

NUTRITIONAL STATUS OF CHILDREN IN THE PACIFIC ISLANDS.

Report of visits to South Pacific Commission (Noumea) and to New Hebrides, W. Samoa, Tonga and Fiji; 19 July to 26 August, 1975.

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	Page
1. <u>GENERAL</u>	
1.1 Terms of Reference	1
1.2 Consultations	1
1.2.1 People contacted prior to visits	1
1.2.2 Consultations during visits	1
1.3 NZ Milk Biscuits	2
1.4 Nutritional Work of the South Pacific Commission (SPC) and the World Health Organisation (WHO)	
1.4.1 SPC	5
1.4.2 WHO	7
1.4.3 Combined approach of SPC and WHO	8
1.5 Definition of Malnutrition in Children	8
2. <u>NEW HEBRIDES</u>	
2.1 Health Services	10
2.2 Nutritional Status of Children	11
2.3 Health Education	12
2.4 The Use of NZ Milk Biscuits	13
2.5 Adequacy of Local Food Supplies	14
3. <u>W. SAMOA</u>	
3.1 Health Services	15
3.2 Nutritional Status of Children	15
3.3 World Food Programme (WFP.W.S.741)	16
3.4 Weaning Food for W. Samoa	17
3.5 Nutrition Education	18
3.6 Distribution of NZ Milk Biscuits	18
3.7 Adequacy of Local Food Supplies	20
4. <u>TONGA</u>	
4.1 Health Services	20
4.2 Nutritional Status of Children	21
4.3 Health Education and Food Consumption	21
4.4 Distribution of NZ Milk Biscuits	22
5. <u>FIJI</u>	
5.1 Health Services	23
5.2 Nutritional Status of Children	23
5.3 Nutrition Education	24
5.4 Distribution of NZ Milk Biscuits	24
6. <u>CONCLUSIONS AND RECOMMENDATIONS</u>	
6.1 General	26
6.2 New Hebrides	27
6.3 W. Samoa	28
6.4 Tonga	28
6.5 Fiji	28
7. <u>REFERENCES</u>	
8. <u>APPENDIX</u>	
Tables 1 - 9.	

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1. GENERAL

1.1. Terms of Reference

- a. Nutritional problems of children up to the age of 12 years, related to other health problems; incidence and causes of malnutrition; priority needs in nutrition.
- b. Nutritional programmes of the South Pacific Commission (SPC) and of the World Health Organisation (WHO) in the south Pacific region.
- c. Adequacy of local foods to meet the needs of growing children.
- d. The distribution of N.Z. milk biscuits and their effectiveness in alleviating malnutrition.
- e. The provision of other milk products from New Zealand or of other forms of aid to assist the nutrition of children.

The visits were made at the request of the Ministry of Foreign Affairs under their bilateral aid programme. The project was linked with a request from the N.Z. Food Bank for an increased government subsidy to assist with the distribution of milk biscuits. A subsidy of \$12,000 per year had been granted to the N.Z. Food Bank to send milk biscuits to Fiji, W. Samoa and Tonga for the 3 years 1972-75. Because the renewal of the grant was under discussion it was decided to review the nutritional status of children in this region.

1.2. Consultations

1.2.1 People Contacted Prior to Visits

The Nutrition Department, School of Home Science, University of Otago was pleased to carry out this project since its staff and graduates have a long-standing interest in nutrition in the Pacific region. Thanks is expressed to the University of Otago and to the staff of the School of Home Science enabling the author to take 6 weeks leave from Dunedin.

A number of people were consulted prior to the visits (see Appendix Table 1) and the author is grateful for the considerable amount of background information provided. In addition the members of staff of the N.Z. Consulate in Noumea, the British Residency in Vila and the N.Z. High Commissions in Fiji, W. Samoa and Tonga provided details for each area and arranged introductory consultations.

1.2.2. Consultations During Visits

Much of the information in this report was obtained from official documents and through discussion with those involved in each country visited, in the fields of health, education, agriculture and child welfare and with the distribution of the N.Z. wholemilk biscuits.

Sincere thanks is expressed to those listed in Appendix Tables 2, 3, 4, & 5 who were consulted during the visits.

1.3. N.Z. Milk Biscuits

Milk biscuits were developed in 1966 by the N.Z. Dairy Research Institute with the financial backing of the N.Z. Dairy Board at a time of surplus of milk products on world markets. The aim was to produce a milk product "suitable for distribution particularly to children in under-developed areas" containing "in a portion which can conveniently be eaten at one time, all the nutritive value of 1/3-1/2 pint of whole milk" (Chapman, King, McGillivray & Robertson, 1966).

The successful production of the biscuits created considerable interest both within New Zealand and amongst international aid organisations. The Manawatu Dairy Company provided space for their production and in collaboration with the N.Z. Dairy Research Institute the method of manufacture has been modified from time to time. During 1974 there were some manufacturing problems causing a shortage of supply. Towards the end of the year full production resumed and stocks of milk biscuits are held for immediate shipment as required.

To aid the distribution of milk biscuits the N.Z. Food Bank Trust was set up in 1967. The council of the Food Bank was made up of representatives of aid organisations and of the N.Z. Dairy Board with Dr N.C. Begg as medical adviser. The Trust took its name from a comment by the late Lord Boyd Orr who once described New Zealand as "the food bank of the Pacific" (Chapman, 1967; Editorial, 1967). The Executive Director of the Food Bank, Mr H.H. Innes was a former director of milk marketing in New Zealand and the Food Bank owes a great deal to his energy and initiative for its establishment and growth during the last 8 years.

Based on advice from Dr N.C. Begg the Food Bank has given priority to children aged 3 to 7 years. Biscuits are sent mainly to those kindergartens and schools where assurance is given that the same children will receive the biscuits regularly for 2 to 3 years. The Food Bank receives applications from teachers, nurses, doctors and church groups, and from well-wishers living in or visiting various developing countries. Meeting of the requests depends on an assurance that the biscuits will actually reach the children for whom they are intended, and on the availability of finance or the ability of the Food Bank to find a sponsor for each scheme. The government subsidised schemes make up only a small part of the total operation.

The Food Bank pays for the purchase of the biscuits and their transport to the recipient country, after which the local people bare the cost of internal freight. The biscuits are sent to the Health Department in W. Samoa, to the Red Cross Society in Tonga and to the N.Z. High Commission in Fiji to enable import without customs duties. These agencies arrange delivery to the schools and clinics where the biscuits will be used.

The Food Bank has always endeavoured to keep its administrative costs to a minimum which has made it difficult for them to follow through the distribution in all cases. This is particularly true where the personnel of the receiving agencies changes as has occurred in the kindergartens in Fiji (see section 5.4).

Initially those receiving milk biscuits were asked to submit regular reports to the Food Bank giving weights and heights of each child every 3 months with comments about general health. Unfortunately many of these reports are no longer available and in some cases those using the biscuits did not have adequate training to make accurate assessments. On examining a group of the earlier reports, Dr Begg stated, "Weight and height gains have been amazing in the more deprived areas and supervisors have noted great improvement in general health. The records provided reflect a great deal of work by the supervisors but in some areas the recording has not been done sufficiently well".

In 1969 at the request of the Food Bank, the value of the milk biscuits was tested in Fiji (Hawley, Jansen & Wilmott, 1971). Four schools were chosen with 139 Fijian and 74 Indian children in the trial groups and 99 Fijian and 165 Indian children as controls. The trial groups received milk biscuits for 38 weeks (excluding holidays) with 2 biscuits per day, 5 days per week. Heights and weights were measured at the start and end of the period. The children were aged 5-8 years; further details of the four groups were not reported. Results:

<u>Fijian</u>	<u>Receiving biscuits</u>		<u>Controls</u>	
	<u>Height</u> cm	<u>weight</u> kg	<u>Height</u> cm	<u>Weight</u> kg
End	123.8	24.3	123.6	24.2
Start	119.2	21.8	120.8	22.4
	<hr/>	<hr/>	<hr/>	<hr/>
Gain	4.6	2.5	2.8	1.8
	=====	=====	=====	=====
 <u>Indian</u>				
End	118.4	18.7	119.7	20.1
Start	113.9	17.2	115.3	18.2
	<hr/>	<hr/>	<hr/>	<hr/>
Gain	4.5	1.5	4.4	1.9
	=====	=====	=====	=====

The Fijian children receiving milk biscuits gained in height and weight more than the control group. The gain in height of the Fijian children receiving milk biscuits was the same as for the 2 groups of Indian children.

In 1971 Dr N.C. Begg received from the Joan of Arc School, the height-weight records of 75 Samoan children aged 7-8 years receiving 2 biscuits per day (1 per day during the first month) for a school year.

Results:

	<u>75 Children 7-8 years</u>		<u>*WPRO Standard 7-8 years</u>	
	Height in.	Weight lb.	Height in.	Weight lb.
End	50.0	62.1	52.3	63.0
Start	46.5	51.9	50.0	57.2
	<hr/>	<hr/>	<hr/>	<hr/>
Gain	3.5	10.2	2.3	5.8
	=====	=====	=====	=====

(* Jansen & Bailey, 1972).

By the end of the year the mean weight for age approached the standard value with much greater increases in height and weight than expected. At the time Dr Begg noted the frequent comment of "skin clear and eyes bright" by teachers and nurses using the biscuits. During the visits mentioned in the present report, contacts were made with more than 20 users of milk biscuits and the improvement of sores and scabies and the alertness of the children receiving the biscuits was invariably the spontaneous reaction. Discussions held with users of milk biscuits are summarised in Appendix Table 9.

The heights and weights of 115 children aged 5-18 years receiving milk biscuits at Vaipuna O Malia School, W.Samoa, were recorded in February and November 1973. Analysis of 101 of these records for children aged 6-13 years reveals that the mean increment in height at all ages was greater than might have been expected, but not the gain in weight. Many of the children had weights less than 80% of the standard weight for age at the start and end of the period.

The N.Z. Food Bank was able to provide records from another school (St Peter's, Falifa, W.Samoa) from November 1973 to November 1974. These records for 135 children aged 5-11 years had been carefully compiled (a sample page is attached following Appendix Table 6). There were 20 incomplete records and the remaining 115 are summarised in Appendix Tables 7 and 8. As the age was given only in years the year plus 6 months was used for comparing the mean for each group against standard figures, though this may have been a false assumption for the smaller groups. The forms did not indicate the sex of the children and this information was provided from the names by Miss Iune Sapolu a Samoan student at the University of Otago. Except for the 6 year old boys the gains in weight were less than the standard but gains in height for boys and girls of all ages were greater than standard gains. Without control experiments these Samoan records are difficult to interpret.

Although N.Z. milk biscuits have been used in many projects throughout the Pacific those using them have had neither the time nor the expertise to test their value with controlled objective experiments.

After 8 years of use, the long-term effects of milk biscuits on the nutritional status of children are still unknown.

One of the problems facing aid-giving agencies such as CORSO, Save the Children Fund or the Food Bank is the decision regarding the form in which milk might be supplied. Milk biscuits are expensive but have the advantage of ease of handling and storage. In 1970 CORSO set down the following guidelines for the use of milk biscuits:

- a. In cases of emergency when storage or water supply are minimal.
- b. For schools and dispensaries.
- c. For pre-school children, for long-term feeding.
- d. Where there are difficulties in storage, preparation or supervision of re-constitution of liquid milk.
(Bryden, 1970).

In addition to the N.Z. milk biscuits, Australian milk biscuits are used in some areas of the Pacific. Their main difference is that lactose has been reduced to a low level in the Australian biscuit with carbohydrate provided by cereals. Both types of biscuit also contain sucrose. The Australian biscuit is similar in texture to commercial biscuits; the N.Z. Dairy Research Institute has also prepared cereal-based milk biscuits in 1975. The low lactose and familiar texture of the Australian biscuits may be an advantage but their likely confusion with ordinary biscuits has been criticised by one user (Barnes, 1975 a & b). This confusion is avoided with the original NZ milk biscuit, and lactose intolerance has not been a difficulty in the Pacific islands provided milk biscuits are introduced gradually. Hawley et al (1971) gave one biscuit daily for the first 2 weeks before increasing the intake to two per day and no cases of lactose intolerance were observed with either Indian or Fijian children, though Fijian adults have been shown to be intolerant to 50g lactose (Masarai, Sharma & Jansen, 1971).

1.4. Nutritional Work of the South Pacific Commission (SPC) and the World Health Organisation (WHO).

1.4.1. South Pacific Commission.

The headquarters of SPC were visited from 21 to 23 July and the members of staff consulted are named in Appendix Table 2. "The SPC is an inter-governmental body concerned with the advancement of the health and social and economic development of the people of the Pacific islands". It was set up in 1947 and its principal officers are the Secretary-General and three Programme Directors.

The Health Programme includes three special projects: Nutritional Diseases; Dengue Fever; Fish Poisoning. The last SPC Conference recommended

that the financial contribution to the special projects be increased by 20% to offset inflation. Because of the vast area with many small populations it is essential that SPC work through specific projects to make the best use of their limited resources.

The SPC has been involved in nutrition research for many years but the present nutrition project commenced in June 1974. The feasibility of a long-term multi-disciplinary nutrition project was considered in 1972-73 and directors of health services in the Pacific stressed the need for practical implementation of many suggestions already made in previous surveys. In 1973, Dr E. Hipsley acting as consultant on nutrition, recommended the setting-up of the nutrition project with the following emphasis:

- a. Nutrition projects should be based as far as possible on home-grown products, or in the case of urban communities on locally produced foods.
- b. The SPC nutrition project should work through national departments in each area.
- c. The project should be designed to include a reasonable demonstration of results and their evaluation.
- d. Emphasis needs to be placed on primary prevention of malnutrition.

In 1974 Dr A. Raoult was appointed as medical nutritionist to the Health Programme and has been assisted by Miss B. Jabre and Dr A. Bourre. A number of short-term consultants have been employed including Dr M. McKenzie (social anthropologist) and Dr. A. Niiranen (paediatrician). Dr Raoult commenced with two pilot projects, the first on the island of Malekula in New Hebrides (see sections 2.2 and 2.3) and the second at Aitutaki in the Cook Islands. It was considered necessary to take base-line measurements before making recommendations in these demonstration areas. The paediatrician carried out anthropometric measurements on a small group of children while the nutritionist examined clinically more than 3000 of the population in the two areas. The sanitary engineer and health education officer collaborated with the surveys making practical recommendations regarding water supply, waste disposal, latrine construction, village cleaning, the strengthening of women's activities and supplementation of children's diets.

A close association between health education and the provision of health services is emphasised by SPC, so it is difficult for them to carry out health education at grass roots level since health services are the responsibility of national departments. However, Miss Jabre has participated in a number of training courses and conferences for caterers, teachers, nurses, agricultural workers, community leaders and social workers. These are the groups who are able to provide health education directly or indirectly to the community.

The long-term objective of the nutrition project is to improve nutritional status, and thereby the general health status of island people. When the pilot projects have been completed it is intended to plan further health education programmes using these projects as demonstration centres. Environmental and dental health, and health education are priorities in the Health Programme.

To meet the needs of young children SPC is encouraging the production of a local weaning food (see section 3,4) in W.Samoa. This should also be considered a pilot project to determine whether locally-produced weaning foods are feasible for the Pacific islands and have any advantages over imported foods (in cost, acceptability and educational value) or the use of home-grown non-processed foods.

The Economic Development Programme of SPC deals with tropical agriculture, livestock production, fisheries development, plant protection and the storage and transport of foods. Success in any of these fields could make important contributions to the nutrition of the islanders provided a sensible balance is kept between home consumption and export of foods. In November-December 1975 a technical meeting on root crops is to be held for the Pacific, followed by intensified research on this topic.

The Economic Development Programme has also been conducting training courses for the fishing industry, to improve the catching and handling of fish. The number of communities aided by such education is likely to be small unless the project becomes self multiplying.

Amongst the activities of the Social Development Programme are two with important nutritional implications. A demographer is studying population growth and migration; the extent of this growth will determine the food needs of the future. In 1963, SPC opened a Community Education Training Centre in Suva, with support from FAO. The Centre provides Home Economics training for girls from the Pacific region preparing them for work with women's groups to encourage community involvement in development projects. This work is closely linked with agricultural extension in some areas. More than 200 women have now been trained to participate in community education. Their training is very basic and well suited to local needs provided that employment for these teachers can compete in the future with more attractive urban opportunities.

1.4.2. World Health Organisation

The WHO employs 40-50 workers in the Pacific; Dr J.H. Hirshman is regional representative for the South Pacific, based in Fiji. From 1968-72 Dr A.A.J. Jansen was employed as medical nutritionist under an Applied Nutrition Education and Training Project. During his 5 year term he carried out surveys and training programmes in W. Samoa, Tonga, Fiji, British Solomon Islands Protectorate, Gilbert & Ellice Islands, American Samoa, Trust Territories of Pacific Islands and in Papua-New Guinea.

An important nutritional contribution of WHO is their encouragement of local health services to use standard growth charts for all infants and children (see section 1.5). The Organisation has published the handbook "Health Aspects of Food and Nutrition" (WHO, WPRO, 1972. 2nd edn) and the booklet, "The Early Detection of Childhood Malnutrition in the South Pacific" (Jansen & Bailey, 1972).

From August 1973 to November 1974 Dr. H. Wassef was employed as WHO adviser on maternal and child health and she carried out surveys in New Hebrides, Fiji and W. Samoa. Dr H.J.L. Burgess is the present regional adviser in nutrition, based in Manila.

1.4.3. Combined Approach of SPC and WHO

Both SPC and WHO place considerable emphasis on environmental health and both have projects investigating the causes and control of dengue fever. However, WHO usually endeavours not to duplicate the work of SPC. For example, mental health and dental health are specialist areas within the Health Programme of SPC rather than WHO. Because SPC now has a long-term Nutrition Project, WHO is putting more emphasis on maternal and child health (MCH), epidemiology and family planning. The withdrawal of WHO from a nutritional emphasis is more apparent than real since nutrition has close links with many aspects of child health.

The SPC and WHO have an important combined role to play in health education by providing support to the national health services and by assistance with provision of audio-visual material for health education programmes.

1.5. Definition of Malnutrition in Children

A basic issue involved in the terms of reference is to decide on the meaning of "malnutrition", with reference to aid programmes planned to alleviate it. In cases of severe malnutrition requiring hospitalization, the signs are usually obvious and have been clearly described for the south Pacific, by Jansen & Bailey (1972). The signs are sometimes not recognised and the children are frequently admitted to hospital for other reasons.

In milder cases the borderline between good and poor nutritional status is often poorly defined. This has led to much confusion and misleading conclusions regarding the prevalence of malnutrition. Since retarded growth is an early sign of malnutrition, careful measurement of weight-for-age is a simple diagnostic tool which may enable preventive measures to be introduced at an early stage.

The WHO record cards for child health give a growth curve with an upper line marking the "standard rate of growth". WHO.WPRO (1972) give tables of standard weights derived from Jelliffe (1966) and Nelson (1964) (Iowa standards). A centre line in the curve indicates a borderline between good and poor growth.

Jansen & Bailey (1972) referring to standard weights-for age stated, "Experience has shown that weights above the 80% level in this table are seldom associated with malnutrition. Weights between the 60 and 80% levels may be described as pre-clinical. Any child whose weight falls below the 80% level or whose weight is not increasing adequately at successive examinations, should receive prompt attention."

In his project report describing the examination of 3933 children in W. Samoa in 1969, Jansen calculated that 7% of the children suffered from "borderline malnutrition" indicating in a footnote that this referred to children whose weight fell below the borderline on the WHO.WPRO charts. Whether this referred to 80% weight-for-age or to a variable figure is difficult to determine since Jansen & Boubella (1970) pointed out that "the line varies from 15% below the mean in infants to 30% below it in older children."

In 1974 WHO set out guidelines for nutrition activities through local health services (WHO Nutrition Unit, 1974) and stressed the value of carefully recording the growth of children and the training of health workers to recognize "any child having less than 70% of bodyweight related to age."

Whether one chooses 85%, 80% or 70% of weight for age as the "borderline" will affect the interpretation of the results as has occurred in W. Samoa (section Section 3.3). Now that standard record cards are being introduced their date of publication should be indicated so that comparisons are possible. The International Child Centre in London has overcome this difficulty by producing a growth chart with two lines, the upper represents the 50th centile for boys and the lower line is based on the 3rd centile for girls.

2. NEW HEBRIDES

A visit was made to New Hebrides from 23 July to 1 August with Vila as the base, but 26 to 30 July was spent on the island of Tonga at the Silimaui Health Centre. The stay in New Hebrides was longer than originally planned because of weather conditions. Those people officially consulted are listed in Appendix Table 3.

2.1. Health Services

Because of its unique political situation New Hebrides has three health services; the Chief Medical Officer of the French National Service is also Chief Medical Officer of the Condominium, while the Chief Medical Officer of the British National Service (BNS) is the Deputy Chief Condominium Medical Officer. This means a certain amount of duplication and a generous coverage of the population in terms of hospital beds and related services. Both the British and French services have recently opened new base hospitals in Vila.

For administrative purposes the country is divided into 4 districts: North, South, Central 1 and Central 2. A Condominium Medical Officer, Dr R. Ratard is responsible for Rural Health Services and is at present gaining overseas experience on a WHO Fellowship. The Condominium Health Service takes responsibility for immunisation programmes and has special interest in the control of malaria, tuberculosis and leprosy.

There are medical officers supervising each district with village dispensaries and small rural hospitals in both the British and French service, throughout the islands. On Efate a model dispensary was established at Panaungisu where 17 village dispensers have received in-service training. Student nurses are also sent to this demonstration clinic which is maintained at a high standard of cleanliness and efficient administration.

Communication is particularly difficult in the New Hebrides because of the many different islands though the main population centres are accessible by air transport. The use of English, French, Bislama and numerous local dialects makes spoken communication difficult and radio links are often limited.

2.2. Nutritional Status of Children.

It is not possible to give accurate figures relating to child health in New Hebrides since there is no comprehensive school health service or recording of births or of admissions to clinics and hospitals, for the country as a whole. However, discussions with Dr G. Conscher (Chief Medical Officer BNS) Dr A. Sinclair (Senior Medical Officer BNS) Dr J. Mills (Medical Officer Central District 2, BNS) and Dr D. McFadyen (WHO, Vila) all confirmed the impression that the nutritional status of New Hebridean children is high, especially when compared with certain Asian and African countries in which some of these doctors had previously worked. Far greater than nutritional problems is the need for increased health education at the village level to improve housing, sanitation and water supply and to control malaria, tuberculosis and intestinal parasites.

In October 1973, Miss S. Jones a public health sister measured the heights and weights of 559 children aged 0 to 5 years throughout the island of Malekula. The results obtained were:

Age (months)	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>8</u>
Weight (kg)	4.7	5.5	5.5	6.7	7.7	7.5	7.6
% standard weight	110	110	96	106	112	101	90
Age (months)	<u>10</u>	<u>12</u>	<u>15</u>	<u>18</u>	<u>21</u>	<u>24</u>	<u>30</u>
Weight (kg)	8.1	8.7	8.5	8.5	9.3	11.5	11.7
% standard weight	87	88	80	75	78	93	87
Age (months)	<u>36</u>	<u>42</u>	<u>48</u>	<u>54</u>	<u>60</u>		
Weight (kg)	12.8	13.5	14.5	15.4	15.8		
% standard weight	88	87	88	89	86		

(*WHO, WPRO, 1972)

At 18 and 21 months the mean weights for age were less than 80% of the standard.

One year later Dr A. Niiranen working with the SPC ^{IN} Nutrition Project (see section 1.4.1) recorded heights and weights along with other anthropometric data of 144 Malekula children at Wala Rano. For this smaller group there were more sub-standard weights from 6 months right through to 5 years and it was concluded by Dr Niiranen that protein-calorie malnutrition was common. Four children had been excluded from the survey because they "looked malnourished". Records kept at Wala Rano from 1964-69 showed that of 200 children born during the period, 14 died before the age of 5 years.

After her visit in May-June 1974 Dr H. Wassef (see section 1.4.2) concluded that about 20% New Hebridean children were underweight for age but frank malnutrition was rare. This is presumably due to the prolonged breastfeeding of infants. In Dr Niiranen's survey, 44 out of 50 children under 28 months were breastfed. This was the total food intake of the 16 infants under 6 months.

Dr A. Raoult examined more than 1700 people of all ages at Wala Rano in 1974. Detailed results of the survey are not yet available but he has supplied some comments based on his and Dr Niiranen's experience. On the average, nutritional problems start at 6 months and have their highest incidence about 16 months of age. There were 30% of children between 6 months and 4 years with unsatisfactory weight for age but the borderline "limit of malnutrition" was not indicated in these preliminary notes. For school age children, 37% were above 80% of the standard weight and 63% below 80%.

In other areas of New Hebrides where staff were consulted, two deaths from malnutrition were reported in 1974 from the area served by Panaungisu Clinic and one death on the island of Tanna. In 6 months during 1975 while Sister M. Sanderson has been in charge of Silmauri Health Centre she has treated 3 pre-school children for severe malnutrition and one of these (a bottle fed infant) has died.

2.3. Health Education

The SPC had chosen a New Hebridean village (Wala Rano) for one of the pilot projects in nutrition. If Wala Rano is to have its full impact as a demonstration area there will need to be very close liaison between the SPC Health Programme, the WHO Development of Health Services and the British, French and Condominium health services.

The SPC Health Education Officer has recently conducted a survey of 58 migrant households at Tagabe on the outskirts of Vila. The survey acted as a training exercise in health education for student nurses and for students from the School of Agriculture. Courses in foods and nutrition were also given at the School of Agriculture in 1974 and 1975 while Dr Wassef (WHO) gave lectures on maternal and child health, to student nurses during 1974.

Vila is experiencing typical problems of urbanisation as people come from outer islands seeking employment without adequate housing. Sister M. Naupa with a team of public health nurses holds regular MCH clinics and examines children in one British school as a preventive measure. School health examinations could be increased if staff were available.

Throughout the Pacific islands women's groups play an important part in community education. The Women's Clubs in New Hebrides are organised by the Department of Education and in 1974, 4 community education workers trained in Fiji were employed (see section 1.4.1.) Health, hygiene and nutrition education were amongst the topics in courses given to 550 women during the year. The emphasis is on locally-produced food with production of vegetables and poultry included in the instruction.

Linked with the work of the Women's Clubs, a Home Economics centre has recently been opened at Kawonu College (teacher training college in Vila). Instruction in foods and nutrition is given to both boys and girls at the College as well as to local school children.

The teachers' college is an important centre of influence for health education especially in the British education service which employs more New Hebridean teachers. Sanitation, meal service (if any), gardens, building standards and health education at schools have a considerable influence on disease prevention and health standards. Simple books and posters in the local dialects or Bislama could help this work. A booklet in English entitled "Health Education in Primary Schools" (produced in the British Solomon Islands) is in use at Napogasale school on Tongoa. Posters with Bislama captions were being prepared at the Department of Education, for health education in Vila. The SPC has recently revised a nutrition education poster giving a guide (in English) to the nutritive value of island foods.

There is a potential for the greater use of radio in health education as this is a basic method of communication, and possibilities were discussed with Dr J. Mills of Malekula. Though films are popular cost of the transport of the essential equipment to areas without electricity is very high, and it is difficult to obtain suitable films.

2.4. The Use of N.Z. Milk Biscuits.

Some years ago Miss Barbara Hay (now Mrs J. Cunningham, Vila) working as a nursing sister on the island of Epi, carried out a controll study of the use of N.Z. milk biscuits at the request of Dr N.C. Begg, but unfortunately Dr Begg has not kept the report. New Hebrides is not one of the territories receiving biscuits under the N.Z. Government subsidy.

Following a visit by the Director of the N.Z. Food Bank to Vila in May 1975, a small consignment of 12 cartons of biscuits was sent to Mr R. de Boulay at the British Residency for relief work in an isolated area. The biscuits were included as a protein supplement

to rice and other foods, being sent to an area of food shortage due to weather conditions. While they provide a supplement of high nutritive value which is easy to handle and transport, their usefulness in emergency situations is limited, as familiar foods are more acceptable.

Prior to leaving New Hebrides, Dr R. Greenough, former Chief Medical Officer (AMS) discussed the use of NZ milk biscuits with Dr A. Raoult. They both recognized that nutritional deficiencies are most likely to occur in the 6 month to 3 year age group where it is difficult to arrange an efficient supplementation programme except through BCH clinics. Although SPC is actively engaged in producing a weaning food in Samoa, Dr Raoult considers it will be a long time before such a food could be available for other areas. Dr Raoult stated, "I therefore believe that a routine distribution of NZ milk biscuits associated with nutrition health education can only be fruitful. -- It will be necessary to make maximum use of existing structures.-- Any mass distribution should be avoided as it could not be efficiently associated with health education."

At present Australian milk biscuits are used in the AMS Hospital at Vila and by some public health nurses.

2.5. Adequacy of Local Food Supplies.

Reef production is being increased with some exports to New Caledonia; vegetable production on the island of Tanna meets some of the market needs in Vila. On the whole New Hebrides economy is still at subsistence level and is dependant on the fluctuating prices of copra. Root crops and fruit are readily grown but gardens often have to be cut out of the bush and provide unsatisfactory employment for young people. In many areas fresh fish is difficult to obtain and fish poisoning has been a problem.

Co operative stores have been built in large numbers so foods readily stored are available for purchase. The storage facilities are often limited and cereals may deteriorate before they can be sold. Tinned fish is available. Difficult transport to the islands makes the supply of imported foods a problem.

Although cows, pigs and hens are kept in some villages, the conditions are often unfavourable for production of eggs and village facilities would make it very difficult at present to provide fresh milk and meat which was hygienically safe.

With the combination of village gardens, stores, good health services through local clinics and the retention of extended breast feeding, it is possible to provide the foods required for young children though some help with supplementary feeding may be needed from time to time. A vigorous programme of health education is required if the nutritional status of New Hebridean children is not to deteriorate.

3. WESTERN SAMOA.

The visit to Samoa took place from 1-13 August and was confined to the island of Upolo. A planned visit to Savaii was cancelled owing to the incidence of dengue fever in the health district to be visited. The names of those persons officially contacted are listed in the Appendix Table 4.

3.1. Health Services

Dr W. McKendrick, Director of Health arrived recently from Auckland following the departure in June 1975 of the Acting Director (the late Dr W.H. Reed, 1938). The Department of Health has its offices at the Apia hospital which is being rebuilt with substantial help from New Zealand. In addition to the main hospital there are 14 district hospitals and a number of sub-centres, 14 medical officers and more than 40 district nurses.

The organisation of village communities is strong in W.Samoa enabling the district nurses to work through the women's committees. This is an invaluable channel for MCH services and for health education. It is hoped that a continued close liaison can be kept between the District Nursing Service and the National Council of Women (with which many women's committees are affiliated).

3.2. Nutritional Status of Children.

In 1973 there were 1139 admissions of children 0-12 years at Apia hospital and 58 died. Malnutrition was noted in 126 cases of whom only 4 were over the age of 3 years. Gastroenteritis, pneumonia and bronchitis accounted for more than half the 1549 admissions. Including the district hospitals 204 children (198 under 3 years) were treated for malnutrition in 1973 and 169 (161 under 3 years) in 1974. The drop in numbers is largely due to a policy of home treatment instituted at Fagali Hospital on Savaii, in 1974 (King & King, 1975).

A number of surveys have been conducted in the last 10 years. Dr M. Kewie and Miss R. Wilkins in 1965 conducted a nutritional survey in 3 urban and 2 rural villages. All but one of 22 infants were breastfed and there was one case of severe malnutrition in 80 children under 4 years. In 1969 Dr Jansen recorded weight for age of 3933 children 0-5 years in both Upolo and Savaii. Of 1806 children from 4 villages on Savaii there were 9 cases of "clinical malnutrition" between 1 and 3 years of age. There were 3 cases of "clinical malnutrition" amongst 1458 children from Upolo plantations but no cases amongst 669 children in Apia. Dr Jansen reported that 7% of W. Samoan children suffer from "borderline malnutrition" and are in a "vulnerable position" (see section 1.5).

As part of the SPC Nutrition Project Dr Niiranch in 1975 took anthropometric measurements on 326 children aged 0-3 years in one district near Apia, and found 4% were below 80% of the standard;

64% of the children in this group were from families of more than 5 children.

A more representative sample of Samoan children has been weighed by Mrs C. King with as many health districts as possible included in the sample. For 718 children aged 1-5 years, 10 3/4% were below 80% standard weight for age (WHO, WHO, 1972) and 2.6% were below 70%. This study was in progress during the visit and an additional 200 children have now been weighed.

Dr Jensen, Dr Nijman and Mrs King have all commented on the more frequent incidence of unsatisfactory weights amongst girls than boys in their Samoan survey.

3.3. World Food Programme (# FWA 741)

Following Dr Jensen's 1964 report of "borderline malnutrition" in children 0-5 years, an application was made to the U.N. World Food Programme for assistance with child feeding until such time that the local production of milk, meat, fish, eggs and vegetables has increased to enable better feeding of the rapidly expanding population. The Samoan Government reported a need to supply for 3 years in the first instance: 30g skim milk powder daily to approximately 7000 pregnant and nursing women each for 12 months; 30g skim milk powder daily to 20,000 pre-school children aged 9 months - 5 years; 1 milk biscuit per school day to 25,000 children aged 5-12 years; 30g skim milk powder daily to 100 children in hospitals; daily ration of 100g rice, 30g skim milk powder, 20g cooked beef, 20g vegetable oil, for 60 pre-school children attending Nutrition Rehabilitation Centres (to be established).

The Department of Health and Welfare was to be involved in distribution of the food and in nutrition education programmes, with the WHO Country Liaison Officer in Apia assisting in the operation of the project. After prolonged negotiations and consultation with the members of children to be involved, the project was jointly approved in 1965 by the World Food Programme and the W. Samoan Government at a cost in the vicinity of U.S. \$1,000,000.

With changes of medical staff and further studies on the nutritional status of children since 1969, the Department of Health in 1973 is not in agreement with the original WFP proposal. In April 1973, Dr V.T. Vennelsen, Deputy Director of Health in Apia, made the following comments: "It is felt that without prior intensive and prolonged health education efforts, without the guarantee of an efficient administrative apparatus this project is doomed to failure from the start. It is suggested therefore that the project be cancelled and that alternative ways of combating malnutrition be sought". "The sector of the population needing mostly the nutritional support envisaged are the preschool children (especially during the weaning period) and pregnant women. Strengthening of the ongoing MCH programme could reach this group of people. -- Increased awareness could reduce drastically the number of clinical malnutrition cases over a short period of time". "Treating the food supplements as 'medicines' rather than 'handouts' would be

are acceptable to the public. "Intense health education, especially nutrition education could well be the only logical answer to the whole problem. "Effort given to Agriculture and Education) should be encouraged to intensify their efforts at combating the causes of malnutrition."

Discussions with Dr. W. H. Calkins, Director of Health clearly indicated his support for Dr. V. C. Allen's comments. The Department of Health would prefer to gain support for the Red Warming Food project.

3.4. Counting and for W. G. 10.

Since both Philip and Lawrence were registered usually between 1900 and 1902, it is probable that they were both in the United States at that time. It is also probable that they were both in the United States at that time. It is also probable that they were both in the United States at that time.

It was decided that a place for which could be substituted with water and which did not have a high level of pollution should be used for one of the large groups of children. The place was chosen and the children were taken to the place.

A number of possible combinations of taro and rice flours, skim milk, pinyia concentrate, coconut oil and sugar have been considered. One formulation would require that 17g skim milk are required per 100g feeding food if the product is to have 10p Cal % greater than 0.8 which is the target value. A formulation including both taro and rice flours is a wide range of supplies of taro have been fluctuating in recent years. From considerations of dental health it might be questioned that the sugar is an essential ingredient. Although the taro flour may already possess enough sugar, pinyia concentrate and coconut oil could be able to cope with the population of the feeding food if it is to be administered "medicinally" through hospitals and the district nursing service, to children at risk (see table 3.3).

Samples of the winning feed have been sent to Dr B. Standahl of the University of Hawaii, where further analysis will be carried out before final decisions are made on the formulation. It is hoped that this will be completed in time for field trials to be conducted in 1976.

If WFP is willing to support this project by supplying the milk, sugar, and other necessities, this would be a more appropriate use of aiding the health of the children than the original plan which would tie up the time and energies of the staff of government departments in a wasteful manner, instead of concentrating the help where it is really needed.

If WFP is not able to undertake the Weaning Food project, SPC and the Western Samoan Department of Health will need support from other sources. The appointment of a dietitian following the resignation of Mrs King, is an urgent necessity for the successful inauguration of the programme.

3.5. Nutrition Education.

The combined efforts of the women's committees and the District Nurses form a strong basis for nutrition education to the mothers of young children. The National Council of Women has produced some illustrative material which may be in courses for women but there appears to be a shortage of posters and pamphlets in the Samoan language, such as the combined nutrition, family planning, environmental health posters seen in Tonga (see section 4.3).

As the Department of Health has had a dietitian for several years it has been possible for nutrition education to be extended. Lectures have been given to student nurses, to public health inspectors and to kindergarten teachers as well as some radio programmes on nutritional topics.

In 1967 Dr H.B. Deloit and Miss R. Jones published health education books in English and Samoan at 3 levels.

- Part 1 for primary school pupils;
- Part 2 for senior pupils, teachers and nurses;
- Part 3 for mothers and women's committees.

The material was relevant to the local situation and there may be value in revising these books to meet present-day needs.

The Home Sciences Centre in Apia includes foods and nutrition in its curriculum but reaches only a small group of pupils in the capital.

3.6. Distribution of N.Z. Milk Biscuits.

Some of the original testing of milk biscuits was carried out in Samoa by Dr M. Weave and biscuits have been received by some schools since 1967. In March 1975 the NZ Food Bank arranged the dispatch of 1226 cartons of biscuits to the Department of Health in Apia. These were received by Dr Tetemai who arranged their distribution to the district nursing service, a church youth group, 13 kindergartens and 16 schools. Of the total consignment 190 cartons were provided by the NZ government grant; 32 of these were retained at Apia hospital for distribution by district nurses under the supervision of Sister S. Nathan and 138 cartons were delivered to Dr F. Penei. Dr Penei conducts a daily Bible class for the children of his village and 200-300 children aged 1-16 years receive the milk biscuits daily with a larger group on Sunday.

The total consignment was intended for distribution to approximately

4000 children though the number is variable since those in charge of the distribution use their discretion in helping needy families from time to time. It was possible to have discussions with approximately half the people responsible for milk biscuit distribution in Samoa since the Congregational, Methodist and Catholic churches have a centralised distribution to their schools and kindergartens. The consumption of the biscuits was observed at two Methodist schools.

The Department of Health in W. Samoa acts as recipient and distributing agent for N.Z. milk biscuits but neither controls the list of institutions receiving the biscuits, nor receives any reports from them regarding the progress of the children. In earlier years, progress of the children receiving milk biscuits was reported to the Dept of Health and for one school Dr Tautasi noted a decrease of respiratory infections and normal weight gains for a group of 7-9 year old children previously underweight. The participants in the scheme are those who have applied to the N.Z. Food Bank and have fulfilled the criteria laid down (see Section 1.3).

Of the 16 schools receiving biscuits 11 are Catholic schools and the distribution to these is arranged through St Mary's School Apia. This school and one other Catholic school pay the Food Bank for some of their biscuits. St Mary's has a tuck shop and sells milk biscuits to the children along with peanuts and frozen papaya concentrate. The first two classes in the school (aged 5-7 years) receive the biscuits free. The 5 Methodist schools on the scheme had started only recently. The availability of the biscuits was greatly appreciated by pupils and teachers though in one case it was admitted that the scheme had a detrimental effect on the preparation of local foods for breakfast, by boarding school pupils. In some schools the children receive 5 biscuits per week but in the John Wesley Primary School 9 per week were given to children aged 5-12 years.

In W. Samoa about 25 kindergartens are affiliated to a Pre-School Association and teachers are receiving in-service training. Many of the teachers are wives of pastors of the Congregational Church. It was possible to discuss the milk biscuit distribution with several of the teachers attending the training course. In those kindergartens which do not meet daily children receive 3 milk biscuits per week. Since the facilities (buildings and equipment) are very limited the milk biscuits are welcomed by the teachers as a means of making the kindergarten session more attractive. In some kindergartens it was considered that the attendance was poorer in 1974 when the supply of milk biscuits was limited (see section 1.3). Some teachers have used the biscuits to aid nutrition education to try to discourage children from bringing:

- a. sweet biscuits and cordials;
- b. food from home in unhygienic wrappers.

However some children consume both the milk biscuit and some food brought from home.

The future of the milk biscuit scheme in Samoan kindergartens and schools may depend on the outcome of the WFP negotiations and on the provision of other facilities. There may be cases where milk biscuits have been supplied where they were not required on nutritional grounds but they were welcomed by the teachers and children sometimes working in limited surroundings. Possibly books or other educational aids might have been more beneficial.

If the use of NZ milk biscuits is to be linked with the improvement of health, which is the desire of the Food Bank, distribution by district nurses would appear to be the most effective manner. Sister Vaasa working on Savaii indicated that she could use twice as many milk biscuits as she currently receives from Apia. The nurses are able to assess the needs of individual children and to watch their progress. The biscuits can be valuable as a short-term supplement for sickly children as well as their longer use envisaged by the Food Bank.

3.7. Adequacy of Local Food Supplies.

With N.Z. aid, the poultry, beef and dairy industries are being built-up in W. Samoa. Most dairy units consist of 2 to 5 cows and women's groups are encouraged to take an interest in these; competitions are held amongst women's groups for the best milk production. The Department of Agriculture in Apia has been selling vegetable plants and fruit trees to encourage home gardening. In recent years with a rapidly growing population and more money available from N.Z. relatives, local consumption of foods has increased. This creates problems in trying to expand exports as is the case with the banana industry in Samoa. Rice imports have increased in recent years.

Further comments about the adequacy of the food supplies in relation to the health of children must await the outcome of the WFP negotiations.

4. TONGA

The visit to Tonga took place from 14-19 August and those officially contacted are listed in Appendix Table 5.

4.1. Health Services.

Like New Hebrides, Tonga is made up of many islands some of which are quite remote from the capital Nuku'alofa. The rural health services radiate from clinics with public health nurses responsible for MCH under a number of medical officers. There is unfortunately a considerable turnover of public health nurses and many vacancies at present. This makes it difficult for accurate records of child health to be kept. Large families are common and the Public Health Division is placing much emphasis on its family planning activities, supported by a WHO expert in this field. Recently 200 families per month have been accepting the family planning programme.

4.2. Nutritional Status of Children.

Statistics on child health are limited in Tonga since births are not always registered. The paediatrician sees very few cases of severe malnutrition in Vaiola Hospital, Nuku'alofa, though some of the cases of gastroenteritis may be linked with unsatisfactory bottle feeding which is discouraged. Ear infections are a particular problem amongst children in Tonga. The paediatrician makes regular visits to the outlying islands and recently saw 15 cases of malnutrition amongst 400 children examined; most of these were on the island of Vavau.

In 1972 Dr Jansen (WHO) carried out nutritional surveys on Tongatapu, Vavau and in the Ha'apai group. He found some cases of clinical malnutrition in young children and low weight for age in older children but also much obesity (especially in women). Dr Jansen in 1973 noted the problems experienced by boarding schools in providing adequate food for children, and this problem still exists.

4.3. Health Education and Food Consumption.

The Department of Agriculture employs 14 men and women to give advice on production and preparation of foods. The instruction is linked with the district nursing service so that advice on child health can be given at the same time. Lectures on nutrition and gardening are also given at the Teachers College and the extension work is stimulated by agricultural shows throughout Tonga and by gardening competitions. A refrigerated van has been purchased to encourage greater consumption of fish and eggs in the villages on Tongatapu. A mobile film unit is used as a means of instruction and for raising funds to improve gardens.

In 1973 the dietitian at Vaiola Hospital, Miss J. Madill (now Mrs Wishart) carried out one-day dietary recalls amongst adults aged 20-69 years; 395 from the villages of Fallelao and Lotefoa in the Ha'a-pai group and 400 from Nuku'alofa. The percentage frequency of the use of certain common foods in the two groups was:

	<u>Ha'apai villages</u>	<u>Nuku'alofa</u>
Coconut cream	92	88
Pork	23	25
Other meat	23	82
Fresh fish	45	38
Other fish	25	18
Milk-sweetened condensed	2	22
Other milk	6	17
Eggs	2	5
Cheese	0	3

Although these were groups of adults the figures may give some indication of family food consumption.

Under the MCH and family planning section of the Health Department, a Health Education Officer is employed and lectures and radio programmes are prepared. In order to obtain visual aids for health education, a workshop discussion was held with local artists present to interpret the findings. From this discussion a calendar and a flip-chart with Tongan captions were produced. Topics included in the illustrations are: advantages of smaller families, needs during pregnancy, importance of breastfeeding, introduction of supplementary feeding, suitable local foods to be introduced at 4, 6 and 9 months of age, importance of breakfast for school children, feeding the family, village cleanliness, construction of latrines, keeping of animals. The visual aids were financed by the United Nations Fund for Population Activity and printed by WHO in Manila. The Department of Health is to be commended for its initiative.

4.4. Distribution of N.Z. Milk Biscuits.

The scheme in Tonga is not working very satisfactorily and the Food Bank had expressed some concern about it. The biscuits are sent to the Red Cross Society of Tonga and some of them are despatched by them to the outlying islands. The Department of Education is responsible for the transport of the biscuits from the port in each island to the schools listed. While the Director of Education appreciated the generosity of New Zealanders in supplying the biscuits he believes their distribution is not within the function of a Department of Education. This view is obviously shared by some of the teachers, and the Red Cross Field Officers have had to deliver the biscuits themselves to the schools in some cases. For this reason the Red Cross Society has added a number of schools to the original list where it is felt that children aged 6-8 years would benefit from the snack. Three or four cartons are delivered at a time to each school while the main stock is stored at the Red Cross Hall.

During discussions with four Red Cross officials (Princess Pilolevu president; Iteni Helu, secretary; Mrs A. Taunt, welfare officer and Major Hornibrook, former secretary) it was apparent that the Red Cross Society of Tonga would prefer to have the distribution supervised from the Department of Health as was suggested by Red Cross in 1972. Red Cross would be happy to deliver biscuits to the Department of Health for use by district nurses and to receive back reports of the scheme to despatch to New Zealand. While some milk biscuits might be distributed through kindergartens this is unlikely to reach those children whose diets require supplementation since families able to pay kindergarten fees should be able to provide adequate foods.

Dr Muimui Tatola already has a departmental fund from which infant foods are purchased for distribution to needy families by public health nurses. However, the allowance is not as large as required and a small supply of milk biscuits or milk powder from New Zealand would be helpful. In Tonga the nurses often use motor bikes for transport so they are unable to take out large supplies at any one time. Major Hornibrook considered that it should be possible to phase out such aid programmes to Tonga in a few years time if the efforts by the

Department of Agriculture to improve local food production, are successful.

Tonga High School and Toupou College are two cases where older children are receiving milk biscuits. While the children no doubt enjoy the snack, in the case of the high school this seems quite unnecessary. Toupou College is a Methodist agricultural school which produces vegetables, milk and beef as part of their training programme and as a source of income. The milk and beef are sold while the boys' diet contains vegetables, imported mutton and NZ milk biscuits. This is an example of the question raised by Dr Jansen of the difficulty of boarding schools to provide finance for both food and educational materials for their pupils.

5. FIJI

The visit to Fiji took place from 19 to 26 August and those officially consulted are listed in Appendix Table 6.

5.1. Health Services.

Fiji is divided into 4 health districts each with a chief medical officer and a network of district hospitals and clinics. Heavy responsibility is placed on district nurses who may have to work in remote areas isolated from the nearest medical officer. Attempts are made to move staff from the most remote areas every 6 months. In 1975 a 3 year course for medical assistants was commenced at the Fiji School of Medicine to reduce the work-load and make better use of the potential of those who have received a full medical training. An extensive immunisation programme covers the whole country and subsidies are available to encourage improvement of water supplies and installation of latrines.

5.2. Nutritional Status of Children

For a number of years the Department of Preventive and Social Medicine at the Fiji School of Medicine has conducted surveys in various parts of Fiji as part of their training programme for medical and dietetic students and others. Although the number of cases of clinical malnutrition observed, have been few, children with low weight for age have been reported at all ages up to 12 years. For example, more than 30% of the children were below 80% standard weight for age in a group of 500 Indian children examined in the Ba district in 1969. Jansen & Boubella (1970) measured the nutritional status of Fijians at Serea, an inland village of Viti Levu and found the nutritional status of 72 children aged 1-6 years was good but there was some growth retardation at 2-4 years of age.

In 1974 there were 134 cases of frank malnutrition treated at the CWM Hospital Suva mainly in the 6 months to 2 years age group. Up to August 1975 only 42 cases had been treated and it is hoped that this may be due to a more intensive follow-up of infants with borderline weight, preventing clinical malnutrition from developing. Only 4 of

the 42 patients were admitted to hospital with malnutrition as the primary diagnosis; 3 of the 42 children died.

5.3. Nutrition Education.

The district nurses find it easier in the rural setting to watch the progress of mothers and infants than in Suva or in other towns. They not only record the progress of the children but encourage the growing of vegetables and the preparation of weaning foods from local products. The traditional food pattern of Indian families includes more rice, milk and legumes while Fijian families tend to consume more root vegetables when available.

The Department of Nutrition at the Fiji School of Medicine was established in 1967 and provides training for dietitians for Fiji and some other Pacific islands. In addition the staff participate in teaching nutrition to medical and dental students, to public health nurses, medical assistants, health inspectors and to students at the SPC Community Education Training Centre. Miss S. Tikaram, Head of the Department of Nutrition, would like to see the staff of the Department strengthened so that the best use may be made of their potential contribution to preventive medicine.

The Department of Nutrition has produced a food guide and is preparing a poster on breastfeeding. A manual on infant feeding based on locally available foods has been revised and funds are being sought from an international agency for its publication.

In 1975 a chapter on foods and nutrition has been incorporated into the Fiji Government Development Plan 7 showing the emphasis being given to this aspect of health. The Fiji Home Economics and Nutrition Society has been active in nutrition education through the news media and the holding of professional meetings.

In 1970 home economics for teachers was introduced at the University of the South Pacific and this should provide a further group who will participate in health education through the schools.

5.4. Distribution of N.Z. Milk Biscuits.

In Fiji milk biscuits are sent to the N.Z. High Commission and are delivered by them to the hospital, the Crippled Children's Society, the J.P. Bayly Clinic, Sister B. Slader and to about 9 kindergartens in Suva. Milk biscuits are also sent to a number of schools in other parts of Fiji. The list of recipients was mainly drawn up by Mr T. Muir in 1971 when he was South Pacific Field Officer for V.S.A. Mr Muir was based in the Department of Education and the distribution of milk biscuits commenced in 1973. The delivery of biscuits to the institutions on the original list has continued without further reference to the Department of Education and Mr Muir left Suva some time ago.

After discussing the use of milk biscuits in Suva with two senior officers of the Department of Education (Mr Prasad and Mr Tukunia) they

indicated their intention to review the scheme with their pre-school advisers so that the help could be given to children who were likely to have a need for such supplements. The visit to Fiji included part of the school holidays so it was possible to see only the children at the YWCA kindergarten though Mrs Tagimarama the head teacher was not available during the visit. The work of the Chance kindergarten which endeavours to cater for children from less privileged families, was discussed with Mrs Symmons the supervisor.

While the N.Z. High Commission has been happy to arrange delivery of the milk biscuits, the gift would be more beneficial if there could be an occasional follow-through so that as personnel in the institutions change, new staff could be informed of the purpose and origin of the gifts. Earlier this year when Dr W.D. Barney (Senior Lecturer in Education, University of Auckland) was visiting a number of kindergartens in Suva, he realised that some staff were unaware of the origin of the milk biscuit scheme, of the reasons why the biscuits were unavailable in 1974 and whether the scheme was intended to be temporary or permanent in nature. Any educational value of such a scheme is weakened if the recipients are uninformed.

The need for supplementary feeding in inland areas or in coastal regions in Viti Levu or other parts of Fiji may be different from the need in Suva. Any districts where there is a special need could be indicated by the Department of Health. For example, Dr Ganga Ram Medical Officer for the Central Division pointed out that there are some regional pockets of malnutrition in this health district which might be helped by supplementary feeding. The Nutrition Department in Fiji prefers the use of milk powder rather than milk biscuits provided the conditions are appropriate. The powder can be incorporated into familiar recipes to fit into the customary eating pattern of the family.

In Suva and surrounding districts milk biscuits are used also by the J.P. Bayly Clinic and by Sister B. Slader, in welfare work. The Clinic as well as providing low-cost medical treatment for poorer families, distributes food parcels to 150 families. The work is well organised with careful records kept of the recipients; the food parcels contain tinned fish, sharps enriched with Multipurpose Food, rice enriched with Risone, skim milk, milk biscuits, sugar and split peas.

Sister Slader is a very experienced nursing sister who has worked for the past 18 years amongst Indian families living up to 20 miles from Suva. She works amongst the poorer families many of whom live in one-roomed cottages though some have been settled by the Housing Assistance and Relief Trust (HART) in new low-cost housing. In this situation milk biscuits are a very useful supplement since help can be given to many children during Sister Slader's regular visits to the housing settlements. Sister Slader is convinced that the children's health has greatly improved in recent years since receiving milk biscuits. During 6 hours spent with Sister Slader during routine distribution of food parcels and milk biscuits to a large number of homes, the value of the biscuits was observed. As with other Pacific

islands emphasis on housing, sanitation and employment is also needed if good health of future generations of children is to be ensured.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. General.

There are a number of aspects of the nutrition of infants and children which are common to the New Hebrides, Western Samoa, Tonga and Fiji.

- a. Extended breastfeeding is an important safeguard for infant health. Where this is not practised intensive education through MCH services is needed to ensure adequate infant feeding.
- b. Guidance in supplementary feeding is required so that mothers gain confidence in a weaning schedule appropriate to the foods locally available.
- c. Public health nurses play an important role in MCH services in both rural and urban situations. The nurses need every possible encouragement through training and facilities, including adequate transport.
- d. The weighing of infants and young children by the nurses is a valuable diagnostic tool. Staff may need additional training with the use of record cards for plotting the child's progress. The task has become more difficult with a change to the metric system in some areas. The method requires scales which can be frequently checked to give accurate weights, regular visits so that unsatisfactory growth can be rapidly investigated, and accurate records of date of birth where possible.
- e. Where clinical malnutrition occurs it is usually between the ages of 6 months and 3 years. A large number of surveys of the growth of children have been carried out revealing a very similar pattern in all areas. Mean weights for age are sometimes above the standard (WPRO.WHO, 1972) for the first 6-9 months but there is less satisfactory growth from 9-21 months. For this reason SPC and the Departments of Health have placed emphasis on production and testing of a local weaning food. Nutritional status of older children is usually good though obesity may be a concern in some areas.
- f. There is a place in the Pacific islands for N.Z. milk biscuits and milk powder available either for purchase from stores or by donation to those who have a particular need for such a supplement. The use of donated milk products needs to be guided by public health nurses or other medical staff. Recommendations in the past have sometimes been made by those who mistakenly assumed that Pacific island children require a food pattern very similar to that of N.Z. Those responsible for nutrition education throughout the Pacific are rightly putting emphasis on the value of locally produced foods. Where it is considered desirable for children to have a snack at kindergarten or school, milk biscuits are preferable to sweet biscuits, sweets or cordials, though locally grown fruit or vegetables are even more

preferable if available, for their educational value. In each of the territories there are boarding schools supported by churches where milk biscuits form a useful financial supplement to reduce expenditure on food and hence reduce school fees. Where food aid is provided, it should be planned to cease the aid as soon as local supplies or conditions have improved.

- g. There is awareness of the need for health education by those administering the health services but not always the opportunities to meet the needs. Formal health education in the school curriculum is required but should be supported by practical demonstrations as part of a concerted effort to improve environmental health. Close liaison between Departments of Education, Health and Agriculture is needed. Could SPC or WHO assist with the preparation of further books and visual aids for health education to meet the language needs of different territories?
- h. The organisation of village life in the Pacific islands provides an ideal centre for health education though methods must be flexible to adapt to changing ways of life. Where nutritional problems occur they are often related to a breakdown in traditional patterns without adequate provision or understanding of modern alternatives.

6.2. New Hebrides.

- a. Both WHO and SPC workers in New Hebrides realise the need for health education. The British health service would like to train health education workers within the country but would need some overseas expertise to initiate the scheme. The greatest possible use should be made of the demonstration area at Wala Rano as well as the Panangisu Clinic so that there is widespread awareness and involvement by local communities in village improvement, as a basis for increasing public health. Additional demonstration villages may be needed to involve and train people from many islands. Efforts are being made to improve village water supplies.
- b. The medical dressers and district nurses play a key role in rural health services. There is at present a shortage of staff for the training of nurses in New Hebrides.
- c. One suggestion made for supporting the rural health services was that milk products might be sent from N.Z. and sold to village stores for retail. The money available could be used by the local health committee to improve village clinics and local health facilities. The Leprosy Trust Board of N.Z. has been generous in its aid to the health services; the type of aid has been ideal in encouraging local participation.
- d. It would be helpful to have milk products available in small quantities for distribution by district nurses for needy families as required.
- e. There is a shortage of health education books and visual aids prepared for the local situation. The Department of Education in Vila has facilities for printing posters and books in simple form.

6.3. W. Samoa.

- a. It is to be hoped that decisions regarding the operation of WFP.WS741 can be made along the lines of the recommendations by the Department of Health.
- b. Every effort should be made to see that the production of the weaning food proceeds according to schedule. Some N.Z. input may be required.
- c. The appointment of a dietitian to the Department of Health for several years prior to the availability of Samoan dietitians, is important if the present programme of nutrition education is to be continued and the weaning food project is to be adequately tested.
- d. It is recommended that there be a change of emphasis in the distribution of milk biscuits so that supplies are made available to district nurses, if they are still required when the weaning food becomes available. Supplies to older children could be phased out unless local people wish to purchase them. The Department of Health should receive reports regarding the value and operation of the milk biscuit projects. The situation in kindergartens needs further investigation; aid other than food may be more appropriate.
- e. There appears to be a shortage of health education teaching aids directly relevant to Samoa.

6.4. Tonga.

- a. Health education in Tonga has a co-ordinated approach with emphasis on family planning, local foods suitable for pregnancy and weaning, feeding the family and village hygiene.. This type of approach is encouraged by WHO (WHO Nutrition Unit, 1974) and the Tongan experience may be applicable to other territories.
- b. If it is possible to extend the use of child record cards with regular weighing of infants this should assist in prevention of malnutrition and make statistics more accurate. However, the use of record cards will be limited if public health nurses are in short supply.
- c. The Red Cross Society should be encouraged to plan a reorganisation of milk biscuit distribution by means of discussions with the Department of Health to ensure that the supplementation is linked with health needs.
- d. The supplying of milk biscuits to older children is linked with a much broader question regarding the financial support for education in general, and for boarding schools in particular.

6.5. Fiji.

- a. Fiji has become a training centre for doctors, dentists, medical assistants, dietitians, public health nurses, community education workers and home economics teachers all of whom play an important part in health education in the Pacific islands. The Nutrition Department

at the Fiji School of Medicine has a unique opportunity to train these potential leaders in nutrition education, but cannot do this work unless it is adequately staffed. The Community Education Training Centre is at present reviewing the employment opportunities for the women whom they train.

- b. There appears to be a marked improvement in the incidence of malnutrition amongst young children in Suva during 1975. If this improvement is maintained, other territories may be able to learn about the precautions taken to accomplish these results in Fiji.
- c. The Department of Education is investigating ways of re-organising milk biscuit distribution to kindergartens in Suva so that aid will be received where it is most needed. The type of welfare work carried out by the J.P. Bayly Clinic and by Sister B. Slader are examples where food aid from New Zealand is appropriate.

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8. APPENDIX.

Table 1. People Consulted Prior to Visits.

Dr I. Prior)		
Miss F. Davidson)	Wellington) Pacific islands
Dr W.J. Barnes))
Mr H. Innes))
Mrs O. Gaeth)	Auckland) N.Z. Food Bank
Dr N.C. Begg	Dunedin)
Dr W. McGillivray	Palmerston North) Milk Biscuit
N.Z. Dairy Board	Wellington) manufacture
Dr T.G. Hawley)) Fiji
Dr R. Greenough)	Auckland) New Hebrides
Dr B. Mackereth))
Mrs J. Wishart	Invercargill)
Mr R. Van Asch	ANZDEC, Auckland) Tonga
Dr M. Earle	Massey Univ.	Infant formulae
Mr R. Mawson	Hamilton	Weaning food, Samoa
Dr W.D. Barney	Auckland	Milk biscuits, Fiji
Dr J. Hodge)) M.R.C. Pacific
Professor J. Miles)	Dunedin) South Pacific
) Commission
Dr G. Loison)	South Pacific	Health
Dr A. Raoult)	Commission	Nutrition
Dr D. Reed)	Noumea	Epidemiology
Mr P. Sotutu	Canberra	Fiji-education
Dr W. McDonald	Apia	Samoa-health
Dr A. Barnes	England	Australian milk
		biscuits.

CONSULTATIONS DURING VISITS

Table 2. South Pacific Commission., Noumea

Mr G.F. Betham	Secretary General
Dr F. Mahony	Programme Director (Social)
Dr G. Motha	Programme Director (Economic)
Dr A. Bourre	Medical Officer
Miss B. Jabre	Health Education Officer
Mr E. Dunn	Sanitarian
Mr G. Chan	Waste Digester Specialist.

Table 3. New Hebrides

Dr G. Conacher	Chief Medical Officer (BNS)
Dr A. Sinclair	Senior Medical Officer
Dr D. McFadyen	WHO Medical Officer
Dr J. Mills	Medical Officer Malekula
Mr R. de Boulay	British Residency
Sister E. Will	WHO Nurse Educator
Sister J. Silvane	WHO Public Health Nurse
Sister M. Naupa	Vila Public Health Nurse
Sister M. Sanderson	Silimauro Health Centre
Mr G. de Preville	School of Agriculture Tagabe
Mr Crawley	Kawenu Teachers College
Miss L. Tambu	Home Economics teacher
Mrs J. Murray	Red Cross Welfare Officer
Mrs J. Cunningham	Former nursing sister

CONSULTATIONS DURING VISITS

Table 4. Western Samoa.

Dr W. McKendrick	Director of Health
Mr W. Meredith	Director of Agriculture
Dr W.J. Vermuelen	Deputy Director of Health
Dr Ieremia	Head Public Health
Dr You Tseng Kuo	WHO Country Liaison Officer
Dr Gobius	WHO Family Health
Dr Tautasi	Family Health
Mrs C. King	Health Department Dietitian
Sister M. Matatamua	Hospital Matron
Sister Betham	Matron Public Health
Sister Potafofou	District Nurse
Sister Vaasa	District Nurse
Mrs Keillani	President Pre-School Assn.
Mrs T. McDonald	Secretary Pre-School Assn.
Mrs Villi	Kindergarten teacher
Mrs Sapolu	Kindergarten teacher
Mr D. Mordaunt	Secretary Methodist Church
Rev O. Fau'olo	Secretary Congregational Church
Dr Pouesi	Congregational Church Pastor
Mr C. Pedrana	Food Processing Laboratory
Mrs L. Paavae	National Council of Women
Mrs M. Bartley	Home Economics teacher
Sister Gaynor	St Mary's School, Apia

NEW ZEALAND WHOLEMILK BISCUITS

SUPERVISOR: Mr. W. L. SchoolDISTRICT: H. P. SchoolName of child: Tia'i Tāpura Age 8 Weight 51 Height: 3'10"Date when biscuits started: 12th Nov. 1973 Number of biscuits per day: one (two on Friday)Number of biscuits given each visit: None Flavour of biscuits: assorted (Friday)General condition of child: looks frail + weak

Date seen	Number of biscuits given	Date seen	Number of biscuits given	Date seen	Number of biscuits given	Date seen	Number of biscuits given
12-17	14	19-23	14	25-30	14	Dec 2-7	14
December	-	school	14				
January	-	school	14				
Feb 11-15	14	19-22	14	25-17 May	14	4-9	14

3 MONTHS CHECK: Weight: 52 Are you satisfied the child eats the biscuit: Yes / No
 Height: 3'10" General Condition: Same as above

11-15	7	18-22	7	25-29	7	Apr 1-5	7
8-12	6	15-19	-	22-26	7	29-31 May	7
1-16	7	13-17	7	20-24	14	27-31	-

6 MONTHS CHECK: Weight: 53 Are you satisfied the child eats the biscuit: Yes / No
 Height: 3'11 1/2" General Condition: improving a bit

June 3-7	-	11-14	14	17-21	7	24-28	7
July 1-5	7	8-12	7	15-19	7	22-26	7
29-2 Aug	7	5-9	7	12-16	7	19-23	7

9 MONTHS CHECK: Weight: 55 Are you satisfied the child eats the biscuit: Yes / No
 Height: 4'1 1/2" General condition: same as above

20-30	14	1/11/77	14	30-4 Oct	7	7-11	7
14-18	7	1-25	7	28-1 Nov	7	4-8	7
11-15	7	18-22	7	25-29	7	1/2-2-6	7

12 MONTHS CHECK: Weight: 55 Are you satisfied the child eats the biscuit: Yes / No
 Height: 4'2" General Condition: much improving

CONSULTATIONS DURING VISITS

Table 5. Tonga

Dr Supilo Foliaki	Director of Health
Mr Naa Feifia	Director of Education
Dr S. Tutavake	Paediatrician
Dr Muimui Tatola	Head Public Health
Princess Pilolevu	President Red Cross
Mr Iteni Helu	Secretary Red Cross
Major Hornibrook	Former Secretary Red Cross
Mrs A. Taunt	Red Cross Welfare Officer
Mr Sapeli	Toupou College Headmaster
Mr Springett	Toupou College Farm Adviser
Mrs Eleanoa Alanaki	Agriculture Extension
Rev. K. Munro	Methodist education

Table 6. Fiji

Dr S.C. Ramrakha	Permanent Secretary of Health
Dr M.V. Mataitoga	Acting Director Preventive Medicine
Dr B. Pathik	Principal Fiji School of Medicine
Miss S. Tikaram	Nutritionist Fiji School of Medicine
Dr Ganga Ram	Medical Officer District 1.
Dr K.D.Sharma	Paediatrician CWM Hospital Suva
Dr J. Hirshman)	WHO Regional Office for
Dr R. de Wilde)	South Pacific Suva
Mrs Chand	Supervising Dietition
Mrs S.Parkinson	President Fiji Home Economics & Nutrition Association
Miss M. Roberts	Home Economics Education - University South Pacific
Rev. A. Quigley	Principal Pacific Theological College
Dr & Mrs G. Hemming	J.P. Bayly Clinic
Sister Betty Slader	Anglican Public Health Nurse
Mr Prasad)	Department of Education
Mr Tukunia)	Youth & Sport Suva.
Mrs Symmons	Supervisor Chance Kindergarten
Mrs M. Vulaca	Community Education Training Centre

Table 7 - November 1973.

Height-weight record : St Peter's School Falifa W.Samoa.

115 children

Age (y)	5	6	7	8	9	10	11
(Weight in lb., height in inches)							
<u>BOYS</u>	(5)	(9)	(7)	(7)	(5)	(11)	(5)
<u>Weight-mean</u>	42.6	41.3	47.3	48.4	49.4	61.2	62.2
<u>Range</u>	38-50	35-49	40-54	40-54	42-54	49-69	57-65
<u>Standard **</u>	45.5	51.0	57.0	62.9	68.9	74.6	80.7
<u>% Std.</u>	94%	81%	83%	77%	72%	82%	77%
<u>Height-mean</u>	42.0	43.0	44.7	44.3	45.2	48.8	49.0
<u>Range</u>	41-44	40-45	41-48	42-49	42-48	45-53	48-51
<u>Standard</u>	45.0	47.6	50.0	52.3	54.3	56.0	57.8
<u>% std.</u>	93%	90%	89%	85%	83%	87%	85%
<u>GIRLS</u>	(9)	(6)	(8)	(7)	(16)	(9)	(11)
<u>Weight-mean</u>	41.0	45.5	44.9	48.4	55.8	66.9	64.0
<u>Range</u>	35-46	41-49	36-42	41-54	44-75	56-81	54-84
<u>Standard</u>	45.5	51.0	57.0	62.9	68.9	74.6	80.7
<u>% Std.</u>	90%	89%	79%	77%	81%	90%	79%
<u>Height -mean</u>	41.3	42.8	43.6	45.4	46.4	49.9	50.2
<u>Range</u>	40-42	42-44	38-48	41-48	42-50	48-54	46-54
<u>Standard</u>	44.4	46.9	49.3	51.4	53.5	55.8	58.3
<u>% Std.</u>	93%	91%	88%	88%	87%	89%	86%

Table 8 - November 1974. Height and weights of same children after receiving 7 N.Z. milk biscuits/week excluding school holidays.

Age (y)	6	7	8	9	10	11	12
<u>BOYS</u>	(5)	(9)	(7)	(7)	(5)	(11)	(5)
<u>Weight-mean</u>	46.2	47.6	52.6	52.3	54.4	64.8	66.6
<u>Range</u>	42-52	40-54	45-56	47-58	48-58	(50-75)	(61-72)
<u>Standard **</u>	51.0	57.0	62.9	68.9	74.6	80.7	88.4
<u>% Std.</u>	91%	84%	84%	76%	73%	80%	75%
<u>Height -mean</u>	45.6	46.4	47.6	48.3	50.0	53.2	54.8
<u>Range</u>	44-49	44-49	44-50	46-51	48-52	49-56	51-60
<u>Standard</u>	47.6	50.0	52.3	54.3	56.0	57.8	60.0
<u>% Std.</u>	96%	93%	91%	90%	89%	92%	91%
<u>GIRLS</u>	(9)	(6)	(8)	(7)	(16)	(9)	(11)
<u>Weight-mean</u>	45.4	49.7	50.4	54.4	60.0	74.4	70.8
<u>Range</u>	39-50	46-53	39-56	48-60	48-84	63-90	55-95
<u>Standard</u>	51.0	57.0	62.9	68.9	74.6	80.7	88.4
<u>% Std.</u>	89%	87%	80%	79%	80%	92%	80%
<u>Height-mean</u>	44.0	46.7	46.8	49.3	51.8	55.3	54.5
<u>Range</u>	42-46	45-50	43-51	48-52	47-59	53-58	52-59
<u>Standard</u>	46.9	49.3	51.4	53.5	55.8	58.3	60.7
<u>% Std.</u>	94%	95%	91%	92%	93%	95%	90%

** Iowa standards recommended by W.H.O. (1972) Regional Office for Western Pacific Manila "Health Aspects of Food and Nutrition".

Numbers in brackets represent numbers of children in each age group.

Table 9.

Milk Biscuit Distribution : Schemes Contacted During Visits
to the Islands.

Contact	Numbers Involved	Comments	
NEW HEBRIDES	Mr R.de Boulay Br.Residency	-	Milk biscuits used in relief work in isolated area with food shortage in 1975.
	Mrs J.Cunningham	-	As nursing sister employed by Presbyterian Church used milk biscuits for 2 years to test their value for Dr N.Begg
W.SAMOA	Sister S.Betham Apia Hospital	-	Distributes milk biscuits and milk powder to public health nurses throughout W.Samoa for cases of special need.
	Sister Vaasa Tuasivi	-	Receives biscuits from Sister Betham and could use more if available.
	Mrs S.M.Villi Saleimoa	76 3-6 years 40 6-8 years	Kindergarten teacher who has used biscuits gratefully for 7 years. 1 pkt/week given to sick villager.
	Mrs N.Sapolu Lefaga Bay	90 3-6 years	Kindergarten 3 days/week. Prefer milk biscuits to unsatisfactory food from home.
	Mrs K.B.Keillani Falelatai	190 3-6 years 66 5-7 " 10 elderly	7 biscuits/week - 6 at school & 400 children receive 1 on Sunday. 10 biscuits/week for elderly people.
	Sister Gaynor St Mary's School Apia	80-100 5-7 yrs Tuck Shop	Small children receive biscuits in school; others may purchase them from tuck shop. Some biscuits given to catechists' families on low income. St Mary's arrange distribution to other Catholic schools.

	Rev.Oka Fau'olo Secretary Congregational Church	210 3-6 years in 3 pre- schools	No fees paid in these kindergartens 5 biscuits/week and supply sent home if children absent. Scheme started 1975.
	Mr D.Mordaunt Secretary Methodist Church	130 5-12 years 40 12-14 " 360 12-16 " 150 13-18 " -	John Wesley Primary Avoka (vocational:girls) Methodist High George Brown (25 boarders) Additional local families Scheme started 1975 Methodist Church willing to buy some milk biscuits.
	Dr Pouesa Faito'outa	200-400 1-16 + years	Given out at afternoon Bible class 7 days/week Larger group on Sundays. Some given to neighbouring village.
<u>TONGA</u>	Mrs A. Taunt Red Cross Welfare Officer Mr Iteni Helu Red Cross Secretary	-	Milk biscuits given out gradually to schools on list plus 10 other schools. Some sent out by welfare officers to needy families, elderly people and a few kindergartens
	Mr Sapeli Toupou College headmaster	700 10-16+ years	Earlier problems with import duty and bondage as not imported through Red Cross. College produces its own milk but cannot afford to use it. Milk sold to finance college expenses.
	Primary school in Nuku'alofa.	80 6-7 years	One of the schools added to the list by the welfare office. Teachers and pupils appreciate the biscuits as gesture of goodwill.
<u>FIJI</u>	J.P. Bayly Clinic	150 families	Milk biscuits included in food parcels for destitute families.
	Sister B. Slader	-	Frequent visits to poorest Indian housing areas 10-20 miles from Suva. The children queue for biscuits when the nurse visits the area.

Dr K. Sharma
Paediatrician
CWM Hospital
Suva

-

Some biscuits used in the
wards or following discharge
from hospital

YWCA
kindergarten

-

Children observed at play.
Multiracial with some children
from wealthier homes

Mrs Symmons
Chance
kindergarten

83 4-6 years
younger child-
ren in after-
noons

Endeavours to provide pre-school
in lower income areas.
Previously served mid-day meal
but not possible with present
hall. Children receive milk
biscuit + fruit and some have
snack from home. Supported by
Fiji government grant.
