large number of Europeans living there. It had a large community of Indians and several of them were involved in dairying.⁴⁵ Dairying in the Medan area developed under Indian and European initiative.

Information on cattle on dairy farms on Java and the outer provinces is available for 1925 on. Between 1925-1938 despite the economic crisis the number of dairy cows on Java increased from 10 074 to 15 368 (see Table 5.2). This cannot be explained by a rapidly growing demand from European, Chinese or Indonesian consumers. Most likely dairy owners tried, when faced with fallen milk prices, to compensate their diminishing income by producing more milk. Hence the number of cows increased.

Milk production varied according to the level of management of the dairies. Dr Kunst, the head of the Veterinarian Service, estimated the milk production for the dairies in Java and Madura in 1935 at about 23.7 million litres and for the outer provinces at 3.5 million litres.⁴⁶ Compared with the outer provinces, the milk production on Java was more efficient. Here the average milk production per cow, based on Kunst's calculation was 1755.5

litres a year against only 500 litres a year per cow for the outer provinces.

Table 5.2

Cattle on dairy farms on Java and the outer provinces, 1925-1938.

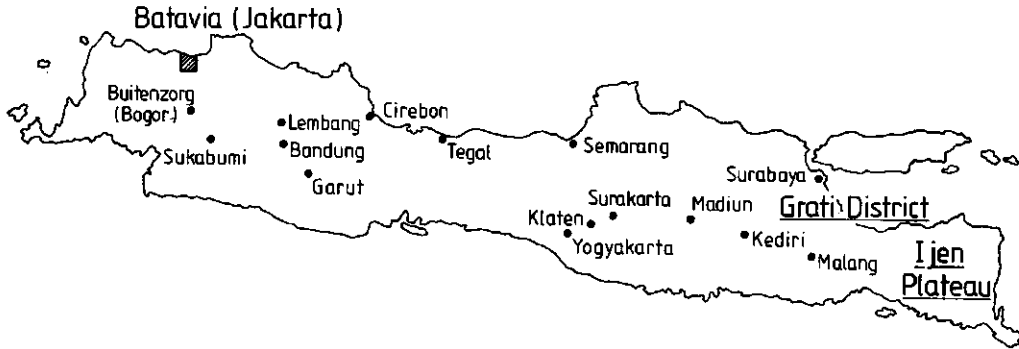
year	Java and Madura					Outer Provinces				
	cows	heifers	bulls	bull calves	heifer calves	cows	heifers	bulls	bull calves	heifer calves
1938	15 368	2329	784	1778	4363	5772	3011	1176	2075	2566
1935	13 471	2476	797	1886	3979	7204	2986	2604	1818	2565
1930	10 585	1985	668	1661	3226	-	-	-	-	-
1925	10 074	2273	823	2078	3162	-	-	-	-	-

Source: Indisch Verslag 1939, Part II, p.284.

This is quite an achievement as Merkens estimated the milk production of a cow in Java around 1920 at 2.5 litres a day or about 910 litres a year.⁴⁷ The amount of milk produced outside the officially registered dairies was probably limited, as most dairies fell under regular control.⁴⁸ The higher milk production per cow on Java was probably due to the presence of modern dairy farms, while in the outer provinces the milk supply came mainly from small dairy farms. Again, dairy cattle on Java consisted of 76.3% pure blood or valuable Dutch and Australian cross breeds, for the outer provinces this was only 8%.⁴⁹ The milk produced was for direct consumption and dairy products such as butter and cheese were hardly ever made.

Figure 5.1

Places with major dairying activity in Java in the years 1920-1940.



Source: Places with a major dairying activity, according to the veterinarians 't Hoen, 1923; Merkens, 1923; van den Akker, 1934; E. van N.I., 1939

Until the economic crisis of the 1930's, dairy farming in the Netherlands Indies was characterized by a demand for fresh milk among the Europeans and an insufficient milk supply. The price of fresh milk was so high that Dr 't Hoen, the government veterinarian, could write in 1923 that a price of f 0.50 for one litre of fresh milk would make the mouth of every Dutch farmer water.⁵⁰

The attractive price of milk from the producers point of view caused several people to begin dairy farming. Because of the sustained demand for milk and the correspondingly high price, a profound knowledge of dairying was not a requisite for new entrepreneurs in this field. As a result, good knowledge of modern dairying was limited among European, Chinese and Indonesian dairy keepers.⁵¹ Not all newcomers in the field were successful.

Three kinds of dairies could be found in Java between 1920-1940; modern dairies, small dairies and a kind of dairying activity which may be called occasional dairies (see also Table 5.3). The modern dairies were relatively

large enterprises, nearly always owned and managed by Europeans (see Figure 5.2 and 5.3. They may have had 50-250 adult and young cattle.

Table 5.3

Kind of dairies to be found on Java, 1920-1940

1 Modern dairies

- Modern dairies might have had 50-250 adult and young cattle, with a daily milk production of 100-600 litres a day.
- Standards of hygiene were well met.
- Spacy, well ventilated and clean cowsheds.
- Dutch and Australian full and valuable crossbreeds were used.
- Owners were Europeans.

2 Small dairies

- Small dairies had few cows and milk production was not more than 50 litres a day.
- Production and quality of milk was inconsistent.
- Standards of hygiene varied considerably.
- Cowsheds varied from reasonable to poor.
- Cattle consisted of heterogeneous breeds.
- Owners were mainly Europeans and Indo-Europeans, widows and retired people. The dairy was generally a subsidiary business.

3 Occasional dairies

- Occasional dairies were a mini business with only one or two cows.
- Surplus, milk was sold, often to small dairies.
- Milk production and quality of the milk was very irregular.
- Standards of hygiene were poor.
- Cowsheds were of a poor quality.
- Cattle consisted of local and heterogeneous breeds.
- Owners were mainly Indonesians and Chinese.

Source: based on 't Hoen, 1923, pp 503-504; van den Akker, 1934.

Standards of hygiene were well met and comparable with the Netherlands. More widespread were the small dairies with only a few cows. As distinct from the modern dairies, the production and quality of the milk of the small dairies

was inconsistent. Also the stock of cattle consisted of heterogenous breeds. The owners were mainly Europeans and Indo-Europeans, often widows or retired people. In most cases small-scale dairying was a subsidiary business. A special category was formed by the occasional dairies, a kind of a mini dairy activity based on only one or two cows. The owners were mainly Indonesians and Chinese, who were occasionally engaged in producing a little milk. The cattle consisted of local and heterogenous breeds. The production of milk was very irregular and the quality poor. The milk was often sold to small dairies. Despite their limitations, these modest occasional dairies were of importance as a first step for Indonesians to become, as small proprietors, conversant with the production of milk. Small dairies and occasional dairies were found chiefly in the smaller places, but there were some in the bigger towns. Although detailed data are scanty, the material analysed for this study indicates that consumers of fresh milk were in the first place Europeans. The Veterinary Service could state that the sale of fresh milk was principally confined to the Europeans and to a lesser degree to Chinese living in the large towns. The Indonesian population consumed practically no fresh milk.⁵² However, one exception has to be made and that is the emerging Indonesian middle class (see further Chapter 6.4).

The share of the modern dairies, although small in number, in the total milk production was high. In Bandung for example 6 out of 30 dairies produced about 60% of the total milk production in 1921.⁵³

An interesting picture at the beginning of the 1920's of the fresh milk supply of a major town on Java, is illustrated by a report of the Milk Commission of the Bandung municipality.⁵⁴ The Commission visited most of the 30 dairy farms in the Bandung area and was very concerned with the future of the milk supply. It even feared that for several reasons milk production might dry up.

- (1) Most of the dairy farms were too small and the total milk production was only 3000 bottles a day or about 2000 litre.⁵⁵ The total population of Bandung was about 167 000 inhabitants, including 20 000 Europeans.⁵⁶
- (2) Sufficient forage, in particular green fodder, was not easy to get and was expensive.



Figure 5.2

Meadow of the Villa Lucia with dairy cows, Salatiga, Middle Java ('t Hoen, 1919, p.98).



Figure 5.3

Milking shed in Bandung (Ligthart, Hövig et al., 1926, p.253).

(3) Management of the dairy farms was weak and local personnel were not well trained. Several of the smaller farms were subsidiary activities for the housewife, while her husband was working elsewhere. The Milk Commission had a low opinion of the farms and stated that the majority were "managed by well-meaning dilettantes".

(4) Another problem rose from the lack of young cattle to replace older ones. Before the First World War, milk cattle could be bought from Australia. Imports from Australia were later on forbidden because of infestation with tuberculosis. Due to high transport costs importation of cows from the Netherlands was rather expensive. The Commission mentioned that a large number of milk farms in the Indies depended on the bulls of the stock breeding farm Generaal de Wet.

Lack of sufficient capital to import good cows was a major difficulty. To begin a dairy farm with 25 cows and a bull, the Commission estimated that f 50 000 was necessary. This included the cost of buildings.

The Commission expected that the need for fresh milk would grow because of the rapid growth of the population of Bandung. It was apparently thinking of the European segment and the opening of new hospitals or hospital extensions. It concluded rightly that at about 50 cents per litre, fresh milk still remained a luxury or a medicine. In comparison with other foods, milk in the Indies was very expensive. With an average household income of about f 0,81 a day, it was out of the question for fresh milk to become part of the diet of the local population.⁵⁷

The Commission concluded that existing farms should be supported with good dairy cattle and some new farms be established with at least 40 cows.

Not only the municipality but also the authorities of the Preangan where the town of Bandung is situated showed an interest in support for livestock improvement and adequate veterinary care (see also Figure 5.4 and 5.5).⁵⁸

5.3 Central Milk Depot

Because of problems connected with a safe milk supply several people became interested in establishing a Melk Centrale or Central Milk Depot for important Javanese towns. In 1920 during a conference of engineers in Batavia, Ir A. de Boer made a plea for a Central Milk Depot. He compared the various aspects of milk hygiene with the situation in the Netherlands in the years around 1880. He argued that in the tropics milk should first be hygienically treated in a Central Milk Depot before it was distributed to



Figure 5.4

Dr B. Vrijburg's dairy farm "De Friesche Terp" in the early 1930's, Pengalengan, south of Bandung. In contrast to milking sheds in towns, in the higher attitudes cattle could be grazed because of the cooler climate and available space (by courtesy of the Vrijburg family).



Figure 5.5

The dairy farm "De Friesche Terp" had a distribution office in Bandung from where each morning cooled unpasteurized milk was distributed in bottles to European customers by carrier tricycle, early 1930's (by courtesy of the Vrijburg family).

the consumers.⁵⁹ The idea of a Cooperative Central Milk Depot for the Bandung plateau was proposed in 1928 by the Ursone brothers from a dairy farm in Lembang.⁶⁰ It remained a proposal, as many dairy owners did not see the point of it.

Dr B. Vrijburg, than municipal veterinarian of Batavia, was another advocate of Central Milk Depots for major population settlements.⁶¹ He was owner of the dairy farm De Friesche Terp in Pengalengan, a place South of Bandung. Producers of milk could bring their product to the Central Milk Depot where the quality could be tested and where the exact amount could be measured. Further milk could be pasteurized and put into bottles for sale to consumers. His colleague, Dr J. Stapensea of the Veterinary Service of the municipality of Semarang was however, not enthusiastic about establishing a Central Milk Depot. In a paper he expressed his doubts about its usefulness in tropical countries. For the city of Semarang he considered it even undesirable, provided the public were regularly acquainted with the results of dairy inspection (marks granted for plant and working methods) and milk control (marks for composition and quality).⁶² A good quality milk should be sold at moderate prices so that it could be introduced into low income households. Dr Stapensea probably had Indonesian households in mind.⁶³

According to Stapensea, the establishment of Central Milk Depots, whether under municipal, private or cooperative control, would lead to a considerable price increase and to a decline of the quality of milk. In the Central Depot, all milk would be mixed together and payment of the supplier according to the quality of his milk would become impossible. This was expected to be detrimental to the incentive of the producer to feed his cattle properly and to treat the milk hygienically on the dairy.⁶⁴ Stapensea saw no point in having milk pasteurized because of the tropical conditions. The consumer should boil the milk and if possible only once.⁶⁵

In Europe and North America it took quite some time in professional circles before pasteurization of milk was generally accepted. In the 1890s the general conception was that heating milk did something to it which made it less suitable for infants. According to Morse the basis of this conception was that babies and young animals get their food raw.⁶⁶ When the dangers of contaminated milk and tuberculosis infection through milk began to be better realized, the bias against pasteurization disappeared, at least among professionals.

Vrijburg reacted immediately to Stapensea pointing out that a Central Milk Depot in tropical countries was good for both producers and consumers.

The objection that dairies with good quality milk would decline was, he maintained, incorrect. This could easily be avoided by means of a good system of control. An increase in milk price was not necessary.⁶⁷ Vrijburg referred to the inefficient system of milk supply in Batavia.

"Let us take an example, one of the most important sales outlets in Batavia, the Koningsplein (now the Lapangan Merdeka). In the morning one may observe roundsmen with cars and bicycles, pikolans, distributing milk which, without any doubt, originate from about 15 different dairies".⁶⁸

The possibilities of a Central Milk Depot dealing with problems of milk surplus by turning it into butter and cheese were also stressed.⁶⁹ As may be expected Stapensea reiterated his point of view without adding any new arguments.⁷⁰

The first Central Milk Depot to be established in the Netherlands Indies however, was not due to a direct concern for a good quality of fresh milk for the consumer. It was the economic necessity caused by the Depression of the 1930's which brought the milk producers in Bandung together. This was anticipated by what was called a fierce milk war among the producers.⁷¹ A milk surplus and a diminishing demand for milk as a result of a decline in income lay at the core of the problem. All over Java in the major and smaller towns the dairies were faced with the problem of a fresh milk surplus. In 1923 the price of a litre of fresh milk was f 0.50. In 1937/38 it decreased in Batavia to f 0.25.⁷² The causes of this milk surplus were threefold.

- (1) Smaller households without children turned to the various kinds of tinned milk which were easy to store.
- (2) Many households had to economize and reduce their fresh milk consumption.
- (3) The expansion of dairies in and around towns resulting in fierce competition. Dairies competed with each other for clients, not only by means of advertisement, but also by using aggressive vendors.⁷³

Without much public attention the NV Bandoengsche Melkcentrale or the Bandung Central Milk Depot was established, becoming operational in August 1932.⁷⁴ It was born out of the need to prevent uncontrolled competition

between the dairies of Bandung, Lembang and Cisarua. The Central Milk Depot tried to stabilize the prices at such a level that some room was left for making a reasonable profit. However the Bandung Central Milk Depot soon ran into difficulties. Originally it was anticipated that it would have to deal with a milk surplus of 1000 litres a day out of a daily production of 10 000 litres. But in 1933 the milk surplus grew to 3000 litres (see also Table 5.4).

One of the biggest milk producers Ursone did not participate in the Depot and set up its own distribution network.⁷⁵ Likewise a small group of dairies remained operating alone on the market, benefitting in fact from the stabilized prices. Even new dairies were established, "parasiting" as Dr van den Akker, director of the Hygienical Service of the Municipality of Bandung called it, on the achievements of the Central Milk Depot.⁷⁶ In order to solve these difficulties, in May 1933, the Central Milk Depot requested the government in Batavia for financial support for transforming the milk surplus into butter or cheese or to set up milk condensing factories.⁷⁷ The request was turned down as it was not the policy of the government to support individual enterprises.

In the meantime Nestlé made efforts to take over the Central Milk Depot.⁷⁸ Nestlé was of the opinion that a self-contained condensery was economically not feasible. It nevertheless considered that a combination of a condensery with the Central Milk Depot would be profitable if surplus milk was bought at a reasonable price. Nestlé proposed taking over the depot for f 130 000 (more or less at cost price) and making an agreement for the purchase of a maximum milk surplus of 5000 litres a day. The offer was not accepted, probably out of fear of becoming too deeply involved with a big company.

The situation aggravated rapidly when the largest of the mortgagors, van Zijl of the dairy farm Generaal de Wet, recalled his mortgage and soon others followed. As a result, the Bandung Central Milk Depot went bankrupt in 1934. Now the major fresh milk producing centre on Java was faced with collapse. The municipality of Bandung with its relatively large European population took the unusual step of intervening. The collapse of the dairy was considered economically and socially undesirable. The burgomaster and a special committee took action. Consultation took place first with the owners of the two biggest dairies, Hirschland and Ursone. Out of these consultations came the idee that the

Table 5.4
Estimated milk production and sale in litres per day in the Regency of Bandung, 1934.

milk production	litres/day	sale of milk	litres/day
dairies affiliated with the "Bandoengsche Melk Centrale"	9400	municipality of Bandung	5000
		Regency of Bandung outside the municipality)	800
dairies not affiliated	4000	outside the Regency, particularly Batavia	1700
	<u>13 400</u>		<u>7500</u>

milk surplus a day 5900 litres

Source: based on A.R., Min. v. Kol., 1901-'45, verb. no.3553, 23-3-1935, no.13.

Bandung Central Milk Depot should be continued under municipal direction. A new settlement had to be made with all the mortgagors, and the bankruptcy had to be annulled. Likewise all dairies were to be compelled by the municipality to cooperate. The burgomaster of Bandung requested the Governor General for approval and financial support. On the 27 December 1934 the situation was settled along the lines of the proposals.

Despite hesitation in directly assisting private enterprise, the government had acted favourably. It did not want the milk trade to collapse nor to have a stagnation of the milk supply of West Java.⁷⁹ In 1935 all dairies with more than 10 lactating cows in the Regency of Bandung had to be licensed by law⁸⁰ (see also Appendix 2).

Nestlé's plans however did not materialize. The CCF of Leeuwarden was quite understandably concerned with the idea of a Nestlé participation. It was seen as a typical continuation of Nestlé's policy to acquire interest in dairies in countries with a sizeable tinned milk consumption. Under the device of supporting local dairying Nestlé approached the government for setting up import restrictions. Behind a protectionist wall Nestlé could develop its local milk condensing. Dr Vrijburg tried to get CCF to participate in the Central Milk Depot of Bandung and to set up a local milk condensery. However, CCF considered participation to be unrealistic because of the high price of local fresh milk, the primitive equipment of the depot and the economic crisis.⁸¹ On the positive side CCF advised the Central Milk Depot to transform the organization into a cooperative, to develop close collaboration with the Bandung municipality and to recruit a

good "allround" dairy expert from the Netherlands.⁸²

In other milk producing centres or Java as in Surabaya, people became interested in a Central Milk Depot. A Central Milk Depot Commission of Surabaya was set up and recommended such an institution for the benefit of the government, consumer and dairy keepers, based on the supply of pasteurized milk. Not all dairies were convinced of the usefulness of pasteurized milk.⁸³ Likewise many dairy keepers were suspicious of the idea of participating in a Central Milk Depot.⁸⁴

By the end of the 1930's the small dairies were scarcely economically viable and many disappeared. In view of the difficult situation of dairying in general the government did not want to support any newcomer in this kind of activity.⁸⁵ At a meeting of small farmers and dairy keepers in Batu in 1940, the veterinarian Dr J.H. van den Berg from Malang summarized the reasons for failures in the small dairy activities.

- (1) Mis-management by those with no expertise in dairying, like retired government officials who had no professional skill in this field.
- (2) Cows of a poor quality, often bought out of ignorance.
- (3) Delay in calling upon the advice of a veterinarian.
- (4) Poor book-keeping.⁸⁶

On the political level, in the Volksraad or People's Council, a motion was passed requesting the government to support the dairies.⁸⁷ The government was invited to do this through import quotas of tinned milk, trans-migration of cattle, and technical assistance and extension for the dairy keepers.⁸⁸ The Indonesian member of the Volksraad, Hoedojo, said he was in favour of the motion because of the importance of the Indonesian-owned dairies in Yogya and Solo. He did not see the point of first establishing Indonesian dairies but rather in making better use of the animals they already possessed. In his opinion draught and slaughter animals already gave sufficient milk for home consumption, goat milk being used for Arabs and part of the desa population. Speaking for his constituency, the Principalities, Hoedojo said that the population was making milk products from cow and buffalo milk, dadih, a kind of youghurt, samin, a kind of butter, and minyak samin, a kind of butter oil. The government did not impose restrictions on the import of tinned milk.

However, in 1939 the Veeweide plan was launched for the development of dairy cattle in meadows in the mountain regions in the Province of East Java. However, because of the Second World War, the plan was never executed.

5.4 Alternatives to fresh cow milk

The relative scarcity of fresh milk and a correspondingly high price, caused Europeans to look for alternatives. In the first place use could be made of buffalo or goat milk. This was done, but on the whole Europeans were not very charmed by these kinds of milk.⁸⁹

In the various harbour towns, Arab communities kept the Bengali goats with an average milk production of about 1.5 litres a day.⁹⁰

The indigenous goat and to a lesser extent the sheep could be found all over Java and other parts of the archipelago. These small domestic animals were kept by the poorer households in the rural areas for slaughter. They were also a means of saving money by raising them for sale.⁹¹ In the previous chapter, I have already shown that goat and ewe milk were hardly ever consumed by Europeans or Indonesians. The only goat milk consumers were Arabs. Some efforts had been made to import sheep and goat (Bengali and Etawah) for both meat and milk production. In some places on Java Indonesians set up local stock breeding associations, but as far as milk was concerned these efforts were very limited.⁹² Because of the absence of tuberculosis, goat milk may have served as an attractive food for children. Van der Burg wrote that the aversion of the higher (European) classes to goat milk was not justified.⁹³

Around 1900 in medical circles in the Netherlands, discussions took place about whether or not there was a relation between goat milk as infant food and anaemia. Today we know that this is true⁹⁴) Of course it should be realized that in the Netherlands goat raising (and hence the use of goat milk) was not considered a prestigious activity. In rural areas the only milk-giving animal landless labourers could keep was the goat, often called the "cow of the poor". Because of a European and, in particular, Dutch bias against buffalo and goat milk, these kinds of milk were not included in efforts to develop a local dairy industry in Indonesia.

Those concerned with the local food and nutrition of the population realized that local fresh milk was too expensive to become a basic food. European physicians and nutritionists, brought up in a dairy tradition,

looked for cheap milk alternatives of vegetable origin. The soya bean (Glycine max) was considered as an alternative because of its high protein content and widely used. In the archipelago, particularly on Java, the fermented strong-smelling and tasty soya bean Tempe had been known for centuries. It had been introduced by the Chinese and gradually adopted by the population.

In 1889 the inspector of the Civil Medical Service, Cornelissen, urged the heads of the regional administration in Java and Madura to put more emphasis on the cultivation and use of soya beans.⁹⁵ It was not used as a food for infant feeding. Another soya bean product, soya milk offered better possibilities. Soya milk is a white emulsion expressed from soaked, softened soya beans and has the appearance of milk, which of course it is not. Soya milk was not part of the indigenous cooking and the Dutch probably heard of the trials with soya milk for infant feeding in China. Soya milk was sometimes made in the Chinese communities in the Indies.⁹⁶ According to B.S. Platt the value of soya milk as an infant food had been studied since 1909. It was scarcely ever used in traditional infant feeding in China, and its association with infant feeding started with the efforts of an American-trained Chinese paediatrician to find a substitute for human milk.⁹⁷

The importance of soya beans for the nutrition of the Indonesian population was stressed by Jansen and Donath in 1923.⁹⁸ Ten years later Donath recommended soya milk as a cheap substitute for cow milk.⁹⁹ In the meantime, some small hospitals in the 1930's were already using soy milk as a substitute for cow milk.¹⁰⁰ It is widely used as a supplement in the diet of patients in the hospital of Semarang (Centraal Burgelijk Ziekenhuis). The director of the Hospital, Dr Cohen, was aware that soya milk should not be considered as a milk substitute.¹⁰¹ This point of view was however quite exceptional.

The idea of soya milk as a good substitute for cow milk was apparently so widely spread that in 1935 the Public Health Service issued a warning to its medical officers.¹⁰² The main message implied that soya milk was an excellent protein-rich food but nevertheless had its limitations for infant feeding purposes. It was well suited for supplementary feeding as a good source of protein and B vitamins (B_1 and B_2) and was relatively cheap. Soya milk has however, in comparison with cow milk a number of disadvantages. It is short in fats and carbohydrates, in unorganic salts, and in the vitamins A and D. Another limitation is its often bitter and

tart taste. This can however be reduced and several methods have been developed. The paediatrician de Haas and the nutritionist van Veen were of the opinion that soya milk might be a good source of cheap protein but could not under the prevailing circumstances, be considered as a substitute for cow milk.¹⁰³ In the report of the preparatory committee for the Intergovernmental Conference of Far Eastern Countries on Rural Hygiene in Bandung in August 1937, doubt was also expressed as to whether soya milk was the answer for improving the rural diet.¹⁰⁴

Interest in soya milk as a substitute for cow milk remained. A non-profit organization (the Indische Maatschappij voor Individuele Werkverschaffing) requested the Medical Laboratory in Batavia to do some work in making soya milk more comparable with cow milk. A report on this work was published in 1937.¹⁰⁵ The soya milk prepared corresponded approximately to cow milk. This was done by adding sugar, coconut oil, salt and boiled pawpaw juice (neutralized with calcium carbonate). Because of the vitamin A deficiencies in the Indonesian diet, much thought was given to enriching the soya milk. Experiments were made with good vitamin A or carotene sources such as liver oil, red palm oil and pawpaw juice. Preference was given to pawpaw juice because of its general availability.

As for keeping quality, soya milk is comparable with cow milk. Kept at ordinary room temperature in the tropics it goes bad within 24 hours. The soya milk prepared was considered to be a good supplementary food for young children, but was not be used as a substitute for breast milk. The product was meant to be used in hospitals and health centres. The price compared favourable with cow milk, 4.5 cents as against 25-28 cents for a litre of cow milk.¹⁰⁶

Soya milk did not become a generally accepted product for replacing local fresh cow milk, either by the Indonesians or by the Europeans, despite its relatively low price. From the consumers point of view, the limitations of soya milk were the bitter and tart taste due to the contemporary techniques, the rather lengthy food preparation (milk is immediately ready for consumption), and the absence of a soya milk industry to bring the product to the consumer. Buffalo and goat milk did not become an alternative for local fresh milk either, largely because of a European bias. A real substitute for local fresh milk became imported tinned milk; sweetened condensed milk and in particular sweetened condensed skim milk.

The dairies in the Netherlands Indies were, in the first place, established to satisfy the demands of European consumers and reached only a very small section of the better-off Indonesians and Chinese. What the dairies did not manage to do, the European condensed milk industry did; the bringing of a milk product to more people within Indonesian society.

6. MILK PRODUCTS TO INDONESIA

6.1 Export of milk products to tropical regions

Although condensed milk was originally developed as a product to satisfy the Western European and North American consumer the industry also tried to expand its market into other regions. In the 1880s Nestlé and Anglo-Swiss were already very active in Africa and Asia. The Anglo-Swiss brand of sweetened condensed milk Milkmaid was especially well-known¹. Among the Dutch brands exported to the tropics, Hollandia was the most well known at that time.² To ensure a better position, the new firm Nestlé and Anglo-Swiss Condensed Milk Company established a central office in London. This had several advantages, such as the prospect of preferential tariffs for British goods in the markets of the empire, the lack of import duties on imported condensed milk, and good transport facilities between London and Africa and Asia.

An important development was further the replacement of local sales agents by subsidiaries in 1910. This gave Nestlé a real advantage over other firms such as the Dutch ones which still continued to work with sales agents. Nestlé had set up a depot in Singapore. As a centre for grouping orders and splitting up consignments, it played a major role in oriental markets where depots were opened at Hong Kong, Calcutta, Madras, Bombay, Colombo and in 1913 in Japan.³ On the whole, sales agents were less effective in promoting a particular product as Hepkema found out during his mission for the Cooperative Condensery in the Netherlands Indies in 1930.⁴

By 1900 sweetened condensed milk, evaporated milk and sterilized milk in that order of importance, were being imported into the Netherlands Indies.⁵ There are indications that around 1900 some dried milk-powder may have been being imported into the Netherlands Indies but it could hardly serve as a substitute for fresh milk or condensed milk. Or as a contemporary looked at it:

"A study on different samples of milk-powder gave us the impression that, diluted with water it cannot serve as a replacement for fresh cow milk because an appropriate method of manufacturing dried milk-powder has not yet been found.⁶ One gets a liquid which has the same chemical composition and to a certain extent the same colour, but as far as smell, taste and general appearance is concerned it differs so much

from fresh milk and even condensed milk that one rightly may doubt if milk powder can be destined in normal usage as a substitute of fresh milk.⁷

Throughout the period studied, until 1941 milk-powder had never had any substantial importance in the total milk supply of the Netherlands Indies.

6.2 The arrival of condensed milk in Indonesia

Despite all efforts to develop dairy farming in the tropics, milk remained an expensive food and only available in and around the larger cities. Condensed milk was a good alternative, particularly for those living in the smaller places on Java and in other regions. It is of interest to note that in 1873 the very active firm of Henri Nestlé was already marketing its milk food farine Lactée (a powdered milk based on milk and cereals) in Netherlands Indies.⁸ When condensed milk arrived is difficult to say, but there are indications that it was already used around 1880 by Europeans, especially for infant feeding.⁹

It is surprising that in the period when the techniques of milk preservation in tins were still in their infancy, tinned milk products were being introduced into Netherlands Indies. In 1835 an advertisement appeared in Batavia mentioning a product called "Lait conservé".¹⁰ The Royal Food Preservation Factory J.H. Nieuwenhuis Jr & Co, begun in 1844, sent from Amsterdam to the Netherlands Indies a consignment of foods preserved in tins, among which were 300 tins of milk.¹¹ This was most likely sterilized milk as the Gail Borden method of milk condensing presumably had not yet crossed the Atlantic Ocean. The same firm sent a large consignment of 50 000 litres of milk preserved in tins to the military hospitals of Aceh, Northern Sumatra, during the Aceh War in 1877.¹² Around 1883 most of the condensed milk consumed in the Netherlands Indies was Swiss condensed milk from the Anglo-Swiss company at Cham. Another milk product on sale was Alpenmilch, evaporated milk in tins or bottles from the "First Swiss Alpine Milk Exporting Company" at Romanshorn, Switzerland.¹³

Looking at the price of condensed milk it is obvious that it was a very expensive product, out of reach of the local population (Table 6.1). In 1883 the military pharmacist Cayaux published a rather critical paper in the medical journal for the Netherlands Indies on the use of condensed milk and farine lactée as infant food. He argued that condensed milk was not suitable

for infant feeding.¹⁴ He quoted the instructions of the manufacturer on the label of the tin which said that for infant feeding, the contents should be diluted with 7 to 14 parts water. No further instructions for infant feeding were printed on the label.

"Diluting the content of the tin with 7 parts water will give about 2.5 litres of liquid. This liquid does not even provide half of the proteins and fat which the same amount of fresh milk does".¹⁵

Table 6.1
Prices of condensed milk, local milk and milk food in the main towns of Java in 1883*).

price per container	amount of protein for one guilder
1 tin of condensed milk 450 g f 0.50 (Anglo-Swiss)	112.5 g protein
1 bottle of fresh milk 667 cc f 0.40	102.0 g protein
1 tin of farine lactée 400 g f 1.50	32.0 g protein

Source: based on Cayaux, 1883

*) farming household budget in Java, 38.3 cents a day.

From 1900 on, data are available on milk imports into the Netherlands Indies. Although not yet specified in the different kinds of milk products and only giving the money value and not the actual quantities imported, these figures indicate an increasing demand for condensed milk (Table 6.2). Imported milk products were still chiefly of the Anglo-Swiss Company. The increase of milk imports, and in particular, sweetened condensed milk can be explained by a number of factors.

(1) Sweetened condensed milk had several advantages over fresh milk. It was a relatively safe product, while fresh milk was often produced and handled under unhygienic circumstances whereby adulteration frequently occurred. When closed, the condensed milk tin could be stored for quite some time, whereas in the tropics, fresh milk had a very short shelf life.¹⁶ When the tin was opened, the sweetened condensed milk could be

Table 6.2

The index of milk imports and other European foods, based on import value in guilders, from 1900 till the outbreak of the First World War, Netherlands Indies.

year	1900	1905	1910	1913	
Food	index				import value 1913 in million guilders
	milk	100	172	255	
cheese	100	125	187	197	0.4
butter/margarine	100	115	152	170	3.0
wheat-flour	100	87	168	227	5.8
hard liquor	100	85	113	143	2.7
beer	100	135	175	250	2.5
wine	100	91	111	114	1.5

Source: Centraal Kantoor voor de Statistiek, 1927.

kept much longer than fresh milk. Furthermore, compared with the locally produced milk it was less expensive. However those used to fresh milk didn't like the taste of condensed milk.

(2) The influx of Europeans after 1900 stimulated a further demand for foods coming from Europe. The European community changed from a male-dominated society to one where family life became increasingly important. The European population in the Netherlands Indies increased between 1905-1920 by 74 000 while between 1890-1905 the increase had been only 21 000.¹⁷

(3) The sales activities of agents of the condensed milk industry operating in the Netherlands Indies made a regular supply of milk products possible. These activities were first directed to satisfying the needs of the European community, but later they reached the Indonesian population (Figure 6.1 and 6.2).

Although different sizes of condensed milk tins were put upon the market, the majority had a diameter of 7.5 cm, a height of 8.3 cm and a bruto weight of 0.5 kg.⁸ With the price of the condensed milk at f 0.50 per tin, it is obvious that it was out of reach of the masses of the Indonesian population. The government statistician Sollewijn Gelpke (1880), calculated the annual farming household budget on Java to be f 140.-, or about 38.3 cents per day.¹⁹

6.3 Milk products and the Indonesian population

How and when did these new foods, originally destined for the European consumer, also reach the Indonesian population? The earliest information on the use of condensed milk by Indonesians is reported by Dr van der Burg in his book "The Physician in the Netherlands Indies", published in 1883.²⁰ He writes that during a severe fever epidemic in the Regency of Banten, condensed milk was distributed to Indonesian children when the mothers were too exhausted to breast-feed them. The distributed product was Swiss condensed milk. No information is further given on the reaction of the mothers and children to this new product, nor on who was responsible for the distribution.

Milk products were used by the Indonesians for infant feeding, in tea or coffee, as an ingredient in ice lollies and ice cream, and sometimes as a medicine. This basically reflected the ways Europeans used the various milk products, with one notable exception; not as a drink. As a beverage, milk was only used medicinally. The various ways the milk products were consumed by Indonesians are discussed below.

The major direct use of milk products by the Indonesians was for infant feeding (Figure 6.3 and 6.4). At first sweetened condensed milk was used and later, in the 1930's, the cheaper sweetened condensed skim milk. Evaporated milk remained a product used only by Europeans, in coffee, porridge and puddings.²¹ The poor keeping quality of an opened unsweetened milk product made it unsuitable for the local consumer.

Because they were unacquainted with milk as a food, and because of the high price of milk products in relation to the very low purchasing power of the Indonesian population, condensed milk products did not reach the great masses.

There are several indications that the situation changed somewhat in the beginning of the 1920's.²² Gradually condensed milk found some acceptance among the more well-to-do Indonesians and Chinese and became known as Susu blik.²³ However the consumption of condensed milk was not limited to these few. A study published in 1927 on infant mortality in the East Coast of Sumatra indicated that breast-feeding was widespread among the households of the Deli plantation workers. Nevertheless artificial feeding with condensed milk did occur and even an occasional feeding bottle was noticed. Although not explicitly stated, the reasons for not breast-feeding were mainly death of the mother, illness of the mother, a mother who did not want to take care



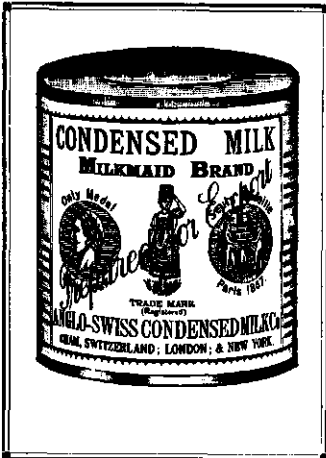
HOLLANDIA-VLAARDINGEN

(1) sterilized full-cream milk



HOLLANDIA-VLAARDINGEN

(2) unsweetened condensed milk



(3) sweetened condensed milk



(4) full-cream and buttermilk

Figure 6.1

Advertisements for tinned milk products aimed at the European consumer. The Hollandia advertisement shows the two major modes of use; as a drink for young children and in tea or coffee.

Source: 1. Nederlands-Indië, no.7, 1930, p.4; 2. Nederlands-Indië, no.11, 1930, p.15; 3. Alg. Landb.W.B1. Nederlands-Indië, no.43, 1925, p.1415; 4. Alg. Landb.W.B1. Nederlands-Indië, no.37, 1925, p.1285.

Als 'n koele stroom vol lafenis...



Zoo gaat figuurlijk gesproken - de Friesche Vlag-melk over Indië. Versche, koele melk uit Holland! Friesche volle melk van het gezonde Friesche vee. U proeft er gewoonweg de room in. En de Hollandsche zon en het Hollandsche groen! Hygiënisch in blikken komt deze melk over zee naar U toe, om U te brengen: veel van de Hollandsche frischheid, veel van de Hollandsche gezondheid!

Kent U onze wedstrijd in het fouten-reeken al? Vraag Uw leverancier om de bijzonderheden. f 2000,- aan prijzen.

„De Friesche Vlag op het etiket. En ook 'n uitspraak die 't bevestigt!”

Gecondenseerde ongesuikerde Vollemelk
(evaporated)

FRIESCHE VLAG

Figure 6.2

Advertisement around 1936 for evaporated milk, a tinned milk used exclusively by European consumers (by courtesy of CCF, Leeuwarden).

of the infant and gave it to a relative, and sometimes because the breast milk was not sufficient to feed the infant.²⁴ Artificial feeding was risky both in the home and in the plantation hospitals. Of the 92 infants below the age of 3 months who died in the hospitals of the Deli Maatschappij between June 1925 and May 1927, 16 had been artificially fed.²⁵

Breast-feeding was universally practised and artificial feeding by bottle, using tinned milk, was rare. However, in cases when the mother died, a grandmother or an aunt cared for the infant and fed it artificially.

Traditionally the caretaker chewed cooked rice and then transferred it carefully to the mouth of the infant. After the arrival of tinned milk, it too was used as an infant food.²⁶ At the end of the 1920's in the Karo-Batak Plateau of the East Coast of Sumatra, industrial products such as tinned milk, tinned sardines and biscuits could be found in the simple shops of remote kampungs.²⁷ Likewise in the 1930's on Java tinned milk could be found in the small tokos spread over the island.²⁸

loetnja, atau terlaloe gampang dapat oleh baji, djadi baji itoe djadi malas mengenoet.

Kalau dot diperiksa seperti jang terseboet tadi, dan kedapatan soesoe teroes keloear bertetes-tetes, maka dot itoe tidak boleh dipakai lagi, haroes teroes diboeang.

Pada oemoemnja baiklah sekali pakai dot doea boeah; satoe jang berlobang ketjil sedikit oentoek 5 menit jang pertama kalau si baji masih koeat merasakan laparnya; soedah itoe diganti dengan dot jang lobang lebih besar sedikit, soepaja bolehlah soesoe dihabiskan dengan tidak baji djadi tjape mengenoet.

Botol-soesoe Nestlé. Perloe sekali botol soesoe dipilih dengan saksama dan selaloe haroes bersih.

Botol soesoe boeatan Nestlé memang sengadja dibikin oentoek mentjoekoopi segala sjarat memberi makan kepada baji. Garrapané dan saksama sekali boleh dibersihkan, sebab tidak ada

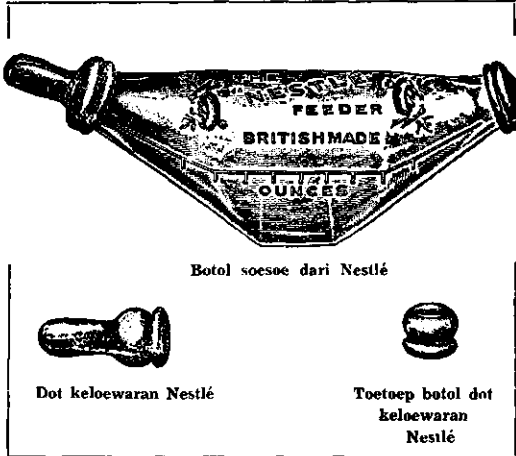
SOESOE „TJAP NONNA“



BOEKOE BOEAT
PERDJAGAAN
DAN MAKANAN
ANAK - ANAK



DIKELOEARKEN OLEH
NESTLÉ & ANGLO-SWISS CONDENSED MILK CO.



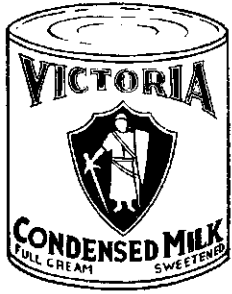
Botol soesoe dari Nestlé

Dot keloewaran Nestlé

Toetoeep botol dot
keloewaran
Nestlé

Figure 6.3

A brochure on infant feeding based on sweetened condensed milk aimed at the educated Indonesian mother (by courtesy of CCF, Leeuwarden).



SOESOE VICTORIA

ja-itoe soesoe (gecondenseerd), dari kaleng, moerah dibelinja, enak dan lezat rasanja.

SOESOE VICTORIA jang patoet bikin anak toean djadi sehat. Mengandoeng bahan-bahan jang perloe boeat badan sehat, seperti garam, vitaminen, proteine, goela, gemoek d. s. b.

Bikinan Negeri Belanda Paling baik boeat anak-anak.



1391

Dimana sadja bisa dibeli.

Importeur: KIAN GWAN.

Figure 6.4

Advertisement for the use of sweetened condensed milk for infant feeding, Sin Po Newspaper, June, 1936 (by courtesy of CCF, Leeuwarden).

DARI SAMPI KE-MANOESIA

adalah djalan pandjang, tetapi boeat Soesoe entjer „TJAP NONNA“ djalan jang aman. Disebabkan oleh teliti dan rapi pembikinannya, saban orang boleh minoem Soesoe entjer „TJAP NONNA“ dengan tidak oesah dimasak lebih doeloe. Oleh sebab itoe Soesoe entjer „TJAP NONNA“, soesoe jang paling baik, jang dimana-mana toean bisa dapat. Minoemlah saban hari

Soesoe Entjer „TJAP NONNA“

Simpem etiket dari blik. boeat dapatkan barang-barang persenan jang bagoes dan berfaedah! Mintalah boekoe tentang barang-barang persenan pada

NESTLÉ, Koningsplein Noord 13, Batavia-C.

Figure 6.5

Advertisement for sterilized milk indicating its use for adults, Sin Po Newspaper, June, 1936 (by courtesy of CCF, Leeuwarden).

The continuing imports of condensed milk created some concern among health authorities. Dr W.F. Donath of the Health Laboratory in Weltevreden, Batavia took the initiative of carrying out a study on the nutritional value of tinned milk and milk-powder (Chapter 7.2). In an introduction to the study, Prof. C.D. de Langen of the Medical School at Weltevreden summarized the various aspects of milk imports as follows:

"The import of milk products is increasing rapidly. This increasing import is not exclusively for the benefit of the European population, but indigenous groups are also using more and more milk for the nutrition of infants and children. Not least is this the case with the ill in the kampungs. Those who have seen and learned to use milk in the hospitals, propagate this later among family and acquaintances. In particular the cheaper condensed milk products have found their way to the population".²⁹

Prof. de Langen urged the government to end free imports of inferior milk products.

The increase in use of fresh milk by the Europeans in the years before the economic crisis of 1929 was not detrimental to the import of condensed milk. This because of the fact that the Indonesians and Chinese began to use the cheaper skim milk products.³⁰ Of all the imported tinned milk products, the sweetened ones were those the most consumed by the local population.³¹ However it was still very expensive. In 1929 a tin of 400 cc such as Milkmaid or Tjap Nonna could cost around f 0.50 in the city of Batavia.³² However, the cheaper sweetened condensed skim milk continued to pour onto the market. The difference in price between the whole-cream and skim milk products was enormous. In 1937 in Batavia a tin of condensed sweetened milk (300 cc) cost around f 0.35 while a tin of skim milk was f 0.13, which meant a difference of 22 cents (See Table 6.3). In a household budget survey carried out in 1937 among labourers of the Batavia municipality, 77% had a daily wage of f 0.30.³³ The price of a tin of sweetened condensed milk was more than this minimum daily wage (105%), while the skim milk products cost less than half (39%). This was of course still high but nevertheless within reach of the better-off Indonesians and Chinese. In the coolie household budget survey, expenditure on prepared rice and delicacies (jajan) have been grouped together. This includes the prepared foods these wage earners bought during their lunch hour. Also included in the item delicacies are outlays

for cocoa, tinned milk, prepared meat, fish, vegetables, and bottled drinks (lemonade and the like). Workers with a daily wage of f 0.30 spent on a monthly basis, f 0.13 on rice and f 0.89 on delicacies which may have included some tinned milk. Further it is of interest to note that households lived primarily on credit, with an average of 63% of wages going to landlords and warung-keepers in payment of debts.³⁴

Milk products had also gained some acceptance for use in tea and coffee.³⁵ As with infant feeding, first sweetened condensed milk was used and later the cheaper skim milk. In a report to CCF in the Netherlands, the sales representative of Internatio in Batavia referred to the dual destination for sweetened condensed milk; as food for Indonesian and Chinese children, not only infants, and, particularly on Sumatra, for use in coffee and tea.³⁶ The well known brand of Nestlé Tjap Nonna still dominated all markets. The report mentioned that some success had been made with skim milk destined exclusively for the Indonesians for coffee or tea as well as for the preparation of puddings and ice creams.

In the town of Palembang on Sumatra, sweetened condensed milk found its way to the bigger and smaller restaurants where it was used in coffee or tea. The clients of the bigger restaurants were Chinese traders, Indonesian taxi drivers, and those with some income who were in a position to drink coffee or tea several times a day. The more educated Indonesians, traders and office clerks did not visit these restaurants, but took their food and drinks at home. Skim milk was largely used for the making of ice creams and the rest for coffee or tea in small restaurants.

"The visitors consist of Chinese and Indonesian coolies; in any case the lowest and poorest class of the population. It is out of the question that these people can read newspapers. However, they are generally very well aware of the different brands on the market and their prices. Among themselves there is much discussion about food and drinks".³⁷

A small part of the skim milk used in the household was for the preparation of kwe-kwe³⁸ and sometimes for use in tea or coffee. In 1937, Hughes, the export manager for CCF gave a vivid description of a coffee shop.³⁹

"Palembang is a town with one coffee shop after the other, and behind the counter of the shops the cheaper brands. ... I have once checked how the coffee shop operates. The coffee is poured into a cup and with a skillful gesture a scoop of milk is thrown into it by means of the well-known Chinese spoon of stone. This explains why the coffee shops of Palembang need to have a thick kind of milk. When he (the coffee shopkeeper) has a thin kind of milk, it will run too fast from the spoon so he is obliged to add some more. I have calculated that the man gets at most two scoops from a tin of 14 oz. In most of the coffee shops such a cup of coffee costs 5 cents, of which the milk will cost him 2.5 cents. The average coffee shop uses 3 to 4 crates a months, the bigger ones even 10 or more. People are very much attached to the brand Teapot".⁴⁰

Table 6.3

Price of milk products and fresh milk in cents in Batavia in 1937/38.

milk product	amount	price*
sweetened condensed skim milk	1 tin 300 cc 397 g	f 0.13
sweetened condensed milk	1 tin 310 cc 397 g	f 0.35
evaporated milk	1 tin 410 cc 454 g	f 0.20
fresh cow milk	1 litre	f 0.25

Source: based on Donath, 1938, p.1259.

* In a household budget survey carried out in 1937 among labourers of the Batavia municipality seventy seven percent had a daily household expenditure of f 0.30 (Van Laanen, 1979, p. 138)

Likewise many coffee shops could be found in the coastal places of Kalimantan, particularly in the Pontianak region. The turnover of sweetened condensed milk was higher in the coffee shops than in the warungs.⁴¹ On Java however, there were fewer coffee shops and the population almost exclusively drank black coffee.⁴²

Milk also found its way to the Indonesian consumer by means of ice lollies and ice cream. In this form however, the consumers hardly realized that milk was a major component. The making of ice cream in the tropics was of course connected with the development of ice making machines. It is likely that ice cream was already being made after 1846 when for the first time natural ice was imported from the United States.⁴³ At the end of the 1870's ice factories could be found in the major Javanese towns. Ice water became a popular drink among Europeans, and Indonesians living in and around the towns also began to appreciate it. In actual fact it replaced the water coming from the traditional cooling jars.⁴⁴ In this period, for those of the Indonesians who could afford it, ice cream found some acceptance. However, until around 1935, the most popular form in which the population consumed ice was to buy from the tukang-es, for the price of 1 cent, a glass filled with grated ice on which a kind of syrup was added.⁴⁵ This was gradually replaced by another product, the ice lolly. This was a mixture of water and sweetened condensed milk, and in order to make it more attractive, a colouring was added. The mixtures were put into tubes of glass or metal together with a bamboo stick, and were frozen. The ice lollies were made by small enterprises with a daily production of 3-5000. They were packed in large tins and sold by vendors in the kampungs for 1 cent each.⁴⁶ In a large town such as Surabaya, besides a modern ice cream factory, some fifteen small enterprises could be found with a production capacity each of 3500 lollies a day.⁴⁷ The total consumption of ice lollies for Surabaya was estimated at 100 000 a day.⁴⁸ Ice cream remained expensive (5 cents for a scoop) and was consumed only by the Europeans and the better-off Chinese and Indonesians in "ice palaces" or from ice cream barrows.⁴⁹ In order to reduce the costs of ice cream making and ice lollies, sweetened condensed milk was used instead of fresh milk.⁵⁰

In some instances milk products were utilized as a medicine. This was so in the Chinese communities where sterilized milk was popular for this purpose (see e.g. Figure 6.5). In a report from Internatio it was mentioned that sterilized milk was used as medicine by old and sickly Indonesians and Chinese, the brand Milkmaid (Nestlé) being well-known.⁵¹ Chinese attributed to Milkmaid the property of a purge while Indonesians gave it other miraculous properties. Chinese and sometimes also Indonesians kept sterilized milk in their homes as an Obat (a household medicine).⁵²

What was the level of consumption of the different kinds of tinned milk

by the Indonesian population? The available data are limited. From 1928 onwards the Statistical Office collected data for Java and Madura and the outer provinces on the imports of sweetened condensed milk, evaporated milk, sterilized milk and other milk products. The figures show an increase in the total imports of tinned milk until 1930, then a decline, but after 1933, a steady increase. In 1938 more tinned milk was imported than ever before (Table 6.4). At the same time there was a shift away from the more expensive sweetened condensed milk to the cheaper sweetened condensed skim milk (Figure 6.6). In 1928 the share of sweetened condensed skim milk was 15.2% of the total tinned milk import; by 1938 it had increased to 47.8%. The import of this skim milk product rose from 2.1 million kg in 1929 to 8.1 million in 1938 (Table 6.4).

The economic crisis of 1929 also deeply affected the economy of the Netherlands Indies. It caused a decline of income and even the total money circulation declined. Hence a demand for the cheaper sweetened condensed skim milk is not surprising. According to de Haas, the price of sweetened condensed skim milk in 1935 dropped to about 1/3 of the price prevailing in 1928.⁵³ De Haas would have welcomed such a price decline for other kinds of tinned milk products, but not for an inferior one. As a paediatrician he was concerned with the problem of "ignorant" people who were induced into buying a skim milk product on account of its low price, under the impression that it was a cheap milk, while in reality it was more like sugared water. As far as regional distribution is concerned, of all tinned milk imported, 36% was destined for Java and Madura. In the beginning of the economic depression this rose to more than 40%. Although 68.7% of the total population was living in Java and Madura (and 80% of the European population), 64% of the tinned milk went to the outer provinces.⁵⁴ This high proportion of imported tinned milk products to the outer provinces cannot only be explained by the presence of Europeans there and by an inadequate supply of fresh milk. Sumatra, and in particular the east coast with its plantations and smallholder cultivation of cash crops, was a major importer of food. Estate labourers and smallholders were very dependent on a money economy for their food supplies. They were used to having to buy food and they formed part of a rapidly changing society. This society was very diversified and was made up of Javanese, Chinese, Indians and Europeans as well as the local population.⁵⁵ As a result people were confronted with new ideas and commodities and had a little money to spend.

From the available data on imports it is not possible to conclude how much tinned milk was used by the Indonesian population. I have already concluded that of all kinds of tinned milk, Indonesians consumed sweetened condensed milk especially sweetened condensed skim milk. On average, 70% of the sweetened condensed milk was imported into the less populated outer provinces (Table 6.5). This may suggest European clientele, as fresh milk was scarce. On Java, compared with the outer provinces, dairy farming lessened the need among Europeans for tinned milk. On the other hand, more skim milk than full-cream milk was imported into Java. This may indicate that skim milk was in demand by Indonesians. It confirms the reports by nutritionists and health personnel on the increasing use of skim milk by the Indonesians. A report in 1930 stated that about 75% of the imported condensed milk was used by Indonesians and Chinese.⁵⁶

This estimation is probably too high. Looking at the availability of tinned milk per caput a year for the total population of the Indies in 1930 this was 0.249 kg and in 1938 around 0.262 kg.⁵⁷ As far as the consumption of fresh cow milk is concerned, the availability per caput a year was 0.448 litre and around 0.455 litre in 1935 and 1938 respectively. Taking into account that most of the fresh cow milk was consumed by Europeans, the per caput availability for the European community in 1938 may be estimated of 124 litre or 0.340 litre per caput a day. In 1936/38 in the Netherlands, the availability of milk per caput a day was as high as 0.450 litre.⁵⁸

Hardly any food consumption data are available on the use of tinned milk by the Indonesian population. Initiated by J.J. Ochse and G.J.A. Terra of the Horticulture Service (Tuinbouwkundige Dienst) of the Department of Economic Affairs, a start was made with food consumption studies. The first survey began in 1931 in Kutowinangun, in the Regency of Kebumen. It was found that among the rural population the total value of food consumed was less than 3 cents per person a day, selametans and all sorts of snacks and in-between meals included. The findings of the study gave no reason for unqualified optimism, the margin between income and expenditure for food being very small.⁵⁹ Donath who did work on the analysis of the nutritional value of the food consumed, made some comment on milk products and the Indonesian population. During the period of the survey no use of milk was found. Donath mentioned that in the towns, the cheaper sweetened condensed skim milk was used by the indigenous society not only for infant and child feeding, but also during the care of the ill. The use of tinned milk was

Table 6.4

Import of milk products to the Netherlands-Indies in 1000 kg, 1928-1938.

kind of milk products	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
sweetened condensed milk	10 424	10 888	9494	7241	5544	4911	4800	4948	4914	6011	6309
sweetened condensed skim milk	2127	3089	3331	3356	3560	4461	5548	5843	6251	9560	8198
evaporated milk	1453	1894	2332	2418	1988	1896	1942	1945	2086	2468	2635
total tinned milk	14 004	15 871	15 157	13 015	11 092	11 268	12 290	12 736	13 251	18 039	17 142
sterilized milk	5345	5742	5167	3944	2181	1959	1908	2005	1601	2138	2364
milk-powder, butter milk, milk foods	317	322	359	346	243	256	205	245	330	325	357

Source: based on Centraal Kantoor voor de Statistiek, 1928/'38.

Table 6.5

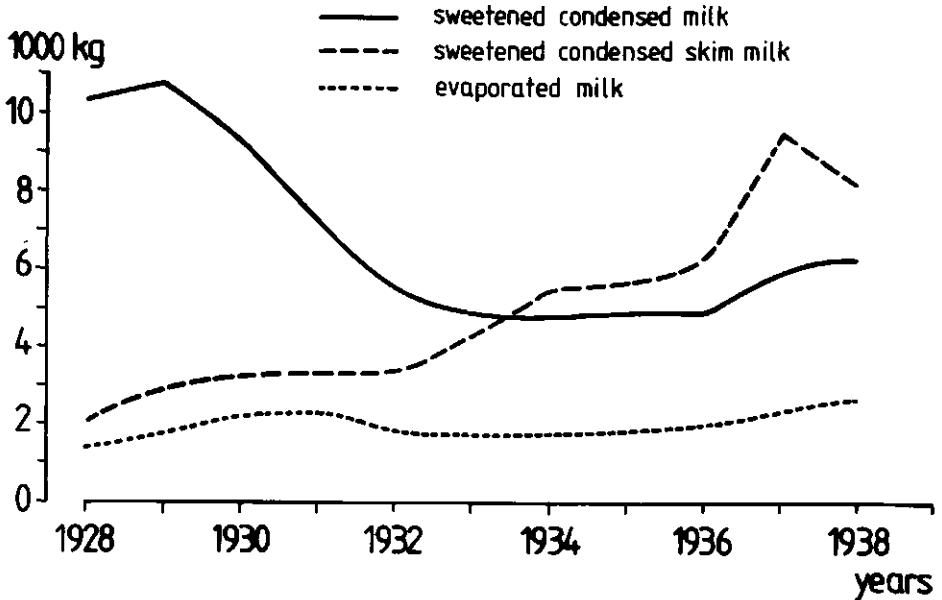
The import of tinned milk to Java between 1928-1938 expressed in percentage of the total imports of tinned milk to the Netherlands Indies.

kind of tinned milk	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
sweetened condensed milk	30.3	30.8	30.7	34.2	32.5	29.4	27.2	25.9	23.8	19.7	21.4
sweetened condensed skim milk	43.8	40.1	37.0	41.2	44.0	46.7	43.6	46.6	43.3	36.1	41.8
evaporated milk	67.7	63.8	66.6	65.5	60.0	60.0	58.4	58.1	58.3	56.5	55.6
all tinned milk	36.2	36.5	37.6	41.8	41.4	41.3	39.6	40.3	39.4	33.4	36.3

Source: based on Centraal Kantoor voor de Statistiek 1928/'38.

Figure 6.6

Import of tinned milk to the Netherlands-Indies in 1000 kg, 1928-1938.



Source: based on Centraal Kantoor voor de Statistiek, 1928/'38.

much more extensive than was generally thought to be the case. Further, it was mentioned that in the distant past milk had already been used by "sons of this country", referring to the Javanese poem, the *Nitiçãstra*.⁶⁰

In the 1930's, several food consumption surveys were carried out in rural areas but milk products however were not recorded.⁶¹ The use of these must have been confined largely to the cities. In the Batavia expenditure survey, milk was listed as an item. During a session of the *Volksraad* in 1940 on the question of sweetened condensed skim milk, a government representative quoted an unpublished report prepared by the physician Maria J. Otten-van Stockum.⁶² According to this report an average of 2.9% of infants in the

town kampungs were artificially fed. Of all infants, 0.24% received sweetened condensed skim milk instead of breast milk.

6.4 How to reach Indonesian consumers

How did milk products reach the Indonesian population? This happened through those Indonesians who had close contact with Europeans; such as those employed by the colonial government and private industry, those employed in office work and/or having received some form of school education. As was mentioned before, the better-off Indonesians and Chinese were the first to use milk products, and were later followed by some of the less well-to-do. The spread of some European habits and commodities and their gradual acceptance by the Indonesians manifested itself first in the towns.

As in most of present Third World countries towns are the places where the legacy of the colonial past and the indigenous culture meet each other.⁶³ Although urbanization was less than that in Malaya and Singapore, and also rather less than in the Philippines with its primate city of Manila, Javanese urban development in the context of overall economic growth was certainly not inconsiderable. In 1930 the urban population of Java and Madura amounted to 8.9% of the total population.⁶⁴ In search for centres of effective administration and trade, colonial powers established themselves in already existing settlements or founded new ones. In the Netherlands Indies these were considered at the beginning of this century as "western enclaves", with European burgomasters and municipal councils with a European preponderance.⁶⁵ Compared with British India for instance, where from 1872 onward, regional and town councils were created, decentralisation and the creation of representative councils in the Netherlands Indies was a rather late phenomenon. In accordance with the decentralisation law of 1903, three townships on Java acquired municipality status in 1905 and in 1906, twelve others followed. In 1907 and 1908 eleven of the twenty Residencies on Java were given their own regional councils.⁶⁶

The municipal councils, usually based on the Dutch model, were authorized to administer the town. This included construction and maintenance of roads, provision of a safe water supply and sewerage, and the running of slaughter houses and market places. Care for the spiritual and material interest of the Indonesian masses in the town was an area hardly touched by the municipal council.⁶⁷ The majority of Europeans as well as foreign orientals

like the Chinese and Arabs, lived in the towns.⁶⁸ Nevertheless, Europeans made up not more than 10% of the population, Bandung, with 12%, being the only exception. It was in the towns that a new modern Indonesian elite gradually developed; intellectuals and a middle class.⁶⁹ Commodities from overseas including food stuffs were imported by the towns for local consumption and also for further distribution to the interior. In the towns, and of course particularly in the capital city of Batavia, offices of trading companies and major stores could be found. With the further growth of the towns at the end of the 19th century, expansion took place along the main roads leading to the rural areas, resulting in a ribbon development. Rural *kampungs* became absorbed into the towns. Along the main roads Chinese traders established their *tokos* and Indonesians their small *warungs*. Because of their favourable situation, the junctions were much preferred as sites by the Chinese *toko* keepers. Likewise the *pasar* or market, and to a lesser extent, street vendors became sales outlets for imported commodities.⁷⁰

Who were the Western-educated Indonesians who formed the modern middle class and elite? Within the framework of the ethical policy, after 1900 a modest start was made in the field of education. Originally education was viewed by the government as a means for westernization and assimilation. After the 1920's, a more conservative view dominated; western education for the Indonesians should depend in the first place on the needs of the government and private sector for western-trained personnel.⁷¹ In 1907 the *desa* school or Volksschool was created, offering a period of three years of primary schooling with the local language as medium of instruction. The Volksschool was meant for the benefit of the masses. In 1940, about one-third or two million of children of school age attended these schools. It should be realized however, that only a minimum of teaching was considered necessary.

Of more importance were the Dutch-Indonesian (1915) and Dutch-Chinese schools. Here the language of instruction was Dutch. These schools offered a modern education and laid the foundation for a small but well-trained new elite. From here young people could continue with secondary school education. In 1920 a start was made with training at university level with the creation of a Technical Faculty in Bandung, followed by a Law Faculty (1924), and a Medical Faculty (1927), both at Weltevreden in Batavia.⁷²

Indonesian families were very interested in these new educational possibilities for their children. They did not come only from the priyayi group, but also from less prominent families. Many had to make great sacrifices so that their children could study.

What was the effect of western education on the social structure? Dumasy (1980) who is rather sceptical of the good intentions of the Netherlands Indies educational policy has come to the following conclusions.

- (1) At village level, the traditional authority structure was eroded. The schoolteacher emerged next to parents as a new authority. Even the village religious officials were hurt. For instance, in the 19th century these officials had been employed by the government as vaccinators, while in the 20th century this role was taken over by the schoolteacher. Likewise education for girls, although modest, caused changes in outlook on the position of women.
- (2) The different forms of higher education created more radical changes. School leavers gradually formed a new elite, not based primarily on descent or birth like the priyayi, but a class of modern-trained people based on individual achievements.⁷³

The number of Indonesians enrolled in schools giving a western education grew from a 3000 in 1904/05 to 54 000 in 1920/24 and to 100 000 in 1940.⁷⁴ It was not easy for the western-educated Indonesians to get suitable jobs as they were subject to discrimination in favour of the Dutch. Few Indonesians were in a position to get a post in the civil service higher than the rank of a clerk. It is interesting to note that as a reaction to the Dutch administration and the development of a national consciousness, various Islamic and nationalistic groups created their own form of formal education. The western-education did not result in the creation of a group of modern Indonesian entrepreneurs. A government survey carried out in 1928-1929 in urban areas showed that less than 2% of the western-educated Indonesians were self-employed and over 83% worked for wages with the Netherlands Indies government and to a lesser extent with Dutch and other western enterprises.⁷⁵

As far as the purchasing power was concerned, in 1939 the number of Indonesians with a yearly income of between f 200 and f 900, was 562 000 and those with a yearly income above f 900, 36 000.⁷⁶ Of a total population with more than 59 million, it is a relative small number but for the modern western and of course Japanese industry, still an interesting market. In

1937 most labourers in the Batavia municipality had a household expenditure of f 123.- a year.⁷⁷ The economic and educational expansion of the Dutch after 1900 resulted in an increase in the circulation of money all over the archipelago. It opened up possibilities for marketing and for the exchange of goods at a longer distance with a greater variety of products to be bought and sold by Indonesians.⁷⁸

The spread of tinned milk in the Indonesian society took place through two main change agencies.

- (1) Through hospitals and clinics using milk and milk products for infant feeding and medical care;
- (2) Through the marketing activities of the agencies and sales offices of the condensed milk industry of Western Europe, North America and also of nearby Australia.

6.5 Child Care Centres and Milk Kitchens

Medical care in the Netherlands Indies for the indigenous population was for a long time restricted to efforts to eradicate endemic diseases such as small pox, malaria, framboesia and lepra. In the early 1920's a change took place and the public health service began to pay attention to maternal and child health care (Figure 6.7 and 6.8). Infant mortality was very high. De Haas refers to a figure of round 300‰ for 1936. In urban environments infant mortality within the first six months was 3.3 times as high as in the second six months of life.⁷⁹ Another estimation shows that of all infants born alive, 50% died before reaching the age of five.⁸⁰

The socio-medical interest in mother and child care first occurred in the towns of Java. Somewhat later, medical authorities and the management of the estate companies in East Sumatra showed interest in it for the families of the plantation workers.⁸¹ This is not surprising as in the 19th century modern hospitals were set up in the first place to meet the needs of Europeans, usually in the major places of European residence.⁸² On the other hand, it was the missionaries, who while working with the population, became concerned with health problems. Through medical missions, efforts were made to provide modern medical care for the population at least in the areas covered by the mission societies.⁸³

Hygienic centres and child care centres (consultatie bureaux) were set up in major towns on Java. Although these made quite an impressive start, the majority of the population was still not being reached by modern medical



Figure 6.7

Weighing of infants in a Hygienic Centre (Nationaal Rapport, 1937).



Figure 6.8

A demonstration barrow of the Department of Public Health (Nationaal Rapport, 1937).

care. In 1936 in Batavia, a city of around 750 000 inhabitants, nearly two-thirds of the confinements took place under the guidance of a midwife. But at the same time the Indonesian population showed great interest in the child care centres. Education was provided for mothers in the field of infant feeding and health. The importance of breast-feeding which, in contrast to European women, was universally practised, was always emphasized.⁸⁴ In Batavia, the largest city of the archipelago, about 90% of Indonesian infants were breast-fed during their first year.⁸⁵ In the town of Semarang, Otten-van Stockum estimated that 4-5% of the infants received artificial feeding, while in rural areas this may have been as low as 2%.⁸⁶

A major problem however remained. What should be done if breast-feeding failed or if the mother died? Wet-nursing proved to be a difficult alternative as many women disliked taking care of another infant in such a way. Instead, infant foods like gruels or porridges of mashed rice and banana were given. Problems of hygiene and insufficient proteins meant that the chance of survival was low. In view of this, hospitals and later on the child care centres began feeding infants on milk products and, if available, sometimes also on fresh milk. Apart from a medically felt need to start with milk feeding, there was also another factor involved. For the Europeans, especially the Dutch, milk and milk products were considered as essential foods for infants and young children. In the various studies and reports on dairying and milk in the tropics, writers often expressed regret that milk was not a common food among the Indonesian population and that the possibilities for well-developed local dairy farming were limited.

In this context it is not surprising that European physicians, confronted with problems of breast-feeding, followed the example of the consultatie bureaux in the Netherlands by making use of milk carefully prepared in the Melkkeukens or milk kitchens. As in the Netherlands priority was given to breast-feeding. By the end of year 1910 some milk food was being given to infants in the city kampungs of Batavia.

"Moreover, milk was provided free of charge by the public health service in case the mothers were not themselves able to give children the breast. As the children receive free milk for 7 or 8 months this could, on account of the expense, only be given to a limited number. My efforts to induce mothers to fetch their milk from the native maternity hospital - Budi Kemuliaan - which has lately been founded, against a

payment of only 15 to 20 cents per day, have so far failed. Some did not want to spend one cent for it, others again did it for one week, but in the long run found the distance too far".⁸⁷

Needless to say the author of the report completely underestimated fully the low purchasing power of the mother to buy milk food on a regular basis.

In general, sweetened condensed milk diluted with water was used for infant feeding. When around 1918 the evaporated and thus unsweetened milk appeared on the market in the Netherlands Indies some physicians began to use it.⁸⁸ When diluted with 2 parts of water, it came close to the value of fresh cow milk. Milk however is a difficult product to use under tropical conditions as it deteriorates quickly when it can not be kept in a refrigerator or ice box. In order to overcome these problems, some physicians began to use buttermilk and particularly sour milk. This was done in accordance with the food habits in some parts of the Netherlands where buttermilk was used for infant feeding.⁸⁹ Buttermilk, which is the acid by-product from the churning of sour cream into butters, is much more easily digested by young infants than is milk. For a long time the reasons were thought to be found in the working of the lactic acid bacteria, the fine flocculated casein or the low fat content. In 1923 the American Malliot showed that the digestibility of milk was related to the pH of the stomach. In a hot and humid tropical climate buttermilk and soured milks have the great advantage that they can be kept for about 24 hours. However, the very limited scale on which butter was prepared in the Netherlands Indies meant that fresh buttermilk was scarce and very expensive, so only sour milk could be used. For infant feeding there were two options open.

- (1) to utilize the imported condensed buttermilk of Nutricia (see Figure 6.1 (4)) or buttermilk powder (Eledon of Nestlé). This was however a rather expensive way to feed a large number of infants.
- (2) to make a sour milk product from locally available material (locally produced fresh milk, imported evaporated milk, milk-powder).

A disadvantage, however, of buttermilk is that with the process of churning, much of the fat is removed and consequently also the fat soluble vitamins A and D. The traditionally prepared buttermilk is therefore less suitable as an infant food.⁹⁰ In sour milk however, the vitamin A and D level can be much better maintained as this product can be prepared from various combinations of full-cream milk with partially skimmed and skim milk.

Del Baere and Straub were the first to introduce sour milk for infant feeding in Deli, on the East Coast of Sumatra, in the late 1920's. This example was followed by de Haas in 1930 in the Batak hospital in Kabanjahe.⁹¹

The milk kitchens of the clinic of the medical school in Weltevreden under the guidance and supervision of Dr de Haas were well known. It was Dr de Haas who introduced sour milk feeding on a large scale, when faced with the problem of how to bring it to infants of poor families.⁹² Preparation of milk at home for infant feeding was impossible in view of the poor economic and hygienic circumstances. Another problem was how to instruct the mothers to use the exact quantities required. Preparation under well-controlled conditions and distribution from a central kitchen was the only responsible and realistic approach. The main ingredients were full-cream and skim milk-powder, sometimes evaporated milk and later buttermilk powder.⁹³ Fresh milk was used less because of its high price and poor quality.

In the distribution of sour milk there was a shift from full-cream to half full-cream sour milk, probably because of the need to economize. The milk was soured with lactic acid, citric acid, with lemon or orange juice. Then it was carefully put into cleaned bottles with a lightning stopper. From the central milk kitchen the bottles were transported by van to the different Consultatie Bureaux in the city. There the bottles were handed out with the necessary instructions to the mother. Empty bottles had to be returned and then sent back to the milk kitchen for cleaning and re-use. The milk kitchen was not financed from the regular budget of the Medical School and not all staff members were convinced of the importance of infant care in view of other health problems.⁹⁴ The costs of the sour milk and of the personnel of the milk kitchen had to be covered by fees paid by better-off customers. The poorer mother paid a symbolic price.

According to de Haas, in those areas of Indonesia where sour milk or Susu asam was distributed, it was accepted both by the mother and infant. As far as the extent of sour milk distribution is concerned, the following estimations have been made for Batavia at the end of the 1930's. Out of the 20 000 infants born each year, about 3000 were covered by the Consultatie Bureaux. On medical indications more than 500 infants (or 16.6% of the infants covered) received whole or partial sour milk feeding from the milk kitchen.⁹⁵ Generally speaking an infant received 750-800 cc of sour milk a day (Table 6.6).

Table 6.6

Kinds of sour milk distributed from the milk kitchen, Medical School in Weltevreden, to the Consultatie Bureaux of Batavia.

	partial skimmed sour milk per litre	full-cream sour milk
energy	705 cal	700 cal
fat	1.5 %	2.5 %
protein	3.4 %	2.3 %
lactose	3.8 %	3.3 %
lactic acid	0.6 %	0.6 %
ash	0.7 %	0.5 %
water	83.5 %	84.8 %
sugar	5.0 %	4.5 %
flour	1.5 %	1.5 %

Vitamins A, D and C were added by means of cod liver oil and ascorbic acid. Source: de Haas and Meulemans, 1940, p.64, 69.

One of the Consultatie Bureaux distributing sour milk from the Medical School's milk-kitchen belonged to the hygienic centre of Tanah-Tinggi.⁹⁶ This was situated in the eastern section of central Batavia, in the Senen sub-district of Weltevreden. The town quarter had about 25 000 inhabitants and the most easterly part still had a fairly rural character.⁹⁷ On the whole however, it was a densely populated area with overcrowded housing and infant mortality as high as 310.2‰ for the years 1938/40.⁹⁸ The sour milk was handed out under supervision to mothers of eligible infants living in the area. Depending on the living circumstances of the mother this was done at cost price, or at greatly reduced prices or even for nothing. Those eligible for sour milk were the infants who were not being breast-fed, or for whom breast-feeding was insufficient because of the illness of the mothers. A financial contribution from a provincial charity committee made this possible.⁹⁹

Information on the use of milk and milk products as part of infant care in other areas is scanty. As I have already said, in the major towns of Java hygienic and child care centres had been set up from the 1920's onwards and later medical authorities and the management of the estate companies showed interest in the families of the estate workers.¹⁰⁰ In most of these institutions generally speaking milk was used on medical indications.¹⁰¹ It was not only used in hospitals, polyclinics and the Consultatie Bureaux for infant feeding as such, but likewise for the treatment of cases with

xerophthalmia. An official report prepared by the Public Health Service in 1937 said that xerophthalmia, keratomalacia and nightblindness were to be found in many places in the archipelago. Research on vitamin A levels in blood and urine indicated these levels were low. It is not unlikely that hypovitaminosis A also occurred very frequently.¹⁰²

Xerophthalmia occurs most commonly in young children and is frequently associated with protein-energy malnutrition. In 1938 the physician Otten-van Stockum wrote that xerophthalmia is practically always associated with a more or less serious degree of malnutrition. She mentioned that a large number of young children suffering from vitamin A deficiency were artificially fed. She was of the opinion that it was wishful thinking to hope that an adequate nutrition would be within the financial reach of the population in the near future. Here only guidance and well-controlled milk distribution would be of use.¹⁰³

Various reports indicated that foods containing vitamin A such as milk, egg, codliver oil or liver were used to cure patients.¹⁰⁴ In the William Booth ophthalmic hospital in Semarang for instance patients were treated with fresh cow milk, eggs and liver. In the 1920's evaporated milk (Viking brand) was used in the hospital. The physician Dr Wille was very much in favour of evaporated milk as it was sterile and could be mixed with 2 parts of boiled water to get a normal full-cream milk. The Glaxo products, he wrote, were also excellent but more expensive.¹⁰⁵

Data collection by the milk kitchens in Batavia showed that infants grew well on the sour milk.¹⁰⁶ When a child reached the age of one, or perhaps a little later, it was no longer eligible for a supply of sour milk. For the poor household, it was very difficult to replace the sour milk by other protein rich foods. In the only existing bureau for toddlers in Batavia, which was also connected with a consultatie bureau, a relapse in weight of the toddlers was observed. Improvement in the nutrition of toddlers from the poor kampung population seems to have been more difficult than improving the nutrition of infants.¹⁰⁷

It is striking that when dealing with vitamin A deficiency, so much emphasis was placed on expensive foods such as milk, eggs or liver. This was probably not only because of an ethnocentric approach by the physicians, but was also due to a lack of knowledge of Indonesian foods as possible alternatives. Studies carried out in Europe and America by Steenbock and others discovered in the beginning of the 1920's that a vitamin A precursor

or provitamin (carotene) was widely distributed in yellow fruits and vegetables.¹⁰⁸ It took some time before this new knowledge became widespread in medical circles. Good sources of vegetable origin of vitamin A are paw paw, mango, yellow sweet potatoes and dark green leafy vegetables.

The extents to which the milk kitchens operated created some uneasiness in the condensed milk industry as is reflected in this account written in 1937.

"Attacks on tinned milk are carried out on Java by physicians. In all places of any importance infant clinics can be found. All these consultatie bureaux, the clinics, the hospitals, the government hospitals, all these institutions propagate fresh milk for infant feeding. Nearly all these institutions have a milk kitchen. For a few cents the Indonesians and Chinese can buy in the kitchen a small bottle of milk.

... The medical world on Java is perfectly organized and has set out to reduce the mortality rate and considers consultatie bureaux and education of the population as THE means for that purpose. One has informed me that the organization is still in its infancy. In the bigger places an organized propaganda service of mantris can be found who visits the desa and stimulate people to visit the clinics".¹⁰⁹

Summarizing, one may conclude that milk as part of infant care was practised by medical staff in the Netherlands Indies when breast-feeding failed or was insufficient. This happened especially after 1920, when the medical authorities started to emphasize mother and child care. The importance of breast-feeding as the best way of feeding the infant was always stressed. As mother and child care centres emerged first in the towns, milk feeding was mainly an activity in the urban and peri-urban areas.

For reasons of completeness, I would like to refer to a school milk feeding programme at the end of the 1930's in several European primary schools in Indonesia. It originated out of a concern for the living conditions of children from poor European families. Fresh milk or condensed milk was distributed to the children with some bread, a banana and in some schools with a hot meal.¹¹⁰ A school milk committee was set up under the

responsibility of the Department of Agriculture. This was done by C.H.W. van der Ven, until 1935 head master of a private Dutch-Indonesian school in Pematang Siantar (Sumatra).¹¹¹

6.6 Marketing activities of the condensed milk industry

The Netherlands Indies was dominated by a Western capitalist economic system based on plantations, import and export firms, transport companies and after the First World War, also by some industrial enterprises.¹¹² Nearly all these enterprises were run by the Dutch and other Europeans and the position of the Indonesians was that of labourer or office clerk only. For the Indonesians this meant a nearly insuperable obstacle to participation as an entrepreneur in modern economic activities. They were limited to those activities for which the Europeans showed no interest and where some competition could be given to Chinese traders.¹¹³ This reduced the Indonesian entrepreneurs to the position of small petty trader or artisan. Trade above the village level on Java and in other parts of the archipelago was controlled by the Chinese, and sometimes also by Arabs and Indians. At the beginning of the 20th century the old established system of self subsistence and mutual assistance of the Javanese economy had made way for a money economy.¹¹⁴ Schrieke (1929) wrote that the traditional mentality was gradually being broken under the influence of the opening up of the country, the introduction of the monetary system and the cultivation of commercial crops. The spread of the monetary system was aided by the necessity for paying taxes in money and by the fact that all new needs created by contact with the outer world could only be satisfied with money.¹¹⁵

The import and export of commodities was fully controlled by European firms, while the wholesale and retail trade was in the hands of the Chinese.¹¹⁶ Despite their predominant position in the retail trade on Java the Chinese had met already strong competition from Indonesian traders and Indonesian cooperatives before the 1930's. An example of this is the Sarekat Dagan Islam or Islamic Trade Association in Solo which was established in 1911.¹¹⁷

During the economic depression of the 1930's Japanese importers, traders and toko keepers managed to exclude much of the imported European commodities such as cottons, artificial silk, furniture, lamps, glassware,

pottery, metal ware, nails and bicycles from the local market. The population, stricken by the economic crisis, was of course very receptive to the low priced Japanese commodities. An intimate knowledge of the local market and the psychology of its buyers also played a role.¹¹⁸ Their approach was very successful. Instead of leaving retail distribution to the Chinese, as the European import firms did, they opened shops all over the country and employed Indonesian salesmen.¹¹⁹

The Japanese, a people with no tradition of milk usage, even sold Japanese-made milk products in their tokos. However their role in this field remained insignificant, probably because of their limited dairy industry. It nevertheless created some anxiety among European condensed milk manufacturers.¹²⁰ In 1933 the Dutch private dairy sent to the Ministry of Economic Affairs in the Hague a complaint on Japanese milk products for sale in the Netherlands Indies. Japanese sterilized milk in tins of 14 1/2 ounces (435 g) was sold instead of the Dutch tins of 16 ounces (480 g). Moreover the label did not provide any indication that the milk was manufactured in Japan. The text was both in English and Dutch while the label was printed in the colour of the Dutch flag. The question was asked whether it would be possible to have the country of origin printed on the label. However no action on this could be taken as the government of Batavia was still working on a draft regulation on labelling.¹²¹

More excitement was created by an article in the Indische Courant of 21-3-1936 reporting on Japanese tinned milk destined for the garrison at Malang. During a tender for a food contract for the garrison, a Chinese contractor submitted the lowest bid. He got the contract and delivered, among other things, Japanese tinned milk. The newspaper wrote that it was an odd situation when, in East Java, with its surplus of fresh milk, the military consumed Japanese milk.¹²² In the Volksraad, the representative Doeve brought the question to the attention of the government.¹²³ In the meantime private dairying in the Netherlands approached the Ministry for the Colonies with the request for preferential treatment of Dutch products. In Batavia the matter was taken up by the Department of Economic Affairs in close consultation with the commander of the armed forces. The remaining problem was that in making conditions for contracts for supplies to the government or to the armed forces, it was practically impossible to exclude brands from other countries. Despite this constraint the Governor-General informed the Minister for the Colonies in September 1936 that certain

preferences would be given to products from the Netherlands and Netherlands Indies.¹²⁴

The imports of milk products was and remained in the hands of the Europeans, although competition from the United States and Australia was strong. In the 1880's, the sweetened condensed milk of the Anglo-Swiss Company, Milk Maid was almost the only brand of tinned milk available in the Netherlands Indies.¹²⁵ As already discussed, it was to a large extent used by European women for infant feeding. From their depot situated in the Strait Settlements in Singapore, the newly merged Nestlé and Anglo-Swiss Company distributed their milk products to the Netherlands Indies. This was in contrast to the Dutch condenseries with such brands as Hollandia and Aurora which depended for their overseas export on trading companies acting as their sales agents.

During the First World War the steadily increasing imports were interrupted by war hostilities at sea like the unrestricted submarine warfare, by export embargos and finally by the seizure of Dutch merchant ships by the Allies in 1918. Because of shortages the government interfered in the distribution and price setting of sweetened condensed milk.¹²⁶

Before the outbreak of the First World War in 1914, European dairy firms had already increased their efforts to export more of the cheaper sweetened condensed skim milk to Asia, so that a wider range of consumers could be reached, especially the better off groups within the indigenous population. In order to be ensured of an abundant milk supply, Nestlé acquired a substantial interest in the Galak Condensed Milk Company of Rotterdam. On behalf of this company, Nestlé set up a skim milk condensery producing entirely for overseas markets especially Asia, where the consumption of skim milk in tea had rapidly risen.¹²⁷ The Galak skim milk condensery began operation in 1912. This gave Nestlé the chance of altering their policy of giving preference to full-cream milk products without having to associate their brand name with the cheaper skim milk. Another advantage of new factories in other countries was that they were a way to protect the company against possible trade barriers like excessive import duties and import quotas.

Apart from the Nestlé and Anglo-Swiss company who operated with their own controlled network, the other dairy and food industries had to be content with the trading firms who acted as sale agents on their behalf. The imported tinned milk was distributed to the consumers by Chinese wholesale

dealers through an extensive network of mainly Chinese retail traders. Advertisements were placed in newspapers and on posters by the various companies. Some attention was given as to how to approach the illiterate.¹²⁸ In the Netherlands and other European countries the economic crisis led to a surplus of dairy products and a large number of new brands were introduced on the market in the Netherlands Indies (1931). This caused some confusion on the market and prices declined.¹²⁹

How and in what way efforts were made to reach the Indonesian population may be analysed by looking at how a new firm tried to gain a place on the market in tropical countries. This was the CCF, the Coöperatieve Condensfabriek Friesland, with its brand name of Friesche Vlag or as it became locally known, Tjap Bendera (in present spelling, Susu Cap Bendera).

In Europe this Dutch-based firm was confronted by two serious threats, a decline of her major export market in the United Kingdom because of trade protectionism (Part I, Chapter 3.5) and the tendency in the condensed milk industry to form large international enterprises of which Nestlé and Carnation were the major exponents. Slowly but surely the CCF shifted its interests to markets in other countries. Through Dutch, French and British exporting firms, next to existing activities in North Africa, efforts were made to penetrate markets in Cuba, Turkey, Greece, Egypt, East Africa, China, the Strait Settlements and the Netherlands Indies. In the tropical regions of Asia market prospects looked very promising.¹³⁰ However, by the end of the 1920's it became obvious that it was very difficult in tropical markets to compete with the international firms Nestlé and Carnation. The director of CCF realized that in order to get a foothold in tropical Asia, the market should be carefully studied. Hepkema, the director, decided to go there himself to observe and analyse the market prospects personally. The CCF in Leeuwarden was already so firmly established that the director could leave the responsibilities of the condensery to his close associates. In March 1930 he went on a five months trip, visiting Colombo in Ceylon, the Netherlands Indies, Rangoon in Birma, Malacca, Singapore, Indo-China and Hong Kong.¹³¹

He travelled extensively in the Netherlands Indies visiting various places on Java, Bali and Sumatra. Extensive interviews were held with Chinese wholesalers and keepers of the tokos in the desa's and kampungs, as they were the link between the producer and the Indonesian consumer. Hepkema quickly learned that the Chinese wholesalers played a crucial role as they

bought the tinned milk products from the importing trading firms and distributed it further to the various tokos and warungs in the towns and countryside.

One aspect which clearly came out of all these investigations was the very disappointing position of the CCF products on the Netherlands Indies market. Compared with other brands and in particular the Nestlé Milkmaid or Tjap Nonna as it was known to Indonesian consumers, CCF products made a poor impression. Its tinned milk products remained too long on the market so that the quality deteriorated. This problem was discovered by Hepkema to his horror at first point of entry in the Netherlands Indies, Sabang.¹³² In March 1930 he found in a toko CCF tinned milk, Anak Blanda and Het Boertje dating back to 1928 and 1929 respectively. The milk was old and of poor quality as was the appearance of the tin. The Chinese toko keeper explained in Malay.

"Susu Tjap Bendera tida laku", or the milk brand Flag does not work.¹³³

In the early 1930's Nestlé controlled the lions share of the condensed milk, while the evaporated milk market was mostly in the hands of the American firm Libby. Sterilized milk, a product much less in demand, came mainly from the Swiss firm of Bernese Alp with the name Bear Brand.¹³⁴

Based on the observations of Hepkema the following factors may explain the nearly unassailable position of Nestlé.

- (1) When around 1910 Nestlé started to conquer the market the firm sent to Java special salesmen to the kampungs to distribute sweetened condensed milk free of charge. This created some demand from the Indonesians so that in this way a place in the market could be obtained.¹³⁵ At the same time Nestlé did everything possible to maintain the quality of the product, its composition such as the fat content remaining unchanged as well as its organoleptic properties.¹³⁶ As a result the Indonesian consumer gave a special significance to the brand or cap name of sweetened condensed milk, the Tjap Nonna. Closely linked with this was the active policy of Nestlé to replace old tins in the tokos and warungs. Through a system of quick sale and quick consumption Nestlé products remained of a good quality.
- (2) The image was further strengthened by a solid and pleasant looking packing. Because of its huge sales, Nestlé was in a position to produce condensed milk in tins with a size according to the need of its

consumers, the well known 14 oz tins (400 g), small tins of 3.5 oz (115 g) and big square tins with a handle for the coffee shops (Teapot Brand).¹³⁷

- (3) The corner-stone of the Nestlé distribution system was to operate on Java with their own sales offices and their own staff. Only in the outer regions was use made of importing firms such as Borsumé and the Deli-Atjeh Handelsmaatschappij on Sumatra. Upon arrival every shipment was carefully checked for taste, odour and colour before it was released for distribution. Likewise the available stocks in shops, tokos and warungs were checked and changed for new ones when found to be unsuitable for consumption.¹³⁸

Arrangements were made by Nestlé with the major Chinese wholesalers that no other product could be sold other than Nestlé. Violation of the arrangement meant punishment by means of a fine or a forfeit of the bonus share.¹³⁹

- (4) Nestlé was very much in the public eye through its system of advertisements in the form of posters and in newspapers. In order to reach the less-educated population posters and advertisement boards were used. Hepkema noticed during his visit to Java that in the big cities tramcars had large recommendations for Nestlé milk. He came to the conclusion that this type of approach, a sharp study and control of the market and an office with dedicated staff was of invaluable significance. That Nestlé saw this point can be drawn from the fact that these offices were maintained despite a heavy load on the current costs.¹⁴⁰

In order to protect its leading brand Milk Maid against competitors Nestlé operated with some special brands on the market. When a competitor made efforts to introduce a milk product on the market or tried to expand its position, Nestlé considerably lowered the price of one of its special brands, and the newly introduced product generally had to be withdrawn from the market.¹⁴¹ Nestlé and its subsidiary companies had about 75% the condensed milk market in the Netherlands Indies.¹⁴²

How to conquer a "place under the sun" was of course a major worry for Hepkema. Based on his observations and discussions with a great variety of people concerned with the condensed milk business, a strategy was developed consisting of two elements; a concentration of efforts on the introduction

of sweetened condensed skim milk, and a close association with a well-established importing firm.

Skim milk was not only chosen because CCF was an important manufacturer of this product. In this sector of the market, no leading brand existed. Compared to full-cream milk products, it was not so much the brand name and quality, but the price that determined success.¹⁴³ One potential danger remained however, and that was a possible import prohibition as was imposed in other tropical countries.

As the bulk of the skim milk was imported from the Netherlands, Hepkema considered an import prohibition unlikely. During his visit to the Indies he had seen a draft regulation on labelling which aimed at making clear to Indonesian consumers the difference between full-cream and skim milk. Hepkema considered this to be justified and felt that for the trade as such, there could be no objection. Might it even come to an import prohibition of skim milk, then the effort and costs would not have been in vain if skim milk had already become "laku" or in demand. Under the same brand name, full-cream milk products could then be labelled and their consumption would increase as had once been observed in Marocco.¹⁴⁴

A suitable importing firm had to be chosen because the CCF lacked the resources to set up its own sales network like Nestlé. The major importing firms were Jacobson & van der Berg, Geo Wehry, Borsumé and Internatio. It was decided to intensify the earlier contacts of CCF with the firm Internatio which had its head office in Rotterdam.¹⁴⁵ Internatio was what may be called an example of the European general merchant that dominated the trade of South East Asia. For the Indonesian market, Internatio imported the consumer goods from European manufacturers on a commission basis or consignment agreement, and sometimes on its own account. Until the 1930's Internatio did not deal directly with the Indonesian customers, the tokos and warungs. Its system of distribution was based on agreements with Chinese, Arabic and Indian wholesale traders. In order to deal more directly with the Indonesian consumers, Internatio developed its own network of Chinese "runners" and delivery vans which brought the more perishable products to the sales outlets. The system was supervised by an inspection unit (the M.I.R., Monopolie-Inspectie en Reclame).¹⁴⁶

Contacts between CCF and Internatio were very satisfactory but they lacked what could be called an appropriate "milk mentality".¹⁴⁷ Like any other importing firm in the Indies, the assortment of the commodities for sale were very diverse. Consequently insufficient attention was given to

separate commodities such as the tinned milk products of CCF. The staff, as Hepkema reported back home in Leeuwarden to the cooperative, knew much about selling but too little about manufacturing which resulted in a lack of knowledge of milk. Some of them did not even know the difference between full-cream and skim milk.¹⁴⁸

Arrangements were made with Internatio in Rotterdam to send junior staff to Leeuwarden for a crash course prior to their new assignment in the Indies. In a crash course of a few days they were to become familiar with milk and milk products.¹⁴⁹ In the meantime the sales representative of Internatio in Singapore, Mr Grandia, was sent to Leeuwarden for intensive training.¹⁵⁰ In order to speed up things, the CCF consulted the advertizing agent A. de la Mar in Amsterdam, who had an office in Rijswijk, Batavia. De la Mar pointed out that the European population was the pace-maker for any new brand on the market. The fact that Europeans preferred tinned milk showed that it was of good quality, and that most likely the Chinese and Indonesians would follow the Europeans in their preference for certain brands.¹⁵¹

A major point of concern still remaining was how to involve the Chinese wholesaler sufficiently. The distribution system was based on the wholesaler who bought the imported commodity on credit. This wholesaler often lacked capital and if he had sufficient, it was used for investing in houses or speculation.¹⁵² Providing credit remained a risky business for any importing firm. The amount of the credit was fixed on the in the past proven liability. Hence the ability of the importing firm was not to sell, but to give good and safe credits.¹⁵³ De la Mar underlined the necessity for CCF to give a clear brand name to their condensed milk products using a symbol easily recognized by the less-educated consumer.¹⁵⁴

Another recommendation of the report was that CCF should look very seriously into the possibilities for having a sales manager for the Netherlands Indies. Such a manager would be expected to visit the various importing firms, wholesalers, the shops, tokos and warungs, to check the quality and prices, and to report on a regular basis by means of marketing reports.¹⁵⁵

De la Mar further referred to the fragmented position of both the Dutch and Malay language press. No really leading newspaper existed for the whole of the archipelago as only relatively small local newspapers were to be found in the various towns.¹⁵⁶ It is obvious that through the press most of the potential consumers, the illiterate masses, could not be reached. The

Malayan language press had however the advantage of reaching the educated Chinese and Indonesian population groups, who were already receptive to foreign products.

Because of the limitations of the newspapers, it was advised to reach the illiterate consumer through advertisements in railway stations and at train stops. It was the habit of the Indonesians to go well in advance to the railway station and they therefore had a good opportunity to take notice of advertisements. The report attached much value to this kind of publicity despite the fact that a part of the local transport had already been taken over by the bus.¹⁵⁷ Placing advertisement boards at the side of major roads was not advisable, because of the high costs involved.¹⁵⁸ Limited results were expected in towns from posters on city advertisement boards, enamel plates, and show cards in the shops and tokos. However, delivery vans were provided with advertisements (Figure 6.9 and 6.10).



Figure 6.9

Advertisement for sweetened condensed (full-cream and skim) milk on a delivery van in Batavia, around 1935 (by courtesy of CCF, Leeuwarden).

Pasar malams or pasar gambris, kind of annual fairs, were a tradition in the various towns and places of the archipelago. They gave the importing

firms and manufacturers the opportunity to display their commodities to European, Chinese and Indonesian consumers (Figure 6.11). According to de la Mar's report, at the end of the 1920's contact between the importer and wholesaler had become so close that the pasar malam had lost much of its value for reaching the consumer. It was recommended that this should be left to the retail trade. Besides, the number of pasar malams had increased to such an extent that it had become too expensive for the manufacturer to take advantage of them all.¹⁵⁹ Cinemas were already well spread all over the Indies and were very popular with the Indonesians, rich and poor. Advertisements with few words by means of slides or films were an excellent means of reaching all walks of life in the Indonesian population. One difficulty was that the Chinese or Indonesian cinema owners were little concerned with a proper presentation of the advertisement, so that supervision from the side of the importer or manufacturer was needed.¹⁶⁰ The report also advised CCF to get medical recommendations from physicians in the Indies and the Netherlands on the purity and nutritional values of the condensed milk products.¹⁶¹

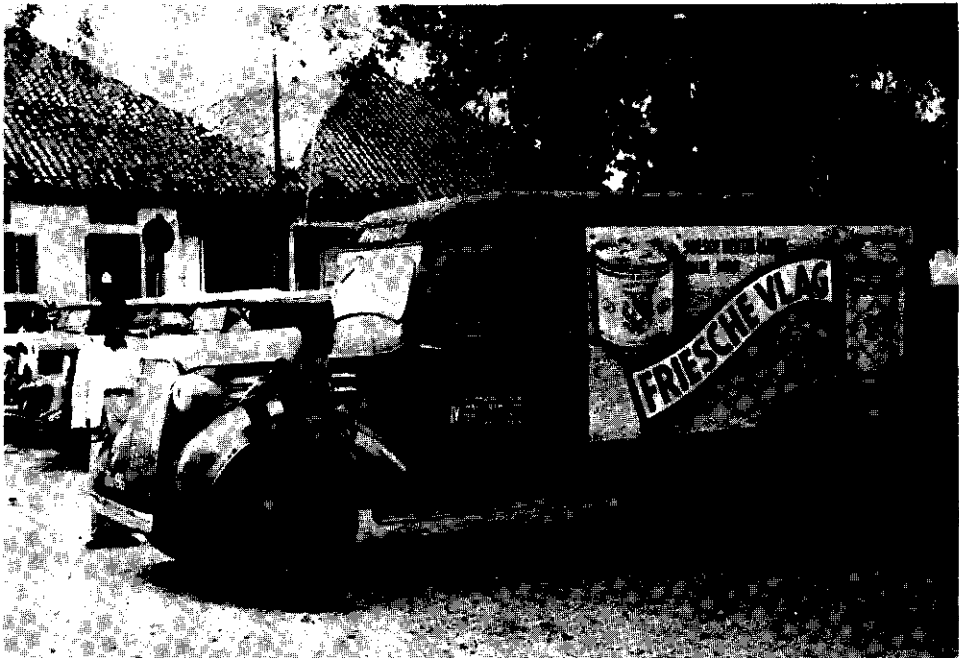


Figure 6.10 Advertisement for sweetened condensed milk and sterilized milk on a delivery van in Palembang, 1936 (by courtesy of CCF, Leeuwarden).



(1)



(2)

Figure 6.11

Promotion of condensed milk at the pasar malam in Batavia, (1) and (2), April 1939 (by courtesy of CCF, Leeuwarden).

The CCF was now well prepared to expand its sales activities. Internatio became actively involved in these by maintaining and controlling sales outlets through close contacts with wholesale dealers and the toko and warung keepers in towns and rural areas.¹⁶² A first act was the "cleaning" of the market by buying back at CCF expense the old tins from the tokos and warungs and replacing them with fresh ones.¹⁶³

After having received his training in the Netherlands, the Internatio representative in Singapore, Grandia, embarked for Malaya and the Indies. He took with him a specially equipped cinema van.¹⁶⁴ In major towns on Java, the promotion picture "Adventures of Ko the cow" was shown. This praised the qualities of the Tjap Bendera or Frisian Flag (Figure 6.12).¹⁶⁵ Although the



Figure 6.12

Advertisement for the Frisian Flag cookery book around 1937 directed at European consumers, showing Ko the cow of the promotion film. The book included recipes using three kinds of tinned milk; chocolate milk, sterilized milk and sweetened condensed milk (by courtesy of CCF, Leeuwarden).

film only mentioned evaporated milk, a product mainly consumed by Europeans, it nevertheless contributed to making the brand name Tjap Bendera more widely known. Under the same brand name skim milk was also sold. It had been agreed that no special advertisements should be made for skim milk and that its low price was the best means for further expansion on the market. In 1931 Internatio strongly advised CCF to spend as little as possible on advertizing skim milk so as not to alarm Nestlé with efforts to expand the sale of sweetened condensed skim milk further.¹⁶⁶

Less progress was made with sweetened full-cream condensed milk. According to Internatio, two mistakes had been made when this was introduced. In the first place the price was so low compared with the Tjap Nonna of Nestlé, that Indonesian and Chinese consumers thought it was of an inferior quality. Secondly the brand name used here was Tjap Bendera which, despite a different colour, was seen by the consumer as inferior skim milk.¹⁶⁷ Based on these experiences, it was decided to introduce sweetened condensed milk under the brand name of Anak Mas.¹⁶⁸

In Java Anak Mas was promoted by means of newspaper advertisements and posters.

A different approach was carried out in Medan, Sumatra. There the promotion was mainly directed at Chinese population groups by means of lectures, a stand at the pasar malam and newspaper advertisements. Inspired by Nestlé, CCF supported a team of 5 nurses (2 Indonesians and 3 Chinese) at Dr Yap's out-patients department in Medan. When the first appointed CCF sales manager for the Indies, G.J.F. Staverman, arrived in Medan in December 1938, he observed that on the whole the introduction of Anak Mas was not very successful.¹⁶⁹ He reported back home to Leeuwarden that as far as the out-patients department was concerned, the approach with Indonesian mothers was quite successful, and that it was possible to create a certain demand for Anak Mas. Many mothers were attending the out-patients department and the idea of changing over to Anak Mas after a period of breast-feeding was brought to their attention.¹⁷⁰

The nurses were not only employed in the out-patients department but also in the areas around Medan. When Internatio trucks with their variety of products went to rural areas to supply the tokos and warungs, some of the nurses went too for sales promotion activities. Much value was attached to the decency of the nurses, in particular the Chinese nurses who would not stay overnight in hotels, but only with relatives or good acquaintances. If for one reason or another a rumour spread about the behaviour of one of the

nurses it would have been likely that her mother would have kept her at home. Needless to say this would have had a negative effect on the promotion activities.¹⁷¹ CCF wanted to import feeding-bottles for the out-patients department.¹⁷² This however proved to be too expensive.¹⁷³ The operational cost of the out-patients department was likewise a burden for the marketing budget and it was seriously considered closing it down. However the free medical check for infants was essential, and it was therefore decided to continue with it.¹⁷⁴

Staverman estimated that more than half of the sweetened condensed milk for Java was used for infant feeding. Therefore he wanted to get feeding-bottles and nurses for promotion activities. These ideas never materialized because of the high costs involved and Hepkema's policy of operating with a limited budget for advertisements. He believed that the prevailing small profit margins would not allow expensive promotion activities.¹⁷⁵

The CCF also tried to take advantage of the habit of using sweetened condensed milk in coffee as was done in the coffee shops of Sumatra and the coastal places of Kalimantan. On Java, where coffee shops were few and the population mainly drank black coffee, Staverman decided to contact the Surabaya Koffie-Propagandabureau (bureau for the promotion of coffee).¹⁷⁶ This bureau, like its counterpart the Thee-Propagandabureau (bureau for the promotion of tea), with a series of vans equipped with loudspeakers and a filmprojector tried to promote the consumption of coffee among the population. During demonstrations coffee was freely distributed. The bureau was not interested in the idea of distributing condensed milk at the same time to promote the consumption of coffee with milk. The promotion activities of the bureau were concentrated on black coffee, Kopi-tubruk, and milk would unnecessarily increase its price.¹⁷⁷ Earlier requests for collaboration from Nestlé had likewise been declined.¹⁷⁸

On the whole, promotion activities in the Indies were not carried out by special nurses or other canvassers. The milk products were distributed by wholesalers and by the "truck-runners" of importing firms. These were people who went with a truck to the tokos and warongs where they sold a wide range of products on commission. Here the problem already observed by Hepkema remained. Milk was only one item among many others. Internatio's distribution system in the Batavia region consisted of 5 trucks. The "truck-runner" visited the outlets once every month and Staverman joined one

of them in order to get a better insight into the system. The products carried by the truck included cigarettes, milk, biscuits, peppermint, all kind of sweets, cigars, tooth paste and soap.

"How can one give sufficient attention to the one product 'milk'", sighed Staverman.¹⁷⁹

The CCF sales activities were further supported by means of newspaper advertisements and posters. Moreover in major Javanese towns vans decorated with CCF products could be seen. With the help of Dutch housewives, a special cookery book was prepared for the European population with recipes using tinned milk as one of the ingredients.¹⁸⁰ Further a children's library was supported by CCF.¹⁸¹

Not all efforts to introduce a milk product were successful. One noticeable failure was the introduction of sterilized chocolate milk in tins (Figure 6.13).¹⁸² In 1936 this product was reasonably well distributed in the tokos and warungs but sales were limited. Of the competitors, only Nutricia's Chocomel was to be occasionally found. In order to push the sale of chocolate milk a special poster was prepared for coffee shops and warungs.¹⁸³ A number of factors may account for the unsuccessful introduction of chocolate milk. The Indonesian and Chinese consumers were at that time not familiar with the taste of chocolate and hence were not interested in trying it.¹⁸⁴ Besides, chocolate milk could not be used in coffee or for infant feeding. Its brown colour led consumers to believe that it was not fit for consumption. In one of the tokos, a representative of Internatio found in a corner a heap of chocolate milk tins. In answer to the question why these tins were thrown into the corner and not put on the shelves the toko keeper explained that the tins were spoiled. What had happened was that the toko keeper, together with a client, had opened a tin and noticing the colour of the milk assumed that it was unfit for consumption. It took the Internatio representative quite an effort to persuade the toko keeper to put the tins on the shelves again. This incident also showed the limited contribution of the "truck-runners" to the promotion of milk products.¹⁸⁵

I could find little information on the turnover of tinned milk in the different tokos and warungs. In the Regency of Krawang on West Java, the average monthly turnover of a toko warung may be estimated for 1939 as 3.8

HARI BERHENTIAN

Dikatakan bundak posiat djenggalah loepa membawa
SOESOE TJOKLAT TJAP „BANDERA”.

Bapa soeka, iboepon djoeja soeka, tereliah anak-anak paling soeka. Ini tiada mendjadi heran, kerana Soesoe Tjoklat Tjap „Bandera” anak betoes dan lagi poeia menjehatkan badan.

Sabagamana keadaannya Soesoe Tjoklat didalam kaleng bagitoepoen boleh di minoem. Ta'oesah ditambahi apa-apa lagi. Kotjoklah dahoeoe isinja, bikinlah doewa lobang dimana toetoeponja dan seoesadahnja bolehlah diminoem seoesoenja.

(1)

Djagalah dengan baik-baik,

dae koentjah temari makan, tebeb kalau didalamja ada tersimpan beberapa kaleng
Soesoe Tjoklat „Tjap Bandera”

soedah tentoe boleh di pastikan, bahwa anak nanti akan minoem Hoer, kerana dia tahoes betoes lang Soesoe Tjoklat „Tjap Bandera” anak adakoe. Ini tiada mendjadi heran, kerana Soesoe Tjoklat Tjap „Bandera” anak betoes dan lagi poeia menjehatkan badan.

Sabagamana keadaannya Soesoe Tjoklat didalam kaleng bagitoepoen boleh di minoem Ta'oesah ditambahi apa-apa lagi. Kotjoklah dahoeoe isinja, bikinlah doewa lobang dimana toetoeponja dan seoesadahnja bolehlah diminoem seoesoenja.

SOESOE TJOKLAT TJAP „BANDERA”

(2)

Figure 6.13

Posters on chocolate milk aimed at Indonesian consumers, (1) and (2), 1936. Efforts to introduce chocolate milk in tins were not successful (by courtesy of CCF, Leeuwarden).

to 5.6 cases of tinned milk or 182 to 268 tins of milk (Table 6.7).¹⁸⁶ In districts with a much lower purchasing power, warungs could be found with a turnover of only 6 to 12 tins a month.¹⁸⁷

Table 6.7

Estimated monthly turnover of various kinds of tinned milk in 103 tokos and warungs in the region of Krawang, West Java, expressed in number of packing cases, 1939.

kind of tinned milk	number of packing cases (1 case = 48 tins of milk)
- sweetened condensed skim milk	
Friesche Vlag	150-175
Cowshead	125-150
Shield	25- 50
others	± 5
	<u>300-380</u>
- sweetened condensed milk	
Milkmaid	100-150
Friesche Vlag	10
others	± 3
	<u>100-163</u>
- sterilized milk	
Milkmaid	20
Bearbrand	10
Friesche Vlag	1
	<u>31</u>
- evaporated milk	0
estimated turnover of packing cases of tokos/warungs	400-574
average number of packing cases per toko/warung	3.8-5.6

Source: based on Archief CCF, Staverman brief no.35, Cirebon, 27-5-1939.

An interesting locally developed product was stroop soesoe, a pink coloured syrup based on imported sweetened condensed milk and lemonade essence. It was sold in bottles or could be drunk by the glass in tokos and warungs in or near towns or large places. I could not discover whether stroop soesoe was originally prepared by Europeans or Indonesians. It was consumed by Europeans, and Indonesians when they could afford it.¹⁸⁸

The marketing activities which the condensed milk industry directed at the Indonesian consumer were all focused on condensed milk. Reference was made to the fact that it could be used for infant feeding, but that it should be used only when breast-feeding was no longer possible was not explicitly stated. Hardly any advertisements were made for sweetened condensed skim milk as its cheapness guaranteed its success. As far as can be ascertained from available sources, it was not promoted as such for infant feeding. It is however very likely that because of its low price a shift took place from full-cream to skim milk for infant feeding. Fear for an increasing use of skim milk for infant feeding by Indonesian mothers caused concern and even alarm among health authorities, and this led to the "skim milk question".

European-oriented education and health services, and the socio-economic changes meant people gradually became much more a part of the world economy and thus dependent on cash income. A growing number of urban dwellers, estate workers or smallholders with cash crops became receptive to the use of European products, including foods. This process was further strengthened by the activities of European firms, by the retail trade and by the presence of an expatriate community with a relatively high purchasing power. As far as the attitude of Indonesian consumers was concerned towards fresh milk and milk products, no indications could be found in the available sources of a fundamental and insuperable prejudice against milk for human consumption. The price remained a major obstacle in making milk an element of the diet of the great mass of the population.

7. THE SWEETENED SKIM MILK QUESTION

7.1 Government policy on food and nutrition

The United East India Company or VOC had, as may be expected of a trading company, an overriding interest in cash crops. On Java these were coffee, indigo, cotton and sugar, and in the Moluccas, pepper and other spices. Despite this interest the VOC was nevertheless much concerned with food supply to both Europeans and Indonesians. For a good functioning of the trade it was essential that this should be reliable particularly in Batavia and the Ommelanden, the outposted offices and in areas with cash crops such as Ambon. The VOC obtained rice through means of forced deliveries and from private Chinese traders. Most of the rice for Batavia came from Cirebon and the north east coast of Java, the granary at that time.¹ Between 1650 and 1790 the company intervened in the rice supply. In periods of good harvest, rice export was promoted while during periods of shortage, export was prohibited.² In Batavia, the fluctuations in rice prices were watched carefully and price interventions occurred from time to time.³ After the collapse of the Company in 1799 its possessions in the archipelago came formally under the direct control of the government of the newly formed Batavian Republic. For the first time, at least theoretically, the new enlightened Republic showed some concern for the welfare of the Indonesian population. In 1808 for example, the Governor-General, Daendels gave instructions for finding ways of improving the lot of the Indonesians and for expanding agriculture as much as possible.⁴ In view of his personality, one may doubt the earnestness of this concern. His administration was however too short to have had any lasting effects.

After the British interregnum (1811-1816), the main interest of the State of the Netherlands was how to make the colony lucrative for the depleted Dutch exchequer. In 1830 the Governor-General van den Bosch introduced the Cultuurstelsel or Culture System based on forced cultivation of cash crops. The thought was that the Landrente, a tax of 2/3 of the rice harvest or 1/3 of its value, was too high for the population and unprofitable for the government. Instead of paying this, part of the fields were cultivated with coffee, sugar and indigo.⁵ The culture system weighed heavily upon the population in many areas because of competition between land and labour for food crops and cash crops.⁶ In the 1870's the forced cultivations were gradually abolished under criticism from liberal-minded

people in the Netherlands.⁷ The Agrarische Wet, the Agrarian Law of 1870, made it impossible to allow agricultural properties belonging to Indonesians to pass into the hands of others. This law was an important step forward in the care of the population as it prevented private enterprise from destroying village economy. On the other hand, according to regulations of the new law, the "wastelands" could be leased to non-Indonesians for a maximum period of 75 years. This part of the law benefitted the the individual planters who had established themselves under the Culture System they professed to despise.⁸ In particular modern plantations were established outside densely populated Java on the east coast of Sumatra.

At the end of the 19th century liberal-minded people both in the Netherlands and the Indies became aware of the fact that the involvement of the Dutch with the economy had not led to an improvement in the welfare of the Indonesian population and they urged that something be done about it.⁹ A substantial change of government policy towards the Indonesian population took place, with the ethische koers or Ethical Policy. This was officially initiated in the speech from the throne in 1901, when Queen Wilhelmina addressed both houses of the States General in a united session. The government stated that it had a moral mandate towards the population and announced an inquiry into the welfare of the population of Java and Madura.¹⁰

Two years before, in 1899, the progressive liberal C.Th. van Deventer, a specialist in Indonesian affairs in the Lower House, had written his much-discussed paper in the literary journal De Gids in which he had spoken of an honorary debt to the Indonesian people. He pleaded for a restitution of the amounts which the Netherlands had taken from them during the course of time, as the population was now in such an alarming economic situation. At the request of the minister for the colonies, Idenburg, he prepared a report in 1904 on the economic situation of the indigenous population. Nieuwenhuys rightly considers this a politely formulated accusation of the government.¹¹ The Ethical Policy however, did not question the colonial system as such, but tried on humanitarian grounds to correct harmful side effects and to stimulate welfare. Its goal would never be the development of the Indonesian people alone. The policy was often linked to, and sometimes hidden by, the aim of developing the economic resources of Netherlands Indies for the benefit of the motherland.¹²

As an important instrument in stimulating the welfare of the population, a Department of Agriculture was created in 1904, later to be renamed the Department of Agriculture, Industry and Trade, and later again, the Department of Economic Affairs.¹³ Out of this department a number of welfare services (Welvaartsdiensten) for the benefit of the population were developed; agricultural extension, veterinary services, irrigation service, rural credit banks. This meant that after 1900 colonial civil service administrators had to work alongside technicians entrusted with technical and development-oriented activities. This created technocratic tendencies in the colonial administration.¹⁴ At first the necessary funds to carry out these activities were lacking. In 1905 as part of the Ethical Policy, the State of the Netherlands took over the Netherlands Indies government debts in Batavia for a total value of f 40 million. This relieved the government in Batavia of financial worries, so that funds could be allocated for the stimulation of welfare of the Indonesian population.¹⁵

In 1911 and 1912 crop failures put the country in serious danger of being without a ready supply of its staple food, rice. A temporary ban on rice export averted the danger. Rice became one of the main objects of the Government economic policy.¹⁶ During the First World War it was difficult to maintain imports from overseas and the government became concerned with food supply, particularly for those in the cash crop growing regions. It introduced several measures to ensure an adequate supply.¹⁷

- (1) A temporary prohibition on the export of rice, which was later followed by prohibitions on the export of cassava and maize.
- (2) An increase in the area under food crops by means of forced cultivation.
- (3) The fixing of maximum rice prices and the making of arrangements with rice traders about the need to keep stocks.

Sometimes regional authorities were involved with problems of supply and could even, if necessary, impose a food distribution system. Interference with the supply of tinned milk caused irritation among Europeans.¹⁸

In 1936 Scheltema made estimations on the food availability per caput per year on Java, based on food production figures and net food imports.¹⁹ Despite population growth, food availability per caput remained at much the

same minimum level during 1875-1940.²⁰ The availability of rice declined but this was compensated by an increase in maize and cassava cultivation.²¹

The superimposition of cash crops left the Javanese peasantry with essentially a single choice in coping with a rising number to feed; tilling their sawahs intensely. There were no real alternatives outside this form of subsistence farming. The peasants could not become part of the plantation economy, nor could they make use of the wastelands which were being planted with coffee trees. Non-agricultural opportunities were few as industry was limited.

This process by which large populations were absorbed on small rice farms through intensive cultivation, without a serious fall in per capita income is analysed and described by Geertz as "agricultural involution", an agricultural system which failed either to stabilize or to transform itself into a new system but rather continued to develop by becoming internally more complicated.²² The theory of agricultural involution has been criticized by various researchers but has not been completely rejected.²³

With much difficulty the government managed to prevent famine in 1919 and 1920. Food shortages were caused by a severe drought in the middle of the wet monsoon. The government intervened and banned the export of rice. It imposed price controls, purchasing and distributing rice to affected areas. It also purchased rice substitutes such as cassava.²⁴ Despite budgetary cuts, the government welfare services intensified their efforts in the 1930's to ameliorate the food situation. Three different measures were taken.²⁵

- (1) Intensification of the amount of land under cultivation.
- (2) Increase in crop outputs per hectare.
- (3) Increase when possible of arable land for food production.

Irrigation schemes were further developed, and attention was given to the dry lands. The introduction of a maize crop and the production of more cassava and soya beans in the dry lands was important in this respect.

New varieties of rice, maize, cassava, soya beans, groundnuts and sweet potatoes with higher yields and better resistance to diseases were introduced. In total there were about 57 main centres on Java and 17 smaller centres from which new varieties were distributed to the population. The introduction of fertilizers was tried but proved to be too

expensive for farmers living on subsistence level, but the introduction of leguminoses to improve the soil was more successful.²⁶

The economic crisis of the 1930's caused a decline in the income of the population, and the government again took a number of measures to keep the price of rice and maize as low as possible.²⁷ Interference with the food prices took the form of a coherent system of guiding measures designed to keep rice surpluses and prices at the desired, predetermined level, chiefly by manipulating available supplies, controlling foreign imports and buying up small stocks of rice to adjust local price levels.²⁸ In order to be prepared for the coming international conflict the government set up a Food Fund in 1939, its main task being to lay in food reserves for times of emergency. Food was obtained by purchasing rice from mills at fixed prices.²⁹

On the whole the overriding concern of Europeans in the 19th century in the colonies was one of health. Earlier, a relatively high occurrence of illness had been tolerated as the price to be paid for economic returns. With the rapid growth of medical science in the 19th century, Europeans began to have higher expectations of their own health.³⁰

In the Netherlands Indies there was a long tradition of nutrition research. It had begun with the clinical observation of the disease beri-beri (B_1 or thiamine deficiency). The symptoms of beri-beri are depression, irritability, failure to concentrate and defective memory. There are also subjective and objective changes in the peripheral nervous system like muscle weakness and heart symptoms like cardiomyopathy, eventually resulting in death. During the greater part of the 19th century, beri-beri was considered to be a disease caused by infection, or by toxic substances in food. In Europe during the 19th century the medical way of thinking on the etiology of diseases was focused on infection. Likewise medical care in the Netherlands Indies was directed towards the eradication of infectious diseases.³¹ For a long time this prevented the development of the idea that a lack of certain chemical compounds in the diet may lead to a deficiency disease. It was due to the work of Eijkman, Grijns, Hulshof Poll, Vordeman and Kiewiet de Jong in the 1890's that beri-beri could be related to food deficiency.³² This interest in beri-beri did not arise from a concern for the population, but from problems encountered during the Aceh wars. Soldiers in combat and even troops on board ships sailing from Java to Aceh suffered from beri-beri. Because of the high losses, the government

decided to set up a commission consisting of the Professors Pekelharing and Winkler to enquire into the aetiology of the disease (1886-1887). Eykman, a young officer of health in the Royal Netherlands Indies Army (KNIL), was attached to the commission³³). After many years of experiments by Eykman and Grijns on feeding chickens with different diets, one conclusion became apparent; beri-beri was caused by an unbalanced diet based on polished rice.³⁴ In 1902 the authorities decided to limit the supply of unpolished rice to prisons and nearly all cases of beri-beri disappeared.³⁵ Beri-beri was in fact a deficiency disease only for those groups within the Indonesian society such as the military, labourers and prisoners who were dependent on mass feeding. In rice, most of the thiamine is present in the outer layer and germ. In contrast to home pounding, machine milling removes nearly all the outer layers and germ of the grain, leaving a whole rice which is highly esteemed, but which is grossly deficient in thiamine. In 1939, for example, only about 20% of the rice crop went to the mills so that in Java beri-beri was not a major problem.³⁶

At the end of the 1920's several studies showed that Xerophthalmia, caused by vitamin A deficiency, often occurred on Java and other parts of the archipelago. It was found especially among children with nutritional oedema in regions with permanent or seasonal food shortages because of crop failures.³⁷

In order to deal with goitre in the mountainous regions of Java it was decided that government salt from Madura should be iodized. But despite this state monopoly, salt was still smuggled in from the coast to the interior, where it was used. Always cheaper than the iodized product, the smuggled salt was more readily accepted.³⁸

Until the economic crisis of 1930, the government of the Netherlands Indies was mainly concerned with the quantitative aspects of nutrition, the food supply. Health authorities became worried that a decline of income would also lead to a deterioration in the quality of the diet. People like de Langen, van Veen and Donath took the initiative and created the Nutrition Institute (Instituut voor de Volksvoeding) in 1934.³⁹ This was subsidized by the Queen Wilhelmina Jubilee Foundation and later received financial support from the government.⁴⁰ The aim of the Institute was to study the influence of nutrition on the health situation of the population and to advise on how to improve it.⁴¹

The Nutrition Institute continued with work already begun on analyses of Indonesian foods and published food composition tables. Of direct practical implication was the collaboration of the Institute with the Horticulture Division of the Department of Economic Affairs. The horticulturists J.J. Ochse and G.J.A. Terra were, by the end of the 1920's, actively involved in work on the significance of home gardens for the nutrition of the population and horticulture division had begun with a programme for the improvement of horticulture in the compounds and gardens of households of Java. Cultivation of vegetables and fruits were encouraged in the hope of lessening vitamin A deficiency.

The Nutrition Institute also collaborated with the Central Bureau of Statistics in a number of coolie budget surveys. Various dietary surveys were carried out to obtain more insight into the nutritional situation and its socio-economic aspects.⁴² One of the outcomes of the surveys was that, with the exception of vitamin A deficiency, clearly defined vitamin deficiencies on Java were limited. Beri-beri and Pellagra were rare. Nutritional oedema occurred in arid and infertile regions when the diet was based on cassava. Protein problems occurred in regions where cassava was the staple food.

In 1939 some civil authorities expressed their concern with the food and nutrition situation of the population, despite the fact that the major setbacks for the local economy had taken place in the years 1933-35 and that after that, the economy slowly recovered.⁴³ On the whole the Javanese diet was of a marginal nature, quantitative and qualitative speaking, and it became more and more difficult to continue to get a sufficient food supply for the ever increasing population. A modern aspect of these surveys is that they were carried out by a team of nutritionists, agronomists and horticulturists.

As well as concern for the food supply and at a later stage, for the nutrition of the population, the Netherlands Indies government became interested in food control. Under the threat of the First World War a food commission (Commissie tot onderzoek van voedingsmiddelen) was established in 1914, its main task being to advise the government in matters relating to food control.⁴⁴ Several disciplines were represented on this commission which included physicians, chemists, pharmacists, lawyers and nutritionists.⁴⁵ The commission operated by making use of the existing laboratories for the necessary analyses. Quality control was carried out on

foods such as coffee, vinegar, wine, arak, flour, marmalade, fruit syrups, pepper and honey.⁴⁶

A major constraint of the work of the commission was that it could only work on an advisory basis, and many of its recommendations were not put into practice. In the Netherlands Indies, a food law and an effective food control system was lacking. Adulteration of local foods and likewise imported ones occurred frequently. Only in larger municipalities were there provisions for food control of meat and dairy products by a veterinarian. In 1920 a Codex Alimentarius for milk was issued.⁴⁷ The Netherlands Indies Penal Code had an article on food adulteration but it was rather vaguely formulated, so its practical value was limited.⁴⁸

It is of interest to note that the quality of foodstuffs destined for the army and navy could if necessary be checked in the chemical laboratory of the military health department in Bandung. Foodstuffs and in fact mainly tinned foods imported on behalf of the Netherlands Indies government were examined in the Netherlands before they were shipped overseas.⁴⁹ At this stage, no arrangements had been made to protect the food quality of the Indonesian population.

A step in the right direction was the Labelling Regulation (Verpakkingsordonantie) of 1935.⁵⁰ In the first years of its existence the Food Commission aimed at the adoption of a food law and of special food control services. It wanted a food control system for European foods along the lines of the food law in force in the Netherlands. As far as Indonesian foods were concerned, the Commission recommended that samples of specific foods from the entire archipelago should be taken and analysed and that food standards should be prepared. Because of the likelihood of a veto from the government because of the high costs involved and probably also because of the complexity of a food law, the Commission prepared a draft labelling regulation. In principle this dealt with commodities, so that both food and non-food commodities could be included. With few modifications the government accepted the draft.⁵¹

The purpose of the labelling regulation was to make provisions for labelling with detailed regulations "in the interest of the trade and for the protection of the consumer". The government could now indicate by decree which foodstuffs should fall under the labelling regulation and could provide the appropriate detailed regulations. In essence, the regulation prohibited false and misleading statements on the label. Provisions were also made for fines and imprisonment for those who

committed offences against the regulation.

Not only the Food Commission, but also various trade associations had an interest in the labelling regulation because of what they called unfair competition with imported commodities of non-Dutch origin. For example Australian butter was sold in tins which looked almost the same as the Dutch ones, but which were smaller and therefore cheaper. The net content declaration on the tins was unclear.⁵² Competition from outside, especially from Japan, was felt most in the non-food sector. Industries in the Netherlands Indies and in the Netherlands alike stressed the importance of a labelling regulation. In view of the low living standard of the population and illiteracy, the Trade Association of Batavia underlined the need for clear and simple labelling.⁵³ After 1936 labelling regulations came into force for vinegar, margarine, flour, and butter.⁵⁴ However, in 1935, when the labelling regulation was established thoughts were given to the quality of milk products. In case of skim milk-powder or tinned milk the idea was to indicate clearly whether the product was of a lesser quality by means of a black stripe with a width of at least 7 mm all around the container.⁵⁵ But much effort was needed before finally the regulations for skim milk products could be settled.

So far food regulations were oriented more towards the protection of the European and better-off Indonesian consumer than towards the protection of the mass of the population. In 1939 a labelling regulation for milk products was in preparation and as this was done in connection with the sweetened skim milk question it had a more direct meaning for the nutrition and health of the population.

7.2 Nutritionists up in arms against skim milk

Those working in the field of food and nutrition observed with suspicion the imports of sweetened condensed skim milk. Several underlying factors contributed to this.

Much progress had been made on research on vitamins. In Europe milk was considered a nutritionally desirable food, especially for infant feeding. Taking the important vitamins A and D out of the milk by skimming off the cream could of course not be accepted. Nutrition studies showed vitamin A deficiencies in the people of the archipelago, and at the same time government medical and agricultural officers became more interested in the well-being of the population. Besides it was known that for some time in

neighbouring countries, authorities had been limiting or had even prohibited the imports of sweetened condensed skim milk.

The Netherlands Indies Government was in this respect far behind other countries in the region. In the early 1920's the sale of skim milk products was forbidden in the Straits Settlements. A regulation in the Federated Malay States insisted upon a red label affixed to the tin bearing a prominent black character warning that the milk must not be given to the ill or to children. This had to be written in English, Chinese, Malay and Tamil.⁵⁶ In 1928 the government of Siam decided to prohibit the import of skim products.⁵⁷ In 1931 Donath and his colleagues were able to write that in all British and French administered countries, the import of sweetened condensed skim milk was prohibited in order to protect the illiterate consumer.⁵⁸

Discussion on these imports took place on two levels: the professional and the political.

On the professional level, the discussion was opened by Donath's study on the nutritional value of tinned milk and milk-powder, published in 1929.⁵⁹ This study was carried out in the chemical department of the Medical Laboratory in Weltevreden, Batavia of which he was head. Food analyses of a great number of imported milk products were made and experimental studies with rats and birds on diets with various milk products were carried out.⁶⁰ Donath, a modest man, was very interested in the nutritional well-being of the Indonesian population.⁶¹ His study was born out of a concern for the nutritional consequences of tinned milk as an infant food.

His conclusion was that on the whole imported milk products were of a quality in accordance with the demands of a good milk. It appeared that with one exception the vitamin A level of the various milks was still reasonably high.⁶² De Langen, Professor at the Medical School in Weltevreden, who had prepared an introduction to this study, was more outspoken on the issue. He came to the conclusion that the increasing use of tinned milk by the population could hardly be seen as an advantage. Children fed with rice pap and banana were probably better off than those fed with the what he called the "doubtful blessings" of the modern milk industry. During the first two years of life many Indonesian children suffered from nutritional disorders so it should have become clear to those dealing with these problems that it was necessary to end the free import of

deficient milk products. This could be done by means of an import prohibition on products from which all nutritional value had been removed, or by putting a higher import duty on products of a low nutritional value.⁶³

Donath's study and de Langen's introduction were mainly oriented to the vitamin value of milk products and not so much on protein as a useful supplement in the diet. This nutritional aspect was quite characteristic of further discussions on milk imports. It is of interest to note that Cayaux in his critical paper on the use of milk products in artificial infant feeding in 1883, the pre-vitamin era, stressed the importance of protein.⁶⁴

The only people outside medical and nutritional circles who were suspicious of and concerned about milk imports were of course those engaged in local dairy farming (Chapter 6.3).

It was the energetic and critical de Haas who took the question of milk imports further. Together with his collaborator, the chemist Ir O. Meulemans, he published a paper on the use of tinned milk in the Medical Journal of the Netherlands Indies in 1937.⁶⁵ This paper provoked heavy and fierce discussion on the question of imports of and the use of sweetened condensed skim milk by the Indonesian population. De Haas was not against the use of milk and milk products for infant-feeding in tropical countries in principle, but he believed that certain conditions to ensure proper hygiene, such as guidance in use by health personnel and a milk product of a high nutritional quality, should be met. Hence his enthusiasm as earlier described for soured milk (Chapter 6.5). His main argument was that both nutritionally and economically evaporated milk was the best of all tinned milk in tropical countries and that sweetened condensed skim milk was harmful and completely unfit for infant feeding.

"After dilution with water sweetened condensed skim milk has only its name in common with milk. In reality it is a cane sugar solution containing a little protein, milk sugar and mineral substances, without even a trace of fat or of vitamin A substances. Against this it may be contended that anything (sweetened skim milk) is better than nothing where no other prepared infant food is available in the native village. But this - something - in this respect is perhaps even worse than nothing, seeing that as an infant food, sweetened skim milk has hardly any more value than rice water in which sugar has been

dissolved, the only - prepared - infant food traditionally known to the native population."⁶⁶

According to de Haas and Meulemans, the price of this "dangerous" product had in 1935 fallen to about 1/3 that prevailing in 1928. They felt that this decline of sweetened condensed skim milk was to be regretted, while a decline in the price of other tinned milk products would have been welcomed. Because of a declining purchasing power among Indonesians, its consumption had constantly increased. People were induced to buy it because of its low price. Indonesian and Chinese consumers were left under the impression that sweetened skim milk was a cheap milk. As a matter of fact they were purchasing a product that was little more than sugar water.⁶⁷

Also labels on the tinned milk products were often not clear. Donath and van Marle, after careful investigation, had pointed out several years before that information on labels on tinned milk products were incomplete and even misleading.⁶⁸

De Haas and Meulemans fully supported Donath's and van Marle's idea that skim milk products should be labelled conspicuously as such, as had to be done for example in Australia, British India, and the Philippines, and that this could be done perhaps in combination with a special import duty. De Haas and his colleagues called it a deception ("it can hardly be designated by any other term") that labels contained no information that sweetened condensed skim milk was utterly inadequate as an infant food. Neither in Malay, Chinese nor Dutch was product information provided and in cases where some information was given, it was in English and very small.⁶⁹

Unlike Donath and Van Marle, de Haas was in favour of a complete prohibition of sweetened condensed skim milk. He realized that by such a measure adults might be deprived of the opportunity of providing themselves with animal protein. In his opinion it remained a question whether adults really consumed sweetened skim milk in such considerable quantities that there was nutritional benefit. Such a slight advantage however did not counterbalance the harm it did to the "most helpless creatures in the world, the bottle-fed infants of the poor".⁷⁰

De Haas and Meulemans came to the conclusion that the continual use of sweetened condensed skim milk could cause xerophthalmia and even blindness in infants. An import and sales prohibition similar to that in force in other tropical countries was, according to them, urgently required.⁷¹ This clear and rather violent point of view against sweetened skim milk was not

only noticed in the archipelago, but likewise in the Netherlands. A lengthy review of the paper appeared shortly after in the Netherlands Medical Journal.⁷²

On a professional level, the main exporter of sweetened condensed skim milk to the Netherlands Indies, the CCF in Leeuwarden, reacted very promptly.⁷³ In a lengthy paper by its senior chemist Dr G.S. de Kadt, sent to the editor of the Medical Journal of the Netherlands Indies, it was stated that there was an awareness of the danger of "casting water into the Thames."⁷⁴ De Kadt spoke of a philippic, that apart from the violent and discourteous tone against the manufacturers of this product, was unmotivated. His main argument was that despite the removal of the vitamins, skim milk was still a useful source of protein. He referred to the use of the cheap skim milk in the Netherlands as part of government support to households affected by unemployment. He further referred to the fact that buttermilk, "so much favoured by Messrs de Haas and Meulemans" had practically the same constituents as skim milk.

In the same issue of the Journal, space was allocated to de Haas who replied with the French saying, "Qui s'excuse s'accuse".⁷⁵ His main criticism of de Kadt was that the core of the problem was not touched on by speaking only of skim milk and not of sweetened condensed skim milk, a product consisting of about 42% sugar. It was not true that the consumer got a good food for a little money. The consumer payed a high price for the imported sugar which was the main ingredient; expensive carbohydrates which could be five or six times cheaper when obtained from local sugar cane. De Haas was very irritated by de Kadt putting buttermilk and sweetened condensed skim milk on the same level, which he called an impudence. The reply ended very emotionally by asking whether Dr de Kadt had the courage to set eyes on infants who had become fully or partially blind after being given sweetened condensed skim milk. According to de Haas, no representative of the firm had the courage to do so. He was further willing to discuss the matter again if de Kadt would accept the invitation and if he offered his apologies for the fact so many children became blind after a diet of sweetened condensed skim milk.⁷⁶

Fortunately for de Kadt, he was supported by Dr J.M. Baart de la Faille, professor in social medicine at Utrecht University, in the Netherlands. Baart de la Faille was chairman of a commission of inquiry into the nutrition of unemployed households in Utrecht. The commission recommended

that households who could not afford full-cream milk should at least use skim milk. In 1936 this was included in a food stamp programme for the unemployed in Utrecht.⁷⁷ In a letter to the editor of the journal he wrote that although the paper had attracted attention in the Netherlands he could not agree with the argument. Reference was made to work done by Prof. L.K. Wolff on the improvement of the protein content of school feeding with skim milk-powder. Further he asked whether five times diluted sweetened condensed skim milk was not after all more nutritious than the traditional rice water with sugar given to infants and which did not contain vitamin A.⁷⁸ This Prof. Baart de la Faille was a close relative of Tj. P. Baart de la Faille who was connected with Internatio, the CCF representative in the Indies.⁷⁹

The polemic in the Medical Journal for the Netherlands Indies continued. Müller, a missionary doctor, working in Yogyakarta argued that he could appreciate the conciseness of the objections against the use of skim milk but not fully the moral issue of whom to blame.⁸⁰ He realized however, that as far as food regulations were concerned, the government was lagging behind neighbouring countries like Siam. Müller quoted a case in Yogya where European parents, because of the failure of breast-feeding, began to feed their two-month-old infant on milk sugar and water. To what extent was the manufacturer of the milk sugar responsible for the death of the child because of fermentation? The appearance of the word "milk" in the term "milk sugar" had had a magic and tragic effect on the ignorant parents.⁸¹ Müller further recommended the use of the cheaper partial skim milk-powder for infant feeding in hospitals. Vegetable fat and even butter could be added as the latter was still cheaper than in the Netherlands. Indeed, cheap butter in tins imported from Australia pushed Dutch butter from the market.

And again the ever militant Dr de Haas replied, first to Baart de la Faille and later to Müller. He argued that Baart de la Faille did not realize the great and essential difference between skim milk and skim milk with an admixture of sugar, either in its composition or its application. No notice was given to the difference between cheaply sold or freely distributed skim milk in the rich Netherlands and the expensive sweetened condensed skim milk containing not less than 40-45% added sugar, which was sold in the Indies to the poorest illiterates.⁸² De Haas was milder in his reply to Müller, stating that adding butter to partially skimmed milk was

expensive and did not economize on infant feeding.⁸³ He then returned to the question of Xerophthalmia and the issue of the danger of the sweetened skim milk for infant feeding.⁸⁴

In an article entitled "Once more sweetened skim milk" Donath joined in the discussion.⁸⁵ He calculated what one could buy for the value of 2.5 cent, or a gobang, in the local markets in Batavia (Table 7.1).

Table 7.1

The estimated quantity of proteins and fats obtained from certain foodstuffs one could buy for 2.5 cents or 1 gobang - the price of an egg - in Batavia in 1938.

local foods				imported milk products and local milk			
amount	food	protein	fat	amount	food	protein	fat
40 g	chicken egg	4.8	4.8	250 cc*	diluted sweetened condensed skim milk.	4.5	0-0.5
75 g	duck egg	9.0	9.0				
35 g	meat, lean (cow, buffalo, pig)	7.0	1.8		50 cc or 66 g undiluted; price of 1 tin of 300 cc or 397 g, f 0.13		
15 g	dendeng (dried meat)	8.2	1.5	100 cc*	diluted sweetened condensed milk. 20 cc or 25.6 g undiluted;	1.7	1.9
35 g	ikan sepat (dried salted fish)	13.3	5.0		price of 1 tin of 310 cc or 397 g, f 0.35		
50 g	ikan gabus (dried salted fish)	20.0	1.5	150 cc*	diluted evaporated milk. 50 cc or 55.5 g undiluted;	4.2	4.7
200 g	kacang tanah (ground nuts)	63.0	95.0		price of 1 tin of 410 or 454 g, f 0.20		
200 g	soya beans	74.0	35.0	100 cc	fresh cow milk, local price of 1 litre f 0.25	3.3	3.8
250 g	tempe kedele (fermented soya bean cake)	62.5	12.5				
250 g	fermented ground nut cake	47.0	6.0				
200 g	tahu (soya bean balls)	10.0	8.0				

Source: Adapted from Donath, 1938 * the milk product was diluted with water to become close to normal fresh milk.

This was a rather sensitive issue. As a result of the economic crisis, the expenditure pattern of the common Indonesian was reduced to such a level

that in 1933 one could not spend more than a gobang a day on food. This was also indicated in the study by Ochse and Terra in Kutowinangun. The government became worried and the Director of the civil service, Mühlenfeld, requested the head of the Department of Public Health to look into the matter. The outcome was the statement that an adult Indonesian should be able to feed himself on 2.5 cents a day.⁸⁶ This reassuring statement by Mühlenfeld in 1933 caused great agitation both in and outside the Volksraad. A storm of protest broke out in the Indonesian press, reflected by cables from Moscow and newspaper reports in the Netherlands. It seems however that in general terms, the statement was confirmed by other investigations.⁸⁷ Donath was less convinced, and maintained that not only the quantity of the diet, but also the quality of the diet in terms of nutrients such as fats, proteins and vitamins should be taken into account.⁸⁸

As for sweetened condensed milk, this product made a poor impression as a source of protein and fat (Table 7.1). Indeed for 2.5 cents, one could get more protein and fat from local food resources and infinitely more from foods of vegetable origin. However as far as milk and dairy products as a whole is concerned, sweetened condensed skim milk is, although a poor source of fat, still valuable for its protein.

Donath who had already been involved for some time in discussions on the labelling of milk products, doubted if a stripe in red or black on the label would be sufficient to warn illiterate consumers that the product was unfit for infant feeding. He recommend that the government follow the example of Siam by prohibiting all imports of sweetened condensed skim milk. Or to put it in his own words:

"Sweetened skim milk is a waste product of Western techniques, expensively sold, which the poor Indies - poor in correct ideas on nutrition, poor in fats in peoples' diet and poor in financial resources - cannot make use of".⁸⁹

In the meantime the question of the import of sweetened condensed skim milk went beyond the professional circles. Some perturbed members of the Volksraad approached the government, putting a number of questions and urging the administration to take appropriate measures. This is discussed further under 7.3.

In the Medical Journal for the Netherlands-Indies the discussion was

more or less closed when in June 1938 the official point of view of the Nutrition Institute was published.⁹⁰ This point of view was made when the head of the Public Health Service and the Director of Economic Affairs requested the Institute for advise on the nutritional value of skim milk and skim milk products. De Haas must have been very happy as all members of the Institute unanimously agreed that the import of sweetened condensed skim milk in its usual form could not longer be continued. There were no objections against institutional use in hotels and on ships, provided sufficient control could be exercised to prevent the milk from coming into the hands of the population.

The members of the Institute had no difficulties in accepting the import of skim milk-powder and evaporated skim milk. This was because no sugar was added to the product and up till then it had not been used for infant feeding. However, the members were of the opinion that it should be labelled in such a way that it could be easily distinguished from full-cream milk products. On the label should be stated in Dutch, Javanese, Malay, Chinese and English that the product was unfit for infant feeding.

A reaction outside the European circles of professionals came from Dr Loe Ping Kian, a colleague and friend of Dr de Haas. In December 1940 he summarized the whole skim milk question and published it in the Sin Po newspaper issued in Batavia.⁹¹ Loe Ping Kian stressed the point that during the preceeding 10 years sweetened condensed skim milk had become a popular infant food among the Chinese and some groups of the Indonesian population. Its import should be considered as a great social danger. However despite expert advice and pressure from the Volksraad the government was still not willing to prohibit its import. Loe Ping Kian said that it was to be regretted that in favour of the dairy industry innocent infants are being sacrificed.⁹² In a postscript he showed some irritation about the way the government played down the results of Otten-van Stockum's report. According to this report, 2.9% of infants in the town kampungs were artificially fed, of which only 0.24% received sweetened condensed skim milk.

"Only! Leaving the exactness of these percentages as an open question, it is strange to hear from the government that a part - however small - of a population of millions of infants faced with disease, blindness or death due to the use of a deficient milk variety, has not been a point of major concern".⁹³

Despite all the critical remarks, the government was reluctant to do anything about it.

7.3 Reluctance of the government to regulate the import of sweetened condensed skim milk.

On the political level, discussion on the question of the importing of sweetened condensed skim milk took place in the Volksraad, or People's Council. This institution was established in 1918, and was in reality more an advisory council without much direct political power. However, wishes and ideas expressed by the Volksraad could not be ignored by the Governor-General.⁹⁴

In 1925 the task of the Volksraad changed from being only advisory to that of being co-responsible for legislation. To the great disappointment of the Indonesian nationalists the reforms were not far-reaching enough.⁹⁵ The Volksraad first consisted of 39 and later of 60 members of which 20 were Indonesians, 15 Dutch and 3 foreign orientals, all elected for a period of 4 years. Besides the elected members, 22 were appointed by the Governor-General (10 Indonesians, 10 Dutch and 2 foreign orientals).⁹⁶

The Volksraad met twice a year. It had the right to introduce bills, the right of petition, the right of amendment, the right of interpellation and the right to express wishes and judgements in resolutions. Members had the individual right to put forward questions to the government. The Volksraad could not change the government. There were in the colonial administration no ministers, and neither the Governor-General nor the heads of departments were responsible to this institution. The chief function of the Volksraad in full assembly was to criticize the budget and related matters of governmental policy. An important aspect of the work of the Volksraad was that a head of department (though not a member) attended the discussions concerning his department. During such a session he explained the matters of his department and answered any questions put to him. This brought the heads of department more in contact with questions of concern from the various sections of the society of the Netherlands Indies.⁹⁷ Indirectly it also exercised an influence on the choice of heads of department in the sense that they had to have the ability to act as a government deputy.⁹⁸ Matters of legislation and of functions concerning administrative routine were mostly delegated to a College of Delegates (College van Gedelegeerden). This permanent committee of 16 members was

elected during the first session of the Volksraad for the whole period of four years and presided over by the chairman of the Volksraad.

It was however, not the nutritionists but those engaged in dairy farming who first became worried about the increasing importation of milk products. Local dairy farming had already had to face competition from imported milk products for many years. This was particularly felt during the depression of the 1930's, when decline in income meant that the demand for fresh milk diminished.⁹⁹

In July 1936 a member of the Volksraad, Doeve, expressed concern about the consequences of tinned milk imports to the government representative Hart, who was Director of the Department of Economic Affairs.¹⁰⁰ He did not understand why the dairies in the plateau of Bandung had had their milk production regulated, while tinned milk was the greatest competitor in the indigenous dairying system. Why not rather impose an import quota on tinned milk or increase the import duties?¹⁰¹

The government representative replied that regulation of the dairies could not be linked with an unrestrained import of milk products. Milk imports were not detrimental to local milk production. It was further argued that on the market cheap tinned milk products cost 14 cents for a tin of 400 cc, which, if diluted to normal milk, sold for the value of 22.5 cents a bottle of 700 cc. Such a price could not be considered as being competitive for local fresh milk. Besides, tinned milk was consumed by families who were not used to drinking milk on a regular basis. An advantage for these families was that tinned milk could be easily stored.¹⁰²

Doeve, who did not agree, came back to his point by explaining that in Chinese tokos, people took susu encer to be not only sterilized milk but also tinned evaporated milk. These tins of 400 cc cost around 20 cents. Diluted to normal milk, the price of a litre came to 16.5 cents. He also mentioned that the price of fresh milk in Batavia was unfortunately still 25-28 cents a litre.¹⁰³ Doeve saw evaporated milk and not sweetened condensed skim milk as the main competitor for the local production of fresh milk. This was because evaporated milk could be reconstituted to a product resembling, to a certain extent, normal milk and could be sold at a lower price. Doeve was right in this, as the consumers of sweetened condensed skim milk were traditionally not consumers of fresh milk.

The problem of milk imports and local fresh milk production came up again during budget discussions in 1938 for the Department of Economic Affairs. Doeve stressed the necessity for the Netherlands Indies to become "in this time of political tension" self-sufficient in milk.¹⁰⁴ He referred to the paper written by De Haas and others in which they urged the authorities to prohibit the import of sweetened condensed skim milk on nutritional grounds. Doeve said that from a hygienic point of view and not from a commercial one, he favoured a prohibition on the import of this product. Consumers of sweetened condensed skim milk could not afford the price of fresh milk. If sweetened condensed skim milk was no longer available on the market, these consumers would not turn to fresh milk. The dairies could only be aided if the imports of the better kind of milk products were to be prohibited.¹⁰⁵

Doeve said further that it was obvious that people in the Netherlands would not appreciate a curb on the imports of sweetened condensed milk. When the Dutch Lower House of Parliament discussed the bill on sugar import regulation, some members drew attention to the fact that Dutch sweetened condensed milk was sold to countries like Cuba and Central America from where the sugar for this product came. Doeve wondered why the Netherlands did not feel obliged to take more sugar from the Indies as a kind of counter offer for the milk imports.¹⁰⁶

Hart, the government representative, indicated to Doeve that the government could not impose import quotas on milk products largely coming from the Netherlands. He did not want to embark on the difficulties resulting from such an import quota. Further he fully agreed that more attention should be given to stimulating local milk production and consumption. As for the importing of sweetened condensed skim milk, Hart was aware of the danger of its use as an infant food. It was still an open question whether or not it was too expensive for use by adults in relation to its nutrients. The government had requested the Food Commission to look into the matter and to give an early opinion.¹⁰⁷

It was Dr V.P. Leunissen who brought the nutritional aspects of the sweetened condensed milk imports more specifically to the attention of the members of the Volksraad and the government. Leunissen, an army surgeon living in Batavia and a friend of Dr de Haas, had been a member of the Volksraad since 1935. In July 1938 during discussion on the 1939 budget for the Public Health Service, Leunissen expressed his regret that the

government had not yet made up its mind on the question of milk imports, despite the available information provided by de Haas, Meulemans and Donath, and despite the advice of the Nutrition Institute. He urged the necessity for the government to give priority in this matter to demands for public health to be put above economic interests and to make a decision as soon as possible on the question of milk imports.¹⁰⁸

It was Dr J. Offringa, Chief of the Public Health Service, who stated that the government could not yet make up its mind on the matter. The Public Health Service had already given advice but it was still waiting for a reaction to come from the Department of Economic Affairs. Offringa continued by saying there were conflicting opinions within medical circles. He referred to the Volksraad member Kruyne who was not in favour of import prohibitions but rather for food labelling. He said further that the government would speed the matter up and give all possible attention to the protection of the health of infants in this country.¹⁰⁹ In a rejoinder, Leunissen said the government's answer on his plea for import prohibitions was not encouraging. Public health should be given first priority and therefore an import prohibition was urgently needed.¹¹⁰ In a second reply Offringa confirmed the government's willingness to take appropriate measures for the protection of the health of infants against the danger of skim milk products.¹¹¹ Doeve intervened in the discussion, saying:

"But how long do we have to wait? It has already been longer than a year ago since this question was broached by Dr de Haas".

Offringa replied: "I hope very soon".¹¹²

The government was apparently reluctant to make any decision on the question of the sweetened condensed skim milk imports, whether in the form of an import prohibition, sales restrictions or food labelling, or even whether to drop the matter as such after careful considerations. In July 1939 during discussion on the 1940 budget for the Department of Economic Affairs, Leunissen rightly complained that no measures had so far been taken.

"I would like to ask in which field the difficulties lie. Would the government inform me if I am correct in looking for them in the field

of trade policy? Would they inform me whether I am correct in assuming that Dutch industry opposes import prohibitions? I am very anxious to know it but I believe that I am not far from the truth".¹¹³ "... I now turn to the government and urge it not to delay anymore. Don't let it come to the sad fact of having subordinated the interests of the public health in this country to the interest of Dutch industry".¹¹⁴

After this sharp attack on the government policy, van Mook, Director of the Department of Economic Affairs, replied for the government.¹¹⁵ He said that sweetened condensed skim milk was indeed detrimental to the health of infants, but that as it was largely consumed by adults it provided a useful and cheap protein supplement. Before taking appropriate measures, it was necessary to investigate whether or not vitamin A and fat could be added in order to make it suitable for infant feeding. He said that results from investigations were expected to arrive soon. He further expressed his hope that Leunissen would become convinced that public health interests were not being subordinated to trade policy considerations.¹¹⁶ The same kind of discussions dragged on during the debate on the Public Health Service budget and in the second term of the discussions on the budget for the Department of Economic Affairs.¹¹⁷ In the Volksraad Leunissen gave a lengthy review of Donath's study on what one could buy for the value of 2.5 cents or a gobang on the local markets of Batavia in terms of proteins and fats. He wanted to refute the statement that sweetened condensed skim milk was a useful and cheap source of protein.

A new element in the question of milk imports was introduced when Dr W.F. Theunissen, Chief of the Public Health Service, informed Leunissen that trials with vitamin A fortification were being carried out and that results would soon become available so that more definite measures could be taken.¹¹⁸ Within a very short time, van Mook was in a position to state that trials with vitamin A fortification of skim milk were succesful, and that these products would soon arrive on the market. In this way the import of harmful products ceased and measures were prepared to do this by legal means.¹¹⁹

In February 1940 van Mook came back to this issue when he had to respond in the Volksraad to a written question posed by Leunissen on the

latest developments.¹²⁰ Van Mook informed the Volksraad that more than 90% of the imported sweetened condensed skim milk had been fortified. The government had in the meantime taken into consideration how to settle it on a legal basis. Should imports of both fortified and non-fortified skim milk be allowed, so long as there was a special label on the latter indicating that it was unfit for infant feeding, or should there be a prohibition on the importing of non-fortified skim milk?

The existence of two types of skim milk, a fortified and a non-fortified one, was considered to be too confusing for the mass of consumers. The government had in mind to prohibit on the import of non-fortified milk and in view of this, a food regulation was being prepared.

"The honourable member will certainly be aware that such a food regulation is a complicated technical matter so it is not yet ready. In the meantime the matter has been solved in such a way that in the opinion of the government all interests concerned have been taken into account".¹²¹

Leunissen said that although he was largely satisfied with the Government's answer, his only concern was what was going to happen to the remaining 10% of imported sweetened condensed skim milk which was not fortified with vitamin A, and with the stocks not yet sold. He wanted, in anticipation of the new food regulation, a ban on the sale of the remaining non-fortified stocks. Van Mook replied that the government did not have the authority to prohibit the sale of legally imported milk products and pointed out that it was a transitional period.¹²²

Again in 1940, the skim milk question flared up in the Volksraad. The government referred to an unpublished report by the late Mrs Otten-Van Stockum which said that only 2.9% of the infants in the town kampungs of Batavia were artificially fed of which only 0.24% by means of sweetened condensed skim milk.¹²³

Up to this time it had been mainly the European members of the Volksraad who took part in the discussions on the sweetened condensed skim milk question. Were the Indonesian members silent because of other priorities such as the demand for a fully-fledged parliament and direct participation in the government? Very likely milk was seen as a minor

issue compared with the social and political problems of the population. However, when Dr de Haas published a study on the prevalence of Xerophthalmia among children in Batavia it was the Indonesian member Soekawatie who immediately reacted.¹²⁴ He referred to the study which indicated that vitamin A fortified sweetened condensed milk was still an insufficient food for infants as it was fatless.

The question of, to which extent the use of sweetened condensed milk caused various stages of xerophthalmia and blindness had, up till this time, not been touched upon. In view of the emotions called up by the use of this product it is surprising how few data on this question were collected. The physician Otten-van Stockum did have some data for Semarang (1920-1925) and Bandung (1929-1930).¹²⁵ Information was collected on home feeding practices for Indonesian infants below the age of 1 year who had been admitted to a hospital suffering from xerophthalmia. In Semarang, 6 out of 13 and in Bandung 25 out of 31 cases of xerophthalmia were associated with a home feeding based on sweetened condensed milk. Before 1932 no case was found by Otten-van Stockum of infants being fed on a skim milk product, with the exception of one child in the second year of life who had received sweetened condensed skim milk during its first year.¹²⁶ In her opinion too much attention was being given to skim milk, and the inappropriateness of sweetened condensed milk was being neglected.¹²⁷ De Haas provided some data for the situation in Batavia.¹²⁸ In the childrens department of the Central Civil Hospital in Batavia during 1935-1938 clinically observed cases of xerophthalmia were found among 259 children (156 boys and 103 girls), being 5% of the total number of children admitted.¹²⁹ Information was collected on home feeding practices among the 152 infants between 0-2 years suffering from xerophthalmia (Tables 7.2 and 7.3). Of these infants, 111 had received an artificial feeding at home. Sixty seven of these, or about 60% had been fed on a diet based on sweetened condensed skim milk.¹³⁰

Needless to say only a small number of infants suffering from xerophthalmia were admitted to the hospital. De Haas was probably right in his conclusions that in reality the number of cases of xerophthalmia associated with a feeding based on sweetened condensed skim milk was higher.

How did it relate to the other nutritional problems of Indonesian children? From the various nutrition studies carried out, it is apparent

that breast-feeding was universal and even in urban areas, 90% of children were breast-fed for at least a year. Probably not more than 5% of the Indonesian infants in urban areas were fed artificially with condensed sweetened skimmed or full-cream milk or the traditional rice water.

Table 7.2

Type of feeding received at home by infants (0-2 years of age) before admittance with xerophthalmia to the children's department, Central Civil Hospital, Batavia, 1935-1938.

type of feeding received at home before admittance	age of admitted infants		total number
	0-1 year	1-2 years	
a. - breast-feeding only	14	24	38
- mixed feeding	1	2	3
b. - sweetened condensed skim milk only	37	6	43
- sweetened condensed skim milk after breast-feeding	21	3	24
c. - sweetened condensed milk only	19	1	20
- sweetened condensed milk after breast-feeding	8	4	12
d. - other artificial feeding	12	0	12
total	112	40	152

Source: based on de Haas et al., 1940, p.937.

Table 7.3

Forms of xerophthalmia in infants (0-2 years of age) and their feeding received at home before admittance to the children's department, Central Civil Hospital, Batavia, 1935-1938.

type of feeding received at home before admittance	forms of xerophthalmia			total number
	blind	blind in one eye	other forms	
breast-feeding	11	5	22	38
mixed feeding	2	-	1	3
sweetened condensed skim milk	21	14	32	67
sweetened condensed milk	5	6	21	32
other artificial feeding	5	3	4	12
total	44	28	80	152

Source: based on de Haas et al., 1940, p.937.

Without any doubt, for a large population this small percentage nevertheless presented an interesting market for the condensed milk industry. Van Stockum had a valid point when she stated by that the significance of a small group of artificially fed infants and their life expectancy was only of minor importance compared to the many times greater group of children. These young children despite the privilege of having enjoyed breast-feeding, would be wrecked in great numbers after their first year and before their sixth year because of an injudicious and insufficient nutrition.¹³¹

This however does not imply that the problem should have received less attention. The various nutrition and health people working in the archipelago were absolutely right in their belief that a skim milk product deprived of its vitamin A was unfit for infant feeding, and that the condensed milk industry should take a more responsible attitude. The need for a food law and an adequate food control system to cover milk products was well pointed out. However, the intensity of the discussion meant that there was a danger of overlooking other nutrition problems in infants and children. Also an adequate food law as such was not going to solve basic causes of malnutrition.

7.4 The point of view of the condensed milk industry

As I have already stated in Chapter 6.6, Part II, one of Nestlé's basis policies was to give preference to full-cream milk products. There was a reluctance to introduce skim milk. Apart from a concern for a high quality product, another factor taken into account was that the consumer often considered sweetened condensed skim milk as a cheap substitute. In order to protect their share in the market against the threat of cheaper products Nestlé only introduced skim milk when a new brand managed to acquire a certain position.¹³² In the Indies this was the brand Cowshead, a skim milk product that protected the interests of Nestlé. To maintain the strong position of Milkmaid it was necessary for Nestlé to ask for import regulations and even restrictions of sweetened condensed skim milk. In 1927 the Trade Association of Batavia requested the head of the Department of Public Health to take measures to distinguish skim milk in such a way that confusion between these two products would be prevented.¹³³ It is very likely that Nestlé was behind this initiative. When in 1937 the skim milk question flared up and further demands were made to the government for food

labelling, the CCF representative Huges reported that Keller of Nestlé had been insisting on such labelling for 5 years.¹³⁴

We have already seen how Dr de Kadt of CCF in Leeuwarden responded to the skim milk question. It is of interest to note that it took quite an effort to have his point of view placed in the Medical Journal of the Netherlands Indies. Huges received de Kadt's paper with the request to submit it to the editor for publication.¹³⁵ In a letter to CCF, Huges complained that he, as a non-medical man, was not making any advance with placing it in the medical journal. The editor was not very keen to give business people the opportunity of attacking a colleague in their midst. If refused, it would be possible to send the paper in the form of a brochure to all physicians as had been advised by a medical doctor (who was no great friend of Dr de Haas).¹³⁶ The problem was finally solved when, on the advice of one of the editors, the paper was edited and signed as a communication from Dr de kadt and not from the CCF.¹³⁷

In the meantime CCF realized that further discussions with Dr de Haas would serve no useful purpose.¹³⁸ This opinion was based on a discussion between Hepkema and two medical professors from the University of Utrecht with working experience in the Indies, Dr C.D. de Langen and Dr A ten Bokkel Huinink.¹³⁹ On their advise, Hepkema approached the Nutrition Institute in the Indies and pointed out that according to information received, sweetened condensed skim milk was generally not used for infant feeding. All available labels (in the Netherlands) were immediately provided with a text in Dutch and Malay stating that the milk was not fit for infants.¹⁴⁰ Hepkema further put forward the idea that the CCF had never made any effort to promote skim milk for infant feeding and that even on this matter, an agreement had been signed with Nestlé.

"We don't see everything from the point of view of self-interest. This may be proved by an exchange between the Burgomaster of Bandung and our Cooperative. Here we gave our opinion on the way the Bandung Milk Depot could be developed and we have the impression that advice given by our dairy experts has been accepted. Finally I am of the opinion that the blame Dr de Haas has given to us as manufacturers of sweetened condensed skim milk is neither justified nor correct".¹⁴¹

Further reference was made to the fact that CCF had begun to look into questions concerning full-cream sweetened condensed milk as an infant food in view of the unfavourable opinions of some physicians.

In the meantime the CCF began to revitaminize their skim milk products and other manufacturers followed (Figure 7.1 and 7.2). This proved to be a sensible approach to the problem. Dr W.J. Bais, physician at a medical centre for a number of plantations in Tebingtinggi, on the east coast of Sumatra, sent a circular letter to the plantation managers in December 1939 advising them to prohibit the use of sweetened condensed skim milk in the plantation area.¹⁴² As could be expected, the advice was accepted and carried out.



Figure 7.1

Label from a tin of sweetened condensed skim milk indicating its use in coffee, tea, cocoa and for household purposes. This revised label states in both Dutch and Malay that it is unfit for infant feeding and that it has been revitaminized, 1939 (by courtesy of CCF, Leeuwarden). (not clearly reproduced because the original lettering was red)



Figure 7.2

Label of sweetened condensed milk indicating its use in infant feeding. Instructions are partially in Malay, 1940 (by courtesy of CCF, Leeuwarden).

Staverman tried to convince Dr Bais that skim milk was generally not used as an infant food. The physician however remained adamant that skim milk was exclusively used for infant feeding as it was too expensive for household use. The Association of Deli Planters (Deli Planters Vereeniging) sent a follow-up circular letter in March 1940 to all its members, pointing out the danger of skim milk because of its lack of vitamin A. It further stated that some manufacturers had taken measures to revitaminize skim milk and that this was already true of the skim milk from Friesche Vlag. A request was made to the members to check the medical wards on the plantation in such a way that no skim milk could be bought without the indication that it had been revitaminized.¹⁴³ Needless to say Staverman was very pleased with this course of things, and concluded that CCF had an important lead on Nestlé and other competition.¹⁴⁴

Dr Bais was taken by surprise by the circular letter which fell into his hands. In a letter to CCF's importing firm in Medan he said it was unwise to deal with important matters of public health without the advice of concerned and interested physicians.¹⁴⁵ In fact Staverman agreed with this reaction, but rather than tell Dr Bais, he communicated it to CCF in Leeuwarden. He mentioned that the lesson to be learned from Dr Bais was that it was important to make more effort to make contact with physicians.¹⁴⁶

7.5 Other reactions

What was the effect of the skim milk question outside the circles of professionals, the industry itself, members of the Volksraad and government officials? Did it create a kind of public concern, an outcry some resembling the heated debate that followed the publication in 1974 of the "Baby Killer", a brochure on the promotion and sale of powdered milk for infant feeding?¹⁴⁷

In Part I, Chapter 3.5 I showed that in England in the 1920's, the question of skim milk imports and vitamin A was causing a wide concern. In Singapore the nutritionist Dr Cicely Williams, who in 1934, introduced the term Kwashiorkor for protein deficiency, began a tirade against what she considered the cupidity of the infant food industry. Skim milk products had been prohibited in Singapore for quite some time but there was a fear that breast-feeding might be replaced by sweetened condensed milk. In the autumn of 1939, Cicely Williams was asked to address the Singapore Rotary Club.

The title of her talk was "Milk and Murder" and to the astonishment of the assembled worthies she accused them of collusion in infanticide. According to Dr Williams, employers encouraged their work people, their servants and their wives to feed babies on tinned milk. She went on to say that anyone who ignorantly or lightly caused a baby to be fed on unsuitable milk, was guilty of that child's death. Breast-feeding was not considered smart by a large section of the population; Chinese, Malay, European, Eurasian, Indian, every one of them. In Singapore there was some deadly influence which affected rich and poor alike. "I cannot feed my baby" was a sort of parrot cry which one continually heard, although it was often not true. It was a claim to sophistication and was often the death knell of the baby. She told them of Chinese women binding their breasts so that they become emaciated or useless; or overworked mothers and of the deplorable economic conditions that forced them to go out to work. She spoke of the necessity for Vitamin A. She begged them to use only unpolished rice and to insist that their wives and daughters breast-fed their children. Her lecture ended by stating that misguided propaganda on infant feeding should be punished as the most criminal form of sedition. The effect on the European audience was electrifying, but it should be realized that it did not touch the larger sections of the population. Further it is of interest to note that Dr Williams cleared herself with the local Nestlé's representative before speaking, and that she did not in fact mention any proprietary names.¹⁴⁸

This tirade was quite remarkable as Dr Williams had gained a positive view of sweetened condensed milk during her work as a paediatrician in West Africa in the Gold Coast (Ghana) from 1930-1936. She recommended sweetened condensed milk as a means of swift recovery for infants after severe illness, to be followed by dried or evaporated milk. At Accra she began to reorganize the outpatient's department of the Princess Marie Louise Hospital in such a way that a Well Baby Clinic could be kept. Further she started tiny clinics in borrowed garages, schoolrooms and even shop fronts in the area around Accra in order to reach larger sections of the population. These clinics were run by trained health visitors together with nurses from the children's hospital. At every clinic various types of food including sweetened condensed milk were prominently displayed and Dr Williams instructed her nurses to encourage mothers to use them as a weaning diet.¹⁴⁹ Her work in West Africa had much in common with the kind of activities Dr de Haas was undertaking. In 1939 she left Singapore for some time and convalesced with some friends in the Indies in the far better

climate of the hills above Batavia. When she met Dr. de Haas she fully underestimated his important work in infant and child nutrition and his social concern for the health of the Indonesian population. Or to put it in the words of her biographer:

"She took the opportunity to visit the hospital of a Dutch paediatrician called Dr J.H. de Haas, who was so wrapped up in his research into congenital syphilis that his remedy for the ubiquitous malnutrition, worse even than in Singapore, was to distribute bottles of milk. Cicely was not impressed."¹⁵⁰

It is most likely that these two very strong personalities had great difficulty in communicating with each other.

In the Netherlands Indies the skim milk question, so heatedly discussed in the professional journals and debated in the Volksraad, had only a limited effect outside these circles. This was also true of the Netherlands, where the question was hardly discussed in public. A search of the major journals of the Dutch dairy industry shows no reference to it.¹⁵¹ Ten years earlier in England, the same question had been extensively discussed. Some reference was made in various journals to other tropical countries. When for example the Federated Malay States modified the import regulations in 1933, detailed information was given on the warning to be affixed to the tin; the contents must not be given to the ill or to children.¹⁵²

In 1936 the private condensed milk industry in the Netherlands expressed its fear that because of fierce competition, the quality of the condensed milk and its containers was likely to suffer.¹⁵³ Under these circumstances manufacturers were compelled to economize on raw materials. Again, as with the skim milk question in England, nothing was said on the fat-soluble vitamins A and D and their importance in infant feeding.

An extensive review of de Haas and Meulemans paper with their very severe criticisms of the importing of sweetened condensed skim milk, was published in the Netherlands Journal of Medicine in 1937.¹⁵⁴ No one however took up the matter in the Netherlands or made a public issue of it. Apparently Dr de Kadt of the CCF in Leeuwarden thought it more sensible to argue with Dr de Haas in a professional journal in the Netherlands Indies.

The effect of the skim milk question was likewise limited in the Indies.

In the Dutch language daily newspapers, such as the Locomotief and the Java Bode, no reference was made to the debate in the Volksraad on skim milk imports.¹⁵⁵ In the special weekly edition of the Locomotief destined for the Netherlands, the request for an import prohibition was hardly mentioned.¹⁵⁶ In 1931, in two Malay language newspapers, one of which was the Djawa Tengah of Semarang, a rather technical article appeared under the heading; "Has skim milk the same value as full-cream milk?". It discussed the problem that mothers, out of poverty, bought cheaper foods and used skim milk for infant feeding. Further attention was given to the need to warn the public against skim milk. The article concluded that the government should issue a regulation that on a tin or on the brand name of the skim milk the words "Not fit for infants or small children" should appear.¹⁵⁷ Oddly enough it was the weekly of the conservative Vaderlandsche Club that gave a brief review of the discussion in the Volksraad, under the heading; "Skim milk under certain circumstances a danger".¹⁵⁸ The review was signed by Kr., which was most likely Dr H. Kruyne, member of the Volksraad and committee member of the association of De Vaderlandsche Club (Patriotic Club).

Why was there such a poor public response to the skim milk question? It confirms a complaint expressed by W.H. van Helsdingen, the President of the Volksraad on the weak relation between the Volksraad, the press and the public.¹⁵⁹ Debates were hardly reported in the press, neither in the Dutch nor the Indonesian newspapers. According to van Helsdingen, this may have been due to a kind of interaction between the opinion of the press that the educated public was not served with reports that could not be considered as pleasant reading and a general indifference of the public for the work of the Volksraad. Another factor may have been the economic crisis which had so affected the economies of both the Indies and the Netherlands that little attention was being paid to ethical questions. Or to say it more simply, people had other things to worry about.

One general concern about tinned milk remained, and that was the price. In 1939 the government decided to allow importers to increase the price of tinned milk by 27.5% in view of the rising costs of raw materials and containers. As a reaction, one newspaper (Indische Courant, Surabaya) commented that tinned milk and milk products were no luxury. It said that the Department of Economic Affairs paid more attention to the interests of the importers than to those of the general public.¹⁶⁰

7.6 Responsibilities of the condensed milk industry

Were the nutritionists right in blaming the condensed milk industry for creating vitamin A deficiency problems and even blindness among infants because of their promotion of sweetened condensed skim milk?

In the material consulted in the archives of CCF concerning the Netherlands Indies I could find no evidence for the promotion of skim milk for infant feeding. However, as was mentioned in Chapter 6.6, Part II, it was very likely that mothers shifted from full-cream milk to the cheaper skim milk for infant feeding. Observations made and reported by the staff of Internatio and, at a later stage, by the sales managers Huges and Staverman on the use of the various kinds of milk products make hardly any reference to skim milk as an infant food. This may have been because business contacts were mainly made with wholesalers, tokos, warungs and coffeeshops rather than with health centres. The condensed milk industry exporting to the Indies was however well aware of the reservations about and even the objections of health authorities to sweetened condensed skim milk.

It was the staff of health centres who were faced with the problem of infants being fed on skim milk deprived of its vitamins, although breast-feeding was almost universally practised, in the urban areas, probably not more than 5% of Indonesian infants being artificially fed. Condensed milk was in demand because of lactation failure or where the mother had died.

In the material analysed for this study I could find no clear indication that the demand for condensed milk (full-cream or skimmed) was because tinned milk was seen as a sign of modernity or because mothers had less time to care for their infants as they became more involved in income earning activities outside the household. There may have been some exceptions to this in the plantation areas on the east coast of Sumatra.

In the meantime the industry could not ignore the point of view of the nutritionists and public health authorities. As I said before, a major step in the right direction was when CCF began to revitaminize its skim milk products ahead of its competitors.

The sweetened condensed skim milk question became overshadowed by events which changed the situation fundamentally. In May 1940, the Netherlands was occupied by the Germans, leaving the Netherlands Indies in the odd

situation of being a colony without a motherland¹⁶¹. Milk imports from the Netherlands were of course interrupted. On 8th December 1941, the Netherlands Indies declared itself in a state of war with Japan, and three months later, on 8th of March 1942, the armed forces capitulated at the airport of Kalijati in Western Java. Out of this situation which was difficult for both Indonesians and Dutch, the Republic of Indonesian was born. The colony was officially proclaimed independent on 17th August 1945.

8. POSTSCRIPT: MILK IN MODERN INDONESIA 1945-1985

8.1 General

The Japanese occupation of Indonesia caused a sharp decline in the number of dairy cattle.¹ Nearly all European-owned dairies disintegrated and well-known dairy farms such as those of Ursone and Hirschland and van Zijl disappeared.² It did not however mean an end to dairying as such. During the Indonesian revolution and struggle for independence in the years 1945-1949, several Dutch dairy owners took up their business again as if nothing had changed. In 1947 for instance, in Jakarta, a model dairy, the Bataviase Model Boerderij, was established.³ Likewise firms such as Nestlé and CCF resumed their export of tinned milk to Indonesia. The CCF, the major Dutch exporting firm of tinned milk, was confronted with many problems as her products on the overseas market had almost disappeared during the Second World War. In July 1946, export of condensed milk to Indonesia resumed under difficult circumstances, having to compete heavily with Australian and American brands.⁴

In the meantime however, there was the continuing process of milk imports, local milk production, processing and distribution passing more and more in Indonesian hands. Milk, once an exotic element in the society, became Indonesianized. This was connected very much with the rise of an Indonesian middle class after the beginning of the 20th century (Chapter 6.4). When in 1949 the Dutch finally recognized the Republic of Indonesia, many of their positions were taken over by this Indonesian middle class. The process was further accelerated when, during the conflict with Irian Jaya in 1958, Dutch possessions were nationalized and the expulsion of Dutch nationals from the country occurred. Likewise CCF (at least temporarily) and its trading partner Internatio had to end its activities after many years of business in that part of the world.⁵ In order to fill the vacuum that was created, army officers became managers of companies and plantations. The army emerged as a social force in the Indonesian society.⁶

It is often said that there is no middle class in Indonesia, but only a wealthy elite on the one hand and a poverty-stricken mass on the other. This is however too simplistic a view of Indonesian society. There is an Indonesian middle class although it is rather amorphous in terms of occupation and status, wealth and power.⁷ It can be described as still being a floating mass, which in economic terms is certainly better off than

the lower classes. Some groups within it may be closer to the upper class, but most of them are still closer to the lower class.⁸ It includes civil servants, teachers and academics, engineers, doctors, lawyers, journalists, airline pilots, business executives, other "white collar" workers and employers. It has an urban middle class culture, and its lifestyle and attitudes provide the underlying coherence. This is most evident in Jakarta, but it is being diffused throughout the country through education, radio, television and magazines.⁹ Because advertisements are placed in the media, brand names of various products are now becoming known in many parts of the country. It is of interest to see that, for example, women's magazines such as Kartini advertize a variety of tinned milk brands.¹⁰

8.2 Fresh milk and milk products

Dairies were taken over from the Dutch by Indonesians and in places where large dairy farms disintegrated, it was the farmers who continued dairying as smallholders.¹¹ The importance which both the government and a number of Indonesians attach to dairying may be seen from the fact that in present day Indonesia a small but nevertheless active dairy industry can be found.¹² The major fresh milk producing areas are:

- East Java; Yogyakarta, Surakarta, Boyolali, Ungaran and Semarang
- West Java; Bandung, Bogor and Jakarta
- North Sumatra; Medan and its surroundings.¹³

These centres of fresh milk production correspond roughly with the dairy centres of late colonial Indonesia.

The supply of fresh milk to consumers depends basically on two different groups of milk producers. In the first place the urban and peri-urban dairy farmers who sell their milk directly and indirectly to customers in the nearby towns. These producers include both larger farmers and smallholders. Secondly there are the small rural milk producers who often have fewer than 5 cows. Milk is sold either through dairy cooperatives or through associations.¹⁴ A major point of concern is the weak development of the "milk line", the flow of milk from producer to collector, from processor and distributor to consumer.¹⁵ This may lead to difficulties such as spoilage of milk, dilution of fresh milk with water and problems in absorbing milk surpluses. Several aspects of this fresh milk supply have already been mentioned in Chapter 5.2 and 5.3. However, what is very new and striking is the concern of the government with the development of a

national dairy industry, with special emphasis on smallholders.

Dairy cattle are to a large extent owned by smallholders, and this is particular true of the situation in East Java (Table 8.1).

Table 8.1

The number of dairy cattle of smallholders and commercial enterprises in Indonesia, 1979.

	smallholders	commercial enterprises	total
	(number of dairy cattle)		
Java	60 000	25 000	85 000
East Java	27 000	7 000	34 000
Indonesia	67 000	27 000	94 000

Source: Directorate General for Livestock Services. 1981, quoted by Feasibility Study, 1982.

It should be realized that in Indonesia less than 40% of the dairy cows are lactating cows. Cows belonging to smallholders produce an average of 1400 litres per lactation and those found on larger dairy farms give about 2500 litres.¹⁶ Most dairy cattle owners can be classified as better-off farmers. Smallholders can be divided into three groups. The first group consists of those who own dairy cattle. A second group consists of shareholders. These are small farmers to whom some owners may entrust their non-lactating cows for general care until they are again in calf when they are returned to their owner. The third group are the grass-cutters, poor and landless farmers who obtain some income by supplying dairy owners with grass and herbs obtained from the roadside.¹⁷

A major limiting factor in the development of fresh milk production is that in a very densely populated island like Java there is not much space for the production of cattle feed. This has to be collected from grass growing at the roadsides and from crop residues. On the whole this feed is of a poor quality. With the increase in dairy cattle, there is a danger that poor farmers will not be able to find feed for their draught cattle or for the smaller ruminants, goats and sheep.¹⁸ Dairying by smallholders will therefore depend very much on the further development of low-cost feeds from crop and agro-industrial residues.¹⁹ More selected dairy cattle with a greater demand for feeds will again compete with the small ruminants for better feeds.

Domestic milk production accounts for only about 10% of the total milk consumption of Indonesia, and dairy farmers have to compete heavily with the marketing activities of the condensed milk industry.²⁰ This was already the case in the 1930's (Chapter 7.3). At the end of the 1960's the demand for milk and milk products rose in such a way that the government encouraged foreign firms like Nestlé, Indomilk and Foremost to establish dairy factories for the production of milk products from imported milk-powder and butter fats.²¹ This should be seen as efforts on the part of the government to create an import substituting industry (Table 8.2). Average milk imports rose in the period 1961/65 - 1973/77 from 84 100 to 317 100 metric tons in whole milk equivalents.²²

Table 8.2
Milk production, consumption and annual growth rate 1961-65 and 1973-77 averages in Indonesia.

	1961/65	1973/77	growth rate
	1000 metric tons		percent
	whole milk equivalents		
milk production	36.0	50.5	2.9
milk consumption	120.1	367.6	9.8
annual population growth	2.5		

Source: based on Sarma and Yeung, IFPRI, 1985.

After Indonesia and the Netherlands resumed diplomatic and economic relations in 1963, CCF established a "Friesian Flag" dairy in Jakarta which became operational in March 1971. It produces sweetened condensed milk by recombining imported dried skim milk and butter fats. Other firms like Foremost produce filled milk, a milk product prepared from products based on imported dried skim milk whereby the butter fats have been replaced by local fats of vegetable origin.²³ The coming of the UHT milk (ultra high temperature treatment) in carton containers has also made an impact in Indonesia.²⁴ Milk with a long keeping quality in small handy carton containers with various flavours can now be found in all the big cities.

Until the 1970's only a few dairy factories used locally produced milk in their milk products. In 1978 there was a major reversal in government policy towards the role of smallholders in the milk industry. In May 1978 the government announced that milk processing factories must buy all locally produced milk presented to them in acceptable condition at pre-agreed high prices. This has been of great encouragement to Indonesian dairy smallholders.²⁵ One remaining problem is that the quality of the milk

delivered is not always up to acceptable standards. The rationale behind the policy is to substitute milk imports with local products and to raise the income of dairy smallholders. Several government departments are involved in the further development of the milk industry; the Department of Cooperatives, the Directorate General of Livestock in the Department of Agriculture, and the Department of Industry and Health. Compared to the effort being given to milk production based on cattle, less attention is being given to buffalo or goat milk.²⁶

8.3 Milk consumption

The consumption of fresh milk is mainly limited to the big cities.²⁷ In the early 1950's fresh milk was chiefly used by hospitals, clinics and the more well-to-do.²⁸ In 1955 the anthropologist Freedman made some interesting observations on milk in an Indonesian society. In Kampung Utan (region of Pasar Minggu), a fruit growing area some 24 km from the centre of Jakarta, he observed that some farmers kept a few dairy cows. The milk was rarely consumed by the villagers but sold to the cities. He came to the conclusion that the demand from the city had familiarized villagers with the fact that cow's milk was a possible food for human consumption, but that the cost stood in the way of its popularity.²⁹ More popular were tinned milk products, particularly sweetened condensed milk. In the town Pasar Minggu sweetened condensed milk was for sale in a couple of shops. He did not see people from the rural areas buying tinned milk but he was told that they liked it.³⁰ The problem remained that it was economically beyond their reach. In the meantime an increasing number of tinned milk products have found their way not only onto the urban and peri-urban markets, but also into the tokos and warungs all over the country.

These milk products are used in the make-shift coffee shops as ingredient in tonic drinks such as Ovaltine, Horlicks and Milo. They are also used as an ingredient in traditional recipes. Advertisements for example suggest that sweetened condensed milk can be poured over green beans or over a black glutinous rice porridge.³¹ It may also be used as ingredient in traditional sweets or deserts. Another advertisement describes a modern breakfast as bread covered with margarine and then spread with sweetened condensed milk.³² Although accurate data on milk consumption are not available at present and those which we do have may be contradictory, they nevertheless give a fair idea that the consumption of

milk is low.³³ By looking at a food balance sheet for Indonesia, we can see that the availability of milk is 2.9 kg per caput per year, expressed in milk equivalents. It contributes only 0.6% of the total protein availability per caput per day. However, if we look at the total availability of proteins of animal origin, its contribution is 6% which is of more significance (total availability of proteins of animal origin was 4.51 g per caput a day in 1976).³⁴

Milk is a food mainly consumed in urban and peri-urban areas. Data collected by the Bureau of Statistics in Jakarta indicate that about 65% of the rural population in Java does not in fact consume milk (Table 8.3).

Table 8.3

Milk consumption (in milk equivalents) in litres per caput per year of various household expenditure categories in Java, urban and rural, 1981.

household expenditure	total Java		urban Java		rural Java	
	milk con- sumption	percentage population	milk con- sumption	percentage population	milk con- sumption	percentage population
rupiah	litre		litre		litre	
< 24 000	—*	14.01	—	2.13	—	16.67
24 000— 36 000	—	24.38	—	7.53	—	28.15
36 000— 48 000	—	18.99	0.1	12.15	—	20.52
48 000— 60 000	1.25	12.06	1.71	9.30	1.19	12.67
60 000— 72 000	1.35	8.03	2.60	9.67	1.25	7.66
72 000— 96 000	2.65	9.43	8.68	16.63	2.23	7.82
96 000—120 000	8.27	4.46	8.94	10.48	6.65	3.12
120 000—180 000	9.41	4.70	9.93	15.47	7.43	2.29
>180 000	21.42	3.94	22.15	16.64	14.87	1.10

Source: adapted from Feasibility Study 1982 and Biro Pusat Statistik 1981.
* none or negligible.

In the urban areas the situation is different. There the percentage of non-milk consumers may be estimated at 10% of the total urban population. Needless to say these belong to the very poor sections of the population.

So far no reference has been made to further developments of a product very closely linked with the milk industry, ice cream. Various ice creams on sticks and in cups are now available. It is interesting that ice lollies, which were so popular in the 1930's (Chapter 6.3) are still an appreciated refreshment for low income consumers.³⁵

8.4 Milk and infant feeding

Sweetened condensed milk and other milk products can also be used as a substitute for breast-feeding. As far as can be ascertained this is much less true of Indonesia than, for instance, of Malaysia where several mothers work in plantations. One problem is that, apart from the fact that sweetened condensed milk has a high proportion of carbohydrate and a comparatively low protein content, it is usually overdiluted.³⁶ The Indonesian government, aware of these difficulties, passed a regulation in December 1975 stopping promotion activities of sweetened condensed milk as a food for infant feeding, and tins had to be labelled as unsuitable for infants.³⁷

This problem should not be confused with the question of baby milk formula, which are foods that come in composition as close as possible to breast milk. Marketing activities connected with milk formula, the problem of using a substitute for breast milk and the danger of bottle feeding have also been criticized in Indonesia.³⁸

In 1977, an Indonesian working unit for the promotion of breast-feeding was created and a campaign was begun with posters and advertisements on T.V.³⁹ In view of world-wide criticism and the WHO International Code of 1981 for the marketing of breast-milk substitutes, infant food industries in Indonesia have also changed their marketing policies.⁴⁰ The CCF for instance has rewritten its labels on tinned milk products in order to avoid any suggestion that it can be used as a substitute for breast-feeding. In Indonesia its tinned milk products are sold under the brand name of "Susu Cap Bendera", but in countries such as neighbouring Malaysia, where "Dutch Baby" was produced, the brand name has been changed into "Dutch Lady".⁴¹

It is not clear why research on sour milk for infant feeding was not continued in Indonesia after independence. Several factors may account for this. A major factor could be that it was not used by the European elite in the colonial period and post-colonial years. Mothers did not like the sour taste of the milk for their infants. Besides, most of them possessed an ice chest and later a refrigerator and were therefore less interested in milk that could be kept for about 24 hours on a shelf. Medical training in public health and infant care in modern Indonesia has been influenced by international workers coming from countries which have a dairy tradition, but they have no direct experiences in feeding based on butter-milk or sour

milk. Therefore the dairying and condensed milk industries have made no further serious efforts to promote sour milk.

As for the question of artificial feeding versus breast-feeding, it should be realized that in Indonesia breast-feeding is still common in rural areas and that most mothers do not have the means to purchase a substitute, in whatever form it may be. However the potential danger of a decline in breast-feeding should not be underestimated. In the East Java Nutrition Study it was found that breast-feeding generally continues 19-24 months, but it can even be prolonged until the child is well over 4 years of age. In the population studied, artificial feeding with milk-powder was uncommon, even in a relatively developed area with a food surplus, about 20 km from the city of Surabaya.⁴² At six months of age all infants were still being breast-fed. However the pattern differed for at what age additional foods or weaning foods were given. A few mothers supplemented breast-feeding with cow milk as such, or with a porridge. Those who did so were invariably the educated in the area, like the wives of teachers.⁴³ In the big cities however, the situation was different and artificial feeding was more frequent.⁴⁴ Dried skim milk-powder was donated by various agencies to Indonesia for distribution in mother and child centres.⁴⁵

Most of these activities have now been abandoned. Large projects had difficulties handling DSM in a responsible way when it came to proper storage, hygiene, and ways to teach mothers how to use DSM in local recipes.

8.5 Concluding remarks

Milk and milk products which has been introduced by the Dutch during the colonial era, and which were once an exotic element in the Indonesian society gradually became Indonesianized. This process was accelerated during the period after independence when the Indonesian government took a great interest in the development of a national dairy industry based on local fresh milk production and import substitution. Milk and milk products became part of the food pattern of an urban middle class. Ecological limitations, a high population density and the low purchasing power of the great mass of the population have so far prevented a much wider diffusion. However, the economic and social implications of the food pattern of the urban middle class should not be underestimated. There is among the lower socio-economic categories of the population a tendency to see this class as

a reference group and to follow their ideas and consumption pattern as soon as education and income increase.

Remembering the limitations, one may wonder how sensible the development of a local fresh milk production really is. It may be useful for increasing the income of smallholders, but from a nutritional point of view it is very doubtful whether locally produced milk can play a role in improving the nutritional status of the population to a large extent. More important is the way in which Indonesia has taken to a dairying industry largely based on the imports of raw materials and local processing. This may be in the form of recombined milk products, whereby imported dried skim milk and butter fats are recombined. Another form are the filled milk products whereby locally produced vegetable fats are added to the imported dried skim milk. To both of these products locally produced milk now has to, by law, be added. A matter of future concern is that regulations concerning an increasing amount of locally produced fresh milk to be used in the processing of milk products may lead to an increase in cost. This may impede further diffusion of milk products among the mass of the population.

9. SUMMARY AND CONCLUSIONS

9.1. General

This study deals with the question of the diffusion of foods from industrialized countries to developing countries, with particular reference to the late colonial era. It focusses on how and why milk and milk products spread from industrialized countries with a dairy tradition to regions of the world with no dairying tradition like tropical countries. This is illustrated by the example of Indonesia. It deals with the early introduction and spread of milk and milk products to the former Netherlands Indies during the years 1880-1942, together with an outline of the period after 1945 when Indonesia became independent. The study is a cross-disciplinary approach based on the social sciences, nutritional sciences and social history.

Indonesia, like the whole of South East Asia, is typical of regions of the world with no tradition of using milk. In some scattered places such as in Sumatra and Sulawesi, communities using buffalo milk have been found, but in Java a milk-using tradition was absent.

It is important to take into account the fact that the data for this study comes mainly from Dutch sources. This has its limitations, as these data primarily reflect Dutch reactions to and interpretation of Indonesian society.

When the Dutch established themselves in the Indonesian archipelago they tried to maintain their food habits and, in the 17th century, gradually introduced dairying for their own needs. By the end of the 1860's, sweetened condensed milk was being produced in North America and Western Europe, and at a very early stage was exported to tropical countries. In the 1880's the firms Anglo-Swiss and Hollandia were active in Java. Other forms of preserved milk could be traced back to an even earlier date. In 1835, an advertisement appeared in Batavia mentioning a product "Lait conservé". In 1844 a consignment of food preserved in tins, among which were 300 tins of milk, was sent to the Netherlands Indies. The sales activities of the condensed milk industry were first directed to satisfy the needs of the European community, but were gradually shifted to the Indonesian population.

Indonesia was influenced by three cultures with strong dairying traditions; Indian, Arabic, and West European, particularly Dutch.

During the first millennium A.D. dairying spread from the Indian subcontinent into South East Asia. With the decline of Indian influence, dairying and the use of milk disappeared. It was in fact a custom related to religious rituals and court life which did not penetrate into larger sections of the society. The islamic influence which followed hardly brought dairying traditions with it, despite the fact the Koran is very positive on the use of milk as a food for man.

Although Arabs living in the northern coastal towns of Java kept goats for both milk and meat production, the use of goat milk did not spread to the rest of the population. However, it is of interest to note that goat meat was a food particular preferred by the more orthodox moslims.

A more permanent diffusion of milk began at the end of the 19th century when the Dutch began modern dairying on the island of Java and around Medan on Sumatra.

At first sight it is striking that the diffusion of milk did not take place in those areas where buffalo milk already formed part of the food pattern. It was Java, with no milk-using tradition that became the core of the present Indonesian dairy industry.

Dairy farms set up by the Dutch were established to satisfy the needs of urban European consumers and not Indonesians. There are indications that by the 1920's several Indonesians were involved in small dairying activities. However fresh milk remained a very expensive and perishable food for the majority of the population.

What the dairies could not bring about was in the long run accomplished by the European condensed milk industry with the diffusion of milk in the form of milk products to larger categories of the Indonesian society. Sweetened condensed milk had several advantages compared to fresh milk. It was less expensive, relatively safe and not adulterated. It had long keeping qualities, even after the tin was opened. Milk products were used for infant feeding, in coffee or tea, and as an ingredient in ice lollies and ice cream, which led to the development of a local ice cream industry. It was also used as a medicine.

One aspect in which there was a clear difference between Indonesian and European consumers in the use of milk was that the former did not use it as a beverage. Milk products consumed by the Indonesians were sweetened condensed milk and, later in the 1930's, the cheaper sweetened condensed skim milk. Evaporated milk remained a product almost exclusively used by the

European consumer. The limited keeping quality of an opened tin of an unsweetened milk product made it unsuitable for the local consumer. Sterilized milk was sometimes used as an obat (medicine). Milk-powder was not important in the total milk supply in the period covered by the study. The quality of milk-powder at that time made it unattractive for consumption at the domestic level.

How did condensed milk reach the Indonesian population? This happened through groups in the Indonesian society who were in close contact with the Europeans; those employed by the Netherlands Indies government and private industry, those working in offices or as labourers and/or those who had had some form of schooling. In the towns a new Indonesian elite emerged, intellectuals and middle class. Diffusion of condensed milk (full-cream and skim) took place in the towns, but also in areas with plantations and smallholder cultivations with cash crops, where the European economy and culture had penetrated into the Indonesian society. From the towns some of the condensed milk was further spread into the rural areas.

As far as the mechanism of the diffusion of condensed milk is concerned, this took place by means of two main change agencies:

- (1) Through hospitals and clinics using milk products for infant feeding and medical care in general
- (2) Through the marketing activities of the condens industry.

In the early 1920's a change took place in the Public Health Service. Until then, activities had been directed at combatting the major tropical diseases. However, in the 1920's the Public Health Service began paying equal attention to maternal and child health care. Hygienic Centres and consultatie bureaux or child health centres were set up in major towns and places on Java. In contrast with European women, breast-feeding was universally practised. At these centres, breast-feeding was always encouraged, but the question remained as to what to do if breast-feeding failed or if the mother died. In general wet nursing was not practised; instead infants were given gruels or porridges of mashed rice and banana. Because of poor hygiene and diets with a low protein content, the chances of survival were small. In view of this, hospitals and later the consultatie bureaux began feeding these infants on milk products, and when available, on fresh milk. In general sweetened condensed milk diluted with water was given. When, around 1918, evaporated milk appeared on the market in the Netherlands Indies some physicians began to use it.

In 1927 buttermilk and sour milk were introduced by a number of physicians for infant feeding. In a hot and humid climate, sour milk can be kept for 24 hours, is hygienic and is much better than ordinary milk for digesting by young infants. Melkkeukens or milk kitchens belonging to the Medical School in Weltevreden, Batavia under the leadership of Dr de Haas became well-known. In Batavia, infants received sour milk feeding from the milk kitchens when it was considered to be medically necessary. Milk as part of infant care was practised by the medical staff in the Netherlands Indies only in cases when breast-feeding had failed or was insufficient. As mother and child care centres developed first in towns, artificial milk feeding on medical grounds was mainly restricted to urban and peri-urban areas.

Before the outbreak of the First World War the condensed milk industry had already made serious efforts to include the Indonesian consumer in its activities. Around 1910 Nestlé began to penetrate into the market on Java by sending special salesmen to the kampungs, distributing free tins of sweetened condensed milk. This created a demand and the firm did everything to maintain the quality of the product under tropical conditions. Other firms such as CCF who could not afford their own sales network made use of an importing firm. Imported milk products were distributed to the consumers by Chinese wholesale dealers through an extensive network of retail traders.

More consumers could be reached by the introduction of the much cheaper, but nutritionally inferior product, sweetened condensed skim milk. The introduction of sweetened condensed skim milk, in particular during the economic crisis of the 1930's, was the result of the crumbling of the British market for Dutch milk products. This caused a reorientation of export from the Netherlands to tropical countries.

The marketing activities of the condensed milk industry included references to the fact that sweetened condensed milk, a full-cream product, could be used for infant feeding. However, it was not explicitly stated that it could be used as a substitute for breast-feeding. Compared with this full-cream product, hardly any advertising was made for sweetened condensed skim milk, the relatively low price being the main factor for its success. As far as can be ascertained, skim milk was not promoted as such for infant feeding. It is very likely that a move from full-cream milk to skim milk for infant feeding took place because of its low price. The fear of an increase in the use of sweetened condensed skim milk for infant feeding by Indonesian mothers created the skim milk question.

When it comes to the point, the present issue of artificial feeding versus breast-feeding, and the role of the infant food industry as discussed for example in the WHO assembly of 1981, is not new. In Indonesia in 1937 a rather emotional discussion flared up on the dangers of the use of sweetened condensed skim milk for infant feeding and the risks of becoming blind. Those working in the field of food and nutrition observed the imports of sweetened condensed skim milk with suspicion . Depriving such a food of the important vitamins A and D by skimming off the cream caused anxiety. Nutrition studies showed vitamin A deficiencies in the archipelago and at the same time government medical and agricultural officers became more interested in the well-being of the population. Besides, it was known that in neighbouring countries, authorities had already limited or even prohibited imports of sweetened condensed skim milk. The Netherlands Indies government was in this respect, far behind the other countries of the region. There was no food law as such, nor did a food control system exist. Only in larger municipalities were there provisions for control of meat and dairying by a veterinarian. The discussion of the importing of skim milk took place on two different levels; the professional and the political.

It was Dr de Haas who took the skim milk question further in 1937 in a rather violent paper accusing the condensed milk industry of having caused xerophthalmia and even blindness among infants with their sweetened condensed skim milk. The question of importing skim milk went beyond the professional circle. Some concerned members of the Volksraad approached the government putting a number of questions, and urging the Administration to take appropriate measures.

The government however, was reluctant to make any decision on import prohibitions, sales restrictions, or food labelling. Probably it was not convinced of the seriousness of the situation and was more inclined to take into account the possible effect on milk imports. In the material consulted however, I could find no indication of this.

The industry tried at first to argue that the question of skim milk was out of proportion and that skim milk was not used for infant feeding. The CCF decided to take positive steps by revitaminizing its skim milk products. On the label was further indicated in both Dutch and Malay that the contents were unsuitable for infant feeding. Other manufacturers followed and van Mook, at that moment Director of the Department of Economic Affairs, was able to inform the members of the Volksraad in February 1940 that over 90%

of the imported sweetened condensed skim milk had already been revitaminized.

In the Netherlands Indies the skim milk question, so heatedly discussed by the professional journals and debated in the Volksraad, had only a limited effect outside these circles, as was also true of the motherland. One of the reasons may be the weak relation between the Volksraad and the press. Another factor may be the economic crisis which caused people to worry about other things.

Were those working in the field of public health and nutrition right in blaming the condensed milk industry for creating vitamin A deficiency problems and even blindness among infants? In the material available for this study no evidence could be found of deliberate promotion of skim milk as an infant food. It is very likely that with the economic crisis of the 1930's mothers shifted from the expensive full-cream milk to the cheaper skim milk for infant feeding. The condensed milk industry exporting to the Netherlands Indies was however well aware of the reservations and even objections of health workers against skim milk. In the available material I could find no indication of a clear demand for condensed milk because its use was a sign of modernity, or that is added to someone's prestige, or that, having less time because of an increase of work load in or outside the household, it was a substitute for breast-feeding. As far as the latter is concerned there may have been some exceptions to this in the plantation areas on the east coast of Sumatra.

In view of the emotions aroused by the use of this product, it is surprising to note how little data there appears to be on feeding practices and the use of condensed milk by Indonesian mothers. Probably, at most, 5% of infants in urban and peri-urban areas received an artificial feeding; the traditional rice water, condensed sweetened full-cream or skim milk. Without any doubt, for a large population, this small percentage nevertheless presented an interesting market for the industry. Although its extent was limited, health and nutrition workers were right in saying that a milk product deprived of its vitamin A was unfit for infant feeding.

The skim milk question also indicated that no real dialogue was possible between those working in the field of public health and nutrition on the one hand and the condensed milk industry on the other. Both were working in two very different worlds, each having hardly any idea of the genuine interests

and responsibilities of the other. A "better knowledge of each other" would of course not automatically have solved the differences between nutritionists and the dairying industry, but it would at least have facilitated efforts for a more constructive approach.

One aspect that became lost in the discussion on sweetened condensed skim milk was the problem of complementary or additional foods to be given to infants on a regular basis, for example after 6 months of age until weaning. Although many infants were breast-fed, poverty meant that they received inappropriate weaning foods.

9.2. Concluding remarks

One may conclude that milk, once an exotic food, has gradually become Indonesianized, and has found a modest place in the food pattern of an emerging urban middle class. No indications could be found in the available sources of a fundamental and insuperable prejudice against milk for human consumption. The price, rather than unfamiliarity with milk as food, remained a major obstacle against allowing it to become an element in the diet of the great masses of the population. It seems that the occurrence of primary lactose intolerance among a traditional non-dairying population is not an obstacle for a modest adoption of milk into the food pattern.

This brings us to the question of what a traditional food is. Many traditional foods were once exotic but the moment people regarded them as part of the food pattern and passed them on to an other generation of consumers, they become traditional. It is likely that milk will eventually become a traditional food in the same way that in Western Europe, exotic tropical beverages such as coffee and tea have become traditional elements of the food pattern.

The spread of milk and milk products in Indonesia in the colonial era among categories of the Indonesian population was not so much the result of the introduction by the Dutch of modern dairy farms in the tropics, but rather of industrial food processing and the development of mass transport. Milk condensing made it possible to bring milk products at a relative cheap price from the temperate zones to zones where prevailing ecological conditions made fresh milk scarce and expensive. It laid the foundations for the present modest but growing Indonesian milk industry which consists of local milk production mainly by smallholders and a dairy processing industry

using imported raw materials such as skim milk-powder and butter oil, and the locally available fresh milk. Since 1950 the Indonesian government has given substantive support to these dairying activities.

The development of dairying in Indonesia shows continuity. The present areas of fresh milk production correspond roughly to those of the late colonial era. Likewise tinned milk (now locally produced from imported raw materials) still competes with locally produced fresh milk. In one aspect there is a clear dis-continuity and that is the use of sour milk for infant feeding. When the Dutch left Indonesia, research on sour milk was discontinued. In view of the keeping quality of sour milk under tropical conditions this is to be regretted.

Nutritionally, it is doubtful whether locally produced fresh milk can play a role in solving malnutrition. It is of importance however as an income-generating activity for smallholders, and in satisfying urban consumer demands. The development of a milk industry based on imported raw materials and local milk may have better nutritional prospects. However the price of locally produced fresh milk, one of the raw materials for milk condensing must not increase too much, or it will impede further diffusion of milk products among the population.

SAMENWATTING

(Melk naar tropische gebieden; verspreiding van een nieuw voedingsmiddel naar Indonesië 1880-1942, met een naschrift voor de periode 1945-1985).

Onderzoek is gedaan naar het verschijnsel van de verspreiding van voedingsmiddelen vanuit de geïndustrialiseerde landen naar ontwikkelingslanden, met name melk en melkproducten naar de traditioneel niet-zuivelverbruikende tropische gebieden. Het is vooral gericht op de beginfase van deze verspreiding die in het laat koloniale tijdperk plaatsvindt en die geanalyseerd wordt aan de hand van de situatie van Indonesië in de periode 1880-1942.

Aanleiding van het onderzoek was het door de Stichting Voeding Nederland (toen nog Nederlands Instituut voor de Voeding) in nauwe samenwerking met de Vakgroep Humane Voeding van de Landbouwhogeschool uitgevoerde project "Verbetering Zuivelvoedselhulp Programma's". Een aspect dat naar voren komt is dat lokale melkproductie en verbruik van melkproducten in verschillende tropische landen geen recent verschijnsel is. De veronderstelling hierbij is dat zuivel in de tropen terug te brengen valt tot het koloniale tijdperk toen West-Europese landen (met hun zuivelgebruiken) grote gebieden onder controle hadden. Daarnaast bestaat zoals bekend kritiek op zuivelexport naar ontwikkelingslanden.

Doel van het onderzoek is:

- (1) Het leveren van een bijdrage in de kennis en inzichten in de verspreiding van voedingsmiddelen vanuit de geïndustrialiseerde landen naar ontwikkelingslanden, vooral in de vroege fase.
- (2) Hoe, waarom en wanneer melk en melkproducten vanuit de geïndustrialiseerde landen zich hebben verspreid naar de traditioneel niet-zuivelverbruikende tropische gebieden.

Het onderzoek is verricht aan de hand van de situatie in Indonesië gedurende de periode 1880-1942. In een naschrift wordt ingegaan op de ontwikkelingen van de zuivel in de jaren na de onafhankelijkheid, 1945-1985.

Het onderzoek begeeft zich op het raakvlak tussen de sociale wetenschappen, de voedingswetenschap en de sociale geschiedenis. Indonesië is gekozen omdat het een land is waar, op enige uitzonderingen na, melkverbruik onbekend was, het bestuurd werd door Nederland, een koloniale mogendheid met een duidelijke zuiveltraditie. Reeds vanaf het einde van de 19e eeuw is veel baanbrekend voedingsonderzoek verricht in Indonesië.

Vanuit een sociaal-wetenschappelijke benadering in sociaal-historisch perspectief werden gegevens uit de volgende bronnen verkregen:

- (1) Gepubliceerd materiaal zoals studies en rapporten op het gebied van landbouw, voeding en veeteelt. Gezien de tropentraditie heeft de Landbouwhogeschool een uitgebreide collectie van Nederlands-Indië, vooral voor de periode 1880-1940.
- (2) Archiefmateriaal van de CCF, Leeuwarden, voor de jaren 1929-1940; Algemeen Rijksarchief, Ministerie van Koloniën, 1901-1945.

Daarnaast is gebruik gemaakt van informanten die op het gebied van voedsel en voeding in het voormalige Nederlands-Indië hebben gewerkt.

Wat de beschikbare gegevens betreft is het van belang rekening te houden met het feit dat deze voornamelijk uit Nederlandse bronnen afkomstig zijn. Dit heeft zekere beperkingen omdat de gegevens in eerste instantie een weergave zijn van de Nederlandse reacties op en interpretatie van de Indonesische samenleving.

De Nederlanders die zich in Oost-Indië hadden gevestigd, probeerden hun eigen voedingsgewoonten te handhaven. Zo introduceerde men al in de 17e eeuw geleidelijk aan de melkveehouderij voor eigen gebruik. Wanneer tegen het einde van de jaren 1860 in de Verenigde Staten en in West-Europa de (gesuikerde) gecondenseerde melk in blik wordt geproduceerd, vindt al spoedig een export naar Nederlands-Indië plaats. Rond 1880 waren de firma's Anglo-Swiss en Hollandia reeds actief op Java. De verkoopactiviteiten van de condensindustrie richtten zich eerst op de Europese bovenlaag, doch geleidelijk aan ook op een deel van de Indonesische bevolking.

Indonesië heeft invloeden ondergaan van drie culturen met een sterke zuiveltraditie: Hindu cultuur uit India, een Arabische en een West-Europese met name een Nederlandse cultuur.

Vanuit India heeft gedurende het eerste millenium van onze jaartelling de zuivel zich verspreid naar Zuid-Oost-Azië. Met de achteruitgang van de Indiase invloed verdween ook weer de zuivel en het gebruik van melk. Het was zeer nauw verweven met de religie en het hofleven zonder inwerking op de bevolking. De Arabische en Islamitische invloed die daarop volgde heeft op het gebied van de zuivel nauwelijks invloed gehad.

Een meer permanente verspreiding van melk ontstond toen de Nederlanders aan het einde van de 19e eeuw een begin maakten met een moderne melkveehouderij op Java en rond Medan op Sumatra.

Het is overigens opvallend dat de verspreiding van melk niet plaats vond in die gebieden waar de melk van de karbouw of buffel reeds een deel van het voedselpatroon was, doch in het typisch niet-zuivel gebied Java.

De melkveehouderij die voornamelijk uit melkstallen bestond, was in de eerste plaats opgezet voor de consumptie van melk voor Europeanen in de steden en niet voor Indonesische consumenten. Er zijn indicaties dat reeds in de jaren 1920 verschillende Indonesiërs betrokken waren bij een kleinschalige melkveehouderij. Verse melk bleef een zeer kostbaar en een snel aan bederf onderhevig voedingsmiddel voor de bevolking.

Het was niet zozeer de melkveehouderij doch de Europese condensindustrie die een verspreiding van melk onder grotere delen van de Indonesische bevolking heeft mogelijk gemaakt. Gecondenseerde melk heeft vergeleken met verse melk verschillende voordelen. Het is goedkoper, het is een relatief veilig product waar niet mee geknoeid wordt zoals dat met verse melk het geval is, het heeft een grotere houdbaarheid zelfs als het blik is geopend. De melkproducten werden door Indonesiërs op de volgende manier gebruikt:

- (1) voor zuigelingen- en kindervoeding;
- (2) in koffie en thee;
- (3) als ingrediënt van ijslollies en consumptieijs;
- (4) als een medicijn.

In één opzicht was er een duidelijk verschil in gebruik van melk vergeleken met Europeanen, het werd in de meeste gevallen niet als een drank geconsumeerd.

Op welke wijze vond nu een verspreiding van gecondenseerde melk onder de Indonesische bevolking plaats? Dit gebeurde vooral bij die categorieën van de Indonesische bevolking die een emplooi vonden bij het Gouvernement of op plantages, daarbij een geld inkomen ontvingen en zo geconfronteerd werden met ingevoerde producten vanuit Europa en later Japan. Vanuit de steden vond een zekere verspreiding plaats naar andere gebieden. Het mechanisme van de verspreiding van gecondenseerde melk gebeurde door middel van de volgende twee categorieën instellingen:

- (1) ziekenhuizen, klinieken en consultatie bureaux;
- (2) verkoopactiviteiten van de condensindustrie.

In de jaren 1920 onderging de gezondheidszorg van Nederlands-Indië een belangrijke verandering door naast de strijd tegen de tropische ziekten ook aandacht te gaan schenken aan de zuigelingenverzorging. In de belangrijke plaatsen op Java werden hygiëne-centra en consultatie bureaux opgericht. Om de

hygiëne-centra goed te laten functioneren werd para-medisch geschoold Indonesisch personeel ingezet. Borstvoeding werd overal gegeven, doch wat te doen in die gevallen wanneer de moeder geen of te weinig borstvoeding heeft, of wanneer zij sterft? In die gevallen werd onder begeleiding een melkvoeding gegeven (gecondenseerde melk, geëvaporeerde melk of verse melk). Bekend werden de melkkeukens van de Medische Hogeschool in Weltevreden, Batavia, waar onder leiding van Dr. de Haas op medische indicatie aangezuurde melk werd uitgedeeld. De zure melk is onder tropische omstandigheden 24 uur houdbaar en kan thuis door de moeder aan het kind worden gegeven.

Reeds voor de 1e wereldoorlog werd door de condensindustrie geprobeerd Indonesische consumenten te bereiken. Omstreeks 1910 was bijvoorbeeld Nestlé actief op Java en speciale verkopers deelden in de kampongs gratis enige blikken gecondenseerde melk uit. Zo ontstond er een vraag naar gecondenseerde melk terwijl het bedrijf alles deed om de kwaliteit van het product onder tropische omstandigheden zo goed mogelijk te bewaren. Andere bedrijven zoals de CCF die pas in de jaren 1930 goed op de markt kwamen, konden zich geen eigen duur verkoopapparaat veroorloven en maakten gebruik van de in Nederlands-Indië gevestigde handelsfirma's. De ingevoerde gecondenseerde melk werd door Chinese groot- en kleinhandelaren gedistribueerd naar de tokos en warongs.

Een grotere categorie van Indonesische consumenten kon nu worden bereikt door de veel goedkopere afgeroomde gecondenseerde melk. Hoewel voor dit product nauwelijks enige reclame werd gemaakt gingen toch Indonesische moeders er toe over om het als kindervoeding te gebruiken. Als gevolg hiervan ontstond de "afgeroomde gesuikerde melk" of "blikkenmelk" kwestie. Gezondheids- en voedingskundigen maakten zich bezorgd over het feit dat melk ontdaan van de vetten en daarmee het in de melkvetten oplosbare Vitamine A (en D) toch aan zuigelingen en jonge kinderen werd gegeven. Vitamine A tekort, problemen van Xeroftalmie en zelfs blindheid waren reeds als een gezondheidsprobleem onderkend. Nederlands-Indië beschikte in tegenstelling tot de buurlanden niet over een goede levensmiddelenwetgeving. Zowel in professionele kring als in de Volksraad ontstond hierover een levendige en felle discussie. Het Gouvernement was overigens weinig bereid adequaat op deze problematiek in te gaan.

De condensindustrie werd vanuit de gezondheidshoek onzorgvuldigheid verweten en zelfs verantwoordelijk gesteld voor het veroorzaken van blindheid onder jonge kinderen. In het onderzochte materiaal zijn overigens geen

indicaties gevonden van een bewuste bevordering van afgeroomde gecondenseerde melk als kindervoeding. In deze kwestie deed de CCF een stap in de goede richting door de afgeroomde melk te vitaminizeren en op het etiket in het Nederlands en Maleis te vermelden dat het product niet geschikt is als kindervoeding.

Borstvoeding was in het laat koloniale tijdperk algemeen en waarschijnlijk kreeg niet meer dan 5% van de zuigelingen in de stedelijke gebieden uitsluitend kunst voeding. Een belangrijk aspect dat in deze kwestie geen aandacht kreeg is het probleem van een aanvullende voeding of het speenvoedsel, wanneer na zo'n 6 maanden borstvoeding alleen niet meer voldoende is. Want zelfs met borstvoeding was de zuigelingensterfte nog zeer hoog in Nederlands Indië. In het stedelijk milieu was de zuigelingensterfte ongeveer 300%, waarvan de sterfte gedurende het eerste levenshalfjaar 3.3 maal zo hoog was als in het tweede levenshalfjaar.

Opvallend is verder dat er geen dialoog plaats vond tussen de gezondheids- en voedingskundigen aan de ene kant en de condensindustrie aan de andere kant. Beiden werkten in zeer verschillende werelden en hadden in feite geen kennis en inzicht van elkaars verantwoordelijkheden. Het spreekt van zelf dat het elkaar beter leren kennen niet automatisch zal leiden tot het oplossen van problemen, maar het zal zeker een constructieve benadering bevorderen.

Melk, eens een uitheems product, begon geleidelijk aan een Indonesisch voedingsmiddel te worden. Het heeft nu een bescheiden plaats gevonden in het voedselpatroon met name van een opkomende stedelijke middenklasse. In het onderzochte materiaal zijn geen indicaties gevonden van een grondige en onoverkomelijke afkeer van melk en melkproducten. De prijs van melk en niet zo zeer de onbekendheid ervan is één van de belangrijkste hinderpalen om een volksvoedsel te worden. Voorts blijkt dat het voorkomen van primaire lactose intolerantie onder een traditioneel niet-zuivel gebruikende bevolking in de praktijk geen belemmering vormt om melk in bescheiden hoeveelheden in het voedselpatroon op te nemen.

De ontwikkeling van de zuivel in Indonesië vertoont een zekere continuïteit. De huidige gebieden met verse melkproductie komen grotendeels overeen met die van het late koloniale tijdperk. De Japanse bezetting en de turbulente jaren daarna betekende geen breuk. Na de onafhankelijkheid stimuleerde de Indonesische overheid zeer duidelijk de zuivel. Hierbij valt de nadruk op de kleinere melkveehouderij en een importvervangende lokale

condensindustrie gebaseerd op invoer van grondstoffen (zoals melkpoeder) en lokale verse melk. Evenals in het laat koloniale tijdperk is de gecondenseerde melk een concurrent van de verse melk. In een opzicht is er een duidelijke breuk met het verleden. Na de onafhankelijkheid zijn activiteiten op het gebied van zure melk voor kindervoeding beëindigd. Gezien de houdbaarheid van zure melk onder tropische omstandigheden is dit jammer.

Vanuit voedingsoogpunt gezien is het zeer twijfelachtig of de productiemogelijkheden van verse melk een bijdrage kunnen leveren in het oplossen van ondervoeding in Indonesië. Van belang is het echter wel voor de verbetering van de inkomenspositie van kleine veehouders en voor consumenten van verse melk in het stedelijke milieu. De verdere ontwikkeling van een zuivel industrie gebaseerd op de invoer van grondstoffen (zoals melkpoeder en boterolie) en op lokaal geproduceerde melk, biedt wellicht betere perspectieven. Een groter aandeel van lokale melk in de grondstoffen kan echter, wanneer dit leidt tot hogere kosten, een verdere verspreiding van melkproducten onder de bevolking in de weg staan.

APPENDIX 1. REGULATIONS REGARDING SWEETENED CONDENSED SKIM MILK IN THE WORLD'S MARKETS ABOUT 1924.

a. Prohibited or without sale.

1. CUBA: All condensed milk which did not contain at least 1% of fat equal to the 25% of solids was considered to be skim milk its sale was prohibited.
2. BAHAMAS: The law absolutely prohibited the importation of skim milk.
3. CHILI: All milk products containing less than 7% of fat were considered to be skim milk, and their sale was prohibited.
4. FLORIDA, OHIO: Condensed, evaporated and powdered milk from which the whole or part of the butter fat had been removed could not be sold under any conditions.
5. PENNSYLVANIA: A Bill was introduced prohibiting the sale of skim milk in the State of Pennsylvania at the last session of the Legislature.
6. ARGENTINA: Importation, sale and manufacture of skim milk were prohibited.
7. SOUTH AFRICA: The importation of skim milk in any form was prohibited by a tariff of sixpence per pound weight, as against 10 shillings and four pence per 100 pound weight of full-cream milks.
8. BRITISH EAST AFRICA: The importation of skim milk was prohibited.
9. STRAITS SETTLEMENTS: The sale of skim or separated milk in any form whatever was prohibited.
10. BRITISH HONDURAS: The sale or importation of skim milk was entirely prohibited.
11. ITALY: The sale of skim milk was prohibited.
12. SPAIN: No brand of skim milk was on sale.
13. NORWAY: It seems there was no sale in Norway of skim milk.
14. ROUMANIA: No skim milk was to be found on the market.

b. Practically prohibited owing to excessive duty compared to the full-cream variety.

15. BRITISH GUIANA: American milk products with less than 8% butter fat not classified as whole milk were subject to a duty of nine dollars and sixty cents; not less than 8% butter fat subject to a duty of forty eight cents per case. British or Canadian full-cream milk was duty free. Skim or partially skim had to pay four dollars and eight cents.
16. COSTA RICA: Milk products with less butter fat or solid matters than 9.5% and 25%, respectively, paid duty of sixty cents. With this percentage or over, thirty cents.
17. PANAMA: No law regulating percentage, but if milk was skim, the duty was 15% instead of 10%.
18. TRINIDAD: Duty on skim milk was 10 shillings per case, against one shilling per case on full-cream milk.
19. PERU: All condensed milk containing less than 8% fat was known as skim, and a duty of ten centavos per kilo (gross weight) was paid; if full-cream sweetened condensed milk, there was no duty.
20. VERMONT, NEW YORK, MARYLAND, WISCONSIN, SOUTH CAROLINA: In these States sweetened condensed skim milk could be sold, but only in containers of ten pounds or more. In South Carolina dealers had to display a sign stating that it should not be fed to babies or invalids.

c. Special care to avoid use for babies.

21. AUSTRALIA: Skim milk had to be labelled in bold type as being "Unfit for infants" and some of the States, such as Western Australia, insisted on the additional wording, "Fit for culinary and manufacturing purposes only".
22. FEDERATED MALAY STATES: No standard, but a regulation which insisted on a red label being affixed to the tin, bearing prominent black characters warning that nearly all nourishment had been removed from this milk, and that therefore it was not to be given to invalids or children. The warning had to be in English, Chinese, Malay and Tamil.
23. FRENCH INDO-CHINA: The customs were instructed to proceed to analyse any milk imported which they suspected to be prepared from skim milk. Any such milk would only be marketed with the sanction of the Medical Officer.

24. CHINA: No regulations, except in Hongkong, where labels had to be put, compelling the printing on the tins in English and Chinese stating "This is skimmed milk - children under one year of age should not be fed on it".
25. PHILIPPINES: Containers of skim milk had to be marked with the words; "Not suitable for nourishment for infants under one year of age". There was also a special tax on skim milk of 20 centavos per kilo (gross weight, including container). Those who contravened the law were liable to a fine of P.600 and imprisonment for six months.

Source: Milk Industry, 1924, based on W.G. Savage.

APPENDIX 2. THE NUMBER OF DAIRY FARMS AND DAIRY COWS, MILK PRODUCTION AND SALE OF MILK IN THE REGENCY OF BANDUNG, 1935.¹⁾

Name of dairy farm	number of dairy cows	milk production litres/day	sale of fresh milk/day
<u>a. members of the central milk depot,</u>			
<u>Bandung. (Bandoengsche Melkcentrale)</u>			
1. Diemont	10	60	
2. Ramasari (B.H. Cramer)	20	95	
3. Tjipaganti (P.J. Streithorst)	35	140	
4. Frisia (J.J. van der Goot)	45	270	
5. Zaanland (B.F.E.R. Jansen Andeweg)	20	105	
6. Andir (E.A. Ritter)	60	280	
7. Oey Tjenpoen	20	80	
8. Tjibodas (F.A. Witbols Feugen)	45	270	
9. Sint Jozefs Hoeve (G.M. Godée)	20	125	
10. Lembangsche Melkerij Ursone	555	2500	
11. Tangkoeban Prahoe (Jhr. L.A.C.de Kock)	140	900	
12. Pondok Boewangbatoe (F.L. Ellwanger)	90	460	
13. De Kleine Hoeve (W.P.J.F. Fraayhoven)	45	150	
14. Tjisaroni (J. Stekkinger)	35	140	
15. E.J. Tremlet	30	105	
16. De Bataafsche Boer (G.D. Walter)	90	350	
17. W.A.J. Noordhoorn	25	50	
18. Timaroe (O.G.J. Uyleman)	85	270	
19. K. Mutschler	90	420	
20. Boerderij "Generaal de Wet" (Hirschland en van Zijl)	5 à 600	2600	
Total	2060	9370	4100

b. other licensed dairy farms in Bandung.

21. Lactasari (F.G. van der Elst)	25	100	
22. A. Rölle	10	40	
23. G.J. Weidema	10	50	
24. De Sierkan (C.L. Altheer)	30	200	
25 Alba (W.Ch. Nagel)	70	700	
26. C.C.W. Ch. Beck	8	50	
27. De Hoop (A. Jansz)	30	150	
28. Nieuwenhoorn (Dr. Ph. van der Poel)	35	200	
29. De Tjisaroea (F.H. Ungermaun)	60	460	
30. Dairy Aerd (C. van der Hoop)	35	150	
31. J.H. Wouters	70	175	
32. Almanak (W.G. Hoogland)	80	450	
		(75)	
	<hr/>	<hr/>	<hr/>
Total	463	3000	2600

c. dairy farms in the Regency of Bandung
not supplying milk to the city.

33. C.J. de Graaf	20	75	
34. G.J. Ling	20	75	
35. J. Timmermans	25	80	
36. Van der Lelij	10	40	
37. Döhne	15	50	
38. Van der Kolk	30	85	
39. P.A.W. Wouters	5	15	
40. J. Hoets	2	10	
41. Dr B. Vrijburg ²⁾	280	600	
	<hr/>	<hr/>	<hr/>
Total	407	1030	800
Total of the regency of Bandung	2930	13400	7500

1) Dairy farms of 10 cows or more.

2) Mainly a stock farm.

Source: A.R. Min. v. Kol., 1901-1945, verb.no. 3553, 23-3-1935, no. 13.

NOTES

1 THE STUDY

1 Jelliffe, 1971, p.153

A booklet that aroused public interest in the matter was a publication entitled "The Baby Killer", an investigation into the promotion and sale of milk powder in developing countries published by the British non-governmental organization War on Want (Muller, 1974). The German language version "Nestlé tötet Babies" caused the Nestlé court case in 1975. In the Netherlands two major critical reports have been published by the Commissie Justitia et Pax, 1980 and Landelijk Overleg Babyvoeding, 1982 on infant food promotion with particular reference to the role of the Dutch dairy industry.

Needless to say this criticism created uneasiness among the major food industries, and efforts were made to improve their image. The Pan American Health Organization and UNICEF sponsored a meeting of pediatricians and representatives of the infant food industry in Bogota in 1970. A first official statement containing recommendations directed to professional groups, government, and industry was the outcome of a conference in Paris in 1972, organized by the Protein Advisory Group of the United Nations. In 1974 a meeting with the infant food industry was held under the auspices of the PAG in Singapore, which led to the establishment of an "International Council of Infant Food Industries (ICIFI) in 1975 (PAG, 1975, pp.1-5; ICIFI, 1975, pp.4-5). The ICIFI is composed of a number of major food industries, and in november 1975 it prepared its own ethical code on the promotion of breast-milk substitutes, which was amended in 1976 (ICIFI, 1977, 1980). A joint WHO/UNICEF Meeting on Infant Feeding and Young Children held, in Geneva in 1979, made a detailed statement on infant and young child feeding and on appropriate marketing and distribution of infant formula and weaning foods. Based on the statement and recommendations of the WHO/UNICEF meeting, the World Health Assembly approved with an overwhelming majority an international code of marketing of breast milk substitutes on 21st May 1981.

The WHO code goes much further than the Ethical Code of the ICIFI in limiting the marketing of breast milk substitutes. Various milk products may be used by mothers for infant feeding depending on income and specific situation; condensed or evaporated milk, milk powder, and the very expensive infant formula.

To what extent inappropriate promotion activities of condensed milk and milk-powder are responsible for the present decline of breast-feeding is still a point of discussion. To such complex matter no direct answer can be given. Sufficient information is available to show that inappropriate food promotion activities have been employed. There is, however, a danger of overestimating somewhat the influence these promotion activities have had on changing food habits. A basic cause of the decline of breast-feeding seems to be the rapid changing socio-economic conditions of women and their households, particularly in urban situations. Increase in the workload of women in the household and income earning activities are detrimental to breast-feeding. (See e.g. Popkin and Solon, 1976, pp.160-162; Popkin, 1980, p.11; Vis and Hennart, 1978, p.205).

2 See e.g. Donath and Van Veen, 1936, "Onderzoekingen betreffende de volksvoeding in Nederlands-Indië gedurende de periode 1850-1919" and Van Veen, 1936, "De studie van de volksvoeding in Nederlands-Indië in de periode 1911-1935". Another good source is the annotated bibliography of Postmus et al. 1955.

3 Despite the strong involvement of the Dutch with nutrition research it should be realized that hardly any senior Indonesian staff was trained. When in 1950 the Nutrition Institute became controlled by the Indonesian government there was a lack of trained personnel to carry out the programmes (Soekirman, 1974, p.7).

2 SOME THEORETICAL CONSIDERATIONS ON CHANGING FOOD HABITS AND THE PLACE OF MILK IN THE DIET

- 1 den Hartog and Bornstein-Johansson, 1976, pp.113-115
- 2 Mead, 1962, pp.51-52
- 3 den Hartog, 1980, pp.298-301
- 4 Delmont, 1983, p.2
- 5 Harris, 1969, pp.9-14
- 6 Sauer, 1952, pp.28-29. See also Cranstone, 1969, pp.247-248 for the place of animals in present agricultural systems.
- 7 Clason, 1977, pp.81-91; Clutton-Brock, 1981, pp.66-70; Sauer, 1952, pp.84-85
- 8 Cole, 1970, p.21
- 9 Simoons, 1971, p.439
- 10 Sauer, 1952, p.87
- 11 Hahn, 1896, pp.89-103; Sauer, 1952, p.93
- 12 Isaac, 1971, pp.458-460
- 13 de Grooth and Verwers, 1984, pp.41-42
- 14 Whyte, 1974, p.17
- 15 Payne, 1970, pp.38-39
- 16 Simoons, 1974, pp.561-562
- 17 Ibid., 1973, pp.83-90
- 18 Brothwell and Brothwell, 1969, pp.50-52
- 19 Forde, 1961, pp.337-338
- 20 The Saami people, the preferred name for the Lapps.
- 21 Forde, 1961, p.367
- 22 Brothwell, 1969, p.50; Sauer, 1952, pp.92-93
- 23 The carbohydrate in milk is lactose which is a disaccharide. To be properly absorbed, lactose must be hydrolysed into its component sugars, glucose and lactose. Essentially, lactose is hydrolysed by the intestinal enzyme lactase, which is found in the brush border of mature villus cells in the small intestine. While lactase is found in all parts of the small intestine, it is mainly active in the jejunum, the part of the intestinal tract after the duodenum. Clinical consequences of feeding lactose to an individual with low intestinal lactase activity include bloating of the abdomen, flatulence, cramps, loose stools, diarrhoea and symptoms of malabsorption and discomfort. It is interesting to note that breast milk contains 7% lactose and cow milk 4.5%. It would appear that lactose intolerance occurs after the usual period of breast-feeding, probably after the second year of life.
- 24 This is named secondary lactose intolerance. Congenital lactose intolerance caused by absence of intestinal lactase is very rare and occurs immediately after birth.
- 25 See e.g. McCracken, 1971, pp.479-517; Simoons, 1970, pp.695-710 and Simoons, 1973, pp.595-611
- 26 Schafer, 1977, pp.105-106
- 27 Goody, 1982, p.107
- 28 Wheatley, 1965; see Part II, chapter 2.1
- 29 In some parts of West Africa an indigenous rice species can be found, Oryza glaberrima.
- 30 Schnell, 1957, p.45
- 31 Braudel, 1981, pp.108-109

- 32 Abel, 1974; Aymard, 1979, pp.5-8
- 33 See e.g. Tannahill, 1975, pp.257-296; Teuteberg, 1975, pp.86-87. For a theoretical analysis of technical artefacts see Bijker, 1984, pp.55-60.
- 34 Flinn, 1980, pp.71-74
- 35 Schumpeter, 1959, pp.88-89. Schumpeter's theory on economic development was first published in German in 1911 (Theorie der wirtschaftlichen Entwicklung) and revised in 1926. The English translation appeared in 1934.
- 36 Ogburn and Thomas, 1922, pp.83-94; Gilfillan, 1945
- 37 Ogburn and Thomas, p.92
- 38 Braudel, 1981, p.109
- 39 Slicher van Bath, 1978, p.29
- 40 Buchanan, 1982, pp.41-43
- 41 Hofstee, 1962, p.43
- 42 Rogers, 1983, pp.1-37
- 43 Grigg, 1982, p.155
- 44 Ibid., pp.154-166; Rogers, 1983, p.22
- 45 Hardeman, 1984, pp.15-18
- 46 Wiegmann, 1974, p.22
- 47 Goody has given an account on the adoption of industrial processed foods by the various classes in West Africa with particular reference to Ghana. (Goody, 1982, pp.175-190).
- 48 Ibid., 1982, p.174
- 49 Wigboldus, 1979, pp.19-20
- 50 Goody, 1982, pp.107-108
- 51 Cazanove, 1936, p.235; Craddock, 1983, pp.78-79

3 A NEW FOOD FOR URBAN CONSUMERS: CONDENSED MILK

- 1 Jagchid and Hyer, 1979, p.44
- 2 "They make provisions also of milk, thickened and dried to the state of a paste, which is prepared in the following manner. They boil the milk, and skimming off the rich or creamy part as it rises to the top, put it into a separate vessel as butter; for so long as that remains in the milk, it will not become hard. The latter is then exposed to the sun until it dries. Upon going on service they carry with them about ten pounds for each man, and of this, half a pound is put, every morning, into a leathern bottle, with as much water as it thought necessary. By their motion in riding the contents are violently shaken, and a thin porridge is produced, upon which they make their dinner" (Marco Polo, 1324; 1982 edn, pp.94-95). See also Devolder et al., 1984, pp.34-35
- 3 Drummond et al., 1958, pp.299-300
- 4 Bomgaars, 1955, pp.19-20
- 5 van der Woude, 1972, pp.567-568; Verdoorn, 1965, pp.248-250; Tosseram, 1936, pp.146-152
- 6 Bruijn and Lucassen, 1980, p.122
- 7 Ibid., pp.88-90; van Wersch and de Knecht-van Eekelen, 1973, p.359
- 8 Ibid., p.120; Leuftink, 1953, p.110
- 9 van Winter, 1955, pp.227-228
- 10 Gids, 1968, p.23
- 11 Corley, 1976, pp.13-14, see also Watt et al., 1981
- 12 Lief (not dated), p.7
- 13 Ibid., p.7
- 14 Drummond et al., 1958, p.318
- 15 Morris, 1958, p.42
- 16 Westermann, 1939, pp.17-20

- 17 In the Netherlands and Germany tin smiths originally came from the guild of lantern makers, who extended their activities to the making of household utensils (Westermann, 1939, pp.56-57).
- 18 Westermann, 1939, p.60
- 19 Ibid., 1939, p.56
- 20 Clark, 1977, p.9
- 21 de Haan, 1935, p.529
- 22 Ibid., p.529
- 23 Hobsbawn, 1969, p.50
- 24 Morris, 1958, p.42
- 25 Drummond et al., 1958, pp.321-322
- 26 Burnett, 1979, p.134
- 27 Tannahill, 1975, p.285
- 28 Teuteberg, 1972, p.83
- 29 Westermann, 1939, p.190
- 30 Ibid., p.201, 241
- 31 Ibid., p.191
- 32 Ibid., p.193
- 33 Clark, 1977, p.14
- 34 Ibid., p.27
- 35 This was due to the introduction of Bessemer's steel making techniques (1855) and was later followed by the Martins-Siemens technique (Westermann, 1939, p.45).
- 36 Clark, 1977, p.18
- 37 Grigg, 1974, pp.194-196. For the situation in the Netherlands CMC/Melkunie (1979, pp.11-71) and Tosseram (1936).
- 38 Hunziker (1946, p.34) listed a number of other inventors of preserved milk. In France these were Malbec in 1826 and Martin de Lignac in 1847. In 1835 Grimaud managed to condense milk by exposing a thin film flowing over an inclined surface to currents of fanned air. In the United States, William Underwood experimented with methods of preserving milk in 1835. The Englishman Newton condensed milk by adding sugar.
- 39 Drummond et al., 1958, pp.302-303
- 40 Hunziker, p.34
- 41 Root and de Rochemont, 1976, pp.159-160
- 42 Morris, 1958, p.35
- 43 Root and de Rochemont, 1976, pp.187-188
- 44 In the 19th century in the Netherlands and Belgium, as in other West European countries, there was a relation between breast-feeding and the level of infant mortality. Among population groups such as urban working-class women, where breast-feeding was often absent, infant mortality was sometimes more than 200 ‰. See e.g. Vandenbroeke et al., 1983, pp.85-115.
- 45 Heer, 1966, p.58
- 46 Morris, 1958, p.36
- 47 Hunziker, 1946, p.333
- 48 Morris, 1958, p.36
- 49 Burnett, 1979, p.144
- 50 Hesselink, 1913, pp.92-93
- 51 Budin began in Paris in 1891 and Hergott in Nancy in 1890 with a child health centre. There was also a political motive behind the setting up these centres. France was faced with a slowly declining population growth. In view of French-German rivalry, the French government was much concerned to reverse this trend. See e.g. Schilpzand and Uithof, 1980, p.112; Sussman, 1982, pp.165-166.
- 52 Teuteberg, 1981, p.290
- 53 Drummond et al., 1958, p.376
- 54 Heer, 1966, p.67

- 55 McCollum, 1957, pp.217-219
56 Ibid., pp.231-232
57 Ibid., p.276
58 Drummond et al., 1958, p.377
59 Ibid., p.378
60 Ibid., p.378
61 Wilson, 1970, p.73
62 Whetham, 1976, p.66
63 Ibid., p.67
64 Fussell, 1966, p.357
65 Roberts, 1973, p.105
66 Ibid., p.108
67 Hunziker, 1946, p.40
68 Bos, 1979, pp.64-65
69 de Jonge, 1976, pp.340-346
70 van Zanden, 1985, pp.346-347
71 Ibid., pp.46-47
72 de Jonge, 1976, pp.286-295; den Hartog, 1982, pp.60-63
73 de Vries, 1977, p.11
74 The batig saldo or profit policy of enforced cultivation of coffee, sugar and indigo by the cultuurstelsel or culture system on Java made a transfer of huge amounts of money to the Dutch exchequer possible. Between 1851 and 1860, 31.5% of the state revenues were derived from Java (See also Fasseur, 1975, pp.118-120).
75 van Zanden, 1985, pp.352-260
76 Bos, 1978, pp.226-231; Kenwood and Lougheed, 1982, p.27; van Zanden, 1985, pp.138-141
77 van der Poel, 1967, pp.176-178; van Zanden, 1985, pp.264-265
78 Sneller, 1943, pp.83-87; van Zanden, 1985, p.248
79 van Zanden, 1985, pp.246-247
80 See e.g. Wilson, 1970, pp.16-32
81 van Zanden, 1985, pp.273-276
82 Hylkema, 1922, pp.33-35; Minderhoud, 1943, p.407
83 Hollandia, 1932, pp.2-4
84 Eigen Haard, 1884, pp.28-33
85 Hollandia, 1932, p.11; It is of interest to note that Hollandia, originally set up to compete with the successful Anglo-Swiss, was taken over in 1929 by the Nestlé and Anglo-Swiss Condensed Milk Corporation after a period of 48 years of heavy competition (Hollandia, 1932, p.40).
86 Hummelinck, 1886, p.274
87 Ibid., p.271
88 Wilson, 1970, p.73
89 The "Leeuwarder IJs en Melk Produktie Fabriek" (Lijempf, 1937). Some other private milk condenseries in the Netherlands before 1914 were the British firm West Friesche Gecondenseerde Melkfabriek in Hoorn, the Jansen & Storms condensery "Neerlandia" in Wagenberg, Van Heels Condensed Milk Company in Naarden and Kampen, the firms Hoekstra and Excelcior in Woerden, and the Galak Condensed Milk Company of Rotterdam.
90 Heer, 1966, p.101
91 Ibid., p.101. The author however, does not spell out in which Asian countries the consumption of tea with skim milk increased.
92 Illustrative is the abortive attempt by a number of farmers in the Rotterdam region to set up a cooperative condensery in 1911. Despite promising perspectives it was a risky venture for small enterprises lacking the required capital. In 1919 the cooperative "Verenigde Zuivel-bereiders" was dissolved and transformed into a limited company (Geluk, 1967, pp.110-111). More successful was the cooperative dairy factory founded in Roosendaal in 1903. During 1911 and 1912 it developed into a

- condensery under the name "Het Anker" (Ibid., p.41). Another small cooperative factory was the condensery of Middelstum in the province of Groningen.
- 93 Croesen, 1931, p.182
- 94 Tjepkema, 1961, pp.58-59
- 95 Ibid., p.76
- 96 Hollandia, 1932, p.11
- 97 van Eekelen, 1984, p.253
- 98 Sneller, 1943, p.115
- 99 Vereniging van Fabrieken van Melkproducten
- 100 Tens of thousands of tonnes of condensed milk were stored in barrels in government warehouses. Storage of condensed milk in barrels was not new. In normal times when in the summer the milk supply was too big to handle, the milk surplus could be preserved in this way for utilization in winter. Due to the war circumstances, the period of storage had lasted too long and the organoleptic properties and microbiological quality of the milk deteriorated. Fermentation occurred and some barrels even exploded (Van Dijk, 1978, p.33).
- 101 Bomgaars, 1955, pp.62-63
- 102 A.Z. Melkhygiënisch Weekblad, 1917, pp.421-423
- 103 Tjepkema, 1963, p.87
- 104 Wagenaar, 1924, p.27
- 105 Sneller, 1943, pp.117-119
- 106 Tjepkema, 1963, p.153
- 107 During the occupation, evaporated milk became a substitute for the scarce and very expensive cream and, after 1945, when society returned to normal, it remained popular with the consumer. The Korean crisis had an unforeseen effect on the further development of this product. Because of shortages of raw materials manufacturers were not allowed to use tins for products destined for the domestic market. This resulted in the appearance of evaporated milk in small bottles (250 cc) in 1951. The introduction of evaporated milk into bottles for the use as coffee creamer made this product very popular in the Netherlands (Ibid., p.174, 178).
- 108 Bos, 1978, p.416
- 109 Ibid., p.252
- 110 In view of this, in 1923 the Linlithgow Committee conducted an elaborated inquiry into the methods and costs of distributing home produced milk and dairy produce in the United Kingdom (Imperial Economic Committee, 1926, p.20).
- 111 Nutrition, 1937, p.117
- 112 Forrester, 1927, p.viii
- 113 Imperial Economic Committee, 1926, pp.81-82
- 114 Milk Industry, 1927, no. 6, p.75
- 115 Ibid., 1922, no. 2, p.53, 55
- 116 Ibid., 1923, no. 12, pp.55-58
- 117 Ibid., 1927, no. 2, p.47
- 118 A.Z. Melkhygiënisch Weekblad, 1923, pp.278-280
- 119 Ibid., p.277
- 120 Officieel Orgaan, 1923, p.587
- 121 These periodicals are Het Algemeen Zuivel en Melkhygiënisch Weekblad of the private dairy industry and Het Officieel Orgaan (van den Algemeenen Nederlandschen Zuivelbond) of the federation of the Dutch Cooperative Dairy Industry.
- 122 Milk Industry, 1927, no. 2, p.47.
The sale of food and drugs act of 1899 prohibited the importation or sale of condensed separated or skim milk, except in tins or other receptables which bore a label on which the words "machine-skimmed" or "skim milk" were clearly displayed.

- 123 A.Z. Melkhygiënisch Weekblad, 1927, p.311
124 van der Molen, 1927, p.438
125 Gerritzen, 1929, p.3
126 Even two more recently published books on the development of milk condensing in the Netherlands do not take these nutritional aspects of skim milk into account. Dat is 't kondensfabryk, by Tjepkema published in 1963 on the occasion of half a century cooperative condensed milk industry in Friesland and the Nederlands Condensboek by van Dijk published in 1978 to celebrate the 25th anniversary of the Netherlands Association of Manufacturers of Condensed Milk.
127 Officieel Orgaan, 1922, p.169
128 Tjepkema, 1963, pp.99-102
129 Milk Industry, 1923, no. 2, p.71
130 Ibid., no. 3, p.43
131 Ibid., p.44
132 Arthur Neville Chamberlain was Minister of Health from 1924-1929 under the conservative government of Stanley Baldwin.
133 Milk Industry, 1928, no. 8, p.93
134 Officieel Orgaan, 1926, p.471
135 Ibid., 1927, pp.619-620
136 A.Z. Melkhygiënisch Weekblad, 1928, p.47
137 Milk Industry, 1927, no. 3, p.55
138 Quoted by Officieel Orgaan, 1929, p.356
139 See e.g. Tjepkema, 1963, p.124; Milk Industry, 1927, no. 6, p.51
140 Minderhoud, 1943, p.505
141 In the period 1930-1933 the Government tried, through a number of agricultural crisis acts such as the Crisis Dairy Act of 1932, to support the agricultural sector through price intervention in a number of commodities. After the failure of the international economic conference in London in the summer of 1933, the Government realized that more far-reaching measures should be taken. The Agricultural Crisis Act was proclaimed in 1934 and gave the Government the authority to regulate production, distribution, import and export, and the price of a great number of various agricultural commodities. A Crisis Dairy Board (Crisis Zuivel Centrale) became responsible for the execution of the measures in the field of dairying.
142 Wolmerstett, 1930, pp.294-299
143 Okkinga, 1930, p.620. Mr. P.Okkinga, director of the Cooperative Dairy Factory in Bedum.
144 Tjepkema, 1963, p.141
145 A.Z. Melkhygiënisch Weekblad, 1936, no. 53, p.443
146 Ibid., p.441
147 Ibid., p.440
148 Colenbrander, 1926, p.458
149 Gerritzen, 1929, p.3
150 Ibid., 1930, p.9
151 Officieel Orgaan, 1937, p.287
152 Ibid., 1937, p.289
153 Sparrius, 1948, p.90. Milk condenseries were major customers of the Dutch tin-plate industry. In the years before World War II about two-thirds of the export of tin-plate was used by the Dutch condensed milk industry (Roosenschoon, 1950, p.18).

4 DAIRYING AND THE USE OF MILK IN TROPICAL REGIONS

- 1 Hahn, 1896, p.77
- 2 South East Asia comprises roughly Burma, Thailand, Cambodia, Laos, Vietnam, Malaysia, Singapore and the Indonesian archipelago.

- 3 Burkill, 1951, pp.443-448
- 4 van Laanen, 1980, pp.254-255; see also Terra, 1953, pp.448-455; Ibid., 1958, pp.157-182
- 5 Whyte, 1974, p.17
- 6 Ibid., p.17
- 7 Forde, 1961, p.449; National Research Council (NRC), 1983, pp.7-13, pp.41-45.
The *Bos javanicus* is now the accepted name, other names used being *Bos sondaicus* or *Bos banteng*, Bali cattle for the domesticated form. Despite a cattle-like appearance, the animals are at least as genetically remote from cattle as is the bison. Both produce sterile males when hybridized with European cattle (NRC, 1983, p.7).
- 8 Wheatley, 1965, pp.577-590
- 9 van Leur, 1934, pp.133-134
- 10 Wheatley, pp.568-587
- 11 Ibid., p.587
- 12 Van Esterick, 1979, pp.9-10
- 13 Hahn, 1896, p.78; Sommerfeld, 1923, pp.187-188. In a study on livestock on the island of Madura he said that the aristocracy of Hindu descent kept milk as a privilege for themselves and forbade ordinary people to use it. Hence the milk drinking-habit did not touch the population, and in the long run dairying disappeared. He compared this with the milk-using Tutsi tribe of Rwanda and Burundi in East Africa. The aristocratic Tutsi invaders had for many centuries discouraged the use of milk by the subjected Hutu majority.
- 14 Broekmeijer (1855, p.16) reported that in Pasuruan, East Java, sheep and goats were raised for milk and meat. He did not state whether milk was used by Europeans or Indonesians. Bleeker (1845, p.417) mentioned that in Batavia goat milk was sometimes used by the population. One may wonder if this observation is fully correct. It is more likely that the author had Arabs in mind and not Indonesians.
- 15 Penning, 1910, p.347; van Hall, 1944, p.106
- 16 Dupuis, 1970, p.543
- 17 Gourou, 1959, pp.53-64
- 18 Aalfs, 1934, pp.40-41.
The following milk oblation was mentioned by Aalfs: *Wedija* (*naiwediam*) a kind of delicacy consisting of milk, sour milk, drawn butter, sugar and honey.
- 19 Leurink, 1946, p.352
- 20 Endendijk, 1980, p.541
- 21 Kok, 1921, p.17
- 22 NRC, 1983, pp.14-20
- 23 Kok, p.63
- 24 Veth (1875) in his classical study on Java wrote that, despite the presence of buffalos and cattle, milk was not consumed although the Javanese was not averse to butter.
- 25 Raffles, 1817, reprint 1965, pp.96-97
- 26 Wheatley, 1965, p.587
- 27 Ibid.
- 28 Poerbatjaraka, 1933, p.25 and in particular page 67.
"The influence of (common) food is exceeded eight times by flour. The power of flour is exceeded eight times by milk through continuous use. Milk is exceeded eight times by *sarpis* (*Ghee*) through continuous use".
- 29 Harmsen, 1953, pp.139-149; Kreemer, 1907, p.956; Ibid., 1956, pp.122-127; Lekkerkerker, 1916, p.88; Merckens, 1927, pp.133-136; Vink, 1941, p.164, 170
- 30 Baudet and Fasseur, 1977, p.328
- 31 de Graaf, 1955, p.153

- 32 Bontius, *Tropische Geneeskunde*, 1931, p.73, reprint of the 1769 English translation by Noteman in London of the Latin text published in 1642, Leiden by F. Hackius. Jacob Bontius (1592-1631) who can be considered as one of the first founders of the tropical medical sciences gave an account on two nutrition diseases; "weakness of sight" and beri-beri. According to Bontius blindness could be related to the eating of hot (temperature) rice. He was the first to give a medical description of beri-beri, which he related not to food but to the humid climate (pp.171-173, pp.107-111). On the significance of Bontius for the development of tropical medicine one may consult the introduction made by van Andel to the 1931 edition and Lindeboom, 1984, pp.342-346, 354-360.
- 33 Boxer, 1965, p.252
- 34 Dumasy, 1980, p.151
- 35 de Graaf, 1955, p.153. Dry cooked rice and a variety of meat and vegetable dishes form the constituents of rijsttafel. What is known as Indonesian cuisine was developed from the courts of Java. In particular the cuisine of Middle Java reached great refinement. The Javanese art of cooking incorporates Indian, Arabic and Chinese elements (Vuyk, 1973, pp.19-22).
In the Netherlands, the rijsttafel and in particular, some of its components, became popular only after 1945 during the process of decolonization. The repatriation of the Dutch and demobilization of Dutch conscripts who had acquired a taste for Indonesian foods during their service in Indonesia are major contributing factors.
In Suriname, a country with a comparatively sizeable population of Javanese origin, rijsttafel was not developed as such. The Javanese were taken to Suriname in the years after 1863 as contract labourers. Under these circumstances no specific cultural exchange took place between the Dutch and Javanese in Suriname. Outside the Netherlands and Indonesia the rijsttafel can be found in contemporary South Africa in the Cape among the population group of Malay descent. "A table laden with its many spiced dishes, its bowls of rice and its numerous condiments its suggestive of the Batavian rijsttafel, and is no less sumptuous a meal than the old Cape colonists used to enjoy in the nineteenth century" (Gerber, 1978, p.23). During the period of the VOC Malays were taken to the Cape. It was the Malay slaves who as domestic servants to the Dutch settlers developed the Cape version of the rijsttafel.
- 36 de Graaf, 1955, p.154
- 37 Bleeker, 1844, p.458
Piet Bleeker arrived in Batavia in 1842 where he was appointed as medical officer to the garrison. He was a close friend of Eduard Douwes Dekker, known as Multatuli (van 't Veer, 1977, p.49, 94).
- 38 Munnich, 1847, pp.170-171. G.J. Mulder (1847) in his study on nutrition in the Netherlands and the national spirit had a more scientific approach. A national diet low in proteins and based on potatoes was detrimental to the physical and mental development of the population.
- 39 Bleeker, 1844, p.459
- 40 C.L. van der Burg, *De geneesheer in Nederlandsch-Indie*, 1883, Volume 1. The book, published in Batavia, consists of three volumes. It was meant for physicians working in the archipelago. The author started his career as an army surgeon; later became a private physician and spent most of his life in Indonesia. He showed a great interest in Indonesian foods.
- 41 Scheltema, 1936, p.14
- 42 See e.g. Schellekens, 1980, pp.198-200
- 43 Nieuwenhuys, 1973, p.391
- 44 Baudet and Fasseur, 1977, p.328; Nieuwenhuys, 1973, p.342; Taylor, 1983, pp.128-129; Wertheim, 1948, pp.57-58

- 45 Nieuwenhuys, 1973, p.342; van Goor, 1979, p.285. This process of Europeanization was felt by Louis Couperus in 1922, when he revisited the country where he spent part of his childhood for the second time. "There is in the Indies a tendency to Europeanize the whole way of life.... Europeanization goes specially with the near abolishment of the rijsttafel. In former days the rijsttafel was the appropriate lunch, but during the last ten, fifteen years - who started it?!, - it has become the fashion to look down on it as unhygienic and Indonesian .." (Couperus, 1981, p.225).
- 46 Jansen, 1938, p.56
- 47 Bruijn and Lucassen, 1980, pp.113-114, 121
- 48 Schöffner and Gaastra, 1982, pp.221-222
- 49 Boekel, 1929, p.122
- 50 Ibid., p.122
- 51 van Heuven, 1928, pp.804-807
- 52 Bensen, 1854, p.305
- 53 Scheltema, 1931, p.250
- 54 Meilink-Roelofs, 1962, pp.286-287
- 55 Van der Chijs, 1885/1897, Nederlandsch-Indisch Plakaatboek, 1602-1811.
- 56 Ibid., part 1, p.283
- 57 Ibid., Part 2, p.495
- 58 Ibid., Part 8, pp.568-569, 817
- 59 de Haan, 1935, pp.527-528
- 60 Staat van den landbouw op Java, 1846, pp.61-64
- 61 Bleeker, 1845, p.417
- 62 Bensen, 1857, p.999; Bernelot Moens, 1860, p.425; Broekmeijer, 1855, p.16
- 63 Noordwijk and van der Weijde, 1856, pp.170-174, 178
- 64 Muller, 1845, p.352
- 65 Ibid., 1845, p.353
- 66 Bernelot Moens, 1860, p.425; Helfrich, 1859, p.327
- 67 Cayaux, 1883, p.317
- 68 't Hoen, 1920, p.460
- 69 de Haan, 1911, pp.538-562
- 70 Bontius, 1769, reprint 1931, pp.15-16
- 71 van der Chijs, Part 5, p.308
- 72 Quoted by Schoute, 1929, p.250 from a report by van der Parra, 30th December 1755. The Governor-General Mossel gave van der Parra (who himself became Governor-General from 1761-1775) the assignment of drafting a plan for economizing on the expenditure of the VOC in Batavia. Van der Parra also looked closely into the hospitals and recommended economizing on food purchases.
- 73 van der Chijs, Part 16, p.309, 311
- 74 Ibid., p.464, 466
- 75 Muller, 1846, p.523
- 76 Groothoff, 1901, p.266
- 77 Wetzelaar and Gieben, 1901, pp.270-281
- 78 van Maurik, 1897, pp.181-182
- 79 de Graaff, 1704, p.12. Nicolaus de Graaff made several voyages to the East Indies, 1644, 1688, 1676 and 1683.
- 80 The Bataviaasch Genootschap der Kunsten en Wetenschappen was founded in 1778 by a group of Dutch scholars and interested people.
- 81 Terne, 1814, pp.1-25
- 82 Ibid., p.2
- 83 Ibid., p.6
- 84 Ibid., p.8-9

- 85 Ibid., p.10. Nils Rosén von Rosenstein's (1706-1773) book "The diseases of children and their remedies" which was first published in Swedish in 1753, was translated into many languages; a Dutch version in 1768 and 1779 and an English one in 1776. It was the most authoritative book on paediatrics in the 18th century (von Rosenstein, 1977, reprint).
- 86 Hartshorn was formerly a chief source of ammonia and used for example in medical preparations for affections of the digestive tract (see also Bakker, 1928, pp.265-266); Terne, 1814, p.16
- 87 The physician Petrus Camper published a treatise on child education in 1763. He was in favour of milk for infant and child feeding and in particular of goat milk (see Burema, 1953, pp.205-206)
- 88 Terne, 1814, p.20
- 89 Ibid., p.22
- 90 Cayaux, 1883, p.304
- 91 van der Burg, 1883, p.240
- 92 Ibid., p.241; van Eekelen, 1984, p.239
- 93 Cone, 1981, p.5,7; van Eekelen, 1984, p.239; Wood, 1955, p.476
- 94 de Graaff, 1704, p.12; Terne, 1814, p.5
- 95 van der Stok, 1888, p.11
- 96 Sussman, 1982, pp.27-29, 182-185
- 97 van der Burg, 1883, p.240
- 98 van der Stok, 1888, p.17
- 99 Ibid., p.24
- 100 Cayaux, 1883, p.136; van der Burg, 1883, p.156; 1904, pp.123-124
- 101 Ibid., p.304
- 102 Boorsma, 1901, p.516

5 A DEMAND FOR FRESH MILK AND THE RISE OF MODERN DAIRYING UNDER TROPICAL CONDITIONS

- 1 van den Berg, 1976, p.9. Reprint of a paper "Een dag in Indië", anonymous, which appeared in a Youth Journal around 1885 in the Netherlands.
- 2 Lekkerkerker, 1938, p.676; Schrauwen, 1930, pp.129-130; Ibid., 1931, p.298
- 3 Lekkerkerker, 1938, p.676; Székely-Lulofs, 1942, p.60
- 4 van Dam, 1942, p.164
- 5 Lekkerkerker, 1938, p.676; Schoorel, 1889, p.270
- 6 Vrijburg, 1903, pp.15-34
- 7 Székely-Lulofs, 1942, p.60
- 8 Wormser, 1942, pp.302-303
- 9 Staat van den landbouw op Java, 1846, pp.61-64.
The report was prepared by a commission of agriculture (hoofdkommissie van landbouw) set up in 1826 by the Governor-General of the Netherlands Indies, Viscount L.P.J. du Bus de Gisignies. He showed great interest in the agricultural development of Java by private Europeans and enterprises (Stapel, 1941). The report was prepared in 1829 and finished in 1830, when the government was handed over to the new governor J. van den Bosch. It is of interest to note that the report was published in 1846 in Brussels in Belgium, du Bus's native country, three years before his death.
- 10 A search of the Veeartsenijkundige bladen voor Nederlandsch Indië (Veterinary Journal for the Netherlands Indies) of which the first issue appeared in 1886, showed that until early 1900, most contributions were written by military veterinarians and wholly or partially devoted to horses.
- 11 See e.g. Schat, 1905
- 12 Kraneveld, 1958, p.98
- 13 Merkens, 1923, p.19
- 14 de Blicck, 1927, pp.234-235
- 15 Vrijburg, 1887, p.172
- 16 Gouvernements Kommissaris inzake veepest; Kraneveld, 1958, p.101

- 17 Tuan dokter Snapphaan, which literally means Sir doctor matchlock.
- 18 Kraneveld, 1958, p.102; Vrijburg, 1914, pp.1104-1105
- 19 Merkens, 1923, p.31
- 20 Ibid., pp.37-38
- 21 van Dalfsen, 1906, pp.153-196. Neijtzell de Wilde, lecturer at the Training College for Indonesian Solicitors (Opleidingsschool voor Inlandse Rechtskundigen) in Weltevreden, wrote in his book on the welfare of the Indonesian population: "It is striking that Java, despite the presence of many Europeans, still produces no or hardly any butter, milk or cheese.." (Neijtzell, 1911, p.61).
- 22 't Hoen, 1906, pp.324-325
- 23 Merkens, 1923, p.22
- 24 Ibid., p.46. The farm Generaal de Wet was founded by two farmers from Transvaal (Hirschland and van Zijl) in 1903, who left their country after the Boer War. It became a major stock farm for dairy cows. 't Hoen, 1930, p.104.
- 25 E. van N.I., 1939, pp.1511-1512; Huitema, 1982, p.238, 262; Widodo et al., 1980, p.83
- 26 Merkens, 1923, p.44
- 27 Ibid., 1926, pp.525-516
- 28 Indische Gids, 1905, p.1529. Quoted from the newspaper "De Locomotief", 22 July 1905.
Modern well-known dairies on Java in the years 1920-1940 were: Unger in Weltevreden, Batavia; Generaal de Wet in Cisarua, Bandung, for both milk production and dairy cattle breeding; Gebroeders Ursone in Lembang; M.E. Bervoets of the Cultuuronderneming Djongrangan, Klaten which was very involved in cattle breeding; van Balgooy, Tegalsari, Purwokerto; van Lang in Garut; Jentink in Surabaya; and Couvreur of the Veeteeltonderneming Idjen on the Ijen Plateau ('t Hoen, 1920, p.461; 't Hoen, 1923, 34, p.465, 469; 't Hoen, 1930, p.104; Nederlandsch-Indische Bladen Diergeneeskunde, 1947, pp.220-221).
- 29 't Hoen, 1923, p.492
- 30 Hoover, 1924, p.74
- 31 Stapensea, 1915, pp.402-403; 't Hoen, 1923, p.492
- 32 Stapensea, 1915, p.403
- 33 't Hoen, 1923, p.493
- 34 Wetselaar and Gieben, 1901, pp.270-281; see also Weehuizen, 1918, pp.161-163.
- 35 Wetselaar and Gieben, 1901, p.279
- 36 van den Akker, 1929, pp.201-202, Kraneveld, 1958, p.107
- 37 't Hoen, 1923, p.492
- 38 De Locomotief, 1936, 20 July, p.3
- 39 Kraneveld, 1958, p.108
- 40 Raabe, 1920, p.1182
- 41 Kraneveld, 1958, p.108
- 42 Lobel et al., 1937, p.532
- 43 A.R. Min. v. Kol., 1901-'45, M.v.O. Residentie Batavia, L.G.C.A. van der Hoek, 29-5-1934, p.74
- 44 Nederlandsch-Indische Bladen Diergeneeskunde, 1923, p.473; 't Hoen, 1923, p.503
- 45 A.R. Min. v. Kol., 1901-'45. verb. no. 3762, 5-5-1938, no. 13; Leake, 1980, p.69.
- 46 de Haas and Meulemans, 1937, pp.1177-1178
- 47 Merkens, 1922, p.143; 't Hoen (1919, p.82) estimated the maximum milk production of a Javanese cow at 3 litres per day.
- 48 Ibid., 1949, p.28
- 49 Based on Indisch Verslag 1935, part II, p.231
- 50 't Hoen, 1923, p.464

- 51 Doeve, 1922, p.471
52 Bakker, 1945, p.2
53 Nederlandsch-Indische Bladen Diergeneeskunde, 1923, p.473
54 The commission was composed of A.H. de Jong, Controleur (District Officer) of Bandung, van den Akker, municipal veterinarian, J. Merkens, manager of the farm Gebr. Ursone in Lembang; Ibid., 1923, pp.473-481.
55 15 bottles is about 10 litres, 't Hoen, 1923, 34, p.469
56 Gonggrijp, 1934, p.74.
57 In 1924 the average income in Java and Madura could be estimated at f 296 a year. For civil servants this was f 1008, for labourers working in European enterprises f 445 and for irregularly employed workers f 125 a year (van Laanen, 1979, p.135).
58 A.R., Min. v. Kol., 1901-'45, M.v.O. Preanger Regentschappen, L. de Stuers, 1922, p.146; M.v.O. Midden Priangan, P.E.W. van Gesseler Verschuier, 30-9-1929, p.72; M.v.O. Priangan, J.H.B. Kuneman, 11-6-1933, p.41
59 Stapensea, 1926, p.415, 418. In the Netherlands, milk was sold raw to the consumers. In the 1880's some dairy plants started in one way or another with the pasteurization of milk. The first pasteurized milk in bottles appeared around 1887 on the market at the initiative of Forster, Professor of Medical Hygiene at the Amsterdam University (Mol, 1980, p.168). Milk sold directly from the churn by the vendors to the consumers continued to dominate the milk trade for many years to come.
60 Algemeen Landbouwweekblad, 1928, p.1632
61 Vrijburg, 1926, pp.481-482
62 Stapensea, 1926, p.418
63 Ibid., p.423
64 Ibid., pp.425-426
65 Ibid., pp.424-425
66 Morse, 1935, p.309
67 Vrijburg, 1926, pp.481-482
68 Ibid., p.487
69 Ibid., p.483, 487
70 Stapensea, 1927, pp.63-74
71 Algemeen Landbouwweekblad, 1931, p.679
72 't Hoen, 1923, p.464, Donath, 1938, p.1259
73 Schrauwen, 1931, p.297
74 Officieel Orgaan, 1933, p.430; The full name of the milk depot was Bandoengsche Melkcentrale, and it was run by the N.V. Maatschappij tot Exploitatie van Melkcentrales in Nederlandsch-Indië.
75 A.R., Min. v. Kol., 1901-'45, verb. no. 3553, 23-3-1935, no. 13
76 van den Akker, 1934, p.12
77 A.R., Min. v. Kol., 1901-'45, verb. no. 3553, 23-3-1935, no. 13; Officieel Orgaan, 1933, p.430
78 Officieel Orgaan, 1934, p.787
79 A.R., Min. v. Kol., 1901-'45, verb. no. 3553, 23-3-1935, no. 13
80 Ibid., verb. no. 3606, 21-12-1935, no. 23.
81 Archief CCF, letter from the Directeur of CCF to Internatio, 13 March 1935
82 Ibid.
83 Nederlandsch-Indische Bladen Diergeneeskunde, 1935, p.333, 338-339
84 Schrauwen, 1936, p.594
85 A.R., Min. v. Kol., 1901-'45, verb. no. 3492, 14-6-1934, no. 24
86 Algemeen Landbouwweekblad voor Nederlandsch Indië, 1940, p.280
87 For further details on the Volksraad see Chapter 7.3.
88 The motion was moved in August 1938 by the members Dr W.Ch.A Doeve, Batavia, P.A. Mandagie, Sulawesi, R.Ng. Djojo Achmed Hoedojo, Yogyakarta, and Mr Ko Kwat Tiong, Semarang. The motion was accepted with 31 in favour and 19 against. (Handelingen van de Volksraad, 1938-1939, 34e verg., 16 August, 1938, p.995).

- 89 van der Burg, 1904, pp.65-66
- 90 't Hoen, 1923, p.481
- 91 Merkens, 1949, pp.32-33, Leurink, 1946, pp.358-359
- 92 A.R., Min. v. Kol., 1901-'45. M. v. O. Residentie Krawang, J.J.A.A. Popelier, 11-10-1929, p.45; Algemeen Landbouweekblad, 1931, pp.1423-1424; Kempster, 1924, p.54; Lulofs, 1905, p.222
- 93 van der Burg, 1904, p.65
- 94 When considering goat's milk for infant feeding it should be remembered that the levels of iron, cobalt and folic acid are inadequate compared to cow milk. Infant feeding entirely based on goat milk will lead to severe anaemia. French, 1974, p.116; Schilpzand and Uithof, 1980, pp.93-95.
- 95 Donath, 1932, p.705
- 96 Shurtleff and Aoyagi, 1979, p.172
- 97 Quoted by Aykroyd and Doughty, 1969, p.52
- 98 Jansen and Donath, 1923, p.83
- 99 Donath, 1932, pp.728-729
- 100 Indische Gids, 1935, p.861; Bulletin Hyg. Organisatie, 1935, pp.1-10
- 101 Lanzing and van Veen, 1937, p.60; Bulletin Hyg. Organisatie, 1937, pp.3-5; The idea of soya milk as a substitute for cow milk remained for many years to come. In 1956 the English nutritionist Platt warned that the term soya "milk" was misleading as the product has nothing in common with cow milk (quoted by Aykroyd and Doughty, 1969, p.52)
- 102 Bulletin no. 26, Hyg. Organisatie, 1935, quoted by Lanzing and van Veen, 1937, p.60.
- 103 de Haas, 1935, pp.1685-1686; van Veen, 1937, pp.2814-2815
- 104 Nutrition, 1937, p.317
- 105 Lanzing and van Veen, 1937, p.60
- 106 Ibid., 1937, p.73

6 MILK PRODUCTS TO INDONESIA

- 1 Heer, 1966, p.68
- 2 In 1888 e.g. the Hollandia condensery sold sweetened condensed milk to boats with a service to the Indies (Hollandia, 1888, p.47).
- 3 Heer, 1966, p.104
- 4 Tjepkema, 1963, p.135
- 5 Centraal Kantoor voor de Statistiek, 1922
- 6 Nienhuis, 1906, p.97
- 7 Ibid., 1906, p.100
- 8 Heer, 1966, p.42
- 9 Cayaux, 1883, p.316
- 10 de Haan, 1935, p.529
- 11 Westermann, 1939, p.191
- 12 Ibid., p.201; The Aceh War was the longest of the colonial wars in which the Dutch were involved. It dragged on from 1873-1904, and in fact the Netherlands Indies government never succeeded in getting the area completely under control. For more details see the study by P.van 't Veer, 1969, De Atjehoorlog.
- 13 van der Burg, 1883, p.136
- 14 Cayaux, 1883, pp.318-319
- 15 Ibid. On page 318 the author gives the following figures:

2.5 litres fresh milk	135 g protein	97.5 g fat
2.5 litres diluted condensed milk	56.25 g protein	47.25 g fat
- 16 It is obvious that particularly in tropical countries, the development and practical application of the various techniques of freezing and chilling was a great asset in the conservation of perishable foods. In the 1830's several ice-making machines were developed in Britain and North

America. Around 1850 James Harrison from Glasgow who migrated to Australia, designed and improved an ether-compressor which made it possible to operate an ice factory. In the meantime Americans mastered a technique of exporting great blocks of natural ice from Massachusetts to as far away as Calcutta. Later on ammonia-compressors were used and ice-making and cool storage for perishable foods were improved (Tannahill, 1975, p.286). In the Netherlands Indies, Europeans first imported ice from the United States. A ship loaded with natural ice coming from Boston arrived accidentally in Batavia in 1846. From then on American ships with ice arrived regularly in Batavia and the government even introduced a bonus system to encourage ice imports. The ice was stored in a special ice house (Yshuis) in Molenvliet, Batavia where it was on sale to the public. Ice was sent to the interior in special ice blankets (de Haan, 1935, p.513). It is very likely that the making of ice cream in Indonesia began in this period. Before the arrival of natural ice, well-to-do European households had, in the 18th century, a side-board in their living room which was provided with a cooling tank. The cooling tank was filled with a mixture of saltpetre and water for chilling bottles of alcoholic beverages (de Haan, 1935, p.513). At the end of the 1870's there were already ice factories in major towns on Java, and in smaller places, small machines of Carré were being used by private individuals and sometimes by the government (van der Burg, 1883, pp.218-221).

In the homes of Europeans ice was used in the ice chests so that drinks and food could be kept cool. It was quite some time however before a refrigerator for domestic use was developed. Conditions became favourable when Westinghouse in North America (1880) introduced the Tesla electric motor. In Chicago in 1913, the first electric refrigerator for domestic use went on sale. The cooling unit however had to be put in a separate room or cellar because of its size, noise and the fact that sulphur dioxide was used as cooling fluid. The first self-contained refrigerators for domestic use were introduced on the market in Chicago in 1925, the Kelvinette electric and the Electrolux gas operating refrigerator (de Haan, 1977, pp.19-22). From then on the electric refrigerator became part of the standard equipment of North American households. In Western Europe, it remained a luxury item until the beginning of the 1950's. Europeans living in the tropics quickly realized the usefulness of this equipment. By the end of the 1930's a refrigerator or at least a simple ice chest where butter, milk and meat could be stored was quite common in most European households in the Netherlands Indies (Wormsen, 1942, p.298).

17 Baudet and Fasseur, 1977, p.328

18 Nienhuis, 1906, pp.94-95

The content of the tins was about 350 cc, 48 tins being packed in a crate of wood.

19 Sollewijn Gelpke, 1880, p.569

20 van der Burg, 1883, Volume I, p.136

21 Archief CCF, Internatio, Palembang, 20 juli 1937

22 Hoover, 1924, p.74

23 't Hoen, 1923, p.481

24 Straub, 1927, p.51, pp.57-63

25 Ibid., p.86

26 de Haas, 1932, p.5

27 Ibid., p.3

28 A personal communication made by Dr de Haas on August 1980.

29 de Langen, 1929, p.150

30 Rothe, 1935, p.7

31 Hoover, 1924, p.74

32 Donath, 1929, p.153

33 van Laanen, 1979, p.138

- 34 Wertheim, 1958, pp.128-129, 223
- 35 de Langen, 1929, p.150
- 36 Archief CCF, Internatio, Rotterdam, 24-8-1931, Batavia Kantoor.
- 37 Ibid., Palembang, 20-7-1931
- 38 Kwe-kwe, or local sweets.
- 39 Archief CCF, Hughes, letter no.122, Palembang en Djambi, 9-7-1937.
- 40 Teapot, sweetened condensed milk of the firm Fussel & Co., Hollandia which belonged to the Nestlé concern.
- 41 Archief CCF, Staverman, letter no.40, Pontianak, 9-9-1939.
- 42 Ibid., Semarang, 13-8-1939.
- 43 de Haan, 1935, p.513
- 44 van der Burg, 1883, p.221
- 45 Archief CCF, Ysmixtures, 5-1-1935, p.1
- 46 Ibid., pp.1-2. Before the coming of ice lollies, small entrepreneurs bought electrical refrigerators on instalment with the purpose of making little oblong blocks of ice with a flavour in the small freezing compartments. The ice blocks were wrapped in paper or carton and sold for the price of 1 cent each. As the refrigerator was destined for household use only, the production was low; 80 blocks in 3 hours. When the small Japanese ice-making machines (Kahuiki) were introduced, with a capacity of 3500 ice lollies a day, the making of ice blocks for sale disappeared (Archief CCF, Ysmixtures, 5-11-1935, pp.5-6).
- 47 Ibid., p.6
- 48 Ibid., p.5
- 49 Ibid, p.2
- 50 Archief CCF, Internatio, Rotterdam, 25-11-1931, rapport Batavia; Ibid., Internatio, Palembang, 20-7-1931
- 51 Ibid., Internatio, Rotterdam, 22-6-1935; Ibid., 15-5-1936, reisrapport Palembang, Benkoelen
- 52 Ibid., Hughes, Letter no.34, Bandoeng, 17-6-1939
- 53 de Haas and Meulemans, 1937, p.1179
- 54 Inter-island trade may have occurred, milk imported into Sumatra may have been later shipped to Java.
- 55 Blink, 1926, pp.128-129; Burger, 1975, Deel I, p.149; Geertz, 1963, pp.110-115
- 56 Rothe, 1935, p.7
- 57 Total number of inhabitants in 1930 according to the census was 60.7 million, and in 1938 estimated at 65.5 million. The milk production for 1935 was around 27.2 million litres per year and in 1938 around 29.8 million litres (see also Chapter 3.2). In the Netherlands data on food availability per caput per year (food balance sheet) have been collected from 1936/1938 onwards by the Ministry of Agriculture and Fisheries. As far as milk and milk products are concerned the figures per caput per year for 1936/38 are milk 165.3 kg, milk powder 1.5 kg and tinned milk 0.5 kg (Mulder, 1962, p.572).
- 58 Mulder, 1962, p.576
- 59 Ochse and Terra, 1934, p.143
- 60 Donath, 1934, pp.296-297
- 61 See also Chapter 7.1.
- 62 Loe Ping Kian, 1941, p.6
- 63 de Bruijne, 1985, pp.235-236; Gutkind, 1974, pp.24-27; King, 1985, pp.13-15
- 64 Tichelman, 1980, p.149, 167
- 65 Wertheim, 1951, p.31
- 66 Locher-Scholten, 1979, p.207
- 67 Gonggrijp, 1940, pp.182-183
- 68 Wertheim, 1951, p.31
- 69 Ibid., pp.34-35

- 70 Ibid., p.31; Ibid., 1958, pp.24-25, 30-31, 37-38; see also Boeke, 1931, p.2
- 71 Dumasy, 1980, p.155
- 72 In 1913 in Surabaya a medical school was opened for training, called "Indonesian physicians", and gave emphasis to the practical aspects of the medical profession (Nederlandsch-Indische Artsenschool, N.I.A.S.). This was anticipated by an earlier training institute for Indonesian physicians (School tot Opleiding van Indische Artsen, STOVIA).
- 73 Dumasy, 1980, pp.157-158.
- 74 McTurnan Kahin, 1980, pp.180-181
- 75 Ibid., p.179
- 76 Ibid., p.186
- 77 van Laanen, 1979, p.138
- 78 Schöffer, 1980, p.23
- 79 de Haas, 1936, p.630; Ibid., 1938, p.1476
- 80 van Stockum, 1938, p.857
- 81 Nationaal Rapport, 1937, p.126. As far as mother and child care of the plantation workers is concerned see e.g., Heinemann, 1935.
- 82 Gish, 1979, p.205
- 83 Mettau, 1984
- 84 Ibid., p.127
- 85 Posthuma and de Haas, 1940, pp.892-893
- 86 van Stockum, 1938, p.1
- 87 Habich-Veenhuijzen, 1920, p.85
- 88 Wille, 1933, p.283
- 89 In the Netherlands, for example in the province of Friesland, mothers had learned from experience that in the absence of breast milk, buttermilk was easily digested by infants. In 1771 the physician Petrus Camper stressed the importance of buttermilk as a basis for infant feeding. In 1865 A.M. Ballot pointed out to the medical profession the importance of buttermilk for infants below the age of one year. At the end of the 19th century, L. de Jager and Texeira de Mattos took the matter up again. In 1904 in the Netherlands the firm of Nutricia began with the production of a condensed buttermilk and in 1921 with an unsweetened product (Schilpzand and Uithof, 1980, pp.81-88); van Lookeren Campagne, 1942, pp.213-220).
- 90 Straub, 1927, pp.59, 61, 67
- 91 de Haas, 1932, pp.58-60; 1936, p.635; Meulemans and de Haas, 1940, pp.2466-2467
- 92 An account on the life and work of Dr de Haas is given by de Wijn, 1985, pp.218-219 and Dunning, 1977, pp.130-132
- 93 For more details on the preparation of soured milks for infant feeding in the tropics see de Haas and Meulemans, 1940, pp.59-73.
- 94 Personal communication made by Dr de Haas on 26-8-1980.
- 95 de Haas, 1949, p.85
- 96 Tesch, p.125
- 97 Ibid., p.38
The Hygienic Centre was part of a Study Ward for Hygiene under the auspices of the Queen Wilhelmina Institute for Hygiene and Bacteriology and the Medical School, Weltevreden, Batavia.
- 98 Ibid., p.111
- 99 Ibid., p.125
- 100 Nationaal Rapport, 1937, p.126
- 101 van Stockum, 1938, p.876. In the 1920's, milk kitchens were established in the out-patient departments of Semarang and in the Wilhelmina Ophthalmic Hospital in Bandung.
- 102 Nationaal Rapport, 1937, pp.178-179
- 103 van Stockum, 1938, p.860

- 104 Straub, 1927, pp.163-171; Sie Boen Lian, 1929, p.1099; de Haas, 1931, p.10
105 Wille, 1933, p.283
106 Posthuma and de Haas, 1940, pp.893-894
107 Ibid., p.895
108 McCollum, 1957, pp.234-235
109 Archief CCF, Hughes, Letter no.114, Batavia, 10-6-1937
110 Ibid., Internatio, Rotterdam, 24-5-1939
111 Wormser, 1942, p.330
112 Kamerling, 1980, p.218
113 Ballendux, 1951, pp.34-35
114 Burger, 1975, p.69
115 Schrieke, 1929, p.239
116 See e.g. Vleming, 1926, pp.193-203
117 Liem Twan Djie, 1947, p.66
118 Ibid., pp.67-70
119 Furnivall, 1939, p.432
120 Dairying however, was not entirely absent from Japan. There are indications that during early Buddhism, some cow milk had been used as the consumption of meat became prohibited. Gradually the milk-using habit faded away (A.Z. Melkhygiënisch Weekblad, 1913, p.294).

Modern dairying began in Japan after the enforced opening of the country in 1853 into the world economy. Gradually some European foods such as bread and milk were developed. Frisian and Holstein cattle were imported (A.Z. Melkhygiënisch Weekblad, 1913, p.294; Timmerman, 1985, p.225). In 1913 Nestlé opened in Japan a sales office (Heer, 1966, p.104). During the First World War, when overseas supplies became difficult, some Japanese firms started with milk condensing based on locally available raw materials (Schulz and Lembke, 1968, p.7). In the early 1930's Japan began to export milk products (Nederlands-Indische Bladen voor Diergeneeskunde, 1937, pp.24-25). In the Netherlands Indies, Japanese firms tried to promote sweetened condensed milk in the Japanese owned tokos. Brand names included Spoon, Weegschaal, Olympic, Angel and Morinage (Archief CCF, Leeuwarden, Staverman, letter no.38, Surabaya, 3-8-1939). On the whole, the Japanese presence in milk products remained modest.

- 121 A.R., Min. v. Kol., 1901-'45, verb. no.3465, 20-2-1934, no.19
122 Ibid., verb. no.3654, 19-10-1936, no.4
123 H. v.d. Vr., 33e verg., 14 August, 1936, p.947
124 A.R., Min. v. Kol., 1901-'45, verb. no.3654, 19-10-1936, no.4
125 Cayaux, 1883, p.314
126 Lulofs and van Vuuren, 1918, p.25
127 Heer, 1966, p.101
128 Hoover, 1924, p.74

In 1924 in Batavia the following milk brands could be found: Milk Maid (sweetened condensed milk, evaporated milk), Lion (sterilized milk), Danish milk (sweetened condensed skim milk), Bear (sterilized milk, evaporated milk), Hollandia (sterilized milk, sweetened condensed milk, evaporated milk), Nutricia (sterilized milk, evaporated milk), Picnic (sterilized milk).

- 129 Officieel Orgaan, 1932, p.454
130 Tjepkema, 1963, p.132
131 Ibid., p.134
132 Archief CCF, Hepkema Rapport Indische Reis, 1930, pp.7-8
In the era of the passenger ships from Europe to the Netherlands Indies, the island of Sabang was the first point of entry, after the port was established in 1896.
133 Tjepkema, 1963, p.134
134 Ibid., p.135

- 135 Archief CCF, Hepkema, Rapport Indische Reis 1930, p.6. When Hepkema visited Colombo, one of the managers of the Holland Ceylon Handel Maatschappij, Barten who worked for Nestlé in Java, supplied him with information on Nestlé.
- 136 Ibid., p.21
- 137 Ibid., p.22
- 138 Ibid., p.23. Prolonged storage of sweetened condensed milk under high temperature for any considerable period of time caused the milk to darken in colour, thicken, show mold buttons and develop a stale flavour. This may happen when a shipment of condensed milk is placed on board too close to the boiler room, and remains for a long period in a hot store room or at the port of entry or in shops.
- 139 Archief CCF, Hepkema, Rapport Indische Reis, 1930, p.22
- 140 Ibid., p.24
- 141 Ibid., pp.24-25
- 142 Ibid., p.25
- 143 Ibid., p.28
- 144 Ibid., p.29
- 145 The N.V. Internationale Crediet- en Handels-vereiniging "Rotterdam", (Internatio) was created in 1863 with the main office in Rotterdam. The firm originally intended to trade with countries both in Asia and Latin America. However it gradually concentrated its efforts on the Netherlands Indies. There it became one of the major importing and exporting firms, with interests also in plantations. In 1864, an office had already been opened in Java. In 1938 the firm had 14 offices in the archipelago including ones Batavia, Bandung, Cirebon, Semarang and Surabaya on Java. An office in Singapore ensured that the firm gained hold on the import and export of products from Netherlands Indies through an international trading centre (Gedenkboek, 1938).
- 146 Stout, 1963, p.35
- 147 Tjepkema, 1963, p.133
- 148 Archief CCF, Hepkema, Med. Alg. Verg., 7 November 1930
- 149 Ibid.
- 150 Tjepkema, 1963, p.135
- 151 Archief CCF, de la Mar, 1931, p.6
- 152 Ibid., Hepkema, Rapport Indische Reis, 1930, pp.11-12
- 153 Ibid., de la Mar, 1931, p.7
- 154 Ibid., p.10
- 155 Ibid., p.10
- 156 Ibid., p.12
- 157 Ibid., p.11
- 158 Ibid., p.17
- 159 Ibid., p.17
- 160 Ibid., p.20
- 161 Ibid., p.19. In 1933 Internatio made a collection of medical references on sweetened condensed milk from a group of nine Dutch, Chinese and Indonesian physicians working in the Indies as general practitioners or in hospitals. The references were written in Dutch, Malay and Sundanese. After having praised the quality of the product, five physicians stated that it was very suitable for child feeding, two that it was suitable for infant feeding and two for the feeding of patients in general. Only one physician stated that it could be used for bottle feeding infants (Archief CCF, Internatio Certificaat, gecondenseerde gesuikerde volle melk, 1933).
- 162 The CCF activities were of course not restricted to the Netherlands Indies and the adjacent Strait Settlement and Federated Malay States. In 1932 and 1933 the markets of the Far East were explored by T.H. Hughes. In China and Hongkong the brand name Longevity became well known. Bouwes, in

- close cooperation with the trading-firm Wise & Co. in Manilla, intensified the sale in the Philippines in 1938 (Tjepkema, 1963, pp.146-151).
- 163 Tjepkema, 1963, p.145
- 164 Ibid., p.145
- 165 The animation film "Avonturen van Ko de Koe", was one of the early animation films in the Netherlands. It shows how Ko the cow, sleeping in a hammock, receives an urgent cable to send tinned milk to the Netherlands Indies. A rocket brings her to the tropics. Ko pays a visit to a sanatorium and gives back health to weak boys by offering a tin of evaporated milk. The black and white film ends with a hand coloured Frisian Flag, the Tjap Bendera! The film is still in good condition in the archives of CCF. Thanks to the courtesy of CCF we were able to see it on a video tape (Archief CCF, Avonturen van Ko de Koe, 1937).
- 166 Archief CCF, Letter Internatio, Batavia, 16-3-1931
- 167 Ibid., 24-8-1931
- 168 The word Anak Mas means a favourite or favoured child. According to Max Havelaar (Eduard Douwes Dekker) the word originally meant a slave who was not bought but born in the house of his master. It was also used for children who were educated as favourites in the house of a lord, or for an adopted child (Wertheim, 1978, p.49).
- 169 Archief CCF, Staverman Letter no.7, Medan, 22-12-1938
- 170 Ibid.
- 171 Ibid., letter no.11, Medan, 3-2-1939
- 172 Ibid., letter no.12, Medan, 10-2-1939
- 173 Ibid., 10-2-1940
- 174 Ibid., letter no.23, Medan, 17-4-1939
- 175 Ibid., letter no.33, Batavia, 10-6-1939
- 176 Ibid., Semarang, 19-3-1939
- 177 Kopi tubruk is prepared by putting ground coffee beans in a cup, pouring boiling water on and adding sugar.
- 178 Archief CCF, Staverman, Semarang, 13-8-1939
- 179 Ibid., letter no.32, Batavia, 31-5-1939
- 180 Ibid., Friesche Vlag Kookboek, Leeuwarden CCF, 1st print 1936, 2nd print 1940, p.281
- 181 Tjepkema, 1963, p.145
- 182 The consumer was advised to shake the tin well before opening. This was necessary because of a precipitation of chocolate particles (Archief CCF, Friesche Vlag Kookboek, p.45).
- 183 Archief CCF, Internatio, Palembang-Ben Kulen, 15/28 -4-1936
- 184 Ibid., Internatio, Batavia, 26-6-1936
- 185 Ibid., Internatio, Batavia, 26-6-1936
- 186 Ibid., Staverman, letter no.35, Ceribon, 27-5-1939
- 187 Ibid., letter no.39, Semarang, 24-8-1939
- 188 Information obtained from various informants who lived in Indonesia before 1942.

7 THE SWEETENED SKIM MILK QUESTION

- 1 Blussé, 1985, pp.72-74; Burger, 1975, I, p.59
- 2 de Vries, 1937, p.148
- 3 Ibid., p.151
- 4 Ibid., p.153
- 5 Gonggrijp, 1955, p.166
- 6 Ibid., p.169; Fasseur, 1975, pp.85-90
- 7 Ibid., p.172
- 8 Geertz, 1963, p.84
- 9 de Vries, 1961, pp.268-270

- 10 Under the leadership of the Resident, H.E. Steinmetz, the inquiry began in 1904 and was completed in 1914. The findings were published in 12 Volumes (Onderzoek naar de mindere welvaart). A summary of the studies was prepared by Hasselman in 1914.
- 11 Nieuwenhuys, 1973, p.310
- 12 Locher-Scholten, 1979, p.209
- 13 Overzicht, 1938, p.16
- 14 van Doorn, 1982, pp.4-5, 15-21
- 15 This support from the State of the Netherlands was rather modest compared with the profit made during the period 1851-1870 on the government products of the culture system. This has been estimated at a f 491 million (Fasseur, 1975, p.118).
- 16 Creutzberg, 1974, p.xxix
- 17 Lulofs and van Vuuren, 1918
- 18 Ibid., p.25
- 19 Scheltema, 1936, pp.12-17
- 20 See also van Laanen, 1980, pp.260-261
- 21 See also Wigboldus, 1979, pp.19-20
- 22 Geertz, 1963, pp.80-82
- 23 van Laanen, 1980, pp.258-260
- 24 Creutzberg, 1974, p.xxxii
- 25 Postmus et al., 1949, p.231
- 26 Ibid.
- 27 Donath, 1936, p.480
- 28 Creutzberg, 1974, p.xxxiv
- 29 Indische Gids, 1939, pp.1029-1030; Postmus and van Veen, 1949, p.231
- 30 Gish, 1979, p.205; King, 1985, pp.24-25
- 31 See e.g. the study by Schoute (1935) on medical science in the Netherlands Indies during the 19th century, and Jonkers, 1948, pp.193-204.
- 32 Donath, 1936, p.491; Donath and van Veen, 1945, pp.75-78
- 33 Donath and van Veen, 1936, pp.112-113
- 34 Eijkman always doubted whether or not a relation existed between the incidence of beri-beri and the absence of a certain unknown substance in an unbalanced diet based on polished rice. It was the health superintendent A.G. Vorderman who in 1894 made a survey on the incidence of beri-beri in the prisons of Java and Madura and demonstrated a relation between the type of rice diets and beri-beri. Grijns and not Eijkman developed the idea, based on experimental work of feeding chickens on diets of rice and beans, that beri-beri was not an infectious disease but a nutritional disorder. Eijkman however, received the Nobel Prize in 1929 and hardly any reference was made to Grijns' original ideas (Reith, 1971, pp.180-195).
- 35 Ibid., p.186
- 36 Postmus and van Veen, 1949, p.231
- 37 See e.g. van Veen, 1936, pp.136-138; 1950, pp.374-383
- 38 van Veen, 1950, p.125
- 39 The idea of a Nutrition Institute for the benefit of the Indonesian population was not new. In 1919 the Association for the Study of Colonial Social Problems (Vereeniging voor Studie van Koloniaal Maatschappelijke Vraagstukken) recommended the establishment of an institute for the study of the composition of the nutrition of the Indonesian population (Smits, 1919, p.148). This recommendation should be seen in the context of food supply difficulties during the First World-War. In the Netherlands however, it led to the creation in 1919 of the Netherlands Nutrition Institute (Nederlands Instituut voor de Voeding, NIVV). But the hard lessons of the First World War were soon forgotten, and when faced with financial constraints in the early 1930's, the NIVV had to close its

laboratory. In 1938 Dr B.C.P.Jansen managed to revive the Institute in Amsterdam (Dols, 1979, p.219). This means that, seen in absolute terms, the nutrition studies programme of the Nutrition Institute in Indonesia was more extensive in the years 1934-1942 than its counterpart in the Netherlands.

There were various research institutes which dealt with the food and nutrition of the population. In the first place there was the Medical Laboratory (Geneeskundig Laboratorium) in Weltevreden, Batavia which has been established in 1888. In 1937 the name was changed to Eijkman Institute. The laboratory had an advisory function and carried out for the government and private institutions hygienical, bacteriological, serological, parasitological and chemical studies. Eijkman and Grijns were associated with the Medical Laboratory. In 1926 Jansen and Donath succeeded in their laboratory to isolate the vitamin B₁ in the crystal form. They began with laboratory production of cheap vitamin B₁ tablets. The chemical laboratory in Buitenzorg of the Department of Economic Affairs and the chemical laboratory of the Medical School were involved in analyses of Indonesian foods. The Nutrition Institute which began as a private organization, was logged in a wing of the Medical Laboratory and in 1940 it came under the Public Health Service (See also van Veen, 1950, pp.374-383).

- 40 Donath, 1936, pp.493-494
- 41 Postmus, 1939, p.416
- 42 For an extensive review of the dietary surveys before 1940 one may consult Postmus and van Veen, Dietary Surveys in Java and East-Indonesia, 1949.
- 43 Creutzberg, 1974, pp.454-462
- 44 E. van N.I., 1932, p.796
- 45 E.g. W.F. Donath, B.C.p.Jansen and A.G. van Veen were members of the Food Commission.
- 46 E. van N.I., 1932, p.796
- 47 Voorschriften voor het onderzoek en beoordeling van levensmiddelen, I. Melk.
- 48 Artikel 386 Indisch Wetboek van Strafrecht. See also Rothe, 1935, p.4. This article of the Penal Code prohibited adulteration of food, drinks and medicines, but not statements which were false and misleading. In the Netherlands, a modern food law and a network of food control services were only established in 1919.
- 49 Rothe, 1935, p.6
- 50 Indisch Staatsblad, 1935, no.161 (E. van N.I., 1939, p.1783)
- 51 Rothe, 1935, pp.9-10
- 52 Ibid., p.13
- 53 Ibid., p.14
- 54 E. van N.I., 1939, p.1783
- 55 Tiddens, 1936, p.253
- 56 Milk Industry, 1924, p.25
- 57 A.Z. Melkhygiënisch Weekblad, 1928, p.31
- 58 Donath and van Marle, 1931, p.296
- 59 Donath, 1929, pp.152-211
- 60 Small birds were used, *Munia maja* and later *Munia Leucogastroides*.
- 61 See e.g. first address as Professor of Chemistry at the Medical School in Batavia (Donath, 1931) and de Langen, 1957, pp.154-156.
- 62 Donath, 1929, pp.210-211
- 63 de Langen, 1929, p.150
- 64 Cayaux, 1883, p.320
- 65 de Haas and Meulemans, 1937, pp.1168-1186. An English version of the paper appeared in 1937; Ibid., pp.48-59.
- 66 de Haas and Meulemans, 1937, p.1175
- 67 Ibid., pp.1179-1180

- 68 Donath and van Marle, 1931, pp.295-297
69 de Haas and Meulemans, 1937, p.1180
70 Ibid., p.1180
71 Ibid., p.1184
72 Sluiter, 1937, pp.3376-3378
73 It was Dr de Kadt who laid the foundation for the research work of CCF. Because of the brutal violence of the Nazi occupiers against the Jewish population Dr de Kadt and his family decided to take their own lives (Tjepkema, 1963, p.164).
74 de Kadt, 1937, pp.2818-2826
75 de Haas, 1937, pp.2827-2828
76 Ibid., p.2828
77 De voedingstoestand van gezinnen van ondersteunde Utrechtse werkloozen in 1935-1936. Gemeente Utrecht, 1937, p.118.
78 Baart de la Faille, 1937, pp.3060-3061
79 A.R. Inventaris van het familie-archief, Baart de la Faille, A.R. 2.21.15
80 Müller, 1937, pp.3237-3238
81 Ibid., p.3237
82 de Haas, 1937, p.3287
83 Ibid., 1938, pp.204-205
84 Ibid., 1937, pp.3043-3045; de Haas et al., 1940, pp.939-940
85 Donath, 1938, pp.1258-1267
86 Donath, 1936, p.481. It seems that the average real income of the Indonesian population was less effected by the crisis than is often thought (Polak, 1943, pp.81-83).
87 See the historiographical introduction by Wigboldus in the study by Burger, 1975, pp.xxiii-xxiv; Indische Gids, 1933, pp.265-267; Ibid., pp.469-471; Koloniaal Tijdschrift, 1937, pp.665-666.
88 Donath, 1936, p.480-481.
89 Ibid., 1938, p.1267
90 Advies van het Instituut voor Volksvoeding, 1938, pp.1406-1407.
91 Loe Ping Kian, 1941, pp.1-6. Sin Po was a newspaper for the Chinese community and had a policy of non-cooperation with the authorities and was greatly oriented to China (Writser, 1936, p.93).
92 Ibid., p.6
93 Ibid.
94 Gonggrijp, 1955, p.185; van der Wal, 1982, p.206
95 van der Wal, 1982, p.204
96 The Indonesian members were elected by the various local councils of twelve constituencies. The Dutch and foreign orientals were elected by their respective representatives of local councils in the whole of the archipelago.
97 Furnivall, 1939, p.282
98 van der Wal, 1982, p.206
99 van den Akker, 1934, p.11
100 Dr W.Ch. A. Doeve, retired inspector of the Veterinary Service, Batavia, member of the Volksraad after 1935.
101 H. v.d. Vr., 1936-1937, 7e verg., 10 juli 1936, p.104
102 Ibid., 31e verg., 12 aug. 1936, p.884
103 Ibid., 33e verg., 14 aug. 1936, p.946
104 Ibid., 1937-1938, 16e verg., 21 juli 1937, p.360
105 Ibid., p.361
106 Ibid.
107 Ibid., 28e verg., 6 aug. 1937, p.777
108 Ibid., 1938-1939, 12e verg., 18 juli 1938, p.287
109 H. Kruyne, Physician in Malang and member after 1935 of the Volksraad; H. v.d. Vr., 1938-1939, 17e verg., 26 juli 1938, p.425
110 H. v.d. Vr., 1938-1939, 18e verg., 27 juli 1938, pp.460-461

- 111 Ibid., 25e verg., 5 aug. 1938, p.706
112 Ibid., p.707
113 Ibid., 1939-1940, 14e verg., 21 juli 1939, p.349
114 Ibid., p.350
115 Dr H.J. van Mook became in December in 1941 Lieutenant Governor-General. He played an important role in the decolonization process of Indonesia in the years 1945-1948. See e.g. Bijkerk, 1982.
116 H. v.d. Vr., 1939-1940, 26e verg., 8 aug. 1939, p.749
117 Ibid., 27e verg., 9 aug. 1939, p.807; Ibid., 29e verg., 11 aug. 1939, pp.865-866
118 Ibid., 27e verg., 9 aug. 1939, p.807
119 Ibid., 34e verg., 17 aug. 1939, p.1032
120 Ibid., 64e verg., 8 febr. 1940, p.1603
121 Ibid.
122 Ibid.
123 Quoted from Loe Ping Kian, 1941, p.6
124 de Haas et al., 1940, p.928; Loe Ping Kian, 1941, p.6. The Balinese Tjokorde Gde Rake Soekawati became President of the State of Eastern Indonesia in 1946, which formed a part of the short-lived Federal State of Indonesia.
125 van Stockum, 1938, p.862
126 Ibid., pp.869-871
127 Ibid., p.872
128 de Haas et al., 1940, pp.928-950
129 Ibid., p.930
130 Ibid., p.939
131 van Stockum, 1938, p.876
132 Archief CCF, Hepkema Rapport Indische reis, 1930, p.28
133 Ibid., Internatio Rotterdam, 1930
134 Ibid., Hugues letter no.108, Batavia, 1-6-1937
135 Ibid., letter no.119, Batavia, 5-7-1937
136 Ibid., letter no.123, Batavia, 12-7-1937
137 Ibid., letter no.125, 15-7-1937
138 Ibid., letter Directeur, 26-8-1937 aan I.V.V., N.O.I.
139 Dr C.D. de Langen was appointed in 1914 as a lecturer at the School tot Opleiding van Indische Artsen (Stovia), the Training Institute for Indonesian Physicians in Batavia. He was very much involved in scientific and public health activities. In 1927 he became Professor of Internal Medicine at the newly created Medical School in Batavia and in 1938 he took a professorship at the University of Utrecht in the Netherlands (Im Memoriam, 1967, pp.221-223). Dr A. ten Bokkel Huinink was the first Professor of Pediatrics at the Medical School in Batavia. In 1933 he left the Medical School to take up the same post at the University of Utrecht (Van Eekelen, 1960, pp.45-47).
140 The text was: "Ongeschikt voor zuigelingen, tida terpakai boewat baij".
141 Archief CCF, letter Directeur, 26-8-1937 aan I.V.V., N.O.I.. Unfortunately a reply from the Nutrition Institute could not be found.
142 Dr Bais was very much interested in nutrition and during the internment of the Dutch in the Japanese period he pointed out to his fellow prisoners the deficiencies of the camp diet (van der Velde, 1982, p.110).
143 Archief CCF, Staverman, letter no.51, Medan 18-3-1940
144 Ibid.
145 Ibid.
146 Ibid.
147 Muller, 1974
148 Craddock, 1983
149 Ibid., pp.66-67
150 Ibid., pp.80-81

- 151 Officieel Orgaan, and the Algemeen Zuivel en Melkhygiënisch Weekblad
- 152 Officieel Orgaan, 1933, p.446
- 153 Algemeen Zuivel en Melkhygiënisch Weekblad, 1936, pp.440-441
- 154 Sluiter, 1937, pp.3376-3378
- 155 Internatio had a subscription to a press clippings service "N.V. Nederlandsch Indisch Persarchief, NIPA", in Batavia, covering Dutch and Malay language newspapers. It is very likely that clippings with information about tinned milk were sent to CCF in Leeuwarden. Among the various clippings available in the CCF Archief only a few on the skim milk question could be found. The newspapers, the Locomotief and Java Bode were searched in the Royal Tropical Institute in Amsterdam.
- 156 De Locomotief, Overzee editie voor Nederland, 22 juli 1939
- 157 Archief CCF, Internatio, Rotterdam, 4-8-1931
- 158 Nederlandsch-Indië, 1937, 15 april, p.58
- 159 van Helsdingen, 1938, pp.82-83
- 160 Archief CCF, Indische Courant, 9-1-1939.
- 161 See e.g. the study by Zwaan, 1980.

8 POSTSCRIPT: MILK IN MODERN INDONESIA

- 1 Leake, 1980, p.69
- 2 Nederlands-Indische Bladen Diergeneeskunde, 1947, p.220
- 3 Ibid., pp.220-221
- 4 Tjepkema, 1963, p.171
- 5 Stout, 1963, p.45; Tjepkema, 1963, p.188
- 6 Soetrisno, 1983, p.35
- 7 Dick, 1985, p.74
- 8 Sadli, 1983, p.60. For a discussion on the development of an Indonesian middle class, its position and stability, one may further consult the Muhaimin papers (1983, pp.22-32) and Wirosardjono (1983, pp.61-63).
- 9 Dick, 1985, p.74
- 10 Van Esterick, 1979, p.2
- 11 Freedman, 1955, p.53; Palte and Tempelman, 1981, p.81
- 12 Everitt, 1978, pp.85-86; FAO/DANIDA, 1984, pp.46-48; Leake, 1980, pp.69-70; Tjokrooesodo and Grossman, 1975, pp.45-52; Widodo et al., 1980, p.83, pp.95-96.
- 13 Tjokrooesodo and Grossman, 1975, p.46
- 14 van den Berg and Zemmeling, 1980, p.12
- 15 van den Berg, 1984, p.623
- 16 Feasibility Study, 1982, pp.1.10-1.11
- 17 Ibid., pp.9.3-9.5
- 18 Zemmeling, 1983, pp.22-23
- 19 Lebdosoekojo, 1982, pp.79-83
- 20 Huitema, 1982, pp.276-277; Tjokrooesodo and Grossman, 1975, p.50
- 21 Leake, 1980, p.69
- 22 Sarma and Yeung, 1985, p.78
- 23 Schenk, 1973, p.445. In 1958 in the Netherlands the problem arose as to whether or not Dutch firms should be involved in foreign countries in the production of filled milk. In the same year in the Philippines the CCF assisted the firm Milk Industries in the production of filled milk in tins based on imported dried skim milk and local fats of vegetable origin. However, the Quality Control Station of Dairy Products imposed an export embargo with the justification that under these circumstances the purity of dairy export was at stake. In view of the serious consequences for dairy export the Minister of Agriculture approved this type of export activities (Tjepkema, 1963, pp.197-198).

- 24 The method of producing sterile milk called ultra-high temperature treatment (UHT) came into commercial use around 1956, when special carton containers and machinery had been invented which made aseptic filling possible. UHT milk enjoys most of the advantages of pasteurized or conventionally sterilized milk and has few of their inconveniences. It has a long lasting quality and, compared with sterilized milk, hardly any cooking flavour (Kon, 1972, pp.24-25).
- 25 Leake, 1980, pp.69-70.
- 26 Devendra, 1979, p.37, 39; Soedjana and Knipscheer, 1984, p.13; Tjokrohoesodo and Grossman, 1975, p.46
- 27 Tjokrohoesodo and Grossman, 1975, p.50
- 28 Harmsen, 1954, p.188
- 29 Freedman, 1955, pp.64-65
- 30 Ibid., p.65. An apparently well known dairy farm in Pasar Minggu was De Friesche Terp, Hemera Zoa, 1954, pp.88, 160, 404
- 31 Van Esterick, 1979, p.8
- 32 Ibid., p.9
- 33 van den Berg and Zemelink, 1980, pp.13-14
- 34 Based on Timmer et al., 1983, pp.24-25
- 35 Josephson, 1982, pp.81-82
- 36 Whyte, 1974, p.118
- 37 Foo Gaik Sim, 1980, p.19, 21
- 38 Wolfers, 1980, pp.33-34
- 39 Suharyono, 1981, pp.8-9
- 40 There is an extensive literature on this topic. Before the WHO Assembly accepted the International Code for the marketing of breast milk substitutes in May 1981, the whole issue was summarized in the Journal of Food Policy from the point of view of both the infant food manufacturers and their opponents (Sparks, 1980, pp.220-225; Chetley, 1980, pp.225-228).
- 41 Blom, 1983, pp.15-18; CCF, 1981; Intercom, 1981, pp.6-8; Internationale Samenwerking, 1984, p.21
- 42 Kardjati et al., 1977, pp.43-44
- 43 Ibid., p.45
- 44 Suharyono, 1981, p.9; Soekirman, 1978 (pp.147-148) speaks of a tendency to artificial feeding in urban Indonesia
- 45 Human Lactation Center, 1979, pp.100-101; Suharyono, 1981, p.8

ARCHIVES

ARCHIEF COÖPERATIEVE CONDENSFABRIEK FRIESLAND, LEEUWARDEN

- Correspondence and reports; Hepkema, S.; Huges, T.H.; Internatio, Staverman, G.J.F.
- Friesche Vlag Kookboek, Leeuwarden, CCF, 1940, 2nd print. 281 pp.
- Nederlandsch Indisch Persarchieff, NIPA, Batavia. Various newspaper clippings.
- Photo and advertisement file.
- Rapport Algemeen Advertentie Bureau. A. de La Mar, Amsterdam. Indische Afdeeling, Batavia, 1931. 25 pp.
- Rapport Indische Reis, Hepkema, S., 1930. 44 pp.
- Soesoe "Tjap Nonna", Nestlé and Anglo-Swiss Condensed Milk Co., not dated. 36 pp.

ALGEMEEN RIJKSARCHIEF, DEN HAAG

Ministerie van Koloniën, 1850-1900

- Index op de Mailrapporten, 1869-1899

Ministerie van Koloniën, 1901-1945

- Openbaar verbaal, 1901-1945
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 - Batavia, Krawang
 - Preanger, Priangan
 - Oost Java, Soerabaja, Modjokerto
 - Sumatra's Oostkust

BIBLIOGRAPHY

- Aalfs, H.G. De rundveeteelt op het eiland Bali (Diss. Utrecht). Utrecht, Smits, 1934. 170 pp.
- Abel, W. Massenarmut und Hungerkrisen im vorindustriellen Europa. Versuch einer Synopsis. Hamburg, Parey, 1974. 427 pp.
- Advies van het Instituut voor Volksvoeding omtrent de waarde van gesuikerde taptemelk als volksvoedsel. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1938, 78, pp.1406-1407.
- Algemeen Landbouweekblad voor Nederlandsch-Indië, 1925, 9, no.37, p.1285.
- Algemeen Landbouweekblad voor Nederlandsch-Indië, 1925, 9, no.43, p.1415.
- Algemeen Landbouweekblad voor Nederlandsch-Indië. Een Coöperatieve Melk Centrale. Algemeen Landbouweekblad voor Nederlandsch-Indië, 1928, 12, 1e sem., no.44, pp.1632-1633.
- Algemeen Landbouweekblad voor Nederlandsch-Indië. Varkens- en geitenfokkerij. Algemeen Landbouweekblad voor Nederlandsch-Indië, 1931, 15, 2e sem., no.50, pp.1423-1424.
- Algemeen Landbouweekblad voor Nederlandsch-Indië. Melkoorlog in Bandung. Algemeen Landbouweekblad voor Nederlandsch-Indië, 1931, 16, 2e sem., no.24, p.679.
- Algemeen Landbouweekblad voor Nederlandsch-Indië. Bijeenkomst klein-landbouwers en melkveehouders. Algemeen Landbouweekblad voor Nederlandsch-Indië, 1940, 24, 2e sem., no.21, p.280.
- Aykroyd, W.R.; Doughty, J. Legumes in Human Nutrition. Rome, FAO, 1969, 138 pp.
- Aymard, M. Towards the history of nutrition: some methodological remarks. In: Forster, R., Ranum, O. (Eds), Food and drink in history, selections from the annales, economies, sociétés, civilizations. Baltimore, John Hopkins University Press, 1979, pp.1-16.
- A.Z. Melkhygiënisch Weekblad. De melkindustrie in Japan. Nederlandsch Tijdschrift voor Melkhygiëne, 1913, 9, no.33, p.294.
- A.Z. Melkhygiënisch Weekblad. Hoe gecondenseerde melk en melkpoeder te gebruiken zijn. Nederlandsch Tijdschrift voor Melkhygiëne, 1917, 13, no.51, pp.421-423.
- A.Z. Melkhygiënisch Weekblad. Maatregelen tegen gecondenseerde melk, een waarschuwing. Algemeen Zuivel en Melkhygiënisch Weekblad, 1923, 19, no.23, pp.276-280.
- A.Z. Melkhygiënisch Weekblad. De voedingswaarde van afgeroomde gecondenseerde melk. Algemeen Zuivel en Melkhygiënisch Weekblad, 1927, 23, no.3, pp.311-313.
- A.Z. Melkhygiënisch Weekblad. Verbod van invoer van ondermelk in Siam. Algemeen Zuivel en Melkhygiënisch Weekblad, 1928, 24, no.4, p.31.
- A.Z. Melkhygiënisch Weekblad. Actie tegen Hollandsche melk in Engeland. Algemeen Zuivel en Melkhygiënisch Weekblad, 1928, 24, no.6, pp.46-47.
- A.Z. Melkhygiënisch Weekblad. Regeling van het uitvoer uit Nederland van magere gecondenseerde melk naar Engeland. Algemeen Zuivel en Melkhygiënisch Weekblad, 1936, 32, no.53, pp.438-446.
- Baart de la Faille, J.M. Over het gebruik van blikmelk in Nederlandsch-Indië. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.3060-3061.
- Bakker, C. Volksgeneeskunde in Waterland, een vergelijkende studie met de geneeskunde der Grieken en Romeinen. Amsterdam, Paris, 1928, 631 pp.
- Bakker, S. On livestock and the Veterinary Service in the Netherlands Indies. In: Honig, P., Verdoorn, F. (Eds) Science and Scientists in the Netherlands Indies. New York, Board for the Netherlands Indies, Suriname and Curaçao, 1945, pp.1-4.
- Ballendux, A.H. Bijdrage tot de kennis van de credietverlening aan de "Indonesische Middenstand" (Diss. Leiden). 's-Gravenhage, Excelsiors foto-offset, 1951, 192 pp.

- Baudet, H.; Fasseur, C. Koloniale bedrijvigheid. In: Van Stuijvenberg, J.H. (ed.). De economische geschiedenis van Nederland. Groningen, Wolters-Noordhoff, 1977, pp.309-350.
- Bensen, C.A. Topografische beschrijving van het eiland Ambonia. Tijdschrift der Vereeniging tot Bevordering der Geneeskundige Wetenschappen in Nederlandsch-Indië, 1854, 3, Aflevering IV, pp.294-314.
- Bensen, C.A. Natuur en geneeskundige topographie der residentie Bantam. Tijdschrift der Vereeniging tot Bevordering der Geneeskundige Wetenschappen in Nederlandsch-Indië, 1857, 5, Aflevering VII-VIII, pp.976-1061.
- Bernelot Moens, J.G.Th. Eenige beschouwingen omtrent Anjer. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1860, 8, Aflevering 5, pp.417-440.
- Bijker, W.E. Techniekgeschiedenis: een mogelijke basis voor theorieën over techniekontwikkeling? Utrecht, Jaarboek voor de Geschiedenis van Bedrijf en Techniek, 1984, 1, pp.44-65.
- Bijkerk, J.C. De laatste landvoogd, van Mook en het einde van de Nederlandse invloed in Indië. Alphen a/d Rijn, 1982. 295 pp.
- Bleeker, P. Bijdrage tot de geneeskundige topographie van Batavia. II, Vegetatie en derzelver producten; III, Fauna en derzelver producten. Tijdschrift voor Neêrlands Indië, 1844, 6, Deel 1, pp.451-478; 1845, 7, Deel 3, pp.381-418.
- Bleekrode, S.A. Scheikundig onderzoek van Grinnade's patent dessicated milk. Tijdschrift voor Nijverheid en Landbouw in Nederlandsch-Indië, 1864, 10, pp.279-282.
- Blink, H. Opkomst en ontwikkeling van Sumatra als economisch-geografisch gebied. 's-Gravenhage, Mouton, 1926, 140 pp.
- Blom, J. Melk is goed voor elk, maar koffiemelk is geen babyvoeding. Landbouwkundig Tijdschrift, 1983, 95, no.9, pp.15-18.
- Blussé, L. An insane administration and insanitary town: the Dutch East India Company and Batavia, 1619-1799. In: Ross, R.; Telkamp, G.J. (Eds), Colonial cities, essays on urbanism in a colonial context. Dordrecht, Martinus Nijhoff Publishers, 1985, pp.65-85.
- Boeke, J.H. De economische verhouding van stad en dorp in Nederlandsch- en Britsch-Indië. Koloniale Studiën, 1931, 15, pp.1-23.
- Boekel, P.N. De zuivelexport van Nederland tot 1813 (Diss. Wageningen). Utrecht, Schotanus en Jens, 1929. 224 pp.
- Bonggaars, P. Melk voor Amsterdam, toen en nu. Amsterdam, NV Melkinrichting en flessenfabriek "Holland", 1955. 103 pp.
- Bontius Tropische Geneeskunde. An account of the diseases, natural history and medicines of the East Indies, James Bontius, London, T. Noteman, 1769. Introduction by M.A. van Aniel. Amsterdam, Nederlandsch Tijdschrift voor Geneeskunde, Opuscula Selecta Neerlandicorum de Arte Medica, 1931. 459 pp.
- Boorsma, W.G. Lahmann's "plantaardige melk" en kanarizadenemulsie als toevoegsel tot melk voor zuigelingen. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1901, 41, no.4, pp.510-53.
- Bos, R.W.J.M. Brits-Nederlandse handel en scheepvaart, 1870-1914, een analyse van machtsafbrokkeling op een markt. (Diss. Tilburg). Wageningen, Pudoc, 1978, 419 pp.
- Bos, R.W.J.M. Techniek en industrialisatie: Nederland in de 19e eeuw. A.A.G. Bijdragen, LH Wageningen, 1979, no.22, pp.59-107.
- Boxer, C.R. The Dutch seaborne empire 1600-1800. Harmondsworth, Penguin Books, 1973, reprint. 363 pp.
- Braudel, F. Afterthoughts on material civilization and capitalism. Baltimore, John Hopkins University Press, 1981, second print. 120 pp.
- Broekmeijer, J.G.X. Geneeskundige plaatsbeschrijving der residentie Passaroeang. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1855, 4, Aflevering I-IV, pp.1-51.
- Brothwell, D.R.; Brothwell, P. Food in antiquity. London, Thames and Hudson, 1969. 248 pp.

- Bruijn, J.R.; Lucassen, J. (Eds). Op de schepen der Oost-Indische Compagnie, vijf artikelen van J. de Hullu. Groningen, Wolters-Noordhoff/Bouma's Boekhuis, 1980. 174 pp.
- Buchanan, R.A. Industrial archaeology in Britain. Harmondsworth, Middlesex, Penguin Books, 1982, 2nd print. 476 pp.
- Bulletin Hygiënische Organisatie. Aanhalingen en aantekeningen betreffende kedeele melk. Bulletin Hygiënische Organisatie Dienst der Volksgezondheid, 1935, no.16, pp.1-10.
- Bulletin Hygiënische Organisatie. Sojamelk. Bulletin Hygiënische Organisatie Dienst der Volksgezondheid, 1937, no.48, pp.3-5.
- Burema, L. De voeding in Nederland van de middeleeuwen tot de twintigste eeuw. Assen, 1953. 327 pp.
- Burger, D.H. Sociologisch-economische geschiedenis van Indonesia, met een historiografische introductie door J.S. Wigboldus. Wageningen, Landbouwhogeschool; Amsterdam, Koninklijk Instituut voor de Tropen; Leiden, Koninklijk Instituut voor Taal-, Land- en Volkenkunde, 1975. Deel I, Indonesia voor de 20e eeuw. 167 pp. Deel II, Indonesia in de 20e eeuw. 267 pp.
- Burkill, I.H. The rise and decline of the greater yam in the service of man. Adv. Science, 1951, 7, pp.443-448.
- Burnett, J. Plenty and want, a social history of diet in England from 1815 to the present day. London, Scholar Press, 1979. 387 pp.
- Cayaux, H.B. De voeding der zuigelingen in Indië. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1883, 23, pp.304-320.
- Cazanove, J.L.F. La question du lait dans les colonies Africaines. Africa, 1936, 9, no.2, pp.227-236.
- CCF. Babyvoeding in de derde wereld: het beleid van de Coöperatieve Condensfabriek "Friesland" W.A. Leeuwarden, Coöperatieve Condensfabriek Friesland, 1981. 24 pp.
- Centraal Bureau voor de Statistiek, In- en uitvoer. s'-Gravenhage, Centraal Bureau voor de Statistiek, 1906-1940.
- Centraal Kantoor voor de Statistiek. In- en uitvoer van Nederlandsch-Indië. Weltevreden, Centraal Kantoor voor de Statistiek. 1927-1938.
- Chetley, A. Viewpoint, the baby milk controversy. A rejoinder. Food Policy, 1980, 5, no.3, pp.225-228.
- Clark, H.M. The tin can book, the can as collectible art, advertising art and high art. New York, New American Library, 1977. 128 pp.
- Clason, A.T. Jacht en veeteelt, van prehistorie tot middeleeuwen. Haarlem, Fibula-Van Dishoeck, 1975. 231 pp.
- Clutton-Brock, J. Domesticated animals from early times. London, Heineman, British Museum (Natural History), 1981, 208 pp.
- CMC/Melkunie. De geschiedenis ener melkinrichting, een eeuw consumptiemelk 1879-1979. Amsterdam, J and T Publicity, 1979. 128 pp.
- Cole, S. The neolithic revolution. London, Trustees of the British Museum, 1970. 72 pp.
- Colenbrander, A.H. De Nederlandsche gecondenseerde melkindustrie. Officieel orgaan, 1926, 21, no.35, pp.458-459.
- Commissie Justitia et Pax Nederland. Babyvoeding in ontwikkelingslanden, de betrokkenheid van Nederlandse ondernemingen. Den Haag, Commissie Justitia et Pax Nederland, 1980. 116 pp.
- Cone, T.E. History of infant and child feeding from the earliest years through the development of scientific concepts. In: Bond, J.T.; Filer, L.J.; Leveille, G.A.; Thomson, A.M.; Weil, W.B. (Eds). Infant and Child Feeding. New York, Academic Press, 1981, pp.4-34.
- Corley, T.A.B. Nutrition, technology and the growth of the British biscuit industry, 1820-1900. In: Oddy, D.J.; Miller, D.S. (Eds). The making of the modern British diet. London, Croom Helm, 1976, pp.13-25.

- Couperus, L. De kunst van rijsttafel eten, het bad dat geen bad is. In: Louis Couperus, op reis. Amsterdam, 1981, Veen, pp.224-230.
- Craddock, S. Retired except on demand. The life of Dr. Cicely Williams. Oxford, Green College, 1983. 198 pp.
- Cranstone, B.A.L. Animal husbandry: the evidence from ethnography. In: Ucko, P.; Dimbleby, G.W. (Eds). The domestication and exploitation of plants and animals. London, Duckworth, 1969, pp.247-263.
- Creutzberg, P. Het economisch beleid in Nederlandsch Indië, capita selecta, een bronnenpublikatie (Economic policy in the Netherlands Indies with an introduction and survey of documents in English). Groningen, Tjeenk Willink, 1974, Tweede Stuk. 793 pp.
- Croesen, V.R.I.J. De geschiedenis van de ontwikkeling van de Nederlandse zuivelbereiding in het laatst van de 19e en begin van de 20e eeuw (Diss. Wageningen). 's-Gravenhage, Mouton, 1931. 205 pp.
- de Blicq, L. The development and present-day stand points of scientific research in the Netherlands Indies. In: Rutten, L.M.R. (Ed.). Science in the Netherlands Indies. Amsterdam, De Bussy, Koninklijke Akademie van Wetenschappen, 1927, pp.227-254.
- de Bruijne, G.A. The colonial city and the post-colonial world. In: Ross, R.; Telkamp, G.J. (Eds), Colonial cities, essays on urbanism in a colonial context. Dordrecht, Martinus Nijhoff Publishers, 1985, pp.231-243.
- de Graaf, H.J. (Ed.). Nederlanders over de zeeën. Utrecht, de Haan, 1955. 260 pp.
- de Graaff, N. Reysen, na de vier gedeelten des wereldds als Asia, Africa, America en Europa. Hieragter is bijgevoegt, d'Oost-Indische Spiegel. Hoorn, gedrukt by Feyken Rijp, 1704, 2nd print. 221 pp., 83 pp.
- de Grooth, M.E.Th.; Verwers, G.J. Op goede gronden. De eerste boeren in Noordwest-Europa. Leiden, Rijksmuseum van Oudheden, 1984. 72 pp.
- de Haan, D. Antieke huishoudelijke apparaten. Baarn, Moussault, 1977. 177 pp.
- de Haan, F. Priangan, de Preanger-Regentschappen onder het Nederlandsch bestuur tot 1811. Batavia, Kolff, Deel II, 1911. 906 pp.
- de Haan, F. Oud Batavia. Bandeng, A.C. Nix, 1935. Second print. 860 pp.
- de Haas, J.H. Over keratomalacie op Java en Sumatra (in het bijzonder op de Karo-Hoogvlakte) en in Nederland. Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië, 1931, 20, no.2, pp.1-11.
- de Haas, J.H. De Karo-Bataksche Zuigeling (Diss. Batavia). Batavia, Kolff, 1932. 95 pp.
- de Haas, J.H. Lucie Yeu; Le lait de soja dans l'alimentation du nourrisson. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1935, 75, pp.1685-1686.
- de Haas, J.H. Over zuigelingenvoeding in Nederlandsch-Indië. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1936, Feestbundel, pp.627-636.
- de Haas, J.H. Xerophthalmie bij 6 kinderen. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.3043-3045.
- de Haas, J.H. Qui s'excuse s'accuse, antwoord van Dr. J.H. de Haas. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.2827-2828.
- de Haas, J.H. Over het gebruik van blikkenmelk in Nederlandsch-Indië, antwoord aan Prof. Dr J.M. Baart de la Faille. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, p.3287.
- de Haas, J.H. Melkproducten in onze ziekenhuizen. Antwoord aan Dr. M.G. Müller. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1938, 78, pp.204-205.
- de Haas, J.H. Zuigelingensterfte in Batavia. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1938, 78, pp.1467-1512.
- de Haas, J.H. Zuigelingenvoeding in de tropen. Nederlands Melk en Zuiveltijdschrift, 1949, 3, no.1, pp.79-88.
- de Haas, J.H.; Meulemans, O. Over het gehalte aan ascorbinezuur (vitamine C) van moedermelk in Batavia. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1936, 76, no.36, pp.2277-2296.

- de Haas, J.H.; Meulemans, O. Tinned milk in the Netherlands-Indies. Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië, 1937, 26, pp.48-59.
- de Haas, J.H.; Meulemans, O. Over het gebruik van blikkenmelk in Nederlands-Indië. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.1168-1186.
- de Haas, J.H.; Meulemans, O. Melk, in het bijzonder als zuigelingenvoedsel. Batavia, Kinderkliniek der Geneeskundie Hoogeschool, Drukkerij Smits, 1940. 104 pp.
- de Haas, J.H.; Posthuma, J.H.; Meulemans, O. Xerophthalmie bij kinderen in Batavia. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1940, 80, no.15, pp.928-950.
- de Jonge, J.A. De industrialisatie in Nederland tussen 1850 en 1914. Nijmegen, SUN, 1976, repr. 1968. 544 pp.
- de Kadt, G.S. Eenige bijzonderheden omtrent de voedingswaarde van gecondenseerde gesuikerde ondermelk naar aanleiding van het artikel van Dr. J.H. de Haas en Ir. O. Meulemans "Over het gebruik van blikkenmelk in Nederlandsch-Indië". Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.2818-2826.
- de Langen, C.D. Over melkvoorziening in Nederlandsch-Indië. Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië, 1929, 18, pp.150-151.
- de Langen, C.D. Instituut voor onderzoek der volksvoeding in Nederlands-Indië. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1934, 74, p.442.
- de Langen, C.D. In memoriam Prof.Dr. W.F. Donath. Voeding, 1957, 18, no.3, pp.154-156.
- Delmont, J. Milk consumption and rejection throughout the world. In: Delmont, J. (Ed.). Milk intolerance and rejection. Basel, Karger, 1983, pp.1-10.
- De Locomotief, 1936, 20 juli, p.3.
- De Locomotief, de stem van Indië, overzee editie voor Nederland, 1939, 22 July (not numbered).
- den Hartog, A.P.; Bornstein-Johansson, A. Social science, food and nutrition. In: Pitt, D.C. (Ed.), Development from below, anthropologists and development situations. The Hague, Mouton, 1976, pp.97-123.
- den Hartog, A.P. Veranderde voedselpatronen in ontwikkelingslanden en de rol van zuivelproducten. Voeding, 1980, 41, no.8, pp.292-302.
- den Hartog, A.P. De ontwikkeling van het moderne voedselpatroon in Nederland. In: den Hartog, A.P. (Ed.), Voeding als maatschappelijk verschijnsel. Utrecht, Bohn, Scheltema & Holkema, 1982, pp.56-115.
- Devendra, C. Goat and sheep production potential in the ASEAN region. World Animal Review, 1979, 32, pp.33-41.
- Devolder, U.; Ostyn, R.; Vandepitte, P. Het reisverhaal van Willem van Rubroek, 1253-1255. Tiel, Heemkundige Kring de Roede van Tiel, 1984. 160 pp.
- de Vries, E. Rijstpolitiek op Java in vroegere jaren. Handelingen van de Twaalfde Dienstvergadering van Landbouw en Nijverheidsconsulenten in Nederlandsch-Indië, Batavia, mei 1937. Departement van Economische Zaken, Buitenzorg, Archipel Drukkers, pp.148-155.
- de Vries, E. De welvaartsdiensten. In: Baudet, H.; Brugmans, I.J. (Eds). Balans van beleid, terugblik op de laatste halve eeuw van Nederlandsch-Indië. Assen, van Gorcum, 1961, pp.267-288.
- de Vries, J. De Nederlandse economie tijdens de 20e eeuw, een verkenning van het meest kenmerkende. Haarlem, Fibula-van Dishoeck, 2nd print, 1977. 207 pp.
- de Wijn, J.F. In memoriam J.H. de Haas (1900-1985). Voeding, 1985, 46, no.6, pp.218-219.
- Dick, H.W. The rise of a middle class and the changing concept of equity in Indonesia: an interpretation. Ithaca, Indonesia no.39, Cornell Southeast Asia program, 1985, pp.71-92.

- Doeve, W.Ch.A. Melkerijen. Algemeen Landbouweekblad voor Nederlandsch-Indië, 1922, 7, 1e sem., no.10, pp.471-474.
- Dols, M.J.L. Enkele beschouwingen bij gelegenheid van het zestigjarig bestaan van het NIVV. Voeding, 1979, 40, no.6, pp.218-222.
- Donath, W.F. De voedingswaarde van blikkenmelk en melkpoeder. Mededelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië, 1929, 18, no.2, pp.152-211.
- Donath, W.F. Opmerkingen over de inheemsche voeding, rede uitgesproken bij de aanvaarding van het ambt van buitengewoon hoogleraar in de scheikunde aan de Geneeskundige Hoogeschool te Batavia op den 18den September 1931. Buitenzorg, Archipel Drukkerij, 1931. 32 pp.
- Donath, W.F.; van Marle, T.W.J. Enkele onderzoekingen van levensmiddelen in den zin van de Nederlandsche warenwet. Pharmac. Tijdschrift v. Ned. Indië, 1931, 8, pp.248-304.
- Donath, W.F. De voedingswaarde der sojaboon en enkele daaruit bereide specifieke Indische voedingsmiddelen. Landbouw, 1932, 7, no.9, pp.705-740.
- Donath, W.F. De voedingswaarde van het inheemse menu te Koetowinangoen. In: Ochse, J.J.; Terra, J.A. (Eds). Geld en productenhuishouding, Volksvoeding en gezondheid in Koetowinangoen. Departement van Economische Zaken. Buitenzorg, Archipel Drukkerij, 1934, pp.227-398.
- Donath, W.F. Verbetering van de volksvoeding in Nederlandsch-Indië. Het "Instituut van Volksvoeding" te Batavia. De Indische Gids, 1936, 58, deel I, pp.480-499.
- Donath, W.F.; van Veen, A.G. Onderzoekingen betreffende de volksvoeding in Nederlandsch-Indië gedurende de periode 1850-1910. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1936, feestbundel, pp.109-124.
- Donath, W.F. Nogmaals afgeroomde gesuikerde melk. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1938, 78, pp.1258-1267.
- Donath, W.F.; van Veen, A.G. A short history of beri-beri investigations in the Netherlands Indies. In: Honig, P.; Verdoorn, F. Science and Scientists in the Netherlands Indies. New York, Board for the Netherlands Indies, Surinam and Curaçao, 1945, pp.75-78.
- Drummond, J.C.; Wilbraham, A.; Hollingsworth, D.F. The Englishman's food: five centuries of English diet. London, Jonathan Cape, 1958, rev. ed. 482 pp.
- Dumasy, E.A.H. Van goeroe tot schoolmeester. In: Kamerling, R.N.J. (Ed.). Indonesië toen en nu. Amsterdam, Intermediair Bibliotheek, 1980, pp.147-179.
- Dunning, A.J. J.H. de Haas, meer vechtlustig pionier dan papieren dokter. Hart Bulletin, 1977, 8, no.5, pp.130-132.
- Dupuis, J. Coutumes alimentaires sociétés et économiques, le cas de la répartition de la consommation du lait en Asie tropicale. Annales de Géographie, 1970, 79, no.435, pp.529-544.
- Eigen Haard, Een interessant bezoek. Eigen Haard, 1884, no.3, pp.28-33.
- Encyclopedie van Nederlandsch-Indië, 's-Gravenhage, Nijhoff. Deel 6, supplement, 1932, voedingsmiddelencommissie, p.796. Deel 8, supplement, 1939, Grati, pp.1511-1512; voedingsmiddelencommissie, pp.1783-1984.
- Endendijk, J. Het welvaartsbeleid op Madoera 1900-1942. Spiegel Historiae, 1980, 15, no.10, pp.539-543, p.575.
- Everitt, G.C. Cattle production in Indonesia. Background to an overseas aid assignment. New Zealand Agricultural Science, 1978, 12, no.3, pp.81-88.
- FAO/DANIDA Dairy development and training programme. Report of the second joint evaluation mission. Rome, FAO (UMBR/INT/005/DEN), 1984. 94 pp.
- Fasseur, C. Kultuurstelsel en koloniale baten. De Nederlandse exploitatie van Java 1840-1860 (Diss. Leiden). Leiden, Universitaire Pers Leiden, 1975. 289 pp.

- Feasibility Study. Feasibility study dairy development East Java. Wageningen, File of the International Agricultural Centre, 1982. Various pages. (not published).
- Flinn, M.W. Origin of the industrial revolution. Burnt Mill, Harlow, Longman, 1980, 9th print. 114 pp.
- Foo Gaik Sim. The promotion of sweetened condensed milk as infant food. In: Consumer action in developing countries. The Hague/Penang, International Organisation of Consumers Unions, Regional Office for Asia and Pacific, 1980, pp.18-33.
- Forde, D. Habitat, economy and society, a geographical introduction to ethnology. London, Methuen, 1961, 12th repr. 500 pp.
- Forrester, R.B. The fluid milk market in England and Wales. London, HMSO, 1927. 140 pp.
- Freedman, M. A report on some aspects of food, health and society in Indonesia. Geneva, WHO, 1955. 147 pp.
- French, M.H. Observations on the goat. Rome, FAO, 1974, 2nd print. 204 pp.
- Furnivall, J.S. Netherlands India, a study of plural economy. Cambridge, University Press, 1939. 502 pp.
- Fussel, G.E. The English dairy farmer. London, Frank Cass, 1966. 357 pp.
- Gedenkboek, N.V. Internationale crediet- en handels-vereeniging "Rotterdam", uitgegeven bij het vijfenzeventigjarig bestaan op 28 augustus 1938. Rotterdam, 1938. 69 pp.
- Geertz, C. Agricultural involution, the processes of ecological change in Indonesia. Berkeley, University of California Press, 1963. 176 pp.
- Geluk, J.A. Zuivelcoöperatie in Nederland, ontstaan ontwikkeling tot omstreeks 1930. Den Haag, Koninklijke Nederlandse Zuivelbond F.N.Z., 1967. 319 pp.
- Gemeente Utrecht, De Voedingstoestand van gezinnen van ondersteunde Utrechtsche werklozen in 1935-1936. Utrecht, Gemeente Utrecht, 1937. 118 pp.
- Gerber, H. Traditional cookery of the Cape Malays. Cape Town, Balkema, 1978, first print, 1957. 127 pp.
- Gerritzen, B. De plaats die Nederland als leverancier van melk- en zuivelproducten, benevens bacon, op de Britsche markt inneemt. Officieel Orgaan, 1929, 24, no.22, extra blad, pp.1-8.
- Gerritzen, B. De export onzer zuivelproducten naar Groot- Brittannië, speciaal wat betreft den afzet van gecondenseerde melk. Officieel Orgaan, 1930, 25, no.36, pp.7-11.
- Gids voor de kruidentuin. Arnhem, Vereniging Vrienden van het Nederlands Openluchtmuseum, 1968. 87 pp.
- Gish, O. The political economy of primary care and "health by the people": an historical exploration. Social Science and Medicine, 1979, 13C, pp.203-211.
- Gonggrijp, G.F.E. Geïllustreerde encyclopedie van Nederlandsch-Indië. Leiden, Leidsche Uitgeversmaatschappij, 1934. 1582 pp.
- Gonggrijp, G. Nederlandsch-Indië onder de staat en als deel van het koninkrijk. In: de Graaf, H.J. Nederlanders over de zeeën. Utrecht, de Haan, 1955, pp.156-207.
- Goody, J. Cooking, cuisine and class, a study in comparative sociology. Cambridge, Cambridge University Press, 1982. 253 pp.
- Gourou, P. The tropical world, its social and economic conditions and its future status. London, Longmans, 5th print, 1959. 159 pp.
- Grigg, D. The dynamics of agricultural change. The historical experience. London, Hutchinson, 1982. 260 pp.
- Grigg, D.B. The agricultural systems of the world: an evolutionary approach. London, Cambridge University Press, 1974. 358 pp.
- Groothoff, A. Een middel om het soortelijk gewicht van koemelk kunstmatig te verlagen. Geneeskundig Tijdschrift voor Nederlandsch-Indië, Deel 41, no.2, 1901, pp.266-269.

- Gutkind, P.C.W. Urban anthropology perspectives on third world urbanization and urbanism. Assen, van Gorcum, 1974. 262 pp.
- Habich-Veenhuijzen, S.D. Report on infant statistics. Mededeelingen van den Burgelijken Geneeskundigen Dienst in Nederlandsch-Indië, 1920, Deel 9, pp.82-97.
- Hahn, E. Die Haustiere und ihre Beziehungen zur Wirtschaft des Menschen, eine geografische Studie. Leizig, Duncker und Humblot, 1896. 581 pp.
- Handelingen van de Volksraad. 1936-1937, 1937-1938, 1938-1939, 1939-1940. Batavia, Landsdrukkerij.
- Hardeman, J. Selectieve innovatie door kleine boeren in Mexico. (Diss. V.U. Amsterdam). Meppel, Krips Repro, 1984. 230 pp.
- Harmesen, L. Aantekeningen over de bereiding van melkproducten door de bevolking. Hemera Zoa, 1954, (61), no.5-6, pp.139-149.
- Harmesen, L. Melkproductie-controle. Hemera Zoa, 1954, 61, pp.188-207.
- Harris, D.R. Agricultural systems, ecosystems and the origins of agriculture. In: Ucko, P.J.; Dimbleby, G.W. (Eds). The domestication and exploitation of plants and animals. London, Gerald Duckworth, 1969, pp.3-15.
- Hasselman, C.J. Algemeen overzicht van de uitkomsten van het welvaart-onderzoek gehouden op Java en Madoera in 1904-1905. 's-Gravenhage, Nijhoff, 1914. 353 pp.
- Heer, J. World events 1866-1966, the first hundred years of Nestlé. Vevey, Nestlé, 1966. 226 pp.
- Heinemann, H. Het hygiënisch werk der Senembah-Maatschappij gedurende de laatste jaren. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1935, 75, no.6, pp.524-533.
- Helfrich, C. Schets eener geneeskundige plaatsbeschrijving van de zuid- en oostkust van Borneo. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1859, Deel VII, Aflevering 3, 4, pp.321-365.
- Hemera Zoa. Advertentie "De Friesche Terp". Hemera Zoa, 1954, 61, p.88, p.160, p.404.
- Hesselink, K. Melkpoeder. Nederlandsch Tijdschrift voor Melkhygiëne, 1913, (9), no.10, pp.88-104.
- Hobsbawm, E.J. Industry and empire. Harmondsworth, Middlesex, Penguin Books, 1969. 384 pp.
- Hofstee, E.W. De groei van de Nederlandse bevolking. In: den Hollander, A.N.J.; 224, Hofstee, E.W.; van Doorn, J.A.A.; Verduyze, E.V.W. (Eds). Drift en koers, een halve eeuw sociale verandering in Nederland. Assen, van Gorcum, 1962, pp.13-84.
- Hollandia, Hollandsche fabriek van melk-producten. Tijdschrift voor Nijverheid en Landbouw in Nederlandsch-Indië. 1888, 36, p.47.
- Hollandia, Hollandsche fabriek van melkproducten en voedingsmiddelen, 1882-1932. Vlaardingen, N.V. Hollandia. 1932. 52 pp.
- Hoover, C.L. Markt voor gecondenseerde melk in Nederlandsch Oost-Indië. Algemeen Zuivel en Melkhygiënisch Weekblad, 1924, 20, no.7, pp.74-75.
- Huitema, H. Animal husbandry in the tropics, its economic importance and potentialities. Studies in a few regions of Indonesia. Amsterdam, Royal Tropical Institute, Department of Agricultural Research Communication, 73, 1982. 313 pp.
- Human Lactation Center. Milk in foreign aid and the developing dairy industries in the third world. In: Raphael, D. (Ed.), Breast feeding and food policy in a hungry world. New York, Academic Press, 1979, pp.99-104.
- Hummelinck, C.H. De fabricatie van gecondenseerde melk. Economist, 1886, 3, no.1, pp.262-275.
- Hunziker, O.F. Condensed milk and milk-powder. La Grange, Illinois, 1946. 560 pp.
- Hylkema, H.B. Historische schets van de Nederlandsche zuivelbereiding. Leeuwarden, van der Velde, 1922. 74 pp.

- ICIFI. Code of ethics and professional standards for advertizing, product information and advisory services for breast-milk substitutes. International Council of Infant food Industries. Zurich, ICIFI, 1977, (not numbered).
- ICIFI. Objectives, history and activities. International council of infant food industries. Zurich, ICIFI, 1980, 11 pp.
- Imperial Economic Committee. Report of, marketing and preparing for market of food stuffs produced within the empire, fourth report dairy produce. London, HMSO, 1926. 147 pp.
- Indische Gids. Europeesch boerenbedrijf op Java. De Indische Gids, 1905, 26, deel 2, pp.1529.
- Indische Gids. Een dagrantsoen van 2 1/2 ct. voor een volwassene, van 8 ct. voor een gezin. De Indische Gids, 1933, 55, Deel I, pp.265-267.
- Indische Gids. Varia, een dagrantsoen van 2 1/2 ct. voor een volwassene, van 8 ct. voor een gezin. De Indische Gids, 1933, 55, Deel I, pp.469-471.
- Indische Gids. Sojamelk als surrogaat voor versche koemelk. De Indische Gids, 1935, 57, pp.860-862.
- Indische Gids. Voedselvoorziening in Noodgeval in N.I. De Indische Gids, 1939, 61, deel II, pp.1029-1030.
- Indisch Verslag. Statistisch Jaaroverzicht van Nederlandsch-Indië over het jaar 1934. Batavia, 1935, Landsdrukkerij. Deel II, 459 pp.
- Indisch Verslag. Statistisch Jaaroverzicht van Nederlandsch-Indië over het jaar 1938. Batavia, 1939, Landsdrukkerij. Deel II, 431 pp.
- In Memoriam Prof.Dr. C.D. de Langen. Voeding, 1967, 28, no.6, pp.221-223.
- Intercom. CCF scheidt orde in verwarrende beeldmerken. Intercom CCF, 1981, no.147, pp.6-8.
- Internationale Samenwerking. Dutch Lady vervangt Dutch Baby. Internationale Samenwerking, 1984, 16, no.6, p.21.
- Isaac, E. On the domestication of cattle. In: Struever, S. (Ed.), Prehistoric agriculture. New York, Garden City, The National History Press, 1971, pp.451-470.
- Jagchid, S.; Hyer, P. Mongolia's culture and society. Boulder, Westviewpress, 1979. 461 pp.
- Jansen, B.C.P.; Donath, W.F. Over het gehalte aan A-vitamine van verschillende Indische voedingsmiddelen en over de waarde van de eiwitten ervan als aanvulling der rijstewitten. Mededeelingen Dienst Volksgezondheid in Nederlandsch-Indië, 1923, 12, pp.48-102.
- Jansen, B.C.P. Food in the tropics with special reference to the Netherlands Indies. Bulletin van het Koloniaal Instituut te Amsterdam, 1938, no.1, pp.56-62.
- Jelliffe, D.B. Commerciogenic malnutrition? Time for a dialogue. Food Technology, 1971, 25, no.2, pp.153-154.
- Jonkers, A. Welvaartzorg in Indonesië. 's Gravenhage, van Hoeve, 1948. 261 pp.
- Josephson, W.A. Dairy abroad, Indonesia. Dairy Record, 1982, 83, no.7, pp.81-82.
- Kamerling, R.N.J. Geen schade aan de exportlandbouw. In: Kamerling, R.N.J. (Ed.), Indonesië toen en nu, Amsterdam, Intermediar, 1980, pp.215-232.
- Kardjati, S.; Kusin, J.A.; de With, C. East Java Nutrition Studies, Report no.1. Amsterdam, Royal Tropical Institute, 1977. 160 pp.
- Kempski, K.E. Die Viehzucht Niederländisch-Indiens. Berlin, Paul Parey, 1924. 82 pp.
- Kenwood, A.G.; Lougheed, A.L. Technological diffusion and industrialisation before 1914. London, Croom Helm, 1982. 216 pp.
- King, A.D. Colonial cities: global pivots of change. In: Ross, R.; Telkamp, G.J. (Eds), Colonial cities, essays on urbanism in a colonial context. Dordrecht, Martinus Nijhoff Publishers, 1985, pp.7-32.

- Kok, J. Het rund en de runderteelt op Madoera, een zoötechnische studie. (diss. Utrecht). Emmerik aan de Rijn, Urban Schmitz, 1921. 187 pp.
- Koloniaal Tijdschrift. Het 2 1/2 cent budget. Koloniaal Tijdschrift, 1937, 26, pp.665-666.
- Kon, S.K. Milk and milk products in human nutrition. Rome, FAO, 1972. 80 pp.
- Kraneveld, F.C. Veterinaire varia van Indonesië no.IV. Een flitsbeeld over de geschiedenis der diergeneeskunde van Nederlands Oost Indië gedurende de periode 1820-1940. Hermera Zoa, 1958, 65, pp.96-116.
- Kreemer, J. De Maleier en zijn Karbouw. De Indische Gids, 1907, 29, Deel 1, pp.948-968.
- Kreemer, J. De Karbouw, zijn betekenis voor de volken van de Indonesische archipel. 's Gravenhage, van Hoeve, 1956. 283 pp.
- Landelijk overleg babyvoeding. Een jaar code, over het effect van de babyvoedingcode van de Wereld Gezondheids Organisatie, en over wat er allemaal nog moet gebeuren. Den Haag, Landelijk Overleg Babyvoeding, 1982. 23 pp.
- Lanzing, J.C.; van Veen, A.G. Sojamelk. Medelingen van den dienst der volksgezondheid in Nederlandsch-Indië, 1937, 26, no.1-2, pp.60-74.
- Leake, J. The livestock industry. Bulletin Indonesian Economic Studies, 1980, 16, no.1, pp.65-74.
- Lebosoekojo, S.; Reksohadiprodjo, S. Low-cost feed rations: the prospect for substitution. In: Fine, J.C.; Lattimore, R.G. Livestock in Asia, Issues and Policies, Ottawa, IDRC, 1982, pp.79-83.
- Lekkerkerker, C. Land en volk van Sumatra. Leiden, Brill, 1916. 368 pp.
- Lekkerkerker, C. Land en volk van Java. Groningen, Batavia, Wolters, 1938, Deel I. 772 pp.
- Leuftink, A. De geneeskunde bij 's lands oorlogsvloot in de 17e eeuw. Assen, van Gorcum, 1953. 135 pp.
- Leurink, G. Veeteelt. In: van Hall, C.J.J.; van de Koppel, C. De landbouw in den Indischen archipel. 's Gravenhage, van Hoeve, 1946, Deel I, pp.348-360.
- Lief, A. A close-up of closures, history and progress. New York, Glass Container Manufacturers Institute (not dated). 47 pp.
- Liem Twan Djie. De distribueerende tusschenhandel der Chineezers op Java. (Diss., Rotterdam). 's Gravenhage, Martinus Nijhoff, 1947. 104 pp.
- Lighthart, T.; Höving, P.; Rinkes, D.A. (Eds). De Indische bodem. Weltevreden, Volkslectuur, 1926. 338 pp.
- Lijempf, N.V. 1912-1937. Gedenkboek samengesteld ter gelegenheid van het vijftienvigjarige bestaan der vennootschap.Leeuwarden, Lijempf, 1937. 51 pp.
- Lindeboom, G.A. Jacob Bontius (1592-1631) over nachtblindheid en beriberi. I, II. Voeding, 1984, no.10, pp.342-346; no.11, pp.354-360.
- Lobel, L.W.M.; v.d. Schaaf, A.; Moh. Roza. Typedifferentiatie van tuberkelbacillen afkomstig van rund, buffel en varken in Nederlandsch Oost-Indië. Geneeskundig Tijdschrift voor Ned-Indië, 1937, 77, pp.406-435.
- Locher-Scholten, E. Association in theory and practice: the composition of the Regency Council (ca. 1910-1920). In: van Anrooij, F.; Kolff, D.H.A.; van Laanen, J.T.M.; Telkamp, G.J. (Eds) Between peoples and statistics, essays on modern Indonesian history presented to P. Creutzberg. The Hague, Martinus Nijhoff, 1979, pp.207-218.
- Loe Ping Kian. Gecondenseerde gesuikerde afgeroomde blikkenmelk (condensed sweetened skimmed milk) is een gevaarlijke voeding voor zuigelingen. Weekblad "Sin Po", Batavia, speciaalnummer, 1941, pp.1-6.
- Lulofs, C. Merino-schapen in de Padangsche Bovenlanden. Tijdschrift voor Binnenlands Bestuur, 1905, 29, pp.213-223.

- Lulofs, C.; van Vuuren, L. De voedselvoorziening van Nederlandsch-Indië. Batavia, 1918, Vereeniging voor studie van koloniaal maatschappelijke vraagstukken, no.6. 177 pp.
- McCollum, E.V. A history of nutrition, the sequence of ideas in nutrition investigations. Boston, Houghton Mifflin, 1957. 451 pp.
- McCracken, R.D. Lactase deficiency: an example of dietary evolution, with CA comment. *Current Anthropology*, 1971, 12, no.4-5, pp.479-517.
- McTurnan Kahin, G. The Indonesian middle class during the last three decades of Dutch rule. In: Fasseur, C. (Ed.). Geld en geweten, een bundel opstellen over anderhalve eeuw Nederlands bestuur in de Indonesische archipel. Deel II: het tijdvak tussen 1900-1942. Den Haag, Nijhoff, 1980, pp.179-186.
- Marco Polo. The travels of Marco Polo, the Venetian. Revised from Marsden's translation and edited with an introduction by M. Komroff. New York, Norton, 1982. 370 pp.
- Mead, M. Culture change in relation to nutrition. In: Burgess, A.; Dean, R.F.A. Malnutrition and food habits, report of an international and interprofessional conference on food habits. Guernavaca, Mexico, 1960. London, Tavistock publications, 1962, pp.50-62.
- Meilink-Roelofs, M.A. Asian trade and European influence in the Indonesian archipelago between 1500 and about 1630. (Diss. Amsterdam). 's-Gravenhage, Nijhoff, 1962. 471 pp.
- Merkens, J. De oeconomische beteekenis van den veestapel in Ned. Oost Indië. *Nederlandsch-Indische Bladen voor Diergeneeskunde en Dierenteelt*, 1922, 33, pp.135-151.
- Merkens, J. Vijftien jaar pioniersarbeid in de rundveeteelt op Java. *Nederlandsch-Indische Bladen voor Diergeneeskunde en Dierenteelt*, 1923, 34, pp.19-61.
- Merkens, J. De plaats van den veestapel in de volkshuishouding. *Landbouw*, 1926, 1, no.6, pp.493-522.
- Merkens, J. Bijdrage tot de kennis van den karbouw en de karbouwenteelt in Nederlandsch Oost-Indië. (Diss. Utrecht). Utrecht, Schotanus Jens, 1927. 191 pp.
- Merkens, J. De veeteelt in Indonesië. *Hemera Zoa*, 1949, 56, pp.21-38.
- Mettau, J.W. Gedeelde vreugd is halve smart, gezondheidszorg hier en in de tropen. Rede uitgesproken ter gelegenheid van zijn afscheid als hoogleraar in de kindergeneeskunde. Rotterdam, Erasmus Universiteit, 1984. (not published). 24 pp.
- Meulemans, O.; de Haas, H.J. Karnemelk als zuigelingenvoeding, bereiding uit ondermelk en volle melk. *Geneeskundig Tijdschrift voor Nederlandsch-Indië*, 1940, 80, no.42, pp.2465-2477.
- Milk Industry. The condensed milk standard. *Milk Industry*, 1922, 3, no.2, pp.53-55.
- Milk Industry. The true facts about condensed milk. *Milk Industry*, 1923, 4, no.2, pp.71-78.
- Milk Industry. The true facts about condensed milk. *Milk Industry*, 1923, 4, no.3, pp.43-44.
- Milk Industry. The condensed milk regulations. *Milk Industry*, 1923, 3, no.12, pp.55-58.
- Milk Industry. Should skimmed milk be prohibited? *Milk Industry*, 1924, 4, no.8, pp.23-25.
- Milk Industry. Nutritive value of skimmed condensed milk. *Milk Industry*, 1927, 8, no.2, pp.45-48.
- Milk Industry. Public Health (condensed milk) amendment regulations. *Milk Industry*, 1927, 8, no.3, p.55.
- Milk Industry. The importation of condensed milk. *Milk Industry*, 1927, 8, no.6, pp.51-53.

- Milk Industry. Milk publicity. Milk Industry, 1927, 8, no.6, pp.75-76.
- Milk Industry. Where the skimmed condensed milk comes from. Milk Industry, 1928, 8, no.8, pp.93-95.
- Minderhoud, G. De landbouw industrie. In: Sneller, Z.W. (Ed.). Geschiedenis van den Nederlandschen landbouw 1795-1940. Groningen, 1943, pp.404-425.
- Minderhoud, G. Cricis en criciswetgeving 1930-1940. In: Sneller, Z.W. (Ed.). Geschiedenis van den Nederlandschen landbouw 1795-1940. Groningen, Wolters, 1943, pp.498-522.
- Mol, J. Van melkinrichting tot levensmiddelenfabriek. Voeding, 1980, 41, no.5, pp.166-172.
- Morris, T.N. Management and preservation of food. In: Singer, C.; Holmyard, E.J.; Hall, A.R.; Williams, T.I. (Eds). A history of technology. Volume 5, 1850-1900. Oxford, Clarendon Press, 1958, pp.26-52.
- Morse, J.L. Recollections and reflections on forty-five years of artificial infant feeding. Journal of Pediatrics, 1935, 7, no.3, pp.303-324.
- Muhaimin, Y. Politics, national businessmen and the Indonesian middle class. Prisma, The Indonesian Indicator, 1983, no.30, pp.22-32.
- Mulder, G.J. De voeding in Nederland in verband tot den volksgeest. Rotterdam, Kramers, 1847. 77 pp.
- Mulder, T. De voeding in Nederland gedurende de jaren 1950-1960. Voeding, 1962, 23, no.8, pp.564-647.
- Muller, M. The babykiller, a war on want investigation into the promotion and sale of powdered baby milks in the third world. London, War on Want, 1974. 19 pp.
- Müller, M.G. Melkproducten in onze ziekenhuizen. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.3237-3238.
- Muller, M.J.E. Geneeskundige topografie van Samarang. Tijdschrift voor Neêrlands Indië, 1845, Deel III, 7, pp.314-380; 1846, Deel II, 8, pp.305-533.
- Munnich, J. Populaire anatomische beschouwingen over het menschelijk lichaam en leven in het Bataviaasch Genootschap van Kunsten en Wetenschappen. Tijdschrift voor Neêrlands Indië, 1847, 9, Deel II, pp.137-176.
- Nationaal rapport van Nederlandsch-Indië, voor de intergouvernementele conferentie van landen in het verre oosten voor de landelijke hygiëne, 3-13 aug 1937, Volkenbond, hygiëne-organisatie. Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indië, 1937, 26, pp.99-216.
- National Research Council. Little known Asian animals with a promising economic future. Washington, National Academy Press, 1983. 131 pp.
- Nederlandsch-Indië, Weekblad van de Vaderlandsche Club, 1930, no.7, p.4.
- Nederlandsch-Indië, Weekblad van de Vaderlandsche Club, 1930, no.11, p.15.
- Nederlandsch-Indië. Afgeroomde melk onder bepaalde omstandigheden een gevaar. Nederlands-Indië, Weekblad van de Vaderlandsche club, 1938, 10, no.15, p.58.
- Nederlandsch-Indische Bladen voor Diergeneeskunde. Rapport Melkvoorziening, uit het gemeenteblad van Bandoeng, no.174, 1921. Nederlandsch-Indische Bladen voor Diergeneeskunde, 1923, 34, pp.473-481.
- Nederlandsch-Indische Bladen voor Diergeneeskunde. Rapport van de melkcentralecommissie te Soerabaja. Nederlandsch-Indische Bladen voor Diergeneeskunde, 1935, 47, pp.332-340.
- Nederlandsch-Indische Bladen voor Diergeneeskunde. Zuivelbereiding in Japan. Nederlandsch-Indische Bladen voor Diergeneeskunde, 1937, 49, pp.23-28.
- Nederlands-Indische Bladen voor Diergeneeskunde. Melkerijwezen. Nederlands-Indische Bladen voor Diergeneeskunde, 1947, 54, pp.220-221.
- Neijtzell de Wilde, A. Een en ander omtrent den welvaartstoestand der inlandse bevolking. Weltevreden, Visser, 1911. 253 pp.
- Nienhuis, J.F.C. Gecondenseerde melk en melkpoeder. Tijdschrift voor Nijverheid en Landbouw in Ned.-Indië, 1906, 72, pp.81-103.

- Nieuwenhuys, R. Oost-Indische Spiegel. Amsterdam, Querido, 1973. 645 pp.
- Noordwijk, P.; van der Weijde, J. Staat van den veestapel in de 1e en 3e afdeling op Java. Tijdschrift voor Nijverheid in Nederlandsch-Indië, 1856, Deel III, pp.167-201.
- Nutrition, final report of the mixed committee of the League of Nations, on the relation of nutrition to health, agriculture and economic policy. Geneva, League of Nations, 1937. 340 pp.
- Ochse, J.J.; Terra, G.J.A. Geld en productenhuishouding, volksvoeding en gezondheid in Koetowinangoen. Departement van Economische Zaken. Buitenzorg, Archipel Drukkerij, 1934. 424 pp.
- Officiëel Orgaan. Een nieuw vitamine "D". Officiëel Orgaan FNZ, 1922, 17, no.852, p.169.
- Officiëel Orgaan. Mededeeling. Officiëel Orgaan FNZ, 1923, 18, no.897, p.587.
- Officiëel Orgaan. Een actie tegen den invoer in Engeland van gecondenseerde ontroomde melk. Officiëel Orgaan FNZ, 1926, 21, no.36, p.471.
- Officiëel Orgaan. De Engelsche boeren en de invoer van afgeroomde gecondenseerde melk in Engeland. Officiëel Orgaan FNZ, 1927, 22, no.43, pp.619-620.
- Officiëel Orgaan. Bestrijding van den invoer van gecondenseerde magere melk in Engeland. Officiëel Orgaan FNZ, 1929, 24, no.23, p.356.
- Officiëel Orgaan. Nederlandsch-Indië als markt voor melkproducten. Officiëel Orgaan FNZ, 1932, 27, no.30, p.454.
- Officiëel Orgaan. Afzetbelangen, Condensfabriek te Bandoeng. Officiëel Orgaan FNZ, 1933, 28, no.28, p.430.
- Officiëel Orgaan. Invoervoorwaarden voor melk en room in de gefedereerde Maleische Staten. Officiëel Orgaan FNZ, 1933, 28, no.29, p.446.
- Officiëel Orgaan. Nestlé vestigt zich in Nederlandsch-Indië. Officiëel Orgaan FNZ, 1934, 29, no.52, p.787.
- Officiëel Orgaan. Regeling van den export van gecondenseerde melk naar Engeland. Officiëel Orgaan FNZ, 1937, 32, no.19, pp.287-291.
- Ogburn, W.F.; Thomas, D. Are inventions inevitable? A note on social evolution. Political Science Quarterly, 1922, 37, pp.83-94.
- Okkinga, p.Enkele beschouwingen betreffende onze gecondenseerde melkindustrie. Officiëel Orgaan FNZ, 1930, 25, no.40, pp.618-620.
- Onderzoek naar de mindere welvaart der inlandsche bevolking op Java en Madoera. Weltevreden, Ruygrok, 1905-1914, 1919. Volumes 1-12.
- Overzicht van de bevordering der inheemsche welvaart sedert 1901. 'sGravenhage, Departement van Koloniën, 4e Afdeling, April 1938. 54 pp.(not published).
- PAG. Recommendations on policies and practices in infant and young child feeding and proposals for action to implement them. PAG. Bulletin (Protein-Calorie Advisory Group of the UN System), 1975, 5, no.1, pp.1-5.
- Palte, J.G.L.; Tempelman, G.J. Indonesië, een sociaal-geografisch overzicht. Haarlem, Roman, 1981, 3rd print. 226 pp.
- Payne, W.J.A. Cattle production in the tropics. Volume 1, Breeds and breeding. London, Logman, 1970. 336 pp.
- Penning, C.A. Burgelijke veeartsenijkundige dienst, kleine huisdieren, geiten en schapen. Jaarboek van het Departement van Landbouw in Nederlandsch-Indië, 1909. Batavia, Landsdrukkerij, 1910, pp.318-355.
- Poerbatjaraka, R.Ng. Nitiçastra, oud-Javaansche tekst met vertaling. Bibliotheca Javanica, Kon. Bataviaasch Genootschap van Kunsten en Wetenschappen. Bandoeng, Nix, 1933. 80 pp.
- Polak, J.J. The national income of the Netherlands Indies, 1921-1939, reprint 1943 manuscript Netherlands and the Netherlands Indies Council of the Institute of Pacific Relations, New York. In: Creutzberg, P. Changing economy in Indonesia, Volume 5, National Income, The Hague, Martinus Nijhoff, 1979, pp.27-101.

- Popkin, B. Time allocation of the mother and child nutrition. *Ecology of food and Nutrition*, 1980, 9, no.1, pp.1-13.
- Popkin, B.M.; Solon, F.S. Income, time, the working mother and child nutriture. *Environmental Child Health*, 1976, 22, no.4, pp.156-166.
- Posthuma, J.H.; de Haas, J.H. Over het resultaat der verstreking van melkzure melk aan zuigelingen van consultatie-bureaux te Batavia. *Geneeskundig Tijdschrift voor Nederlandsch-Indië*, 1940, 80, no.14, pp.888-901.
- Postmus, S. Onderzoeksingsmethoden ter verbetering der voeding in Nederlandsch-Indië. *Geneeskundig Tijdschrift voor Nederlandsch-Indië*, 1939, 79, pp.416-424.
- Postmus, S; Luyken, R.; van der Rijst, P.J. Nutrition bibliography of Indonesia. Honolulu, University of Hawaii Press, 1955. 135 pp.
- Postmus, S.; van Veen, A.G. Dietary surveys in Java and East Indonesia. *Chronica Naturae*, 1949, 105, no.10, pp.229-236; no.11, pp.261-268; no.12, pp.316-323.
- Raabe, J.F.C. Over den bouw van melkstallen. *Algemeen landbouwweekblad voor Nederlandsch-Indië*, 1920, 4, no.39, pp.1182-1183.
- Raffles, T.S. The history of Java. With an introduction by Bastin, J. London, Oxford University Press, Historical Reprints (1817). 1965, Volume I. 479 pp.
- Reith, F.J. Christiaan Eijkman en Gerrit Grijns. *Voeding*, 1971, 32, no.4, pp.180-195.
- Roberts, R. The classic slum, Salford life in the first quarter of the century. Harmondsworth, Penguin Books, 1973. 226 pp.
- Rogers, E.M. Diffusion of innovations. New York, Free Press, 1983. 3rd print. 453 pp.
- Roosenschoon, C.F. Van vader op zoon, gedenkboek tergelegenheid van het vijftig jarig bestaan van de Algemeene Nederlandsche Zuivelbond. Den Haag, Federatie Nederlandse Zuivel, 1950. 173 pp.
- Root, W.; de Rochemont, R. Eating in America, a history. New York, William Morrow, 1976. 512 pp.
- Rothe, C. Een verpakingsordonnantie voor Nederlandsch-Indië. Overdruk "Indische Mercur", 13 maart 1935. *Berichten Kon. Ver. Kol. Inst.*, no.93, 1935. 15 pp.
- Rothe, C. De melkvoorziening in Ned-Indië en het belang van Nederland bij den invoer van gecondenseerde melk. Overdruk "Indische Mercur", 24 Juli 1935. *Berichten Kon. Ver. Kol. Inst.*, no.97, 1935. 15 pp.
- Sadli, S. The obscurity of the middle class. *Prisma, The Indonesian Indicator*, 1983, no.30, pp.57-60.
- Sarma, J.S.; Yeung, p. Livestock products in the third world: past trends and projections to 1990 and 2000. Washington, IFPRI, 1985, Research Report no.49. 87 pp.
- Sauer, C.O. Agricultural origins and dispersals. New York, The American Geographical Society, 1952. 110 pp.
- Schafer, E.H. T'ang. In: Chang, K.C. (Ed.). Food in Chinese culture. New Haven, Yale University Press, 1977, pp.87-140.
- Schat, P. De veestapel op Java en de mogelijkheid om daarin verbetering te brengen ter voorkoming van verderen achteruitgang. Soerabaia, Algemeen Syndicaat Suikerfabrikanten, 1905. 55 pp.
- Schellekens, L. Nederlanders in Azië, Afrika en Latijns Amerika, 1600-1900. (Diss. Nijmegen). Nijmegen, Derde Wereld Centrum, 1980. 224 pp.
- Scheltema, A.M.P.A. Deelbouw in Nederlandsch-Indië (Diss. Wageningen). Wageningen, Veenman, 1931. 425 pp.
- Scheltema, A.M.P.A. The food consumption of the native inhabitants of Java and Madura. Batavia, National Council for the Netherlands and the Netherlands Indies of the Institute of Pacific Relations, 1936. 63 pp.

- Schenk, D. Betekenis van de recombined en filled-milk industrie in Zuid-Oost Azië. *Officieel Orgaan*, 1973, 65, pp.444-446.
- Schilpzand, R.; Uithof, W. Ontwikkeling van de zuigelingenvoeding in Nederland vanaf 1900. Wageningen, Department of Human Nutrition, Agricultural University, 1980. 158 pp.(not published).
- Schnell, R. *Plantes alimentaires et vie agricole de l'Afrique noire, essai de phytogéographie alimentaire*. Paris, Editions Larose, 1957. 223 pp.
- Schöffner, I. Dutch "expansion" and Indonesian reactions: some dilemmas of modern colonial rule (1900-1942). In: Fasseur, C. (Ed.). *Geld en geweten, een bundel opstellen over anderhalve eeuw Nederlands bestuur in de Indonesische archipel. Deel II: het tijdvak tussen 1900-1942*. Den Haag, Nijhoff, 1980, pp.7-28.
- Schöffner, I.; Gaastra, F.S. The import of bullion and coin into Asia by the Dutch East India Company in the seventeenth and eighteenth century. In: Aymard, M. *Dutch capitalism and world capitalism*. Cambridge, Cambridge University Press, 1982, pp.215-233.
- Schoorel, C.N. *Veehouderij en veehoederij op het eiland Madoera. Veeartsenijkundige bladen voor Nederlandsch-Indië, 1889, Deel III, pp.263-301.*
- Schoute, D. *De geneeskunde in den dienst der Oost-Indische Compagnie in Nederlandsch-Indië*. Amsterdam, de Bussy, 1929. 336 pp.
- Schoute, D. *De geneeskunde in Nederlandsch-Indië gedurende de negentiende eeuw*. Batavia, Kolff, 1935. 381 pp.
- Schrauwen, W.A. *Rentabiliteit van Indische melkbedrijven. Algemeen Landbouwweekblad voor Nederlandsch-Indië, 1930, 15, 1e sem., no.5, pp.129-131.*
- Schrauwen, W.A. *Een veeteeltpraatje. Algemeen landbouwweekblad voor Nederlandsch-Indië, 1931, 16, 2e sem, no.11, pp.297-298.*
- Schrauwen, W.A. *De melkvoorziening in Oost-Java. Algemeen landbouwweekblad voor Nederlandsch-Indië, 1936, 20, 1e sem, no.37, pp.593-594.*
- Schrieke, B. *Native society in the transformation period*. In: Schrieke, B. (Ed.). *The effect of western influence on native civilisations in the Malay Archipelago*. Batavia, Kolff, Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen, 1929, pp.237-247.
- Schulz, M.E.; Lembke, A. *Discussion in Japan über Ernährung, Landwirtschaft und Milkwirtschaft*. Nürnberg, Verlag Hans Carl, 1968. 148 pp.
- Schumpeter, J.A. *The theory of economic development, an inquiry into profits, capital, credit, interest and the business cycle*. Cambridge, Ma, Harvard University Press, 1959, sixth printing. 255 pp.
- Shurtleff, W.; Aoyagi, A. *The book of Tempeh*. New York, Harper and Row. 245 pp.
- Sie Boen Lian. *Avitaminose A bij inlandsche zuigelingen. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1929, 69, no.11, pp.1097-1103.*
- Simoons, F.J. *Primary adult lactose intolerance and the milking habit: a problem in biologic and cultural interrelations, a cultural historical hypothesis. American Journal of Digestive Diseases, 1970, 15, no.8, pp.695-710.*
- Simoons, F.J. *The antiquity of dairying in Asia and Africa. Geographical Review, 1971, 61, no.3, pp.431-439.*
- Simoons, F.J. *The determinants of dairying and milk use in the old world: ecological, physiological, and cultural. Ecology of food and Nutrition, 1973, 2, no.2, pp.83-90.*
- Simoons, F.J. *New light on ethnic differences in adult lactose intolerance. American Journal of Digestive Diseases, 1973, 18, no.7, pp.595-611.*
- Simoons, F.J. *Contemporary research themes in the cultural geography of domesticated animals. Geographical Review, 1974, 64, no.4, pp.557-576.*
- Slicher van Bath, B. *De invloed van de economische omstandigheden op de technische ontwikkeling van de landbouw in het verleden*. In: Slichter van Bath, B. *Bijdragen tot de agrarische geschiedenis*. Utrecht, Spectrum, Aula, 1978, pp.29-51.

- Sluiter, E. Besprekingen. Het gebruik van blikkenmelk in Nederlandsch-Indië. *Nederlands Tijdschrift van Geneeskunde*, 1937, 81, no.28, pp.3376-3378.
- Smits, M.B. De voedselvoorziening van Nederlands-Indië. Batavia, Kolff, Vereeniging voor studie van koloniaal maatschappelijke vraagstukken, publicatie no.7, 1919. 191 pp.
- Sneller, Z.W. (Ed.) *Geschiedenis van den Nederlandschen Landbouw, 1795-1940*. Groningen, Wolters, 1943. 544 pp.
- Soedjana, T.D.; Knipscheer, H.C. The national goat program for rural smallholders in Indonesia. *Extension Bulletin, Food and Fertilizer Technology Center*, 1984, no.206, pp.13-19.
- Soekirman. Priorities in dealing with nutrition problems in Indonesia. Ithaca, Cornell University Program on International Nutrition and Development Policy, Monograph Series no.1, 1974. 97 pp.
- Soekirman. Indonesia. In: Winikoff, B. *Nutrition and national policy*, Cambridge, Ma, The MIT Press, 1978, pp.129-167.
- Soetrisno, L. Changes in Indonesia's middle class. *Prisma, The Indonesian Indicator*, 1983, no.30, pp.33-39.
- Sollewijn Gelpke, J.H.F. Het budget van een Javaanschen boer volgens Dr. J.H.F. Sollewijn Gelpke. *De Indische Gids*, 1880, 2, pp.563-573.
- Sommerfeld, K. Het Madoereesche rund, de fokkerij ervan door de Madoereezen, het gebruik ervan en zijn plaats in de veeteelt van Nederlandsch-Indië. *Koloniale Studiën*, 1923, 7, Deel II, pp.170-215.
- Sparks, J. Viewpoint, the baby milk controversy. *Food Policy*, 1980, 5, no.3, pp.220-225.
- Sparrius, H.J. Ontwikkeling van de bereiding en afzet van melkproducten. In: van Hoepen, L.; Icke, C. (Eds). *Van veertig zegenrijke melkjaren 1908-1948*. Bussum, A.H. Kruyt, Vereeniging voor Zuivelindustrie en Melkhygiëne, 1948, pp.86-90.
- Staat van den landbouw, op Java onder het bestuur van den burggraaf du Bus de Gisignies als Kommissaris generaal over Nederlandsch Indië. Brussel, de Mat, 1846. 83 pp.
- Stapel, F.W. Gouverneurs-generaal van Nederlandsch-Indië. Den Haag, van Stockum, 1941. 127 pp.
- Stapenséa, J. De melkcontrôle te Semarang. *Nederlandsch Tijdschrift voor Melkhygiëne*, 1915, 11, no.50, pp.401-406.
- Stapenséa, J. Is de oprichting van melkcentrales in de tropen noodig om het vraagstuk der melkhygiëne tot een bevredigende oplossing te brengen? *Nederlandsch-Indische Bladen voor Diergeneeskunde*, 1926, 38, pp.415-429.
- Stapenséa, J. Melkcentrales in de tropen. *Nederlandsch-Indische Bladen voor Diergeneeskunde*, 1927, 39, pp.63-74.
- Stout, H. Van de toko uit Rotterdam en van wat daarna kwam. In: Baudet, H. (Ed.) *Handelswereld en Wereldhandel, honderd jaren Internatio*. Rotterdam, Internatio, 1963, pp.17-74.
- Straub, M. *Kindersterfte ter Oostkust van Sumatra* (Diss. Amsterdam). Amsterdam, H.J. Paris, 1927. 194 pp.
- Suharyono. Infant feeding diarrhoeal and other enteric disorders. *Netherlands Milk Dairy Journal*, 1981, 35, pp.7-18.
- Sussman, G.D. Selling mothers' milk, the wet-nursing business in France 1715-1914 Urbana, University of Illinois Press, 1982. 210 pp.
- Székel-Lulofs, M.H. Ons leven in de rubber. In: Wormser, C.W. (Ed.). *Zóó leven wij in Indië*. Deventer, Van Hoeve, 1942, pp.56-72.
- Tannahill, R. *Food in history*. St. Albans, Paladin Frogmore, 1975. 384 pp.
- Taylor, J.G. *The social world of Batavia. European and Eurasian in Dutch Asia*. Madison, University of Wisconsin Press, 1983. 249 pp.

- Terne, C. Antwoord op de vraag voorgesteld door het Genootschap der Kunsten en Wetenschappen te Batavia over het beste voedsel om nieuw geboren kinderen zonder borst- of moedermelk op te voeden. Verhandelingen van het Bataviaasch Genootschap der Kunsten en Wetenschappen, 1814, Deel VII, pp.1-25.
- Terra, G.J.A. Some sociological aspects of agriculture in S.E. Asia. Indonesië, 1953, 6, pp.439-463.
- Terra, G.J.A. Farm systems in South East Asia. Netherlands Journal of Agricultural Science, 1958, 6, no.3, pp.157-182.
- Tesch, J.W. The hygienic study ward centre at Batavia, planning and preliminary results, 1937-1941 (Diss. Leiden). s'-Gravenhage, Korthuis, 1948. 199 pp.
- Teuteberg, H.J.; Wiegelman, G. Der Wandel der Nahrungsgewohnheiten unter dem Einfluss der Industrialisierung. Göttingen, Vandenhoeck, Ruprecht, 1972. 417 pp.
- Teuteberg, H.J. The general relationship between diet and industrialization. In: Forster, E. and R. European diet from pre-industrial to modern times. New York, Harper, 1975, pp.61-109.
- Teuteberg, H.J. The beginnings of the modern milk age in Germany. In: Fenton, A.; Owen, T. (Eds). Food in perspective. Proceedings of the third international conference of Ethnological Food Research. Edinburgh, John Donald, 1981, pp.283-311.
- 't Hoen, H. Een enkel woord naar aanleiding van het artikel van den Heer van Dalfsen: "De veestapel van Nederlandsch-Indië beschouwd in verband met zijn belang voor handel en Industrie". Tijdschrift voor Nijverheid en Landbouw in Nederlandsch-Indië, 1906, 73, pp.322-325.
- 't Hoen, H. Veerassen en veeteelt in Nederlandsch-Indië. Weltevreden, Kolff, 1919. 105 pp.
- 't Hoen, H. De economische beteekenis van het veeteeltbedrijf in Nederlandsch-Indië. Nederlandsch-Indische Bladen voor Diergeneeskunde en Dierenteelt, 1920, 32, pp.455-467.
- 't Hoen, H. De melkvoorziening van Nederlandsch-Indië. Nederlandsch-Indische Bladen voor Diergeneeskunde en Dierenteelt, 1923, 34, pp.464-472.
- 't Hoen, H. Over het gebruik van melk in Nederlandsch-Indië. Algemeen Zuivel en Melkhygiënisch Weekblad, 1923, 19, no.40, pp.480-482.
- 't Hoen, H. De samenstelling en de behandeling der melk in Indië. Algemeen Zuivel en Melkhygiënisch Weekblad, 1923, 19, no.41, pp.491-493.
- 't Hoen, H. Over de inrichting der melkbedrijven en het bevorderen der hygiënische melkwinning in Indië. Algemeen Zuivel en Melkhygiënisch Weekblad, 1923, 19, no.42, pp.503-506.
- 't Hoen, H. Het melkbedrijf in Nederlandsch Oost-Indië. Officieel Orgaan FNZ, 1930, 25, no.7, pp.103-104.
- Tichelman, F. The social evolution of Indonesia, the Asiatic mode of production and its legacy translated from the Dutch by Sanders, J. The Hague, Nijhoff, 1980. 301 pp.
- Tiddens, J.P. De wenschelijkheid van een warenwet voor Indië. Indisch Vrouwen Jaarboek, 1936. Jogjakarta, Kolff-Buning, 1936, pp.251-254.
- Timmer, C.P.; Falcon, W.R.; Pearson, S.R. Food policy analysis. Baltimore, John Hopkins University Press, World Bank, 1983. 301 pp.
- Timmerman, A.J. Melkveehouderij en zuivelindustrie in Japan. Zuivelzicht, 1985, 77, no.10, pp.224-225.
- Tjepkema, K. Dat is 't kondensfabryk, een halve eeuw coöperatieve condensindustrie in Friesland. Leeuwarden Coöperatieve Condensfabriek Friesland, 1963. 276 pp.
- Tjokrohoesodo, S.; Grossman, M. The current status of dairy husbandry in Indonesia. World Review of Animal Production, 1975, 11, no.4, pp.45-52.
- Tosseram, B.G.L.M. Het melkwinningengebied van Amsterdam, een sociografische studie over consumptiemelkers. (Diss. Amsterdam). Purmerend, J. Muusses, 1936. 230 pp.

- van Dalfsen, H.W. Iets over den veestapel van Nederlandsch-Indië, beschouwd in verband met zijn belang voor handel en industrie. Tijdschrift voor Nijverheid en Landbouw in Nederlandsch-Indië, 1906, 73, pp.153-196.
- van Dam, J.J.M. Jantje Kaas en zijn jongens. Bijdrage tot de kennis van de Nederlandsch-Indische soldaten tot in de 19e eeuw. Tijdschrift voor Indische Taal, Land en Volkenkunde, 1942, 82, no.1, pp.62-164.
- van den Akker, W. Over de taak van den Veterinair-hygiënist bij de Indische Gemeente. Nederlandsch-Indische Bladen voor Diergeneeskunde, 1929, 41, pp.201-215.
- van den Akker, W. Productie en afzet van melk op Java. Economisch Weekblad voor Nederlandsch-Indië, 1934, 3, no.1, pp.10-12
- van den Berg, J. Zo was Indië, 1850-1950. Laren, Luiting, 1976. 159 pp.
- van den Berg, J.C.T.; Zemelink, G. Pre feasibility study on the dairy husbandry sector in East Java and the milk marketing situation in East and Central Java. Wageningen, File of the International Agricultural Centre, 1980. 65 pp.(not published).
- van den Berg, J.C.T. Zuivel in de tropen en subtropen, het grote misverstand van de generalisatie. Zuivelzicht, 1984, 76, no.30-31, p.623.
- Vandenbroeke, C.; van Poppel, F.; van der Woude, A.M. De zuigelingen en kindersterfte in België en Nederland in seculair perspectief. Bevolking en Gezin, 1983, no.2, supplement, pp.85-115.
- van der Burg, C.L. De geneesheer in Nederlandsch-Indië. Batavia, 1883-1887, Ernst & Co., 3 Vols., 2nd print.
- van der Burg, C.L. De voeding in Nederlandsch-Indië. Amsterdam, de Bussy, 1904. 526 pp.
- van der Chijs, J.A. Nederlandsch-Indisch Plakaatboek, 1602-1811. Batavia, Landsdrukkerij. Deel I, 1602-1642, 1885. 664 pp.; Deel II, 1642-1677, 1886. 664 pp.; Deel V, 1743-1750, 1888. 787 pp.; Deel VIII, 1765-1775, 1891. 1042 pp.; Deel XVI, 1810-1811, 1897. 815 pp.
- van der Molen, G. De voedingswaarde van afgeroomde gecondenseerde melk. Algemeen Zuivel en Melkhygiënisch Weekblad, 1927, 23, no.47, pp.437-438.
- van der Poel, J.M.G. Honderd jaar landbouwmecanisatie in Nederland. Koninklijke Handelmaatschap v/h Boeke & Huidekoper N.V., 100-jarig jubileum. Wageningen, Veenman, 1967. 307 pp.
- van der Stok, N.p. De voeding van zuigelingen, een wenk aan moeders. Populaire verhandeling, bekroond met den eersten prijs, door de Vereeniging tot Bevordering van Geneeskundige Wetenschappen in Nederlandsch-Indië. Batavia, Visser, 1888, 2nd print. 39 pp.
- van der Velde, J.J. Brieven uit Sumatra. Franeker, Wever, 1982. 224 pp.
- van der Wal, S.L. Nederland en Nederlands-Indië 1914-1942. In: Van den Boogaart, E. et al. Overzee, Nederlandse Koloniale geschiedenis 1590-1975. Haarlem, Fibula-van Dishoeck, 1982, pp.201-222.
- van der Woude, A.M. Het Noorderkwartier, een regionaal historisch onderzoek in de demografische en economische geschiedenis van Westelijk Nederland van de late middeleeuwen tot het begin van de negentiende eeuw. A.A.G. Bijdragen, LH Wageningen, 1972, no.16, Deel II, pp.259-614.
- van Dijk, A. Het Nederlandse Condensboek. 's-Gravenhage, Nederlandse vereniging van fabrikanten van gecondenseerde melk, 1978. 78 pp.
- van Doorn, J.A.A. The engineers and the colonial system technocratic tendencies in the Dutch East Indies. Rotterdam, Erasmus University Rotterdam, Comparative Asian Studies Programme, CASP 6, 1982. 40 pp.
- van Eekelen, A. Naar een rationele zuigelingenvoeding, voedingsleer en kindergeneeskunde in Nederland 1840-1914 (Diss. Nijmegen). Nijmegen, Thieme, 1984. 433 pp.
- van Eekelen, M. Prof. Dr A. Ten Bokkel Huinink. Voeding, 1960, 21, no.2, pp.45-47.

- van Esterick, P. Sweetened condensed soma dietary innovation in South East Asia. Ann Arbor, Michigan, Nutrition Planning Information Service, 1979. 13 pp.
- van Goor, J. De plaats van de biografie in de koloniale geschiedenis. Van der Wijck bij voorbeeld... In: van Anrooij, F.; Kolff, D.H.A.; van Laanen, J.T.M.; Telkamp, G.J. (Eds). Between people and statistics, essays on modern Indonesian history presented to P. Creutzberg. The Hague, Nijhoff, 1979, pp.283-290.
- van Hall, C.J.J. Insulinde, werk en welvaart. Naarden, In den Toren, 1944, 2nd print. 192 pp.
- van Helsdingen, W.H. Tien jaar Volksraadarbeid 1928-1938. Batavia, Landsdrukkerij, 1938. 158 pp.
- van Heuven, G.B.J. Gastronomie en amusements in 't Indië van tempo-doeloe. De Indische Gids, 1928, 50, deel 2, pp.803-821.
- van Laanen, J.T.M. Het bestedingspakket van de "Inheemse" bevolking op Java (1921-1939). In: Van Anrooij, F.; Kolff, D.H.A.; Van Laanen, J.T.M.; Telkamp, G.J. (Eds) Between people and statistics, essays on modern Indonesian history presented to P. Creutzberg. The Hague, Nijhoff, 1979, pp.133-146.
- van Laanen, J.T.M. De landbouw tot 1940. In: Kamerling, R.N.J. (Ed.). Indonesië toen en nu, Amsterdam, Intermediair, 1980, pp.251-268.
- van Leur, J.C. Eenige beschouwingen betreffende den ouden Aziatischen handel. (Diss. Leiden). Middelburg, den Boer, 1934. 211 pp.
- van Lookeren Campagne, J. De voeding van zuigelingen met zure melk-mengsels. Voeding, 1942, 3, no.6, pp.213-220.
- van Maurik, J. Indrukken van een tötök, Indische typen en schetsen. Amsterdam, van Hoeve 1897. 3rd print. facsimile, 1979. 408 pp.
- van Stockum, M.J. De voeding van het inheemse kind en xerophthalmie. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1938, 78, pp.856-880.
- van 't Veer, P. De Atjeh-oorlog. Amsterdam, Arbeiderspers, 1969. 320 pp.
- van 't Veer, P. Het leven van Multatuli. Amsterdam, Arbeiderspers, 1977. 472 pp.
- van Veen, A.G. De studie der Volksvoeding in Nederlandsch-Indië in de periode 1911-1935. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1936, feestbundel, pp.125-145.
- van Veen, A.G. "De voeding" op de conferentie van landelijke hygiëne, van 3-13 augustus, te Bandoeng. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1937, 77, pp.2805-2817.
- van Veen, A.G. Nutritional deficiencies in Indonesia before the war. Documenta Neerlandica et Indonesica de Morbis Tropicis, 1950, 2, no.2, pp.121-127.
- van Veen, A.G. Nutrition studies in Indonesia 1850-1950. Documenta Neerlandica et Indonesica de Morbis Tropicis, 1950, 2, no.4, pp.374-383.
- van Winter, P.J. Zuid Afrika in de Hollandse tijd. In: De Graaf, H.J. (Ed.), Nederlanders over zeeën. Utrecht, de Haan, 1955, pp.227-251.
- van Wersch, H.J.; de Knecht-van Eekelen, A. Grepen uit de geschiedenis van de scheurbuik. Voeding, 1973, 34, no.7, pp.326-386.
- van Zanden, J.L. De economische ontwikkeling van de Nederlandse landbouw in de negentiende eeuw, 1800-1914. (Diss. Wageningen). A.A.G. Bijdragen, LH Wageningen, no.25, 1985. 461 pp.
- Verdoorn, J.A. Volksgezondheid en sociale ontwikkeling, beschouwingen over het gezondheidswezen te Amsterdam in de 19e eeuw. Utrecht, Spectrum Aula, 1965. 458 pp.
- Veth, P.J. Java, geografisch, ethnologisch, historisch. Haarlem, Erven F. Bohn, 1875, Deel I. 672 pp.
- Vink, G.J. De grondslagen van het Indonesische landbouwbedrijf (Diss. Wageningen). Wageningen, Veenman, 1941. 204 pp.
- Vis, H.L.; Hennart, P. Decline in breast-feeding, about some of its causes. Acta Paediatrica Belgica, 1978, 31, pp.195-206.

- Vleming, J.L. Het Chineesche zakenleven in Nederlandsch-Indië. Weltevreden, Volkslectuur, 1926. 287 pp.
- Von Rosenstein, Nils Rosén. The diseases of children and their remedies. Translated into English by Anders Sparman, M.D. Facsimile of the 1776 edition, with a bibliographical assessment by B. Valquist and a preface by T.T. Segerstedt. New York, Johnson Reprint Corporation, 1977. 43 pp; 364 pp.
- Voorschrift voor het onderzoek en de beoordeling van levensmiddelen, I Melk. Batavia, samengesteld door de Voedingsmiddelencommissie, 1920. 38 pp.
- Vrijburg, A. Veeziekte in Deli. Veeartsenijkundige Bladen voor Nederlandsch-Indië, 1887, 2, pp.169-175.
- Vrijburg, A. De burgerlijke-veeartsenijkundige Dienst in Nederlandsche-Indië. De Indische Gids, 1914, 36, Deel II, pp.1104-1111.
- Vrijburg, B. Melkcontrole. Veeartsenijkundige Bladen voor Nederlandsch-Indië, 1903, 15, pp.15-34.
- Vrijburg, B. Melkcentrales. Nederlandsch-Indische Bladen voor Diergeneeskunde, 1926, 38, pp.481-489.
- Vuyk, B. Groot Indonesisch Kookboek. Laren, Luitingh, 1973. 455 pp.
- Wagenaar Hummelinck, M.G. Terherinnering aan de Vereeniging van fabrieken van melkproducten (september 1915-juni 1918). 's-Gravenhage, uitgegeven door het bestuur, 1924. 130 pp.
- Watt, J.; Freeman, E.J.; Bynum, W.F. (Eds). Starving Sailors, the influence of nutrition upon naval and maritime history. Greenwich, National Maritime Museum, 1981. 212 pp.
- Weehuizen, F. Vermenging van melk met santen en blikken melk. Mededeelingen v.d. Burgerlijken Geneeskundigen Dienst Nederlandsch-Indië, 1918, 6, pp.161-163.
- Wertheim, W.F. Nederlandse cultuurinvloeden in Indonesië. In: Bartstra, J.S.; Banning, W. (Eds) Nederland tussen de Natiën, een bijdrage tot onze cultuurgeschiedenis. Amsterdam, Ploegsma, 1948, pp.35-79.
- Wertheim, W.F. De stad in Indonesië, oud Indische steden. Indonesië, 1951, 5, pp.24-40
- Wertheim, W.F. Town development in the Indies. In: Wertheim, W.F. (Ed.), The Indonesian town, studies in urban sociology. The Hague, van Hoeve, 1958, pp.1-77.
- Wertheim, W.F. The living conditions of municipally employed coolies in Batavia in 1937. (Translation of Mededeeling no.177 Centraal Kantoor voor de Statistiek, Batavia, 1939). In: Wertheim, W.F. (Ed.), The Indonesian town, studies in urban sociology. The Hague, van Hoeve, 1958, pp.85-224.
- Wertheim, W.F. Indonesië: van vorstenrijk tot neo-kolonie. Meppel, Boom, 1978. 276 pp.
- Westermann, J.C. Blik in het verleden, geschiedenis van de Nederlandsche blikindustrie in hare opkomst van gildeambacht tot grootbedrijf. Amsterdam, Vereeniging Blikfabrieken, 1939. 398 pp.
- Wetselaar, D.J.K.; Gieben, H.B.C. Eene bijdrage tot het onderzoek van melk in de militaire hospitalen. Geneeskundig Tijdschrift voor Nederlandsch-Indië, 1901, 41, no.2, pp.270-281.
- Wheatley, P. A note on the extension of milking practices into South East Asia during the first millenium A.D. Anthropos, 1965, 60, pp.577-590.
- Whetham, E. The London milk trade, 1900-1930. In: Oddy, J.; Miller, D.S. (Eds) The making of the modern British diet. London, Croom Helm, 1976, pp.65-76.
- Whyte, R.O. Rural nutrition in monsoon Asia. London, Oxford University Press, 1974. 296 pp.
- Wiegelmann, G. Innovations in food and meals. Folk Life, Journal of Ethnological Studies, 1974, 12, pp.20-30.

- Widodo, M.W.; Ardhana, M.M.; Purnomo, H.; Soweono, W.R.; Barker, J.S.F. The productivity of Grati dairy cattle under village conditions in East Java, Indonesia. *Sabrao Journal*, 1980, 12, no.2, pp.83-98.
- Wirosardjono, S. Strengthening the emerging middle class. *Prisma, The Indonesian Indicator*, 1983, no.30, pp.61-63.
- Wigboldus, J.S. De oudste Indonesische maiscultuur. In: Van Anrooij, F.; Kolff, D.H.A.; van Laanen, J.T.M.; Telkamp, G.J. (Eds). *Between people and statistics, essays on modern Indonesian history*. The Hague, Nijhoff, 1979, pp.19-31.
- Wille, W.A. Nieuwe ondervindingen omtrent keratomalicia. *Geneeskundig Tijdschrift voor Nederlandsch-Indië*, 1933, 73, pp.279-285.
- Wilson, C. Geschiedenis van Unilever, een beeld van economische groei en maatschappelijke verandering. *Nederlandse bewerking J. de Jongh. 's-Gravenhage*, 1970, Nijhoff. Deel II. 531 pp.
- Wolffers, I. De kwalijke praktijken van Indonesische melkfabrikanten. *Onze Wereld*, 1980, 23, no.9, pp.33-34.
- Wolmerstett, C. Nota betreffende den handel in gecondenseerde melk op de Engelsche markt. *Algemeen Zuivel en Melkhygiënisch Weekblad*, 1930, 26, no.3, pp.294-299.
- Wood, A.L. The history of artificial feeding of infants. *Journal American Association of Dietetics*, 1955, 31, pp.474-482.
- Wormser, C.W. Zoo wonen wij in de steden. In: Wormser, C.W. (Ed.). *Zóó leven wij in Indië*. Deventer, van Hoeve, 1942, pp.292-310
- Writser, J.C. The economic position of the Chinese in the Netherlands Indies. *Oxford, Basil Blackwell*, 1936. 264 pp.
- Zemmelink, G. Nederlandse veehouderij model voor ontwikkelingslanden? *Landbouwkundig Tijdschrift*, 1983, 95, no.12, pp.20-24.
- Zwaan, J. *Nederlands-Indië 1940-1946. I. Gouvernementeel intermezzo 1940-1942*. Den Haag, Omniboek, 1980. 269 pp.

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