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STUDY OF THE SUBURBAN DISTRICT OF TAGABE

(Vila, New Hebrides)

by

The SPC Nutrition Team (Special Project)

15 May - 7 June 1975

Miss B. Jabre: Health Education Officer
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Mr C. Richard: Health Engineer
Dr J. Speake: Dental Public Health Officer

Noumea, New Caledonia
May 1976

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PART I

I. Introduction: the problems of accelerated urban development

- I - 1. The idea of a multidisciplinary study of the suburban district of Tagabe originated with, and was suggested to the authorities of the Condominium of the New Hebrides by the SPC, and in particular by the Programme Director (Health), Dr Guy Loison, and the Project Manager, Special Project on Nutrition, Professor Raoult. The proposal was intended to contribute, through the study of an in situ sample, to a better understanding of the problems raised by the rapid growth of towns which become poles of attraction for rural populations of widely differing background. The inflow of young people looking for work, either alone or in family groups, is now a well-known phenomenon in South Pacific towns. It gives rise to new conditions, which, while varying from island to island, are nonetheless basically related. It concerns practically all branches of government; Public Works (construction of housing, environment), Health Departments (infectious diseases, mental health), Departments of Education, Welfare Departments (questions pertaining to the young, the elderly, and workers), and the Departments of Agriculture, Livestock and Fisheries (food and economic problems) and makes it necessary for Administrations and town planners to seek solutions.

The accidental introduction of an outside population into an environment which is not its own generates an entirely new environmental health situation. On arrival, the newcomers are already immune to various sources of infection (viruses, germs, parasites), but they are also carriers of new forms of contamination - malaria for example. At the same time, the new environment is also contaminated; and if the incoming group is not immune, as is the case with young people, it will be exposed to new and unknown health hazards.

From a psychological and somatic standpoint, housing conditions and related facilities are therefore of the greatest importance. A house capable of withstanding bad weather conditions - but also ventilation, drinking water supplies, adequate heating and cooking facilities, cleanliness of floors in connection with excreta disposal, and inspection of domestic and farm animals - all place heavy demands on sanitation. This calls for sanitarians, but even more for health engineers, who must be consulted at every level - from the town planning stage right up to the inspection of completed projects. The same applies to low-cost or subsidised housing; political issues will therefore be raised.

Such rapid and sometimes unforeseen (although foreseeable) inflows in some cases exceed estimates based on a gradual growth of urban areas. Or they may overload the financial capacity of territorial or local governments, or their available technical staff. The need and the wish for an organized structure run up against problems of available space, disputes over land

ownership, survivals of prior patterns, and different approaches to town planning. Small wonder then that the requisite infrastructure is slow in getting off the ground. But in all countries subject to rapid and inadequately controlled immigration, the foremost concern of the migrants is to have a roof over their heads. This leads to overcrowding of families and groups of single people in shanty towns. The results, from an epidemiological point of view, are deplorable; the spread of infectious diseases among infants, and severe ground contamination by parasitic worms. In addition, in certain types of climate, there is a proliferation of many types of vectors: mosquitoes (malaria, dengue fever), flies, fleas, rats, etc.

These shanty towns become breeding grounds which endanger not only the area in question, but the whole of the urban population. These are very real problems, and they are well-known to the health authorities, who do the best they can with the resources they have available, treating the most urgent or disastrous outbreaks, organizing mass immunization campaigns, and taking steps to control malaria and tuberculosis. In a tropical environment, however, they are generally less well-armed against the excreta problem, that of ground contamination with its various domestic vectors, and the rapid deterioration of environmental sanitation. And they are even less well equipped to cope with nutritional problems.

Nutrition involves two separate aspects. The first is physiological; nutrition as such and diet. The second is the clinical aspect, which may be represented as the state of nutrition of the population. The state of nutrition is in turn a function of two sets of factors; firstly, aggressive infectious factors, as described above, and secondly the tolerance and adaption of individuals. The latter is correlated with their diet, and in particular their protein intake, which determines the rate of spontaneous or induced immunity.

(a) The state of nutrition reflects the individual's general state of health but without reference to cause or factors; infection and dietary factors are generally interwoven. An assessment of the state of nutrition of a population should include clinical data, body measurements, with laboratory aid for metabolic components, but also information on sources of aggression, and reliable statistics on general mortality, infant mortality, morbidity, and in particular the pathology of nutritional deficiencies or abuses.

This is the specifically medical aspect of nutrition, and represents the field of action of the medical nutritionist.

b) Secondly, the dietary factor: one of the main phenomena is the abrupt change in the migrants' dietary habits, especially when they originate in a rural area, based almost entirely on subsistence economy in which families consume their own production. When the immigrants become wage earners in a market economy, their dietary patterns undergo a change reflecting the new products and stocks available, and their newly acquired purchasing power. They have neither the time nor sufficient room to form gardens in which they could grow their traditional tubers, greens, vegetables and fruit. Small-scale stock-raising is also very limited.

Generally speaking, this is followed by an adjustment crisis which may vary considerably in length. The food available is either imported (rice, flour, sweets, tea, coffee, tinned meat, fish, vegetables and fruit) or bought on the local market, but even then it is no less expensive. As a consequence, the immigrants' diet is badly balanced and often unsatisfactory. This applies especially to fundamental quality foods, such as those with a high protein, vitamin and mineral content. Such food consumption surveys are usually entrusted either to institutes specialized in economic polls, or - on a smaller scale - to dietitians or nutritionists. The high-risk groups - infants, adolescents, pregnant and lactating women, and the elderly - are the most severely affected during such adjustment crises. A study of these sensitive groups, therefore, gives a reliable indication of the state of health of the population as a whole. In other words, they could if necessary be considered as an adequate sample in any attempt to draw general conclusions.

An analysis of the state of nutrition provides a guideline to the focal point in the ensuing project - either curative or preventive, and in the latter case, in the form of relief aid, family or food allowances, or alternatively by means of assistance in restoring production for local consumption (family gardening and small-scale stock raising), and encouragement to use locally-produced foods; whatever the solution adopted, it must be supported by a nutritional educational programme geared directly to the objectives sought, and as close as possible to the population concerned. By means of such assessments, food production may be put to immediate and efficient use. The educational authorities are also concerned; the immediate needs are for better organization of school facilities (which are after all the most positive aspect of immigration), and the elimination of overcrowding in existing schools through the construction of new local schools. Long-term objectives may be defined as: providing education adapted to local problems, with proper emphasis on health and nutrition.

- I - 2. The choice of Tagabe: Preliminary data collected in 1974 indicated that Tagabe was suitable for a multidisciplinary survey of this type, as also was Sea-Side, which had been studied by ORSTOM⁺ (but not from a nutritional point of view). Tagabe provided a sample population, which, while relatively small and concentrated in a limited area, was convenient from the standpoint of co-operation with the Condominium authorities, and with a view to the use of young trainees later to become community leaders and officials in these areas. Furthermore, the SPC had, in September 1974, established pilot areas at Wala-Rano, Tautu and Norsup, for the purpose of examining the differences - with their positive and negative aspects - between Melanesian groups living in natural conditions and immigrant groups.

Lastly, this modest survey did not overload the staff and financial resources of the SPC, and, in addition, necessitated a team approach by the specialists working on the Nutrition Project.

Nutritional and dietary studies had in the past been conducted by SPC specialists at Vila.

⁺ French Overseas Scientific and Technical Research Organization.

With the School of Agriculture nearby, this was a perfect opportunity for collaboration between future officers and leaders, and also for a study of ways of organizing and developing family gardening, with a view to restoring a natural family environment.

The project, which had been mentioned in a number of informal conversations, was officially notified to the British and French Resident Commissioners by letter on 30 April 1975; in the letter, objectives and methods were defined, and organizational details suggested.

I - 3. Planning Session (15 May 1975, Vila).

The objectives of the Project were set forth by Professor Raoult and discussed by the Meeting. Those present were:

Representatives of the Government:

Mr Burgess, Assistant Resident Commissioner

Mr Fabre, (Chancelier) Assistant French Resident Commissioner

Mr Foster, British District Agent CD 1

Mr Doyen, French District Agent CD 1

Health Department:

Colonel Doctor de Carfort, Director of the Health Department of the Condominium

Dr Greenhough, Director of the British Medical Service

Dr Ratard, Chief Physician of the Rural Health Service

Sister Dufresche, Director of the French School of Nurses

Agriculture:

Mr Poudevigne, Director of the Agricultural Department

Mr Gwynn, Director of the Tagabe School of Agriculture

Mr de Preville, Assistant Director

Education:

Mr Romanus, Deputy Director of Education

Mrs Allen, British Education Department

Mrs Tinsley, Women's Interests Officer

Urban Development:

Mr Prevot

Labour Department:

Inspector R. P. Le Mang.

Dr MacFadyen, representing WHO, was invited to participate, and informed of organizational details in relation with the Nutritional Course.

Preparation: Subsequent working sessions for the departmental officers concerned defined organizational details and composition of the groups involved: (1) Medical examination, (2) Hygiene and environmental sanitation and environment, (3) Family gardening, (4) Health education. A map of the village featuring individual houses and family data was made up on the basis of documents provided by Dr Ratard. A working base was set up on the premises of the Rural Health Service.

PROPOSED SURVEY OF TAGABE AREA, VILA, NEW HEBRIDES

(Document presented at the planning session on 15 May)

I - PURPOSE OF THE SURVEY

I (i) Main purpose

- To study the nutritional status of all residents, especially children under six years of age, mothers and school children.

These are the high-risk groups in the population and serve as health indicators.

The unit selected is the extended family; this means that all persons who are normally part of the household will also be surveyed.

- To determine dietary factors responsible for possible deterioration in the nutritional status, whether from excessive consumption or deficiencies.
- To study their relationships with the economic level.
- To assess the relative importance in the diet of consumption and of income derived from private gardens, with a view to a possible policy of communal gardens.
- Survey of environmental and dietary health from the points of view of health engineering, town planning and housing.

Such a survey could lead to recommendations for

- Study of basic dietary data, psychological, social and cultural conditions which, together with the data resulting from the above-mentioned surveys, will give some guidelines for the content of health and nutritional education in the Tagabe area.

- I (ii) The Tagabe area would be selected as pilot area for a study with the assistance of the SPC of a suburban district which is becoming urbanised. Similar pilot areas (Tautu and Wala-Rano) have been selected in the Norsup region (Malekula) for a study of the Melanesian rural environment and in Aitutaki (Cook Islands) for a study of the Polynesian rural environment.

- In connexion with the multidisciplinary course in Tagabe, efforts would be made to set up a field demonstration area for the training of staff in various fields.

- I (iii) To establish contacts with the population so as to stimulate local interest in the area and its problems and enlist local co-operation with a view to promoting community and self-development: health, improvement of home, standard of living.

II - GEOGRAPHICAL SCOPE

Tagabe area within the boundaries established by the Survey Department and the town planning authorities as well as by the aerial surveys carried out by the antimalarial section (Rural Health Division).

III - METHODS

As a first step, collection of all existing data including:

- statistical data on:
 - . the population;
 - . the racial groups;
 - . labour and employment, standard of living, salaries.

These would be drawn from previous studies on the development of the Tagabe area or of other suburban districts, such as the survey carried out with the assistance of ORSTOM;

- records of the Department of Agriculture on agricultural development in the district;
- epidemiological data, with special emphasis on outbreaks of measles, T.B., malaria, filariasis (with entomological data), intestinal parasites, microbial gastro-enteritis, using the hospitals' and Department of School Health records;
- data on - dental health;
 - organisation of public health and health education in the area;
 - formal education, including enrolment in both French and English schools;
 - cultural aspects: churches, cultural centres, clubs, scouts and guides;
 - planning in respect of the area.

IV - FIELD SURVEY to supplement the existing data

IV (i) Nutritional status - health:

Through the routine examination of all people normally living in the area, based on the method used by the SPC; this would include dental health.

The basic assumption is that 50 persons can be examined in the course of a working day.

- Supplementary epidemiological data and laboratory investigations.

IV (ii) Environmental health and housing, using the standard form developed by the SPC (water supply, water sanitation, waste and excreta disposal, vector control, potentially dangerous animals).

- Health in the home: preservation and conservation of food.

IV (iii) Agriculture:

Survey of family gardens: area, soil development, irrigation and drainage, fertilizers, fences, predators.

Crops: vegetable crops, tree crops, self-sown crops. Yields.

Breeding of small animals: facilities, yields.

Problems; possible improvements, distribution of seeds, assistance for the development of land or for setting up animal husbandry facilities, etc.

IV (iv) Health education:

Using the standard form developed by the SPC (see I (ii) above), influence of school on the understanding of food and nutrition problems, role of home economics training, role of primary school.

I - 4. Acknowledgements

We are indebted to the authorities of the Condominium, who gave their permission to conduct the survey, to the Heads of Department and local administrative officers and staff who saw to its smooth running or contributed directly, and in particular to those who took part in the field survey, and to Dr Ratard, whose help made the whole project possible.

Health: Miss Margaret Naupa, Chief MCH nurse, Rural Health Service;
Sister Marie Charlotte, RHS nurse;
Mrs Pochon, volunteer nurse.

Agriculture: Mr Poudevigne
Mr De Preville
Mr D. Bick

Local Personalities:

The Anglican priest, Mr Puth, and his assistant Mr Hostol;
Mr Abednego, Assessor;
Mrs Sau, Mrs Mothais, Mrs Lego, leaders of the Women's Group
and the English- and French-speaking trainees who bravely made the best
of often unfavourable weather conditions.

Dr MacFadyen, Miss Wills and Mrs Walsh, who took an active
interest in the survey, and provided us with the services of a number
of English-speaking trainees.

The Nutrition course was coupled with the survey; we wish to
address our particular thanks to Dr De Carfort, Sister Dufresche (Head
of the Nursing School), Mr Gwynn (Principal of Tagabe Agriculture School),
Mrs Allen, Miss Wills and Miss Walsh for having allowed their students
and trainees to take part in the survey.

Lastly, our thanks go out to the inhabitants of Tagabe who reported
for examination despite torrential rain, and warmly welcomed the members
of the team.

SOUTH PACIFIC COMMISSION

PART TWO

EXTRACT FROM A REPORT ON A VISIT TO THE NEW HEBRIDES

by

Bushra Jabre
Health Education Officer
South Pacific Commission

VISIT TO THE NEW HEBRIDES

22 May - 30 June 1975

Noumea, New Caledonia
July 1975

1. **Aims of Visit:**
 - (a) To undertake the Tagabe Survey
 - (b) To participate in Nutrition Course
 - (c) To carry out Health Educational Activities in Wala-Rano.

2. **Duration of Visits:**

May 22 - June 9 - Vila

June 9 - June 23 - Wala-Rano

June 23 - June 30 - Vila

3. **Persons Met Officially**
 - 3.1 **Health**
 - Dr P. de Carfort - Chief Condominium Medical Officer
 - Dr R. Greenhough - Chief Medical Officer British Service
 - Dr R. Ratard - Condominium Medical Officer, Rural Health Service
 - Dr Rivière-Caseaux - Medical Officer - Norsup Hospital
 - Mr J. Taaffe - Public Health Officer - British Medical Service - CD2 Lakatoro
 - Mr Aisen Obed - Assistant Health Inspector - British Medical Service - CD2 Lakatoro
 - Mr Mike Warner - Senior Health Inspector, British Medical Service - Vila
 - Dr D. MacFadyen - WHO Medical Officer - Public Health Advisory Service
 - Miss E. Wills - Nurse Educator - World Health Organisation
 - Miss C. Walsh - Public Health Nurse - World Health Organisation

 - 3.2 **Administration**
 - Mr K. Woodward - Senior Secretary, British Service
 - Mr Doyen - French District Agent - Vila
 - Mr B. Forester - British District Agent - Vila
 - Mr J. Lecuyer - French District Agent - Norsup
 - Mr Gordon Norris - British District Agent - Lakatoro

3.3 Agriculture

- Mr R. Poudevigne - Head of Department
- Mr G. De Preville - Assistant Principal, Tagabe Agricultural School

3.4 Education

- Mr Ramanus - Education Department, British Service
- Mrs Monica Allen - Education Department, British Service
- Mr Surcoux - Head of French Education Department

4. Tagabe Survey

4.1 The survey of Tagabe was three-fold:

- A community profile
- Possibilities for an educational programme
- Customs, beliefs and habits relating to food and nutrition.

4.2 The survey was used as a field training in community work for:

- 4 Nursing students (British)
- 30 Nursing students (French)
- 10 Agriculture students

The trainees were divided into teams to accompany the programme officers in their surveys. The home visits connected with the Social Survey had to be undertaken in the evenings when the household members would be back from work (this automatically eliminated some trainees).

4.3 The survey was conducted on the basis of a house-to-house interview with the housewives (the husband was interviewed in cases where the housewife could not be found on several visits).

4.4 The interviews were conducted mainly in Bichlamar and different local languages (Pentecost, Paama, Tanna, Aoba). The trainees acted as interpreters.

4.5 The detailed report of the survey is attached (Appendix I).

5. Nutrition Course

5.1 The Nutrition Course spread over three weeks and included French-speaking Nursing and Agriculture students.

5.2 The Health Education part was given on three afternoon sessions: participants were divided into small groups and discussions were led on the following topics:-

- Community Survey
 - Methods and Principles of Health Education
 - Role of Community work as a change agent.
-

NUTRITION PILOT PROJECTNEW HEBRIDESTagabeCOMMUNITY PROFILEATTITUDES AND BELIEFS IN RELATION TO FOOD AND NUTRITIONA. COMMUNITY PROFILE

1. Tagabe area is located in the suburb of Vila between the Bauerfield airport and Tebakor. It is made up of makeshift dwellings put up by the people who come from the outer islands, a few Vietnamese and New Hebrideans from Efate Island. The Anglican Mission occupies an appreciable piece of land where a number of families live. The British Residency recently made available to these families a piece of bush land to clear and plant. So this year nearly every family living on the Anglican Mission Compound has a small garden to plant for its own consumption.

If one can describe the inhabitants of Tagabe as a community (or a collection of communities made up of individuals coming from the same island and living in the same vicinity), this population is neither stable nor constant. There is a good number of people who are still on a "circular migration", i.e. who come to Vila for a fixed period of time to earn enough money for some specific purpose: earn enough to pay bride price, to build a house in the village, to pay for debts, etc.

Circular migration is not a haphazard adventure. It happens when a young man decides to join his relatives or the people coming from his island in Vila. He stays with them and they help him in finding a job.

This type of migration is slowly giving way to a more permanent type of migration where the young men (and to a lesser extent, young women) are attracted to the city type of life. They tend to live in groups of 4-5 young men renting one room. To the neighbours this gives rise to several problems - mainly drinking, fights, etc.

During the past few months, there has been a growing crisis of unemployment, the young men are without jobs, without money. They prefer to sit and wait for a job rather than go back to their villages. According to the Pastor and the Assessor this gives rise to delinquency problems which are on the increase all the time.

On the other hand we find the more established migrants who have brought their families to Tagabe and settled there. The women find work as house-girls in Vila, the children go to school (the major problem for this category is the infants who are left alone locked in the room while the mother works in Vila all day long).

The village and island relations remain very strong. Each group of people coming from the same island has a chief, meets regularly and has communal social functions. They celebrate feasts together (weddings, baptisms, and deaths) and exchange gifts on most of these occasions. They help each other by contributing money when any fellow islander is in need.

HOUSING

Migrants can hardly afford to live in a separate house and pay the rent, so they gather 5-10 people to rent a "house" or a room - this gives continuity to the communal life of the village and the close relations between relatives and people coming from the same island.

Certain Vietnamese and New Hebridean merchants have set up improvised rooms which they rent out to migrants at fantastic prices (range being from A\$20 - A\$80 per housing unit, i.e. one room and kitchen).

The latest available statistics on Tagabe are those collected by the malaria control team of the Rural Health Service. The number of houses was given as 80. The number of inhabitants was 465.

	<u>House number</u>	<u>Number of inhabitants</u>
Mele side	1-20	Unknown
River side	21-31	137
River side North	32-38	92
Anglican Mission	48-68	83
(SMAT)	41-47	30

However, neither the households nor the houses are permanent. Many houses which figured on the map could not be located and several new ones have been erected since; families moved out, others moved in; in many instances more than one family is living in one housing unit. Under such conditions, it was very difficult to know exactly the number of inhabitants in Tagabe. An approximate figure would be 465.

2. Out of 73 houses found in Tagabe area 58 households were interviewed (others either moved out, were not located or were absent at different times during day and evening). The islands of origin of these households by order of majority were: Efate, Pentecost, Paama, Tanna, Ambrym, Tongoa. Few families came from Epi, Banks, Malekula, Aoba and Nguna. There was one family from Wallis, 1 from Tonga, 4 families (Indians) from Fiji and 3 European families.
3. Among the families interviewed, 27 were Presbyterian, 33 were Anglican, 2 Seven-Day Adventists and 2 Bahais.
4. There are 3 stores in the area selling mainly tinned food and occasionally root vegetables, fresh fish and fresh meat. There are 2 gas stations, 1 paint shop, 1 construction company (SMAT) and 1 timber company (AGATHIS).
5. The Anglican Church is used by the Presbyterians for their services on Sundays. The Anglican Church runs a boarding house for Anglican single men coming from the outer islands (mainly Aoba, Banks, Pentecost).
6. It also runs a primary school (the only one in the area) having 3 classes, 1 teacher and 55 children between the ages of 6 to 9. The school children may not necessarily be Anglican. The other children go to Kawenu School (British), British Secondary School, Collardeau French School.

7. No bio-statistics are available anywhere. When asked where they go for medical help when someone is sick;

25 families said they go to the British Hospital
 5 to the French Hospital
 7 to both hospitals
 5 to the District Health Nurse.

As to the rest, they said they seek custom medicine first; if not cured they go to the dispensary or hospital.

8. The District Health Nurse said that the most common diseases are:

infected sores,
 respiratory infections,
 diarrhoea,
 gastro-enteritis,
 scabies.

The school teacher said that the school children suffered most from lice and skin diseases.

9. OCCUPATIONS

Most of the men have a daily job in Vila (except for the fact that recently a number have been laid off and are unemployed at the moment). A good number of women work as house-girls in Vila. In these families, both husband and wife do their gardening over the week-ends. A few families originating from North Efate are farmers. They own large gardens in the North and the man does the gardening while his family stays at Tagabe. Since 1975, when the British Residency made available a piece of land to the families living on the Anglican compound, the unemployed wives started their small gardens, planting for their families' consumption.

Other families use gardens which the owners living in Vila allow them to use - they pay in kind.

10. ORGANIZATIONS(a) Women's Groups

- Women's Interest Group: Leaders - Rebecca Sau
Ethel Lego
Mrs Mathais
- Mothers Union
- PWMU
- Raga Women's Association

(b) Religious Groups

- Presbyterians
- Anglicans
- Seventh Day Adventists
- Bahais

(c) Political Party

- National Party (very strong since Walter Lini used to live, until recently, in the Anglican compound and to have his office there).
- UCNH (Union des Communautés des Nouvelles-Hébrides).
The French-speaking New Hebrideans belong to this party.

(d) Sport: One football team: "One Rush".

(e) Cultural: One dance group (which caters for tourist ships).

11. LEADERSHIP

Abednego Sau, Assessor

Chief Linol

Manase

Joel Mamrum, Chief of Man Tanna

Charley of Tanna, Assistant Chief of Man Tanna

Jack Tokone, Chief of Man Paama

Wallis (Father European, mother New Hebridean - owns stores and rents out rooms. Has a number of employees).

12. SERVICES

Health: Once every 2 weeks, the District Health Nurse (Miss Margaret Naupa) holds the clinic at the Anglican Hall. Services rendered are mainly:

- weighing of babies
- dispensing medications
- dressing sores
- vaccination (Rural Health Team)
- occasionally she gives the women some advice on child's care.

Women's Interest Officer: comes to Tagabe only on the invitation of the local women.

13. NEEDS FELT BY THE PEOPLE

Employment: is now the problem No. 1. There are quite a number of young men who are unemployed and who prefer to wait in the hope of getting a job rather than go back to their villages, with the result that they are in a monetary economy without money.

The need for money was voiced by most of the households interviewed. The very quick change from a subsistence to a monetary economy makes people suddenly realize that they have to buy everything and this creates great frustrations and problems.

Social patterns: With the rising number of unemployed single men, delinquency is on the rise according to the Pastor and the Assessor. The main social problems are: alcoholism, assault, adultery.

Public Health: running water
latrines (at least communal).

B. FOODS AND NUTRITION

1. FOODS AVAILABLE

(a) Factors governing availability of food are:

- existence or non-existence of a garden
- income
- amount of rent paid
- family preference.

- Breakfast Bread.
Tea and sugar (or coffee).
Milk is occasionally added.
Butter is rarely used (5 households); eggs were mentioned.
Some households eat taro/banana and left-overs when available.
- Lunch Rice (usually with nothing added).
Rice and 1 root vegetable (when available).
Rice and corned beef or tinned fish (very small quantities when they can afford to buy it).
Rice and bread.
Bread and lemonade (mainly single men who stay in Vila for lunch).
Island cabbage is added when possible.
- Dinner Main meal.
Rice and island food (boiled root vegetable and fresh meat/tinned fish or meat/island cabbage).
Laplap is prepared by women who are not employed. (If family can afford to buy root vegetables).
Bread and tea.
Rice and tea.
- Cooking During week-days, meals are prepared by boiling root vegetables/cabbage/rice in water, using primus, gas or wood fire.
Roasting roots on wood fire or hot stones.
Frying is not very common.
Sundays, Laplap is prepared either individually by every household or communally by a number of households coming from the same island. The earth-oven is used.
- Available cooking utensils: Pots and pans, cutlery, plates, bowls, cups.
- Order of eating: On the whole, children eat first and later parents do.
But in some cases all the family eats together. Fingers are used although spoons are available. The majority of housewives are not aware of the nutrient concepts, and they believe that any food given to the child is good.
- Storage: Most of the households do not store any food-stuff. They buy their daily needs from the store (with the exception of tea, sugar, rice). All tinned food and root vegetables are bought for immediate consumption; garden

vegetables are also brought home for immediate consumption. So there is no problem of storage. What is ripe in the garden or bought at the store determines the family menu.

- Discussion: There is a growing tendency for the adoption of imported foods and this is due to several reasons:

- 1) the very high cost of root vegetables;
- 2) the fact that employed women do not have the time in the evening to prepare traditional food;
- 3) school children are getting used to the taste of imported food through the school-feeding programmes which is mainly based on bread, rice and jam;
- 4) stores set patterns of tastes and choice;
- 5) although people are reluctant to buy new foods, their proximity to the city makes them more prone to break away from their traditions.

3. FOOD HABITS AND BELIEFS

(a) Foods and Non-foods: Taro leaves, manioc leaves and kumala leaves are not considered edible.

(b) Prestige food:

rice	bread
sugar	sweets
fresh meat	root vegetables (because of their high cost)
fresh fish	fruits
fowl	beer
eggs	alcohol (Whisky, Gin, Martini).

(c) Celebration foods:

Laplap (with bullock or pig for very special occasions)
 rice
 pig
 bullock
 goat
 fowl
 fish - shellfish.

(d) Age group or sex-linked foods:

Children: Taro is not given before 2 years of age (gives big belly).

No wild taro because it gives rash.

No meat before 1 year (fresh or tinned) or tinned fish.

No shellfish and crabs to children.

Oranges/mandarines should not be given to children too often.

No wild nuts.

Pregnant women: should not eat:

too much meat;

octopus , crabs, shrimps, lobsters, shells, flying fox
or some fish (baby may be deformed or get sores or scabies);

eggs (babies would get boils on their heads) (Aoba);

salt (it makes them sick);

European food (Tanna).

After delivery, women should not eat bananas (Tongoa); they should eat more cabbage to have more milk. Yam and manioc are good for nursing mothers.

(e) Disease-linked foods:

Eggs give tummy aches (Tongoa).

Turtle eggs cause itching.

Mangoes, pawpaws, guava, cause diarrhoea.

Pig meat gives worms - it should not be eaten before 10 to 14 years.

Eggs should not be given to children that are not strong enough;
otherwise they get boils (Aoba).

Crabs and eggs give children sores (Pentecost).

Chicken and eggs make children bad tempered (Aoba).

Meat gives children tummy aches (Tanna).

No fish should be given to children because of bones and poisoning.

When a child has diarrhoea:- no food is given;

- no milk,

- ripe bananas should not be given;

- boiled water and sugar are given.

(f) Infant feeding practices

On the whole, the women still breast-feed at least for the first few months although a few of the mothers are cutting down their breast-feeding period successively with every new child and a few (mainly unmarried mothers who have to work all day) start bottle-feeding at birth. If the baby is weaned from breast-milk before the age of 1 year, it is bottle-fed till the age of 1 year a highly diluted formula (2 tsp of Sunshine Powdered Milk in 200 cc of water). However, the mothers have no idea about bottle-hygiene and its effect on the child.

Other mothers stop breast-feeding as soon as they can.

Reasons given for weaning were:

- not enough milk,
- mother got a job,
- breast infection,
- baby vomits,
- mother has high-blood pressure,
- pregnancy.

In general, supplementary feeding is rarely started before the age of 8 months - the main reason given is that the infant cannot eat before that age. There is a new trend of starting to give baby food (at 30c a jar) between the age of 8 months and 1 year for about 2 months; one jar is given per day, usually divided between lunch and evening meals, after which the baby is put on the family diet.

If no baby food is given, mashed roots (yams, kumala, manioc, breadfruit) are given in a spoon. No green leaves are added. Meat juice and cabbage water are sometimes given (in some instances at 6 months). Mashed fruit (pawpaw, bananas) or fruit juice is occasionally given. No meat is given before 1 year. After 1 year, it is rarely given more than once a week. If tinned milk is used, it is not given after 1 year. Tea and sugar are introduced at 8 months. A diet of a 1 year old child would be:

<u>Breakfast:</u>	tea and bread (or boiled yam/kumara);
<u>Lunch:</u>	rice or boiled root vegetables and water;
<u>Dinner:</u>	tea, laplap or rice with tinned fish or meat (whenever possible).

Remarks

The main features of the baby-feeding practices are:

1. The late introduction of any supplementary feeding.
2. The absence of any special preparation for baby meals.
3. The irregular feeding-time (baby is breast-fed whenever he cries; he is later fed when the family eats).
4. Baby is put on the family diet very suddenly.
5. Absence in variety of food, which would cumulate the malnutrition (in particular poverty in proteins).
6. Use of milk powder (or concentrated milk) without any notion of proper dosage.
7. Baby diet after 1 year is mainly a carbohydrate one based on rice, root vegetables and bread.

C. STATUS OF WOMEN

On the whole, the woman is not oppressed in the New Hebrides. There is no gatekeeper; man and wife decide what to plant, what to buy and what to eat.

If the man does not work, he does the gardening; if he has a job, his wife plants and she decides what to plant. Women at Tagabe plant yams unlike women in Malekula who are not allowed to plant or boil yams or to even walk in a yam garden while menstruating. Women at Tagabe do not observe menstruation restrictions (not cooking for men during menstrual period or for 2 months after giving birth).

It is the wife who decides what to cook. If the wife has a job, then husband and wife do the gardening over the week-end. They both do the shopping.

There is a serious problem facing working women. Children are locked in the room all day long in the care of an older brother or sister. If the mother does not come home for lunch, children stay without food all day long.

D. DIFFERENCE BETWEEN TAGABE AND TAUTU (MALEKULA)

1. TAUTU

There is more emphasis on diversity in food (probably due to more availability).

People are more reluctant to try new foods, their own being so bland that they cannot cope with new tastes.

Snacks between meals are very important since they are composed of fruits and nuts.

Woman stays at home 5 months after delivery to take care of the baby; later she takes the baby with her to the garden.

Mothers breast-feed till 18 months.

2. TAGABE

Diet is governed by what is available in the garden or what can the family afford to buy.

People are not as reluctant to adopt new eating habits; rice, bread, lemonade, etc. have become main features of the daily diet.

Children do not have snacks. School children who do not get a school meal take bread (or boiled taro) for lunch.

Women are forced to work after delivery; so the child is bottle-fed and left to relatives: sister, grandmother, neighbour, etc.

Feasts are important, gifts are exchanged but customs tend to be less rigid than in villages. Events such as weddings and deaths are still important.

Gifts are offered:

- weddings: glasses, mats, plastics, sheets, plates, food.
- death: money, mats, calico, blanket, clothes, food.
- baptism: clothes, towel, money (baptism is losing its importance as a feast. Only a few families said that they still celebrate circumcision).

Women tend to visit their neighbours coming from the same island.

A good amount of the income is spent on rent (about 50%). (Rents are astronomical: A\$80 for one room). A substantial amount is also spent on commuting to Vila, the fares being 20c by bus each way and 70c by taxi.

(a) Information

Most families have radio and listen to it.

Radio Vila: (news (Bichlamar)
(music
(question time

Radio Australia - news

Radio Honiara

Radio Noumea (French-speaking families).

On the whole, they do not read newspapers, if they do, the British Newsletter to a greater extent, the French newsletter to a lesser extent, and the mission publications:

Presbyterian

News Drum

Anglican

One bread

SDA

Signs of the Times

The Women's Interest Group gets the Women's Club newsletter published by the British Education Department.

(b) Meetings

People in Tagabe attend more meetings than people in Tautu.

Village meetings (everybody attends).

Church meetings are frequently attended.

Co-operative meetings (men and women attend).

Women's club meetings (the majority of women attend).

Mothers Union.

PWMU (Presbyterian women).

Political (National Party and UCNH).

Island meetings (Pentecost, Paama, Tanna).

Parent/Teacher Associations.

(c) Entertainment

Young people tend to go often to cinema, football games, and occasionally dances. Adults rarely do so; they limit their social life to celebrations in the neighbourhood.

(d) Medical Services

When they are sick:

43% go to the Vila Base Hospital;

10% go to the French Hospital;

15% go to both.

Others seek custom medicine or wait for the District Health Nurse to come for the bi-monthly clinic.

RECOMMENDATIONS CONCERNING HEALTH EDUCATION

1. A community health education programme should be organized with the following objectives in view:
 - (a) Make the local population aware of its health problems as revealed by medical, environmental and agricultural surveys.
 - (b) Draw the attention of parents to the problem of children's diets, and those of the family as a whole.
 - (c) Encourage suitable production and consumption of food resources.
 - (d) Encourage a new attitude towards health and nutrition;
 - 1) create good dietary habits;
 - 2) disseminate basic notions of nutrition including reference to local and territorial food resources and problems;
 - 3) encourage all activities and knowledge concerning food hygiene and improved environmental sanitation.

2. To fulfil the above-mentioned general objectives, the following activities could be undertaken:
 - (a) Create a community movement by forming sanitational committees for the upgrading of the environment.
 - (b) Develop the educational activities of the existing women's club.
 - (c) Organize a nursery - this is indispensable. It should be used as an experimental nutritional rehabilitation centre, under strict medical control, with the help, if necessary, of the hospital pediatric staff, so as to prevent the children of working women from being shut in all day without supervision. As is the case with the play centre in Fiji, the women themselves could take charge of the nursery on a rota system.
 - (d) Home economics and dietary courses at school, and school gardens and canteens should together form a "school" in the principles of good nutrition.

The most important food and nutritional problems should be stressed;

- weaning
- weaning foods and the danger of unclean baby bottles
- the importance of breast-feeding

- complementary foods
- the trend towards imported foodstuffs and its risks
- obesity
- alcoholism.

In addition to direct contact between community workers (agricultural agent, public health nurses, etc.), the press and above all the broadcasting services - which reach most of the population including the outer islands - should give maximum coverage to health and nutritional education: for example, programmes in Bichlamar on family budgeting, home economics, child needs, the prevention of infection, the purchasing and preparation of food, food hygiene etc.

There should be regular contact between hospital staff and those active in the pilot area (general practitioners - pediatricians), and between nursing trainees and agricultural students, who should take part in the nutritional education programme and thus gain deeper insight into the human environment.

PART III

REPORT ON A SURVEY OF VEGETABLE GARDENS AT TAGABE

MAY 1975

by Messrs. Bick and De Preville

Condominium Agriculture Department

A survey was made of vegetable gardens in the Tagabe area as part of a South Pacific Commission Nutrition Study carried out during May 1975.

Eighty-eight households, comprising 654 people, were interviewed and details were recorded on a form compiled and adapted to suit local conditions from an example form provided by the SPC Tropical Agriculturalist.

Forty-three households, comprising 269 people, had gardens planted within the area. Fourteen households had gardens on Efate, outside the area. Some of these gardens were close to the area - Blacksands, others were up to 50 km away - Eton. Time and transport did not allow the inclusion of these gardens in the Survey.

Forty-five households had fruit trees planted in the area.

Seven households kept a total of 13 pigs.

Eighteen households kept a total of 260 fowls.

In many instances the gardens were small consisting of only a few plants. The numbers of plants in these cases were recorded and totalled. This total was then converted to an area according to usual planting distances. In the case of some crops, bananas, island cabbage etc. the total number of plants was recorded.

The vegetables were divided into two categories - traditional and introduced or European.

(a) Traditional Vegetables

C R O P	Area m2	Number of Plants
Manioc	3,289	
Taro (<u>Xanthosoma</u>)	1,682	
Kumala	1,708	
Taro (<u>Colocasia</u>)		17
Yam	170	
Banana		573
Island Cabbage		1,132
Sugar Cane		103
Chouchoute (Choko)		14

(b) European Vegetables

C R O P	Area m2	Number of Plants
Chinese Cabbage	534	
English Cabbage	184	
Tomato	325	
Beans	50	
Chinese Radish	6	
Lettuce	82	
Cucumber	8	
Aubergine		2
Maize	610	
Carrots	22	
Onions	11	
Peanuts	100	

The following numbers of fruit and nut trees were recorded within the area:

Avocado	35
Mango	51
Letchi	5
Guava	11
Breadfruit	68
Coconut	131
Papaya	92
Pineapple	80
Orange	43
Mandarin	44
Lime	12
Grapefruit	13
Navel oranges	26
Natapoa	2
Nagavica	4
Nandao	21
Naus	4
Nangai	4
Kava	21

Difficulty was experienced in getting satisfactory answers to questions concerning the amount of time spent working in the gardens. However, the following figures were recorded.

	<u>Hours per week</u>
Heads of households	199
Other members of households	288
Paid labour	<u>70</u>
	557
	==

This indicates an average of 12 hours work per garden per week.

Paid labour was only employed in two gardens in the area.

In every instance it was not possible to obtain satisfactory answers to the questions related to the sale of produce from the gardens, the reason being that the people were unable or unwilling to give out this information.

All the interviewing and recording of information in this survey was carried out by students of Tagabe Agricultural School.

PART IVHOUSING AND ENVIRONMENTAL SANITATION

by

C. Richard

SPC Public Health Engineer

1. PURPOSE OF THE SURVEY

This survey was carried out with a view to determining the relationship between housing, health environment, and local nutritional patterns.

2. TAGABE: LOCATION AND DESCRIPTION

There are three main suburbs around Vila: Elkouk, Malapoa and Tagabe.

The latter is located west of the city on the road to the international airport, 3.7 km from the French and British residencies.

The suburban district of Tagabe was selected for various reasons, including its propensity to receive migrants from other islands, its semi-rural character (a river and a comparatively fertile valley run through it) and its controlled settlement (lotissement Laval).

It is to be noted that the area covered by the survey included three main sections:

- the lotissement Laval located between the airport road and the right bank of the Tagabe river;
- the left bank district, with a few small-scale industries, the Anglican Church, the school and a settlement of Indian migrants, together with a few scattered New Hebridean houses;
- the rural district proper, between the river and the Mele road (hereafter called the Mele road district), where dwellings are generally below standard and not properly recorded on local maps.

3. ORGANISATION OF THE SURVEY

The survey team inspected all dwellings, premises and back yards with a view to filling in the forms prepared by Professor Raoult, Project Manager.

Each house had been previously numbered by Dr Ratard for the purpose of the antimalaria campaign. A map showing these numbers ensured the best possible identification of premises and persons.

4. LIMITATION OF THE SURVEY

Some houses were difficult or even impossible to identify. A number of those shown on the maps did not exist, whereas others were found in places left blank on the map.

A small number of houses were not inspected, or only partially, because they were closed and nobody was around at any time. In some case, it was however possible to collect information from neighbours.

We also left out stores and industrial premises. Non-Melanesian dwellings (mostly European, Indian and Vietnamese) were similarly excluded from the survey. 73 units in all were recorded on the map but 58 only were inspected.

5. CONTENTS OF THE SURVEY

The forms used were originally intended for processing by computer. They comprised ten sections (housing, population, water supply, household refuse, lavatories, food preparation, etc.). Each section in turn covered 9 different cases which were to be recorded on the spot by the interviewers. It can therefore be assumed that all information thus collected and classified correctly reflects the situation in each of the above fields.

It was not easy in practice to screen all the details, which were sometimes irrelevant to the form for the simple reason that the latter had originally been used in other parts of the world. However, I was able to collect average figures and tried to complement them with data obtained from government sources including the Departments of Rural Health, Public Works, Survey and Water Supply.

6. ANNEXES

Attached to this report are four maps showing:

- (a) population of the settlement;
- (b) water supply;
- (c) garbage collection;
- (d) durable housing.

7. FINDINGS

7.1. Types of dwelling

The single household type made up 67.3 per cent of the total. Of these 78.4 per cent have separate rooms and 21.6 per cent one room only.

The multi-household type represented 32.7 per cent, 22.2 per cent of which comprise a single room, where up to 10 persons or more are crowded together. These may be young migrants, bachelors awaiting employment or adults of both sexes. One third only of the dwellings (32.8 per cent) were fenced in. It remains difficult to draw a distinction between urban and shanty-type housing: only 17 of the dwellings visited could be considered as actually urban. They are not all part of the lotissement Laval, where there are only seven types of durable houses. They are fairly evenly spread throughout the district, but none of them is on the river bank.

The final estimation could be as follows:

shanties : 53 per cent
urban dwellings: 47 per cent

Four categories were shown on the population map of the area:

- multi-household
- single-household
- bachelors
- industries

The industrial and business district is located on the left bank of the river and along the main road. The multi-household area, concentrated on the right bank, is mostly shanties.

Of the bachelors, some also live in shanties but many have adequate quarters with modern facilities. Most of the single-household dwellings are located around the Anglican church where there is still ample building space (unfortunately shanties prevail).

7.2. Type of construction

- concrete or durable modern materials	:	29.1%
- corrugated iron	:	38.2%
- not classified	:	52.7%

Floor:

- concrete	:	74.6%
- earth	:	23.6%
- others	:	1.8%

Roof:

- corrugated iron	:	100%
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Two factors are noteworthy:

- 1) In houses built of durable materials, there were no earth floors, as was to be expected. Such floors were found only in corrugated iron or non-classified structures.
- 2) The proportion of earth floors was only 23.6 per cent of the total, which showed an effort at improvement on the part of the occupants (many of whom go barefoot). Houses of the durable modern type were found mostly along the road and on the left bank of the river.

7.3. Occupants

Of the 541 occupants, 453 were identified. We were unable to interview the occupants of 5 dwellings covered by the survey, who were not present. There were more than 200 children under 14.

Children	: below 12 months	20	4.41%
	1 - 3 years	36	7.95%
	4 - 5 years	36	7.95%
	6 -13 years	96	21.19%
Adolescents	: 14 -18 years	50	11.03%
Men	: 19 -59 years	125	27.59%
Women	: 19 -59 years	82	18.10%
Men above 60	:	2	0.44%
Women above 60	:	6	1.34%
Age unknown:			
Children	: 30		
Adolescents	: 17		
Adults	: 41		

It is worth noting that the main group, after children, was that of workers (125 men between 19 and 59); there were more men than women and practically no old people.

Unfortunately, the lack of employment opportunities no doubt contributed to the low standard of living and poor comfort and sanitation conditions in the area.

7.4. Kitchen and other facilities

- Not clearly defined	:	11	19.64%
- Indoor	:	29	51.79%
- Outdoor	:	16	28.57%

The survey showed that open fires and kerosene stoves were the most currently used. The following were recorded:

- Open fire	:	29	40.28%
- Kerosene stoves	:	24	33.33%
- Kerosene burners	:	18	25.00%
- Nil	:	1	1.39%

Five houses only were wired for electricity (6.95 per cent). They were of the one-household type and were equipped with refrigerators, water seal lavatories and septic tanks, as well as indoor piped water.

These five houses may be considered as the most affluent in the area. Only one is located on the lotissement Laval. In all, they represent no more than 37 occupants.

7.5. Water supply

More than half of the houses still depend on rainwater collected from the roofs. Although there is underground alluvial water, only seven wells are in use.

Equally surprising was the fact that only 21.43 per cent of indoor taps are connected to the water mains.

- rain water (roofs)	:	33	47.14%
- wells	:	7	10.00%
- water mains (indoor :		15	21.43%
(outdoor:		15	21.43%

A look at the map will show that virtually the whole of the left bank of the river is supplied with piped water, as well as about two thirds of the lotissement Laval.

Outdoor water taps, which are common in the lotissement Laval, should be replaced as soon as possible by indoor taps, as children gather around them and leave them running, thus attracting mosquitoes and stray animals.

All wells and water tanks are located in the Mele road district, where water mains do not appear to have been laid on. This is also where the ground level is lowest (cf. further comments on the water problem at Tagabe, paragraph 8 below).

7.6. Food storage

- No protection	:	25	40.98%
- Food-safe	:	15	24.59%
- Cupboard	:	15	24.59%
- Refrigerator or ice-box :		6	9.84%

Six houses (i.e. 47 people) had ice.

Insecticides were used in 28 houses, or about 50 per cent of the area.

7.7. Rubbish

Rubbish is collected from the main road to the lotissement Laval and the road to the Anglican church. Unfortunately, only 44 per cent of the population make use of this service. All other families living in overcrowded shanties along the river merely dump their rubbish on the banks, creating unsanitary conditions, and in particular rat, fly and mosquito breeding areas.

Of those living close to the dump, some take their garbage there themselves rather than carrying their dust-bin to the road, which is further away.

- Use rubbish collection	:	26	44%
- Dump	:	4	7%
- Bury rubbish	:	7	12%
- Burn rubbish	:	6	10%
- Scatter rubbish	:	9	15%
- Dump rubbish on river bank :		7	12%

To be accurate, it ought to be mentioned that those who supposedly bury or burn their rubbish do not do it immediately or thoroughly; in actual fact, therefore, the four latter groups, i.e. 49 per cent, belong to the "rubbish-scattering" category.

7.8. Floors and lavatories

Ten houses were equipped with septic tanks, i.e. about 17 per cent. As far as lavatories were concerned, the situation was as follows:

- Water seal latrines	:	15	25%
- Uncovered pits	:	40	70%
- No lavatory	:	3	5%

7.9. On the whole, there was 1 lavatory for 10 occupants, which might be considered adequate if most of the existing facilities were not in appalling condition, especially those located on the right bank of the river.

The situation concerning animals was as follows:

- Stray animals	:	18
- Domestic animals	:	30 (about 50 per cent)

7.10. Communicable diseases

Many people engaged in delousing could be observed in the area, which suggests that lice, as well as bed-bugs, are common.

Mosquito breeding grounds were easily detectable; there were a good many. Numerous rat traces were also observed, especially along the river, but a large number of cats probably keep the population to a minimum. There were many flies but not more than in most other places in the New Hebrides. Cockroaches were found in all dwellings.

Mosquito nets are used in 28 dwellings, insecticides and repellents in 24; in 15 only were both nets and insecticides used concurrently.

8. COMMENTS ON THE WATER PROBLEM AT TAGABE

Water is not free at Vila, even for communities. Water meters are used with 1,458 users for a total population of 12,536.

Besides a 500-franc deposit for the meter, water rates are a minimum of 550 francs for 33,750 litres, plus 8 francs for each additional 360 litres.

According to our estimations, the daily consumption was around 200 litres per person per day.

At Tagabe, there are only 14 users. It seemed that the situation could be improved, but probably not under the present conditions for it is still difficult to extend the network to the shanties and the initial cost would be an obstacle for most people.

Any improvement could only be undertaken as part of a general sanitation programme involving physical planning of the whole area. At the same time, health education could bring the people to realise the advantages attached to being supplied with drinkable water in or near the house.

Water subsidies or reduced rates could be applied to those prepared to build proper houses.

9. CONCLUSIONS

Living conditions are poor in most cases.

Facilities available are inadequate. Any attempts at implementing some kind of social programme should imply the enforcement of physical planning regulations, such as maximum number of occupants per unit of floor area, as well as a number of basic principles relating to the quality of life. Further, such basic facilities as roads, water supply, garbage collection, lavatories and waste water disposal should be provided for those capable of realising the need to improve their own housing conditions and prepared to make the personal effort this requires.

The occupants could also elect one or more representatives responsible for ensuring the enforcement of basic sanitation rules in the area.

The extension of the lotissement Laval, which will be required in any case with the continued increase in population, would provide an excellent opportunity for improving the present situation.

10. PRACTICAL RECOMMENDATIONS

It must be admitted that this suburban district of Vila is generally attractive, as it is located between the airport and the town. It is crossed by two rivers and close to the sea.

But because of its very location, this area should not be left open to rapid and uncontrolled occupancy.

The small lotissement Laval was no doubt properly designed at the outset, but overpopulation coupled with disregard for environmental considerations has led to inadequate housing conditions.

One suggestion would be to prevent the uncontrolled extension of the district, although this would only be a temporary measure and could in no case be considered as a constructive solution.

The following proposals for future action have more practical value:

- 1) - Undertake a survey on a scale of 1:500 or 1:1000, with contour-lines and complete data on housing areas (water supply, latrines, etc.).
- 2) - Draw up an inventory of all existing plots, indicating which are under cultivation or could be used as fields or gardens.
- 3) - Prepare a new mapped plan providing for:
 - The improvement of the present lotissement Laval.
 - Its extension.

Any such plan should exclude the extension of the housing area along the right bank of the river. All riparian areas should be protected and kept free from latrines, dumping grounds and other environmental hazards.

- 4) - Undertake a zoning operation:
 - left bank (industrial and commercial zone
 (mission school zone
 - lotissement Laval: improvement of sanitation
 - right bank: protected natural zone
 - Mele road district: extension of the lotissement

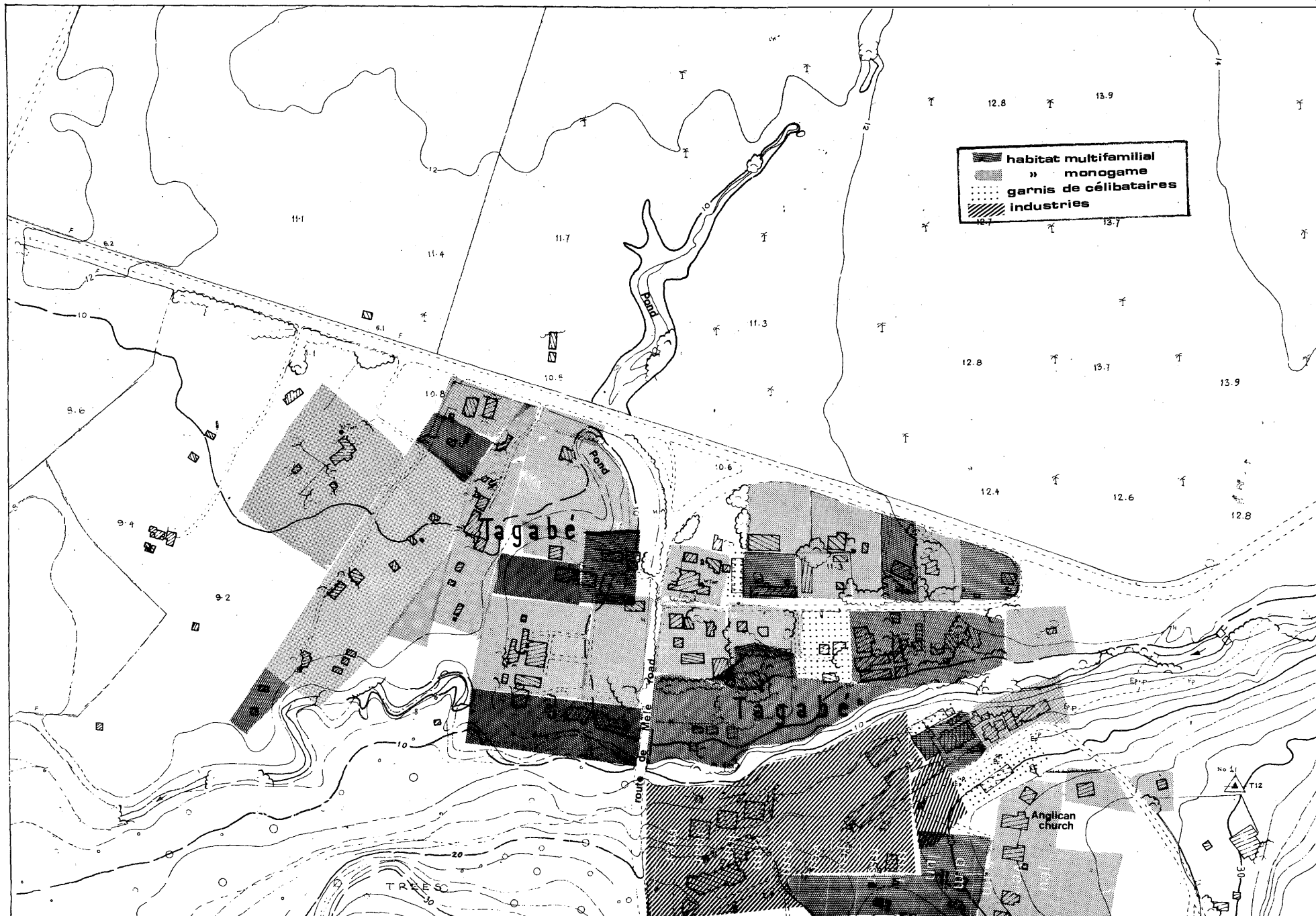
The latter extension should provide for the following:

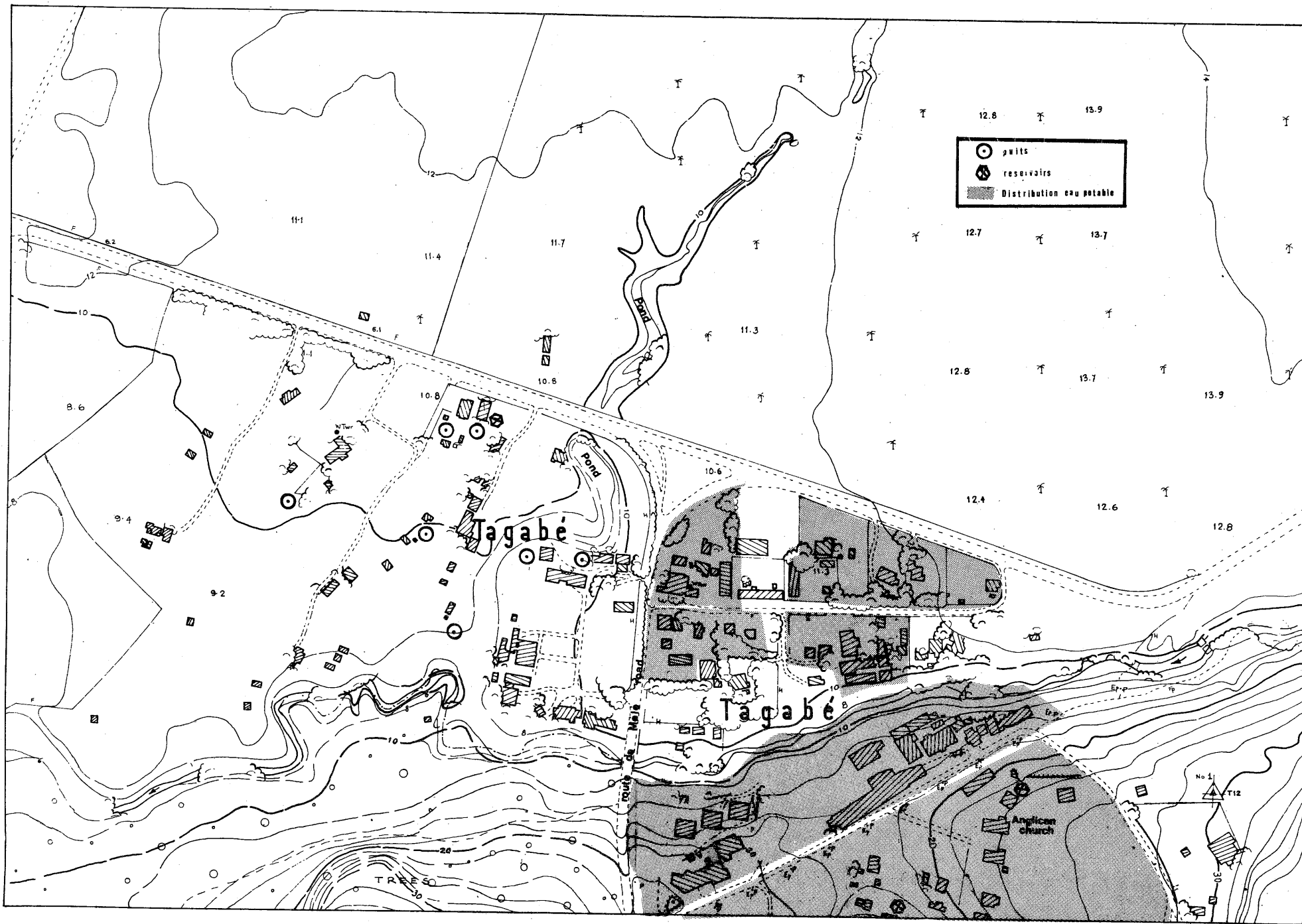
- conservation, and, if possible, improvement, of the agricultural potential
- reclamation of the marshy lands between the Mele road and the Tagabe river.

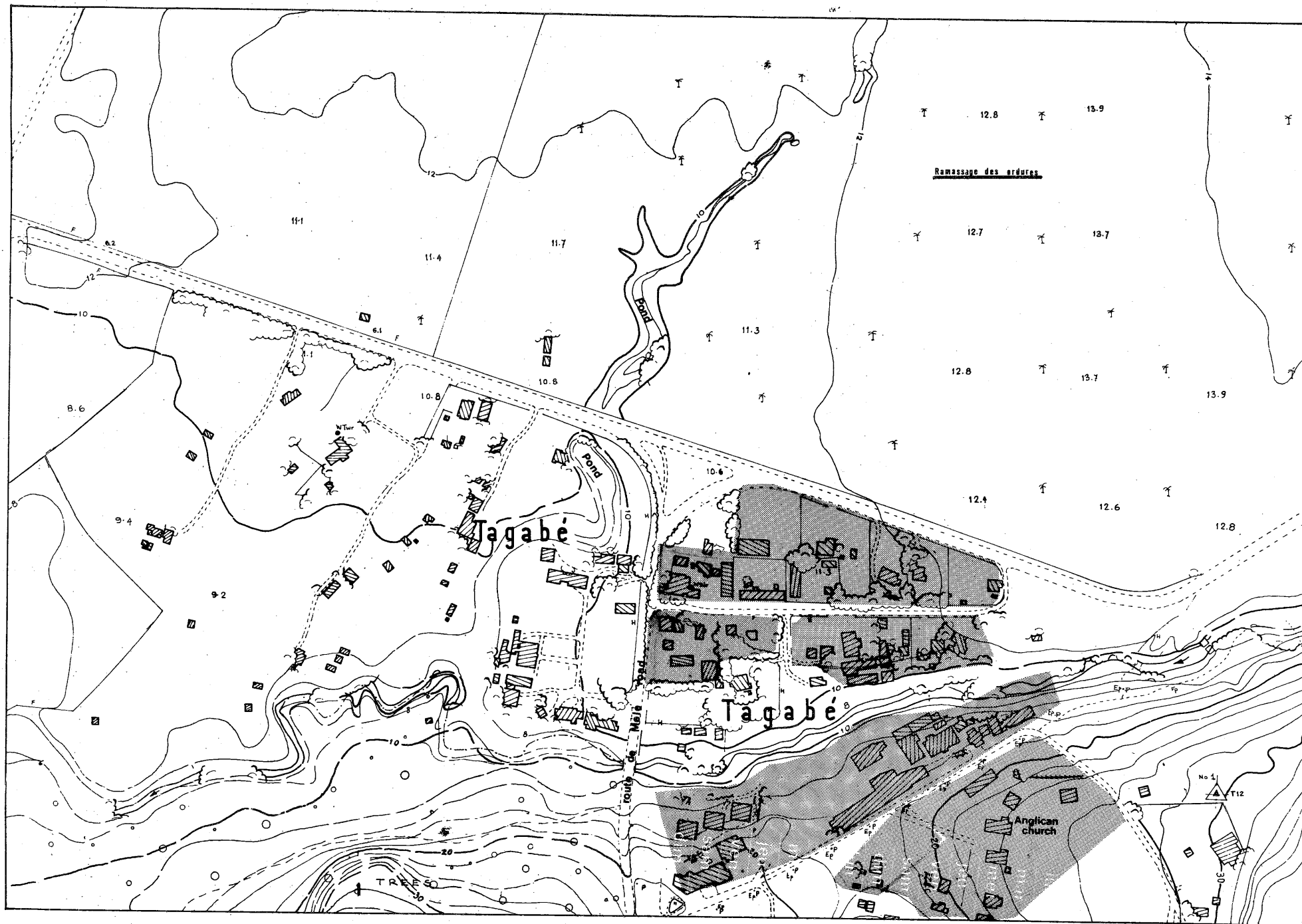
As far as sanitation is concerned, the following forms of improvement should be carefully considered:

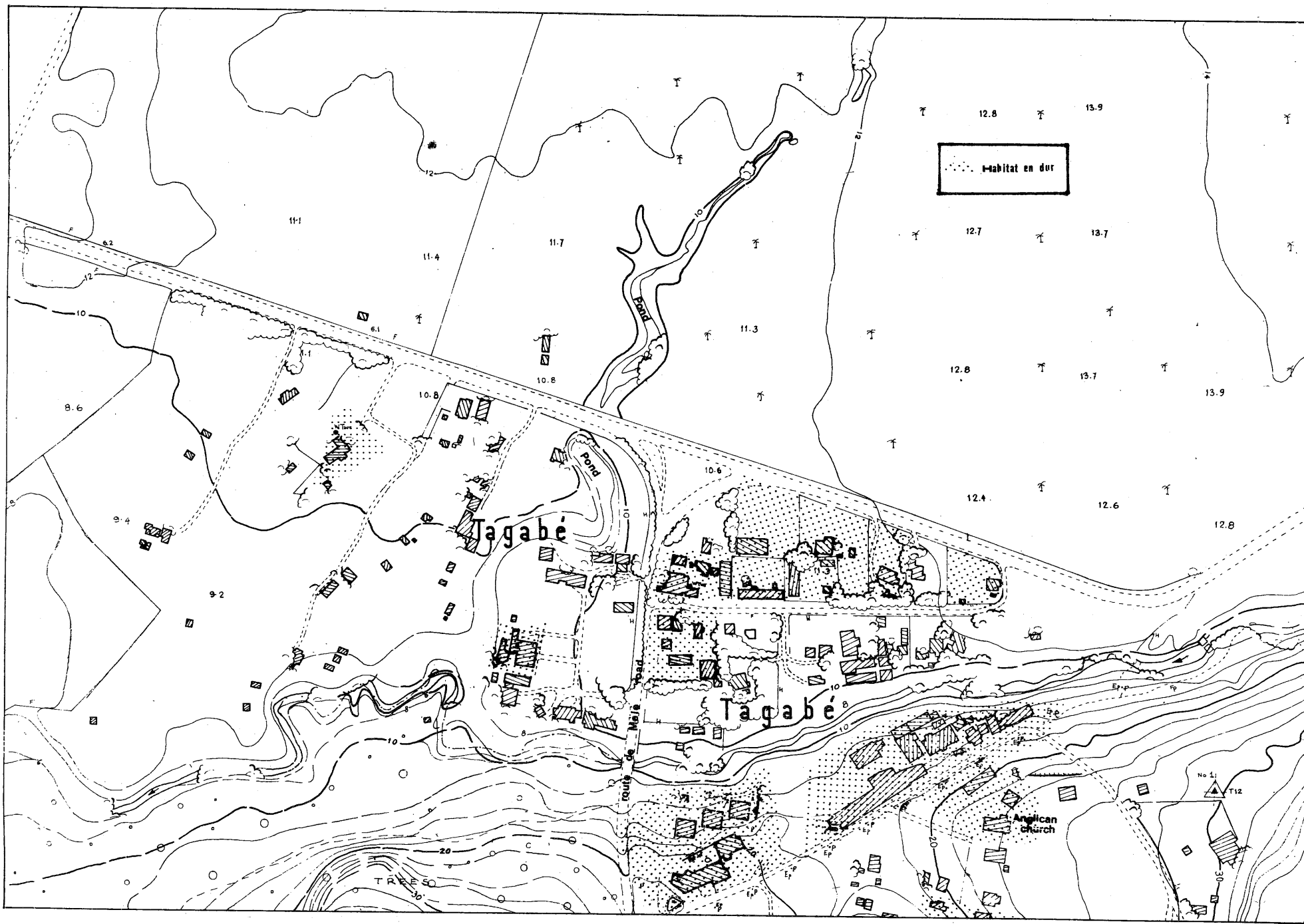
- promotion of a minimum housing standard, providing in particular for the elimination of:
 - earth floors
 - undefined kitchen facilities
 - overcrowding;
- drinking water at reduced rates;
- water seal latrines programme (with possible assistance from the South Pacific Commission);
- provision of large covered garbage containers conveniently located for collection;
- extension of the electricity network, with a special first-installation rate;
- provision of a low-cost community refrigeration system.

Should the above scheme be considered for future implementation, planning for a special project to that effect could certainly be undertaken by a South Pacific Commission team, provided adequate funding could be found.









PART V

NUTRITION SURVEY (Pr. A. Raoult)

V.1.1. General

This survey, which was carried out in an isolated precarious situation, was limited to brief interviews and devoted essentially to objective symptoms suitable for coding.

- The semiological examination was based on the various items on the coded information card (folio D) developed for SPC by Pr Raoult, based on WHO Monograph No. 53 (D. B. Jelliffe) on the evaluation of the state of nutrition in populations.
- The symptoms observed are dictated to an assistant who checks them off. Such cards can be used by paramedical staff, after a period of training; they can be limited to some essential items, according to the type of equipment or systems used in the survey: e.g. dental examination (48.49.50), bone structure (34.35.36).
- For clinical assessment, personal experience is required from the observer, as well as some training in the field, where basically moderate degrees of nutritional symptomatology are observed. In normal field conditions - as well as in health centres - such a survey can serve as a preliminary screening, pending detailed studies in more favourable conditions.

V.1.2. The medical team headed by Pr Raoult was made up of staff members seconded by the Rural Health Division;

Miss Margaret Naupa
Sister Marie-Charlotte and
volunteer nurse, Mrs Pochon,

as well as trainees from the French-and English-speaking Nursing School attending the nutrition course. Auxiliary nurses attending a refresher course directed by Miss Walsh (WHO) contributed to the survey as part of their field training. For three days, all trainees actively participated in various stages of the general survey (medical, sanitary education, sanitation, family gardens) as part of joint teams.

- Nine French-speaking students of agriculture (3rd year), 15 trainee nurses (3rd year) and 16 English-speaking students attended every morning.

V.1.3. Procedure by special assignation

1. Filling out of folio A of the slip: Identification, coding, origin, ethnic group, religion, occupation, economic data. Checking ages against identity cards and MCH cards.

2. Basic biometric data (folio B)

- Infants and toddlers: weight
- Children and adults: weight - height

3. Clinical examination and biometric data

Head circumference, arm circumference, skinfold thickness, blood pressure after 15-minute rest in a sitting position.

4. Dental examination (Dr Speake)

Note: The survey work was hampered by the following factors:

- Very bad weather conditions: heavy rains prevented families from coming every day and turned the whole area into a swamp.
- Lack of official support: the survey was carried out just one week before the first general elections ever held in the New Hebrides.
- Lack of information and preparation: in spite of vigorous efforts on the part of the Health Education Specialist and Rural Health Staff, the population was not aware of the aims of this survey, which was unlike those it was used to (malaria studies, inoculation campaigns, etc.).
- The fact that Tagabe is drained of its inhabitants during the day: most men and two thirds of the women work in Vila all day and school children are scattered in four schools at varying distances, with only some 20 pupils in the local Anglican school.
- The fact that the census data collected by the Rural Health Anti-malaria Unit, although invaluable, were not absolutely up to date and were being revised. Since this is an area where most of the population is mobile (new arrivals from Vate and other islands, such as young people seeking employment, families following migrant workers, travellers), this type of survey is made difficult by the very features which characterise such migrant settlements.

Under such conditions, this survey reflects only a transitory aspect of a very fluctuating situation and in particular:

- On the one hand, present environmental conditions.
- On the other hand, conditions prevailing prior to the installation in the area.

The state of health (and nutrition) of the population is therefore the result of past (food and sanitation) and recent/present conditions.

V.1.4. Organization: The medical survey was carried out within the area so as to minimize population movements.

The examination centre was a building belonging to the Anglican Mission in South Tagabe, where bi-weekly weight checks for infants have been organised by the MCH for the last few months.

The population had been informed the previous week by radio and by the local leaders, following a visit by Pr Raoult, Miss Margaret Naupa (Chief MCH Nurse) and Sister Marie-Charlotte. All families were called according to the code number assigned to their houses and also to the number of people to be examined in 12 working days. Taking into account the population's activities, the medical team was on duty from 8 to 11.30 am and from 4 to 7 pm, and special arrangements were made for late-comers.

Children attending the local Anglican school were examined in a group. Pr Raoult and Dr Speake went to the British Teachers' College to perform a clinical examination of school children living in the Tagabe area.

All survey equipment and cards were provided by SPC.

Transport was provided by SPC for its staff, by the Rural Health Division for its staff and by the Nursing School and the Tagabe School for their trainees.

V.1.5. Survey on the state of nutrition

(SPC Rural Medicine)

Population examined

Age group	Female	Male	Total examined
1. <u>Infants</u>			
0 - 6 months	4	3	7
7 -12 months	3	4	7
Total 0 - 1 year	<u>7</u>	<u>7</u>	<u>14</u>
2. <u>Toddlers</u>			
1 - 3 years	10	10	20
3. <u>Pre-school children</u>			
3 - 5 1/2 - 6 years	20	25	<u>45</u>
4. <u>School children</u>			
5 1/2 - 8 years	<u>28</u>	27	<u>55</u>
9 - 12 years	<u>26</u>	22	<u>48</u>
5. <u>Adolescents</u>			
13 - 17 years	12	10	<u>22</u>
Total:	66	59	125
6. <u>Adults</u>			
Above 18 years	46	37	83
Grand total:	<u>149</u>	<u>138</u>	<u>287</u>

V.2. Survey on the state of nutrition

Clinical data

V.2.1. Infants

There are two distinct periods:

- 1) From 1 day to 6 months, during which the child is in general entirely breastfed. Total: 7 children (3M, 4F).
 - In 6 children out of 7, the weight was above the P50 reference curve (fig. No. 1). Head circumference was, on average, in line with P50 (fig. No. 2).
 - Clinically: No abnormal symptoms.
- 2) From 6 months to 1 year: 4M, 3F = 7 children.
 - Clinical signs: pallor of face and mucous membranes.
 - Anaemia: 3/7 = 43 per cent
 - one moderate case of protein calorie malnutrition (PCM) with undernutrition;
 - one case of rickets, with denutrition and anaemia (7 kg at 9 months).

The median weight curve tended to level off, reflecting beginning of the nutritional crisis which normally starts here at 8 months.

At 12 months (M+F) the average weight was 8.750 kg (1.250 kg below normal).

At the same time, a decrease of the tricipital skinfold thickness was observed: from 10 to 7 mm (M+F). The arm circumference remained stationary. The most remarkable occurrence was the appearance of anaemia after 6 months in 40 per cent of the children.

V.2.2. Toddlers (see figures 1, 2, 3, 3bis, 4, 4bis)

From 1 to 3 years (36 months).
Total: 20 children (10M + 10F).

The overall weight retardation increased compared to the reference standard.

- At 2 years, average retardation (M+F) was 2 kg.
- At 30 months (maximum retardation) it was 2.6 kg.

This was the PCM period.

Five cases were observed, i.e. 5/20 children or 25 per cent, including 1 kwashiorkor without undernutrition and with oedema, and 4 marasmus cases with degeneration of the hair, muscular wasting and slight oedema (1/4). These cases were generally associated with anaemia.

To summarise:

- 2 children were below P50 : 10 per cent.
- 8 between P50 and 80 per cent of P50 (borderline).
- 10 above 80 per cent of P50 = 50 per cent.

Increasing retardation was also observed in all other body measurements.

- At 2 years, the average retardation was as follows:
 - Head circumference: 1.4 cm (M+F).
 - Average skinfold: 7 mm (M+F).
 - Arm circumference: 11.4 cm (M) and 13.8 cm (F).

This was more noticeable among PCM cases (muscular wasting).

Besides the cases classified as PCM, we noticed the following:

- Alterations in the colour and texture of the hair: 9/20 = 45 per cent.
- 2 cases of pilosis: 10 per cent.
- 1 case of melanodontia.

These two symptoms are part of the postcritical syndrome which appears more clearly after the third year.

- Anaemia (pallor of the mucous membranes, clinical assessment):
8 cases out of 20 children: 40 per cent.
- Rickets: 1 case out of 20 children.

On the whole, it appeared from both clinical examination and measuring that one out of two Tagabe children underwent a crisis involving malnutrition/undernutrition/multiple deficiencies between the ages of 1 and 2 and that all children considered as normal were retarded in terms of the various parameters.

The main occurrences, in order, were the following:

- 1) Undernutrition with subnormal weight.
- 2) Malnutrition with normal or subnormal weight.
- 3) Anaemia - probably of mixed etiology.

This nutritional crisis will affect the child's future growth, marked disparities are already noticeable:

- Those children who are well fed and belong to the higher social groups will grow normally;
- Children suffering from PCM will remain threatened for several months.

TAGABE - VILA - NEW HEBRIDES

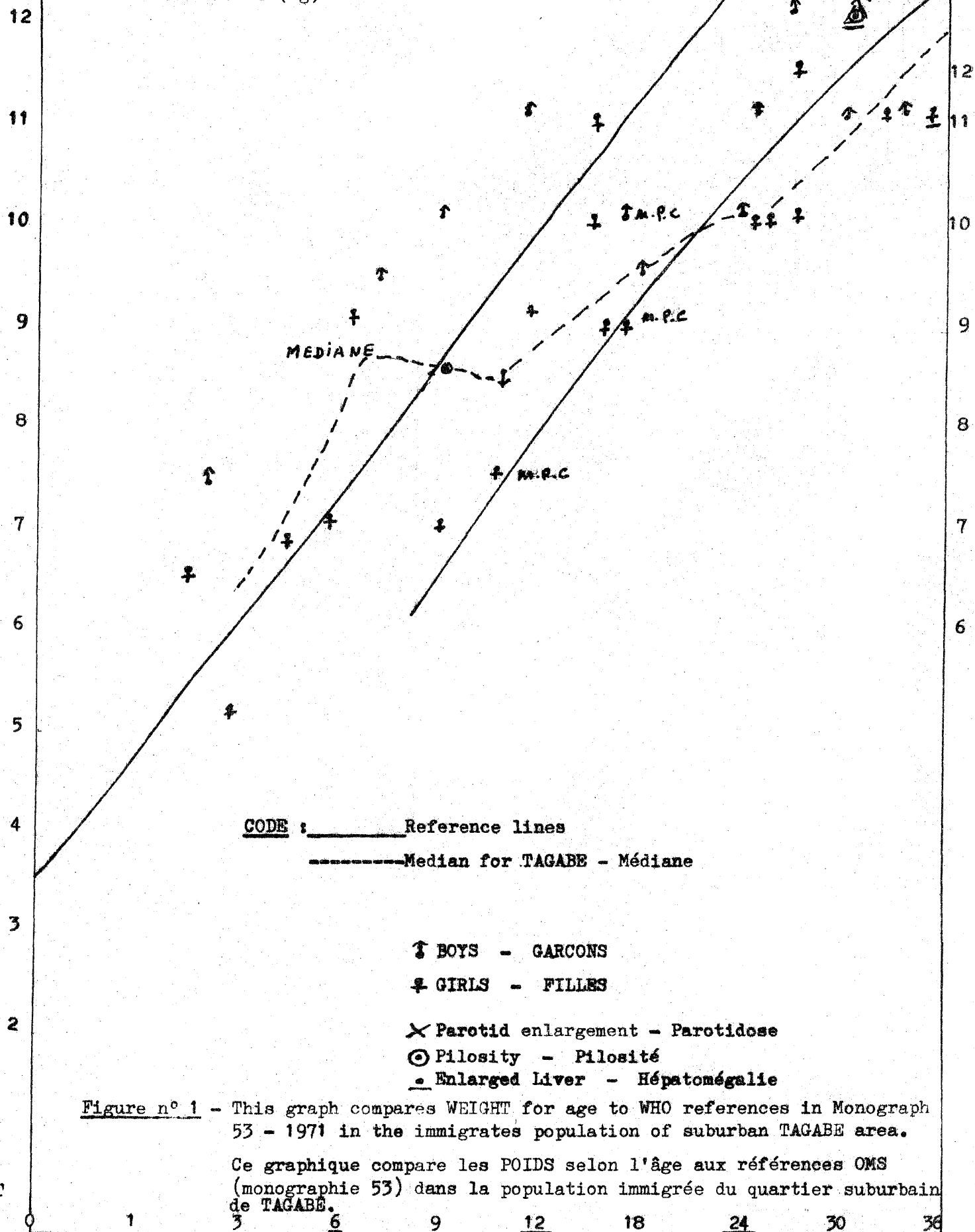
SPC report on nutritional state, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

BOYS and GIRLS

GARÇONS et FILLES

WEIGHT - POIDS (kg)



POIDS
 WEIGHT
 (kg)

Age

MONTHS - MOIS

SPC June 1975

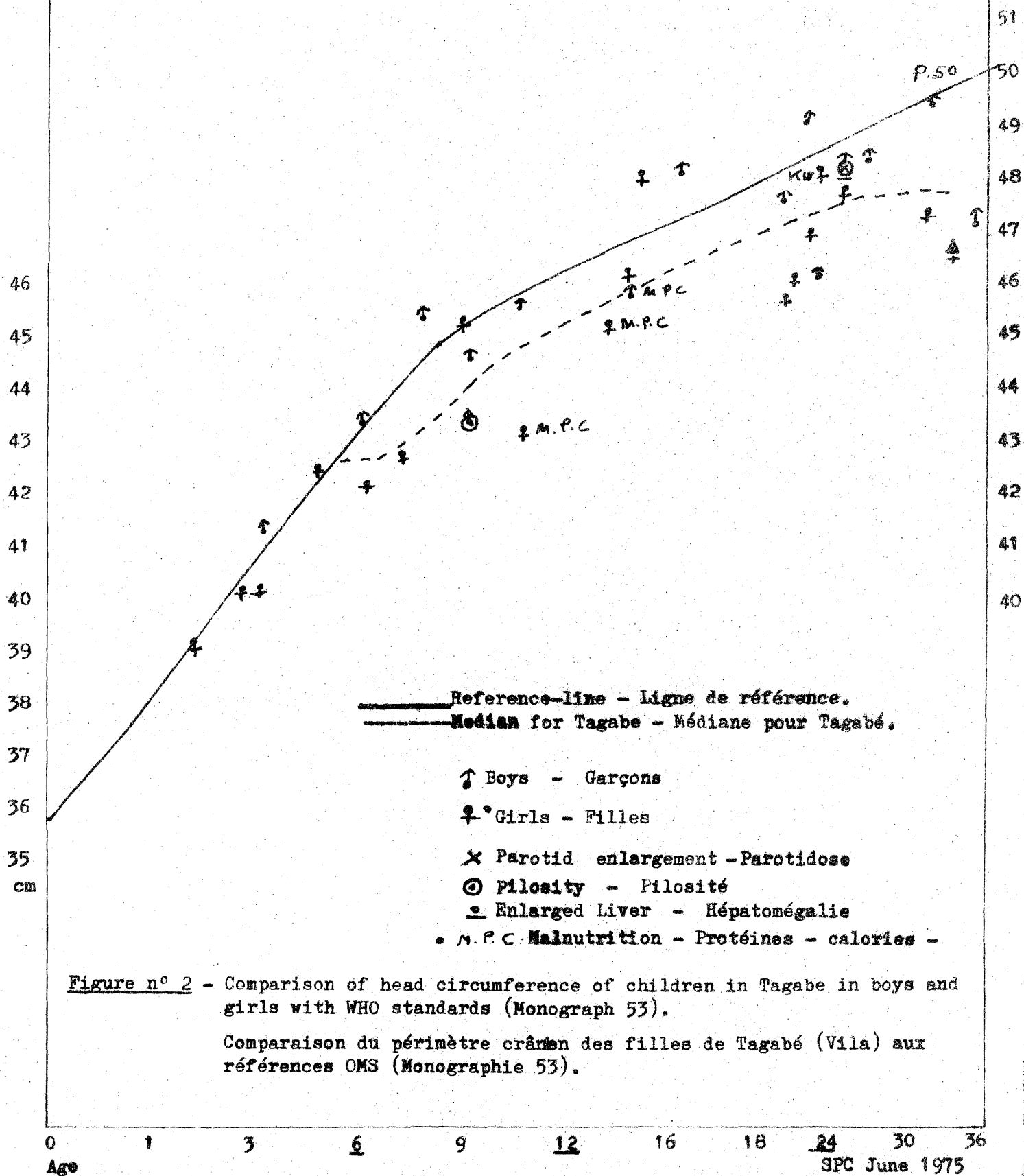
TAGABE - VILA - NEW HEBRIDES -

SPC report on nutritional state, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

BOYS AND GIRLS 0 - 36 months

GARÇONS ET FILLES 0 - 36 mois



BOYS and GIRLS 0 - 3 years

GARCONS et FILLES 0 - 3 ans

SPC report on nutritional state, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

TRICIPITAL SKINFOLD

PLI CUTANÉ TRICIPITAL (mm)

CODE :

Malnutrition border line 80 % of standard (W.H.O)

Ligne limite de la malnutrition

Median in TAGABE

Médiane à TAGABE

⊙ Pilosity - Pilosité

⊙ Enlarged Liver - Hépatomégalie

M.P.C Protein-calories-malnutrition

Malnutrition protéines-calories

BOYS - GARCONS

Figure n° 3

Malnutrition border line

Ligne limite de la malnutrition

MONTHS - MOIS

GIRLS - FILLES

Figure n° 3 bis

MALNUTRITION Border line

Ligne limite de la malnutrition

CODE :

⊙ KW = Kwashiorkor

Figures n°s 3 et 3 bis - Tricipital skinfold among infants and toddlers compared with WHO standards (Monograph 53 (1971)).

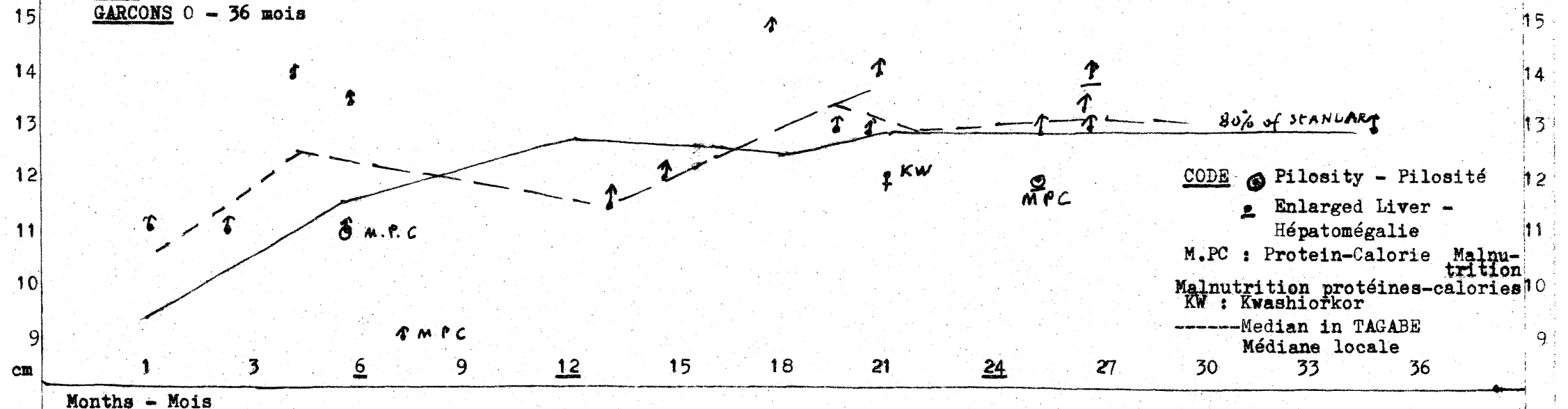
Pli cutané tricipital chez le nourrisson et les jeunes enfants comparé aux références OMS (Monographie 53 (1971)).

SPC report on nutritional status, June 1975
Rapport CPS sur l'état nutritionnel, juin 1975

BOYS 0 - 36 months

GARCONS 0 - 36 mois

ARM CIRCUMFERENCE (left arm - cm)
PERIMETRE DU BRAS (bras gauche - cm)



GIRLS

FILLES

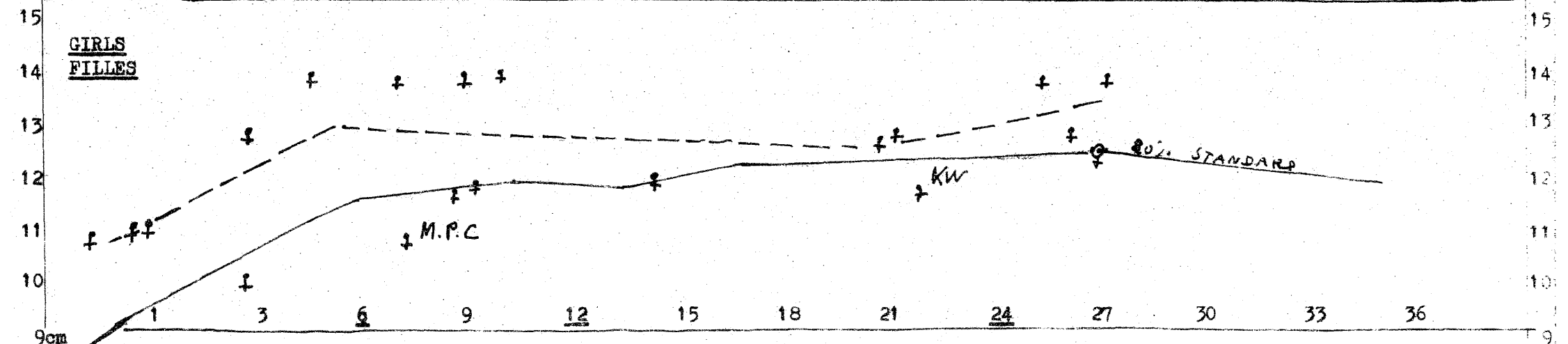


Figure n° 4 - (boys) and 4 bis (girls) - Arm circumference in children of immigrant population in a suburban area of Vila.

Reference curve for malnutrition in WHO Monograph n° 53 (1971).

Périmètre du bras des enfants de la population immigrée dans un quartier suburbain de Port-Vila. Courbe de référence pour la malnutrition dans la monographie n° 53 de l'OMS (1971).

The many undernourished and deficient toddlers might start recovering, but such recovery will only be complete provided feeding and environmental conditions are improved; in most cases it will never be achieved as can well be seen from height and weight retardations.

However, the crisis is not so dramatic in appearance as African kwashiorkor, so that growth retardation or a slight oedema, unless they are systematically and carefully detected, will not be recorded in health statistics, and will not be a cause of concern to families.

Intercurrent infections can be promptly treated in the two nearby hospitals and several clinics. An MCH team visits the children once a month and performs vaccinations. Antimalaria units carry out surveys and spraying.

It may often appear that the worst has been avoided, but moderate, latent malnutrition prevails. We were unable to obtain accurate data on infant mortality in the age groups 0 - 1 and 1 - 4 years because of population movements and for lack of reliable statistics.

Note: This period is considered as crucial as far as malnutrition is concerned.

V.2.3. Pre-school children

The age group 3 - 5 years is used in the international classification.

In the New Hebrides, the official age for school enrolment is 6 years.

Physiologically speaking, this period is one of transition:

- Between 5 1/2 and 6 years, appearance of the first permanent molar tooth.
- Transition from the family or semi-free life to school discipline.
- Partial change in environment, food, sanitation.

We therefore assumed that 5 1/2 was the actual school age.

Number of children examined: in the 3 - 5 1/2 age group: 20F / 25M = 45.

Clinical data:

1) Anaemia and clinical evidence: 12/45 = 26 per cent.

2) Malnutrition (present or sequels):

1. Discoloration and degeneration of the hair:

12/45 = 26 per cent.

2. Oedema: 2 (second degree PCM): 2/45 = 4.4 per cent.

3) Chronic malnutrition syndromes:

1. Abnormal pilosity : $5/45 = 11.1$ per cent.
2. Parotidosis : $2/45 = 4.4$ per cent.
3. Enlargement of the liver : $8/45 = 10.0$ per cent.
4. Melanodontia (enamel dystrophy): $12/45 = 26.7$ per cent.

In most cases, these syndromes were associated.

On the whole, 29/45 were considered as normal, i.e. 64.4 per cent.

Note: International age groups (3 - 5 - 6 - 12) were used for the graphs.

4) Avitaminosis:

- Vitamine D deficiency (rickets or sequels) : 0
- Indications of vitamin A deficiency : 0
- Indications of vitamin C deficiency (see gum condition).

Ariboflavinosis:

- Cheilosis : 1 isolated case.
- Raspberry tongue : 1 isolated case.
- Central depapillation : 1 isolated case.

A total of two cases were identified : $2/45 = 4.4$ per cent.

5) Dental caries and periodontal diseases (see chapter VI, Dr Speake's report)

1. DMF index
 - 1 (3 decayed teeth) : $4/45$
 - 2 (4 to 10) : $3/45$
 - 3 (above 10) : $4/45$

Total : $11/45 = \underline{\underline{24.4}}$ per cent.

In most cases, these were caries of the first and second small molar teeth (baby teeth), apart from melanodontia, affecting primarily the upper incisors and the canine-teeth, which is recorded separately.

2. Periodontal diseases: There were two cases of scorbutic gingivitis ($2/65 = 4.4$ per cent) with swollen and bleeding gums, due to lack of dental hygiene and multiple deficiencies (proteins, B2, C).

6) Skin hygiene:

- Impetigo : $4/45 = 8.9$ per cent.
- Extensive pityriasis : $8/45 = 17.8$ per cent.

7) Body measurements (see figures No.5, 5bis, 6, 6bis, 7, 7bis, 8, 8bis, 9, 9bis).

1. Weight retardation : At 5 1/2 years, it was as follows compared with the P50 Iowa reference curve:

girls : 2.2 kg (median) 17.8/20 kg

boys : 4.2 kg (median)

2. Height retardation : At 5 1/2 years

girls : 4.8 cm : 108/112.8 cm

boys : 10 cm : 104/114 cm

3. Head circumference : At 5 1/2 years

girls : 49/51.2 = 2.2 cm

boys : 49.2/51.2 = 2 cm

4. Skinfold thickness : At 5 1/2 years

girls : 6.5 mm

(malnutrition borderline : 8 mm)

boys : 5.8 mm

(malnutrition borderline : 6.8 mm)

Note: Since clinical data and measurements are of special interest to pediatricians and MCH staff, they should be circulated to them.

V.2.4. Summary and conclusions relating to children from birth to school age

1) Up to the age of 6 months the state of nutrition of the Tagabe children was satisfactory in so far as the weight-height growth was above the reference standards.

A case of rickets was observed; although isolated, it was a warning and in view of housing and environmental conditions, there is reason to fear that rickets might spread.

Infants are generally breastfed and regularly weighed by the MCH staff.

2) The early nutritional or weaning crisis is due to the following causes:

- Environmental factors, at the age when the child begins to crawl on the ground (parasite eggs, germs and soiled water), resulting in frequent infectious diarrhea;

- Loss of passive immunities provided by the mother;

- Food factors.

- As the mother's milk becomes inadequate to cover the calorie requirements, which increase together with the child's weight and height, undernutrition starts between 6 and 8 months with a corresponding drop in the weight curve.

- This deficiency is more noticeable when lactation, due to fatigue or inappropriate diet, is inadequate.

- Complementary starchy energy foods, introduced too late, cannot offset the calorie deficiency in time.

- The mother's milk offers protection in the form of valuable proteins until weaning is complete.

- When weaning is complete (16 - 18 months on average), the child is given the same type of food as the adults, i.e. taros, sweet potatoes, yams and sweets, which are poor in proteins, or rice, cakes, bread and cereals, which are not rich enough (see Miss Jabre's report, part II).

- Late introduction of protein-rich foods of animal origin (eggs, milk, fish, meat) and absence of protein-rich vegetables such as pulses (beans, ground-nuts, peas).

- Limited use of composite industrial foods such as "baby food", which are expensive or unknown.

The nutritional crisis is reflected by:

- A state of undernutrition (weight retardation, inadequate skinfold) appearing around the eighth month and likely to prevail.

- Symptoms of protein deficiencies (protein malnutrition) generally associated with undernutrition. This constitutes protein calorie malnutrition (PCM). Its incidence reaches its peak at age 2. Between 1 and 3 years, 5 out of 20 children have second degree PCM but, apart from confirmed cases, we observed in 45 per cent of the children in the age group 8 months-3 years, slight cutaneous signs, degeneration of the hair, muscular wasting, etc., indicating liminar deficiencies.

3) Anaemia

This is equally serious: 40 per cent of the children presented symptoms. It starts around the sixth month, when the child has exhausted its iron reserves while the mother's milk is also poor in iron.

Later on, it is due to the following causes:

- Inadequate food intake;
- Predatory parasites;
- Inadequate iron intake.

4) The post-critical phase (3 - 5 1/2 years)

- Rapid growth and a recovery in terms of weight and height were observed but as far as the head circumference is concerned, recovery was incomplete in many children, either normal in appearance or presenting such symptoms as enlarged parotid glands and liver or abnormal pilosity. Melanodontia indicated present or past multiple deficiencies, and so did dental caries affecting certain teeth in particular (small mandibular molars). There was little characterised avitaminosis.

Prevention and treatment - Recommendations

- (1) Control by MCH should be continued until school age. Owing to pregnancy or work, the mother often neglects the child after the second year. With an estimated three-year spacing between pregnancies, she would be able to look after it during the most vulnerable period.
- (2) Besides weight data, cases of malnutrition or oedema should also be recorded. Nutritional education should be provided as soon as pregnancy is reported. Mothers should be weighed, oedema cases recorded and free preventive distribution of iron and vitamin B9 tablets organised during the three last months of pregnancy. Protein deficiency should be offset as far as possible by milk biscuits.
- (3) Breast-feeding should be encouraged (general and local campaigns) or, if social factors prevent this, strict hygiene rules should be taught in respect of bottle preparation.
- (4) Diversified foods should be introduced early without precluding breast-feeding. ("The health aspects of food and nutrition", WHO 1969, Western Pacific Regional Office, Manila).
- (5) Vaccinations should be performed as early as possible (before 6 months) prior to the nutritional crisis.
- (6) Milk biscuits should be distributed to children suffering from growth retardation, malnutrition, enlarged parotid glands, enlarged liver and melanodontia, up to school age.

Pending the effects of environment sanitation measures, controlled urbanisation and health education on the rapid spread of intestinal helminthiasis, antiparasite dosing should be undertaken systematically twice a year by means of polyvalent antihelminthics (ascaris, hook-worm); in spite of reinfestations, this would eliminate the predatory effect of a large parasite population and facilitate nutritional recovery.

- (7) In general, steps should be taken to fill the gap observed between age 2, when the child is no longer taken to infant clinics, and school age (5 years), during which period the child is comparatively neglected in favour of younger brothers and sisters and plays freely on polluted ground.

V.2.5. School age

As school age often extends to 17 because of backwardness or errors in age recording, we distinguished three separate groups.

<u>Children examined:</u>			
1)	<u>5 1/2 - 8 years</u>		
	Girls: 28	Boys: 27	Total: 55
2)	<u>9 - 12 years</u>		
	Girls: 26	Boys: 22	Total: 48
Total 5 1/2 - 12 years :	54	49	103
3)	<u>13 - 17 years</u>		
	Girls: 10	Boys: 12	Total: 22
Grand total :	64	61	125

V.2.5.a Clinical symptoms

- 1) Anaemia 5 1/2 - 12 (M+F) : 25/103 = 24.3 per cent
 13 - 17 (M+F) : 7/22 = 31.8 per cent
 Total : 32/123 = 25.6 per cent

2) Present malnutrition and sequels2.1. Discoloration and degeneration of the hair

- 5 1/2 - 12 : 17/103 = 16.3 per cent
 13 - 17 years incl. : 1/22 = 5.3 per cent

2.2. Oedema

- 5 1/2 - 12 : 4/103 = 3.9 per cent
 13 - 17 years incl. : 2/22 = 9.1 per cent
 Total : 6/125 = 4.8 per cent.

3) Syndromes of chronic malnutrition3.1. Abnormal pilosity

- 5 1/2 - 8 (M+F) : 18/55 = 32.7 per cent
 9 - 12 (M+F) : 11/48 = 22.9 per cent
 13 - 17 (M+F) : 3/22 = 13.6 per cent
 Total : 68/125 = 54.4 per cent

3.2. Enlargement of parotid glands

5 1/2 - 8 (3F+3M)	:	6/55	=	<u>10.9 per cent</u>
9 - 12 (1F+3M)	:	4/48	=	<u>8.3 per cent</u>
13 - 17 (OF+4M)	:	4/22	=	<u>18.2 per cent</u>
Total	:	14/125	=	<u>8.9 per cent.</u>

In general, boys were more frequently affected than girls, especially adolescents: 4/10, i.e. 40 per cent.

3.3. Enlarged liver

5 1/2 - 8 (M+F)	:	14/55	=	<u>25.5 per cent</u>
9 - 12 (M+F)	:	5/55	=	<u>9.1 per cent</u>
13 - 17 (M+F)	:	1/22	=	<u>4.5 per cent</u>
Total	:	20/125	=	<u>16.0 per cent.</u>

This had no apparent relation with malaria, no case of spleen enlargement was observed.

3.4. Abnormal pilosity

5 1/2 - 8 years	:	17/55	=	<u>30.9 per cent</u>
9 - 12 years	:	14/48	=	<u>29.2 per cent</u>
13 - 17 years	:	3/22	=	<u>13.6 per cent</u>
Total	:	34/125	=	<u>27.2 per cent</u>

3.5. Melanodontia

5 1/2 - 8 years	:	12/55	=	<u>21.8 per cent</u>
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As melanodontia only affects deciduous teeth which had partly disappeared, this figure does not reflect its actual incidence (see pre-school group).

4) Avitaminosis

4.1. Rickets : 0

4.2. Vitamin A deficiency:

- no cutaneous symptoms
- no corneal symptoms
- ectocornea thickening of dubious etiology
between 9 and 12 years : 2 cases/125 =
1.5 per cent.
- 1 case of Bitot's spots (12 - 19 age group),
more characteristic of chronic avitaminosis.

4.3. Vitamin C deficiency

- A vitamin C deficiency might be the cause of the
observed cases of parodontosis (see below).

4.4. Ariboflavinosis (B2)

- Naso labial seborrhea

5 1/2 - 12 years : 0

13 - 17 years : 3/22 = 13.6 per cent

- Angular cheilosis

5 1/2 - 12 years : 1/103 ≠ 1 per cent

12 - 17 years : 0

- Glossitis : Raspberry tongue

5 1/2 - 12 years : 4/103 ≠ 4 per cent

12 - 17 years : 2/22 = 9.1 per cent

Depapillation : 0

- Black tongue

5 1/2 - 12 years : 2/103 ≠ 2 per cent

13 - 17 years : 3/22 = 13.6 per cent

Normally associated with anaemia.

4.5. Ocular symptoms

- No conjunctivitis - No corneal lesions

- 2 cases of ectocornea thickening and 1 case of Bitot's spots (see above).

4.6. Dentition

4.6.1. Melanodontia was recorded under mal-nutrition sequels.

4.6.2. Dental caries

M and F: 5 1/2 - 12:

DMF index I (3 caries): 29/103= 28.2%

DMF " II (10 "): 14/103= 13.6%

DMF " (10 "): 3/103= 2.9%

Total 46/103 ≠ 45.0%

M and F: 13 - 17:

DMF index I : 0

DMF " II : 12/22 = 54.5%

DMF " III : 6/22 = 27.0%

Total : 18/22 = 81.8%

Grand total : caries : 64/125= 51.2%

This figure is much higher than in Malekula (Wala-Rano): 2.9 per cent in the same age group.

Unlike Wala-Rano, there were no symptoms of fluorosis at Tagabe.

Note: For further information see chapter VI, Dr Speake's report.

4.6.3. Periodontosis: Gums were often swollen or affected with acute gingivitis.

Swollen gums (interproximal papillae): bleeding when rubbed:

M+F: 5 1/2 - 12 : 16/103 ≠ 16.0 per cent

12 - 17 : 3/22 ≠ 13.5 per cent

Total : 19/125 ≠ 15.2 per cent

Note: There is no oral hygiene; besides infection, however, multiple deficiencies (proteins, riboflavin, vitamin C) may be the cause.

4.7. Skin hygiene

Pyodermites - Impetigo: 5 1/2-12 : 2/103 ≠ 2 per cent

Epidermomycoses

(pityriasis) : 5 1/2-12 : 4/103 ≠ 4 per cent

Pyodermites : 12 - 17 : 0

Epidermomycoses

(pityriasis) : 12 - 17 : 2/22 ≠ 9.1 per cent

4.8. Individuals normal in appearance (free of PCM and sequels)

5 1/2 - 8 : 28/55 = 50.9 per cent

9 - 12 : 34/48 = 70.8 per cent

13 - 17 : 15/22 = 68.2 per cent

- : 77/125 = 62.5 per cent

V.2.5.b Body measurements (see figures No. 5, 5bis, 6, 6bis, 7, 7bis, 8, 8bis, 9, 9bis)

1) Weight according to age

1.1. From 5 to 17 years : Girls

15 out of 66 were equal to or above Iowa P50 = 7.6 per cent

13 out of 66 were between P50 and P3 = 65.0 per cent

18 out of 66 were below Iowa P3 = 27.3 per cent

The weight median was calculated from subjects classified as "apparently normal" clinically (including cases of anaemia).

It was always well below the P50 reference standard.

At age 5 1/2, weight retardation was 2 kg (18/20)

At age 9, weight retardation was 1.700 kg (26.3/29)

At age 13, weight retardation was 0.500 kg (44.5/45)

Weight retardation was noticeable until prepuberty age. The peak was observed at 11 years, when it reached 7 kg (32/39).

On the whole: 65 per cent were considered as underweight
27.3 per cent as undernourished (below P3).

The weight median was also calculated for children with symptoms of chronic malnutrition (enlargement of parotid glands and liver, abnormal pilosity, melanodontia). It was always below that of the preceding group and close to the P3 curve.

Compared with children considered as normal (local median), weight retardation was as follows:

5 1/2 years : 1.5 kg

9 years : 2.4 kg

11 years : 4.6 kg

Graph No. 5bis reflects the general situation more clearly than would figures.

1.2. From 5 1/2 to 17 years : Boys

In 5 out of 59 the weight was equal to or above P50 = 8.5 per cent

In 31, it was between P50 and P5 = 52.5 per cent

In 23, it was below P3 = 39.0 per cent

Therefore, 52.5 per cent could be considered as underweight and 39 per cent as undernourished.

In apparently normal children the weight median was well below Iowa P50. Average retardation was as follows:

3.800 kg at 5 1/2 years

4.000 kg at 9 years

5.000 kg at 11 years

7.000 kg at 13 years

The median only coincided with Iowa P50 at age 17.

In children showing clinical evidence of chronic malnutrition, the weight retardation in relation to normal children was more noticeable in girls.

Weight retardation compared with the normal local median was as follows:

At 5 1/2	: 1.200 kg
At 9	: 3.000 kg
At 11	: 5.000 kg
At 13	: 7.500 kg (maximum)

Note: It would be meaningless to try to determine a general median, for the following reasons:

- 1) The ethnic groups were not homogeneous.
- 2) The children considered as PCM-free might suffer from anaemia, parasites or other diseases undetected by field examinations.

2) Height/age

2.1. Girls

In 7 out of 66, the height was above Iowa P50	= <u>10.6</u> per cent
In 45, it was between P50 and P3	= <u>68.2</u> per cent
In 14, it was below P3	= <u>21.2</u> per cent

The height median showed an initial lag between 5 1/2 and 6 (levelling).

At age 6, weight retardation was 7 cm in relation to P50.

At 8, it had almost disappeared.

A second slow-down occurred between 8 and 10 (levelling).

At 9, retardation was 6 cm.

Maximum retardation was observed at 12: 15 cm (below P3).

With accelerated growth associated with puberty, it tended to decrease, although the median remained below P50.

The adult height (local average : 155.5 cm) was reached at 17.

In girls showing syndromes of chronic malnutrition, notable departures from local standards appeared only between 8 and 9, when retardation reached 7 cm (see graph No. 6 bis).

2.2. Boys

In 3 out of 59, height was above Iowa P50 = 5.1 per cent

In 32 it was between P50 and P3 = 54.2 per cent

In 24 it was below P3 = 40.7 per cent

The percentage of children showing height and weight retardation was about the same.

In apparently normal children, height retardation in relation to Iowa P50 was as follows:

At 5 1/2 : 5 cm

At 9 : 5 cm

At 13 : 9 cm

At 17, it was still apparent: 15 cm.

A slowing-down of growth was observed between 8 and 11 years (levelling) with a maximum retardation of 12 cm at 10.

In children showing a malnutrition syndrome, height retardation was substantial in relation not only to Iowa standards but also to the local median. It is a well-known fact that height retardation is a better indicator of previous multiple (especially protein) deficiencies, than weight retardation.

Retardation was as follows:

At 5 1/2 / Iowa P50 : 12.5 cm / Local median : 10 cm

At 9 / Iowa P50 : 32.5 cm / Local median : 21 cm

At 13 / Iowa P50 : 28.0 cm / Local median : 13 cm

(see graph No. 6).

Generally, height retardation was more noticeable in boys than in girls: 40.2 per cent as against 21.7 per cent. Similarly, boys were more generally affected with malnutrition: 55.9 per cent were free as against 68.2 per cent girls (5 1/2 - 17).

3) Head circumference

The standards used were those proposed by Watson and Lowry.

3.1. Girls

In 14 out of 66, the head circumference was equal to or
above P50 = 21.2 per cent

In 16 it was between P50 and P3 = 24.2 per cent

In 36, it was below P3 = 54.5 per cent

The median of "normal" individuals was close to P3, slightly below up to age 9, then above, with a rapid increase starting at 14 and finally reaching P50 at 17.

Maximum retardation occurred at age 6: 15 mm.

At 9, it was 14 mm

At 15 10 mm

At 17 0 mm

In individuals showing a malnutrition syndrome, retardation was substantial, as in the case of height increase. This is very serious since the circumference of the brain is proportional to that of the head (-15 per cent on average).

Retardation was as follows:

At 5 1/2 / Iowa P50 : 25 mm / Local median : 7 mm

At 8: maximum retardation

P50 : 30 mm / Local median : 15 mm

At 12 P50 : 16 mm / Local median : 6 mm

(see graph No. 7 bis).

3.2. Boys

17 out of 59 were above Iowa P50 = 28.8 per cent

22 were between P50 and P3 = 37.3 per cent

20 were below P3 = 33.9 per cent

The median of normal individuals showed an 11 mm retardation between 5 1/2 and 9 years and reached P50 at 9. Then a slowing-down occurred between 9 and 13 (levelling). At age 13 retardation was 11 mm.

Accelerated growth associated with puberty started at 13 1/2 and P50 was passed at 17.

In individuals showing a malnutrition syndrome, retardation in relation to the normal local median was as follows:

At 5 1/2 - 6 mm

At 9 - 10 mm

At 10 - 22 mm

At 13 - 21 mm

It was more clearly marked in boys than in girls.

4) Skinfold thickness

This was measured by means of constant pressure calipers of the Harpenden type (Holtain Ltd. Crymmych, UK).

It yields information on the fatty tissues.

Figures quoted correspond to twice the skin thickness (1.5 mm), i.e. 3 mm, plus twice thickness of the layer of fat. Fat thickness = x (figure quoted) - 3 mm.

4.1. Girls

The standard median is that considered by D.B. Jelliffe (WHO Monograph No. 53) as the upper limit of thinness.

A total of 21 out of 66 were above P50 : 33.3 per cent

45 were below : 66.6 per cent

Periods of thinness were observed:

- At school age: 5 1/2 - 1.8 mm below standard.
- Between 9 and 12 years : at age 11 - 2.4 mm below standard.

The panniculus adiposus increased rapidly as of age 14, overtaking the standard at 16 : +1.5 mm on average. In girls showing malnutrition syndromes, the median was always below that of the "normal" group. Maximum thinness in relation to the latter was observed between 5 1/2 and 12; at 12, it was 2.5 mm below.

4.2. Boys

The skinfold was normally thinner in boys than in girls and individual variations were less apparent.

A total of 20 boys out of 59 were above the standard curve:

33.9 per cent

39 were below : 66.1 per cent

The number of thin individuals was about the same in boys and girls.

In boys as in girls, periods of thinness occurred between 5 1/2 but extended to age 14.

Maximum retardation was observed at 10 : 1.4 mm.

The general median overtook the standard curve at age 15. At that stage, there was little difference left between "normal" individuals and those with syndromes of malnutrition, although the latter causes a reduction of the muscular (active) mass.

5) Arm circumference

5.1. Girls

On average, it was as follows: 15 cm at 5 1/2, 17.5 cm at 9, 17.5 cm at 12, and increased very rapidly during the prepuberty period to reach 25 cm at 17. In children affected with malnutrition it was low between ages 7 and 12: 1.5 cm below normal at 9 years.

5.2. Boys

On average: 15 cm at 5 1/2, 18.5 cm at 9, 19 cm at 13, 23 cm at 17. Rapid increase occurred at age 14.

In individuals affected by malnutrition, muscular deficiency was particularly noticeable between 6 and 9: up to 2.8 cm below average at 9 (-15%).

V.2.5.c Summary and comments

- 1) Both clinical data and measurements show that the state of nutrition is unsatisfactory in school-age children.
- 2) Taking into account only weight deficits exceeding the P3 standard, it can be estimated that one third of the children are thinner than normal, which reveals a general state of undernutrition-undernourishment.
- 3) A state of malnutrition characteristic of protein deficiency, with oedema, was apparent in some children: 5 per cent.
- 4) A quarter of the children showed clinical symptoms of anaemia.

States of undernutrition-malnutrition are mostly apparent in very young school children, between 5 1/2 and 7, and during the prepuberty phase from 10 to 12.

For the former, this is the extension of a situation observed at pre-school age; in the latter, it shows their inability to cover their increased nutritional requirement, and most probably also the accumulation of worms.

In some children there is evidence of previous or recent malnutrition sequels, with swollen parotid glands, enlarged liver and degenerated dental enamel.

- 5) Retardation, sometimes very marked, in terms of height and head circumference, is only partially offset during the accelerated growth phase associated with adolescence.
- 6) Avitaminosis as such seems to be rare, but there are unobtrusive symptoms of multiple deficiencies.

- 7) Particular attention is drawn to dental health problems.

Early treatment and filling of caries should be organized.

Prevention should be provided through both periodic fluoridation or tooth brushing with a fluoridated tooth paste, and health education (tooth brushing programmes).

Peridontitis is evidence of both lack of oral hygiene and inadequate intake of vitamin-rich foods (fruit, green vegetables).

- 8) Skin hygiene is inadequate: clean water supply is a problem at Tagabe. The following steps would be advisable:

- (a) Organisation of feeding programmes in private or government schools: regular distribution of milk and yeast biscuits, or provision of regular meals.
- (b) Development of health (and nutrition) education at school.

- 9) A mobile dental health unit should be organized as well as the treatment and prevention of caries.

Note: The above comments are especially directed to the attention of:

- (a) The Public Health, Rural Health and School Hygiene Departments
- (b) The English- and French-speaking Education Departments.

V. 2. 6. Intestinal parasites in young people

A sample survey on intestinal helminthiasis was carried out by the Rural Health Service laboratory, directed by Dr Ratard. A total of 43 examinations was performed on children between 3 and 17 (samples of 1/4).

A single examination showed that 25 out of 43, i.e. 58 per cent, carried helminth eggs; 8 of those 25 carried multiple parasites.

The breakdown was as follows:

Ascaris (round worm) :	10)	
Ascaris + whipworm :	5)	
Whipworm only :	4)	Total ascaris 15/43 - <u>34.9</u> per cent
Hookworm only :	2	
With whipworm :	3	Total whipworm 11/43 - <u>25.9</u> per cent
		Total hookworm 5/43 - <u>11.6</u> per cent
Strongyloides stercoralis :	2	

The above figures indicate a high degree of ground contamination, as reported by Mr Claude Richard in his conclusions on the excreta problem in the Tagabe area.

TAGABE - VILA - NEW HEBRIDES

SPC report on nutritional status, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

BOYS 3-17 years

WEIGHT (kg)

GARCONS 3-17 ans

POIDS (kg)

CODE : X Enlarged parotids - Parotidose
 O Piloosity - Pilosité
 ⊕ Enlarged Liver - Hépatomégalie
 △ Melanodontia - Mélanodontie
 • Without clinical symptoms - Sans signes cliniques

— Reference lines (USA) -
 — Median for normal children TAGABE
 Médiane des enfants normaux
 Median for malnourished
 Médiane des malnutris

41
40
39
38
37
36
35
34
33
32
31
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19
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11
10
Kg

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Figure n° 5 -

Comparison of weight for age in boys with WHO standard (Monograph n° 53 - 1971).

Comparaison du poids selon l'âge des garçons à la référence OMS (Monographie OMS n° 53 - 1971).

Age 3 Years - Ans 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

TAGABE -- VILA -- NEW HEBRIDES

SPC report on nutritional status, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

GIRLS 3 - 17 years

FILLES : 3 - 17 ans

WEIGHT (kg)
POIDS (kg)

- CODE**
- ✕ Parotid enlarged - Parotidose
 - ⊙ Pilosity - Pilosité
 - Enlarged liver - Hépatomégalie
 - △ Melanodontia - Mélanodontie
 - Without clinical symptoms
Sans signes cliniques
 - Reference lines - Référence
 - Median for normal child TAGABE
Médiane enfant normal TAGABE
 - Median of undernourished TAGABE
Médiane des malnutris

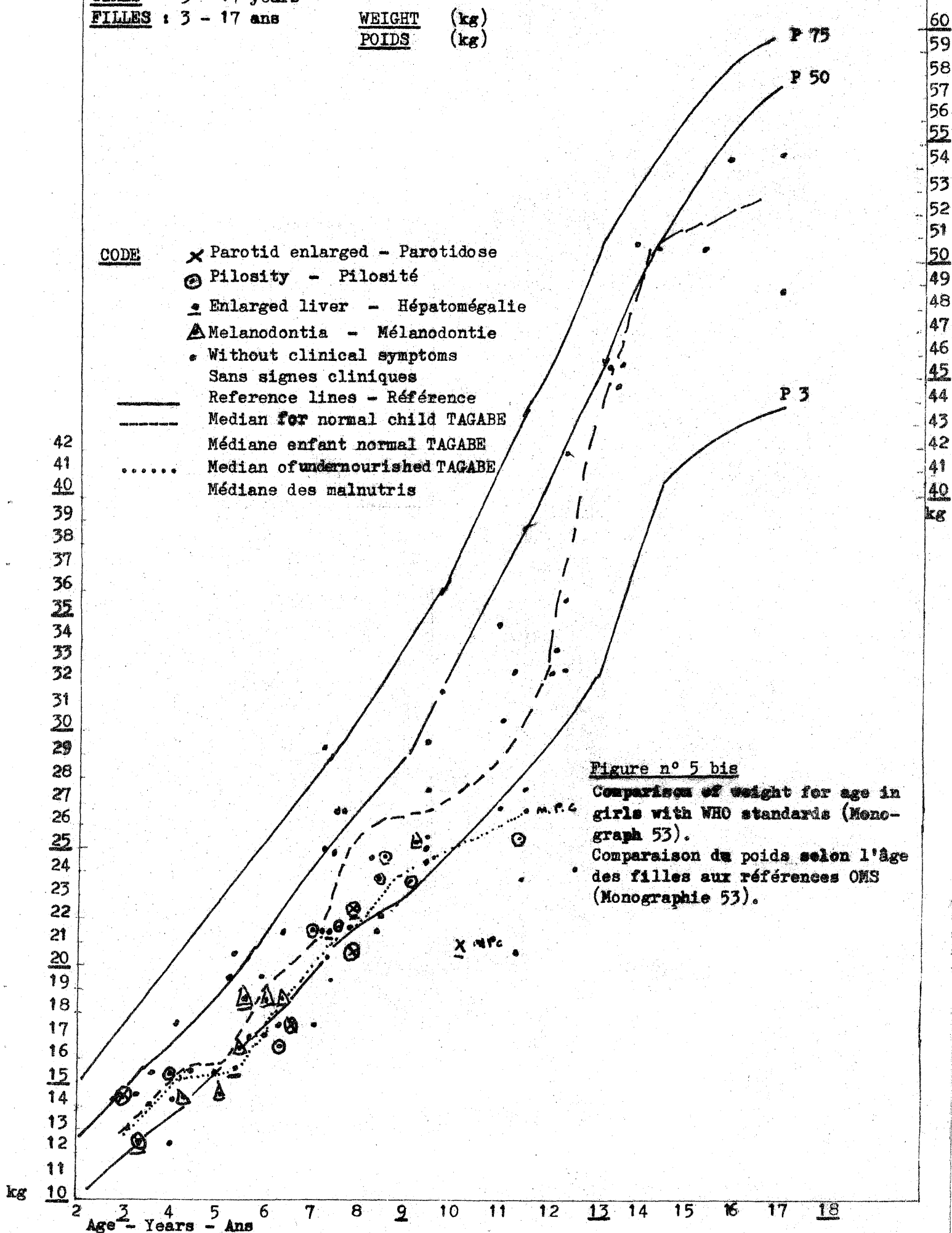


Figure n° 5 bis

Comparison of weight for age in girls with WHO standards (Monograph 53).

Comparaison du poids selon l'âge des filles aux références OMS (Monographie 53).

TAGABE - VILA - NEW HEBRIDES

SPC report on nutritional status, June 1975

Rapport CPS sur l'état nutritionnel, Juin 1975

BOYS 3 - 17 years

GARCONS 3 - 17 ans

HEIGHT (cm)

TAILLE (cm)

CODE :

- ✕ Parotid enlargement - Parotidoses
- ⊙ Pilosity - Pilosité
- Enlarged Liver - Hépatomégalie
- △ Melanodontia - Mélanodontie
- Without clinical symptoms - Sans signes cliniques
- Reference lines - Références
- - - Median for normal children TAGABE
Médiane des enfants normaux à TAGABE
- Median for undernourished children TAGABE
Médiane des malnutris

P50 (USA)

P3

Figure n° 6 - Comparison of height for age with WHO standards (Monograph 53 - 1971).

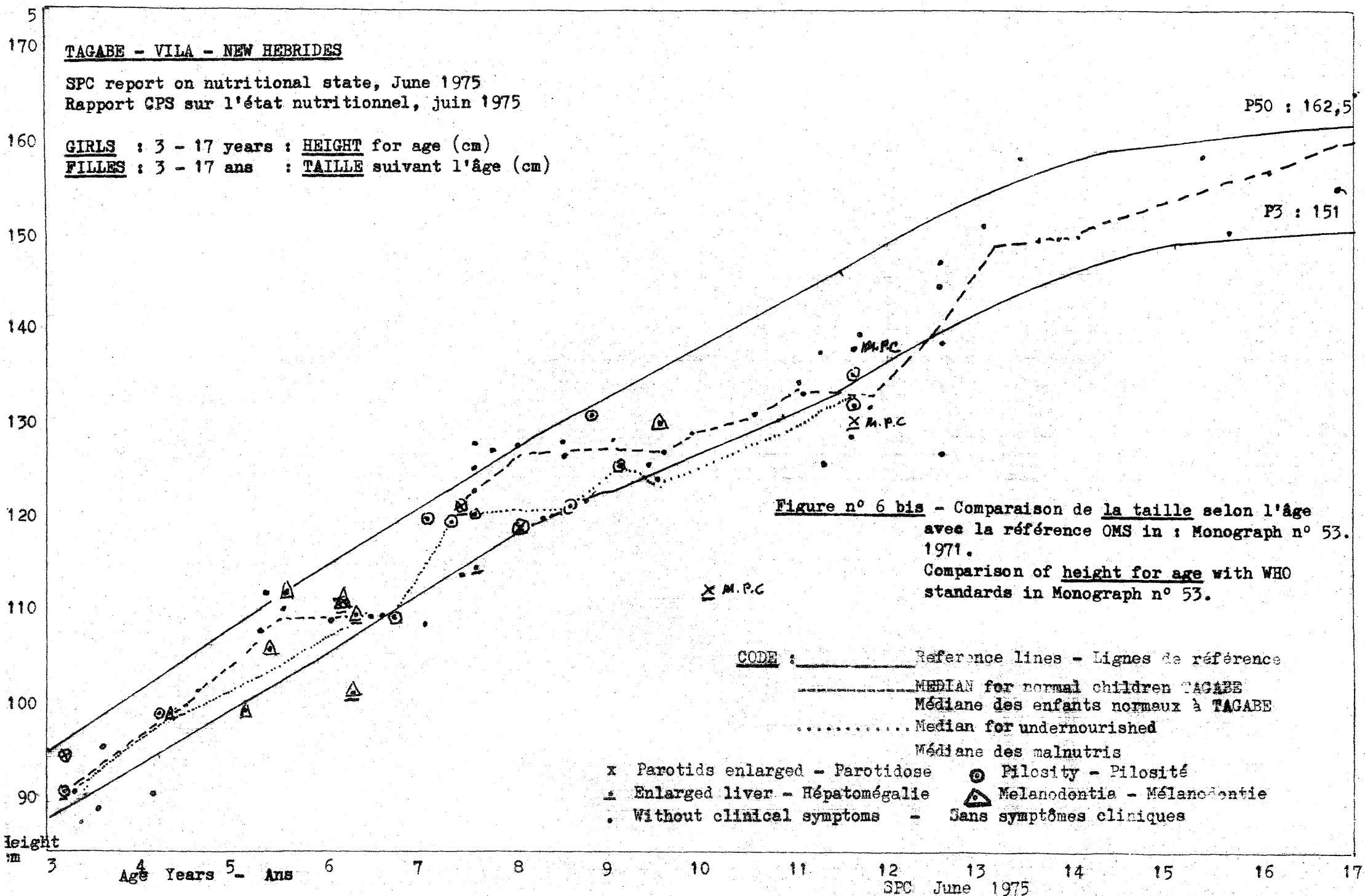
Comparaison de la taille selon l'âge aux références de l'OMS (Monographie 53 - 1971).

SPC June 1975

TAGABE - VILA - NEW HEBRIDES

SPC report on nutritional state, June 1975
Rapport CPS sur l'état nutritionnel, juin 1975

GIRLS : 3 - 17 years : HEIGHT for age (cm)
FILLES : 3 - 17 ans : TAILLE suivant l'âge (cm)



TAGABE - VILA - NEW HEBRIDES

BOYS : 3 - 17 years

GARÇONS : 3 - 17 ans

SPC report on nutritional status, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

HEAD CIRCUMFERENCE (cm)

PERIMETRE DU CRANE (cm)

CODE

x Parotid enlargement - Parotidose

⊙ Piloosity - Pilosité

⊥ Enlarged liver - Hépatomégalie

△ Melanodontia - Mélanodontie

• Without clinical symptoms - sans signes cliniques

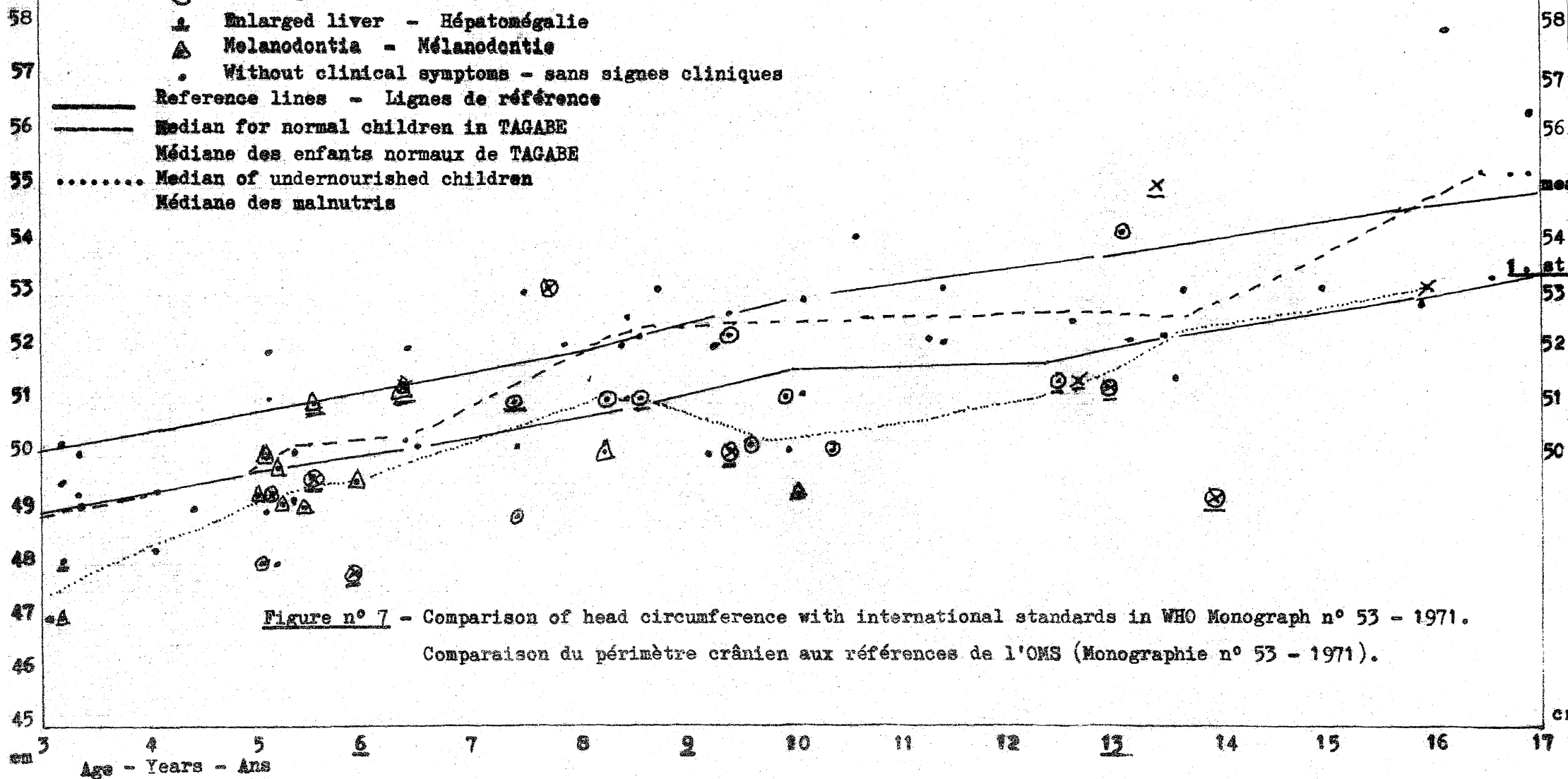
— Reference lines - Lignes de référence

— Median for normal children in TAGABE

Médiane des enfants normaux de TAGABE

..... Median of undernourished children

Médiane des malnutris



TAGABE - VILA - NEW HEBRIDES

GIRLS 3 - 17 years

FILLES 3 - 17 ans

HEAD CIRCUMFERENCE (cm)

PERIMETRE CRANIE (cm)

SPC report on nutritional state, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

CODE :

x Parotids enlarged - Parotidoses

⊙ Pilosity - Pilosité

• Enlarged liver - Hépatomégalie

△ Melanodontia - Mélanodontie

• Without clinical symptoms

Sans signes cliniques

Reference lines

Median for normal children TAGABE

Médiane des enfants normaux

Median for undernourished

Médiane des malnutris

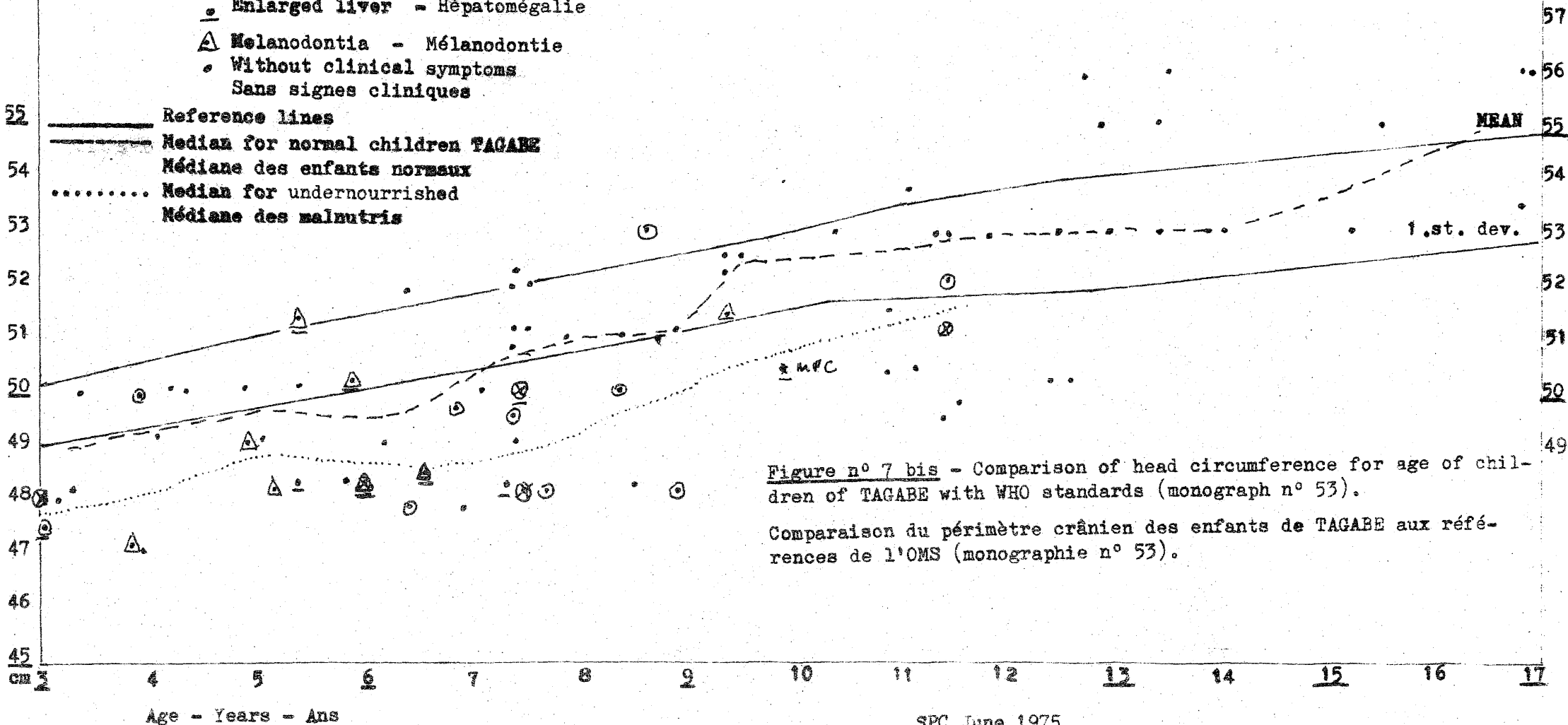


Figure n° 7 bis - Comparison of head circumference for age of children of TAGABE with WHO standards (monograph n° 53).

Comparaison du périmètre crânien des enfants de TAGABE aux références de l'OMS (monographie n° 53).

SPC report on nutritional status, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

BOYS 3-17 years

GARÇONS 3-17 ans

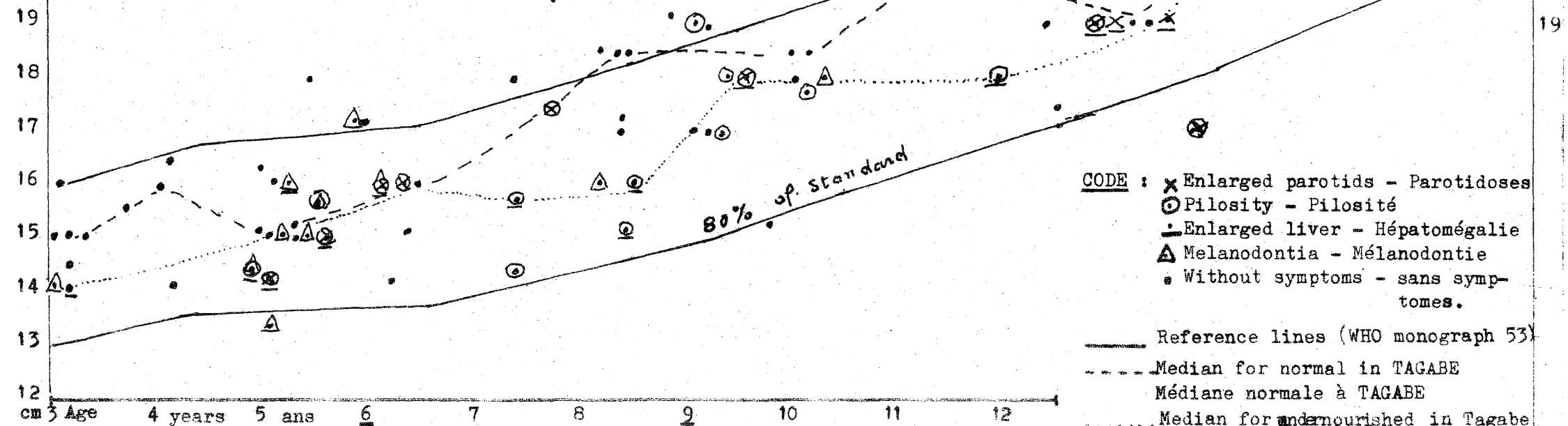


Figure n° 8 - Comparison of left arm circumference of boys in TAGABE with WHO standard adapted from SIRSHIK and HUNT (1941).

Comparaison du périmètre du bras gauche des garçons de TAGABE aux références de l'OMS adaptées de SIRSHIK et HUNT (1941).

TAGABE - VILA - NEW HEBRIDES

SPC report on nutritional status, June 1975
Rapport CPS sur l'état nutritionnel, juin 1975

GIRLS 3-17 years

FILLES 3-17 ans

CODE : X Enlarged parotids - parotidoses

⊙ Pilosity - Pilosité

• Enlarged Liver - Hépatomégalie

△ Melanodontia - Mélanodontie

• Without symptoms - Sans symptômes

— Reference lines - Références

----- Median of normal TAGABE children

Médiane des normaux (Tagabe)

..... Median of undernourished

Médiane des malnutris

ARM CIRCUMFERENCE (left arm)

PERIMETRE DU BRAS (gauche)

P 50

80 %

M.P.C

Figure n° 8 bis - Comparison of arm circumference of girls in TAGABE with WHO standards in Monograph n° 53-1971.

Age - Years - Ans

Figure n° 8 bis - Comparaison du périmètre du bras des filles de TAGABE aux références OMS (Monographie 53 - 1971).

TAGABE - VILA - NEW HEBRIDES

SKINFOLD (tricipital left arm)

PLI CUTANE (tricipital gauche)

SPC report on nutritional state, June 1975

Rapport CPS sur l'état nutritionnel, juin 1975

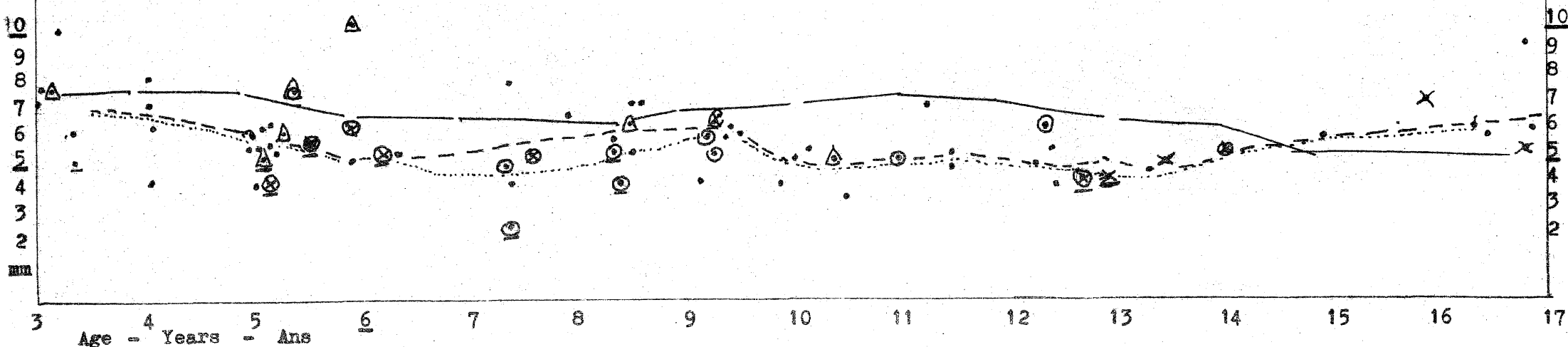
BOYS 3-17 years

GARCONS 3-17 ans

Figure n° 9 - Comparison of skinfold of boys in TAGABE with mean US standard as recommended in WHO Monograph 53-1971.

Comparaison du pli cutané des garçons de TAGABE à la moyenne de référence US, recommandée dans la monographie n° 53(1971) de l'OMS.

- x Enlarged parotids - Parotides
- ⊙ Pilosity - Pilosité
- Enlarged Liver - Hépatomégalie
- △ Melanodontia - Mélanodontie
- Without clinical symptoms
Sans signes cliniques
- Reference mean - Moyenne de référence
- - - Median for normal in Tagabe
Médiane normale à Tagabé
- Median for malnourished
Médiane des malnutris



SPC report on nutritional status, June 1975
Rapport CPS sur l'état nutritionnel, juin 1975

GIRLS : 3 - 17 years
FILLES : 3 - 17 ans

SKINFOLD - left arm - posterior (mm)

Épaisseur du pli cutané tricipital gauche (mm)

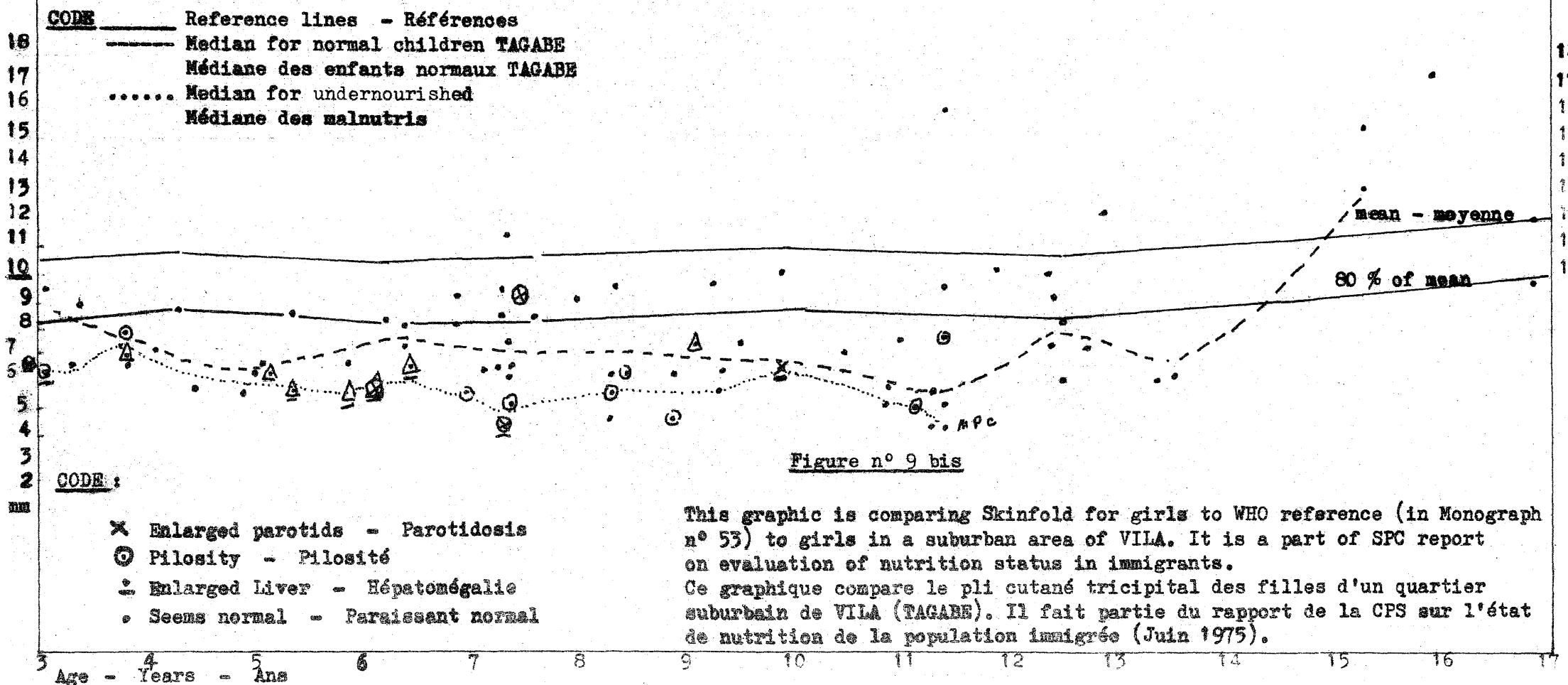


Figure n° 9 bis

This graphic is comparing Skinfold for girls to WHO reference (in Monograph n° 53) to girls in a suburban area of VILA. It is a part of SPC report on evaluation of nutrition status in immigrants.

Ce graphique compare le pli cutané tricipital des filles d'un quartier suburbain de VILA (TAGABE). Il fait partie du rapport de la CPS sur l'état de nutrition de la population immigrée (Juin 1975).

V.2.7. Adults

All individuals above 18 years were considered as adults.

A total of 93 adults (46 F and 37 M) was examined. The age breakdown was as follows:

	Males	Females
18 - 20 years	6	7
20 - 29 years	15	14
30 - 39 years	10	15
40 - 49 years	2	8
50 - 55 years	2	6
55 years	<u>2</u>	<u>6</u>
	<u>37</u>	<u>56</u>

V.2.7.1. Clinical data

- 1) Anaemia: 20 - 40 years : $15/67 = 22.4$ per cent
above 40 : $5/26 = 19.2$ per cent

Comparatively high rates were observed especially in women of child-bearing age.

1 case of acute anaemia with oedema.

- 2) Malnutrition sequels (or present dietary imbalances)

Enlarged parotid glands

M : $3/37 = 8.1$ per cent

F : $2/56 = 3.6$ per cent

Total : $5/93 = 5.4$ per cent

(see Table 1).

- 3) Avitaminosis

- (a) Vitamin A deficiency (see ocular symptoms)

Thickening of the conjunctiva: $10/93 = 10.8$ per cent

- (b) Vitamin C deficiency (see periodontitis)

- (c) Ariboflavinosis

- Naso-labial seborrhea : $4/93 = 4.3$ per cent

- Angular cheilosis : $1/93 = 1.1$ per cent

(d) Glossitis

- Raspberry tongue : $14/93 = 15.1$ per cent
- Central depapillation (B2) : $3/93 = 3.2$ per cent
- Hunter's glossitis : $1/93 = 1.1$ per cent
- Black patches : $4/93 = 4.3$ per cent

Glossitis of the raspberry tongue type was generally associated with moderate riboflavin deficiency. In our experience it is often related to intestinal helminthiasis (especially ascaris).

Chronic lingual capillitis has generally been attributed to riboflavin deficiency and, more recently, to complex B deficiencies (B2, B6, folic acid).

Black patches (large oval spots at the tip and on the edges of the tongue) are caused by a pigmentary infiltration of fungiform hypertrophied papillae. Their aetiology is dubious. They were observed mainly in anaemic women.

(e) Ocular symptoms

No corneal lesions caused by deficiencies.

- Conjunctiva: Thickening of the bulbar conjunctiva: $10/93 = 10.8$ per cent. It was the result of epithelium metaplasia, such as observed in vitamin A deficiencies, but was never associated with xerosis and it seems unlikely that vitamin A deficiency might be the cause.

- Pterygium : $12/93 = 12.9$ per cent

In most cases it appeared early, in young adults:

7 out of 67 $\neq$ 10 per cent

and increased with age:

5 out of 26 above age 40 = 19.2 per cent.

- Pinguecula:

Yellowish lipid deposits appear under the bulbar conjunctiva. It was especially apparent in obese women. In women in the 20 - 40 age bracket, the rate was $4/25 = 16$ per cent. Its symptoms are not severe; pterygium, on the other hand, may be troublesome when it extends over the cornea.

(f) Dental state (M and F adults)

(see part VI - Dr Speake's report)

- DMF I (less than 3 caries) : $17/93 = 18.3$ per cent
- DMF II (between 4 and 10 caries) : $13/93 = 14.0$ per cent
- DMF III (more than 10) : $22/93 = 23.7$ per cent
- Total : $53/93 \neq 56.0$ per cent

Both prevalence and gravity were therefore high. No case of fluorosis was observed.

- Periodontal diseases:

- (1) Swollen gums : 7/93 = 7.5 per cent
- (2) Acute gingivitis : 12/93)
Haemorrhagic gingivitis: 2/93) 14/93 = 15.1 per cent
- (3) Severe pyorrhea : 10/93 = 10.8 per cent
- (4) Gingival atrophy
with loss of teeth : 7/93 = 7.5 per cent
- Total : 38/93 cases of periodontitis = 40.8 per cent.

Except for a few younger women, there is no oral hygiene.

The poor oro-dental condition is a serious public health problem.

(g) Skin hygiene

Extensive pityriasis: 13/93 = 14 per cent.

(h) Miscellaneous

1 case of fibro-modular goitre in a 45-year old woman from Tonga.

V.2.7.b Adults

Body measurements (see graphs 10, 10bis, 11, 11bis, 12, 12bis, 13, 13bis)

The average Tagabe women (median) weighed 58 kg and was 1.55 m tall.

The average man weighed 64 kg and was 1.62 m tall.

1) Weight - height - weight/height ratio
(see graphs No. 10bis F and No. 11 M)

Note: Excess weight in relation to height was calculated by reference to figures quoted by Albert R. Berke in a paper presented to the Symposium Obesity, University of California, San Francisco, USA 1969 (table II).
Published by Nancy L. Wilson and F.A. Davis Co., Philadelphia.

Adults were classified in three groups:

- Group I : Weight/height ratio below the arithmetical mean, these are considered as normal or underweight.
- Group II : Weight/height ratio between the mean and 2 standard deviations.
- Group III : Weight/height ratio above 2 standard deviations.

Those in groups II and III were considered as overweight.

Table I shows the group breakdown as well as the incidence of parotid enlargement and high blood pressure by group.

It can be concluded that 28.5 per cent of women and only 27 per cent of men may be classified in group III, i.e. as truly obese, and that high blood pressure was more frequent as weight increased (graph No. 10 M, No. 10bis F).

Excess weight was related to age (M and F).

<u>Age group</u>	<u>Group I</u>	<u>Group II</u>	<u>Group III</u>	<u>Total</u>
18 - 29	21 - 50%	6 - 14.3%	2 - 4.8%	42
30 - 39	14 - 56%	6 - 24%	5 - 20%	25
40 - 49	6 - 60%	1 - 10%	3 - 30%	10
50 - 55	1 - 12.5%	6 - 75%	1 - 12.5%	8
55	6 - 75%	1 - 12.5%	1 - 12.5%	8

Severe obesity occurred between 40 and 49 years.

Above 55, there was a high percentage of obesity.

2) Skinfold thickness and arm circumference

They increase in relation to weight (graphs Nos. 13 M and 13 bis F).

- In average men (64 kg) they were respectively: 7.5 mm - 27 cm
- In light men (58 kg) : 6 mm - 25 cm
- In heavy men (75 kg) : 9 mm - 29 cm
- In average women (58 kg) : 9 mm - 25 cm
- In light women (50 kg) : 9 mm - 22.5 cm
- In heavy women (80 kg) : 18 mm - 30 cm

3) Head circumference (see graph No. 11)

The average head circumference was 56 cm in men and 54.5 cm in women, but increased in relation to height.

<u>Men</u> 1.52 (small)	:	54.2 cm
1.60	:	55 cm
1.65	:	55.7 cm
1.70	:	57 cm

<u>Women</u>	1.50 (small)	:	53.5 cm
	1.55	:	54.5 cm
	1.60	:	55.5 cm

V.2.7.d Summary and comments

A number of adolescents and adults working in Vila failed to be examined, although they were in no way to blame.

On the whole, the adult population was young: out of a total of 37 M and 56 F, 31 and 36 respectively were less than 40 years old.

Clinically, the main data were as follows:

- In women, frequent anaemia of mixed aetiology (food and parasites).
 - Moderate number of malnutrition sequels (enlarged parotid glands).
 - Comparatively small number of clear cases of avitaminosis (A-B-B2-PP).
 - Frequent mild ocular symptoms (pterygium).
 - Frequent cases of dermatomycosis, which are evidence of inadequate skin hygiene.
 - First and foremost, a very serious dental health problem (caries and periodontitis) partly due to local food habits based on imported products (see chapter VI, Dr Speake's report).
 - Very few cases of high blood pressure (1 obese M).
- High percentage of obese adults, especially women (28 per cent are definitely overweight), although smaller than at Wala-Rano (Malekula) in a natural rural environment.
- No actual obesity was apparent in men, as at Wala-Rano. Most men (58 per cent) were thin, reflecting moderate food intake as observed among youths, who in some cases were unemployed. However, such loss of weight was never excessive.
 - The most vulnerable group is that of pregnant or lactating women who, in most cases, have to work in paid employment at the lowest level. From the medical viewpoint, the MCH should be responsible for this group:
 - Regular distribution of antianaemic products, at least during the last three months of pregnancy.
 - Selective protein complement (milk biscuits).
 - Periodic antiparasite dosing.
 - Family planning, which is justified by living and environmental conditions.
 - Organisation of prevention and treatment of dental caries and periodontitis (see Dr Speake's report).
 - Family education in food budgeting, balanced diet, health hazards related to obesity and excessive consumption of sweets, diet of pregnant and lactating women.

TABLE No. 1

NEW HEBRIDES

OBESITY. ARTERIAL HYPERTENSION. PAROTIDOSIS.

Vila TAGABE

WOMEN			Weight group I						Weight group II								Weight group III							
Total exam.	nb	%	Art. T. 14 18	mild %	Art. T. 18	high %	Parot. %	nb	%	Art. T. 14 nb	mild 18	Art. T. 18 nb	high	Parot.	%	nb	%	Art. T. 14 nb	mild 18	Art. T. 18 nb	high %	Parot.	%	
56	13	23.2	33	23.1	0	0	1	7.7	27	48.2	8	29.6	0	0	1	3.7%	16	28.5	1	6.2	4	25%	0	0

Parotids total 2/56 = 3.6 per cent

Total excess weight : 43/56 = 76.8%

Mild hypertension : 12/56 = 21.4%

High hypertension : 4/56 = 7.4%

MEN																								
37	20	<u>54.1</u>	4	20%	0	0	1	5%	17	45.9%	2	11.7	2	11.7%	2	11.7%	1	2.7%	0	0	1	1/1	0	0

Parotids: 3/37 = 8.1 per cent

Total excess weight : 17/37 = 45.9%

Mild hypertension : 6/37 = 16.2%

High hypertension : 3/37 = 8.1%

TAGABE - VILA - NEW HEBRIDES

MEN (over 18 years)

HOMMES (plus de 18 ans)

SPC report on nutritional state, June 1975

Rapport CPS sur l'état nutritionnel

WEIGHT/HEIGHT ratio (cm - kg) 2 St Deviations

Rapport Poids/Taille

mean weight 64 kg
poids moyen

CLASS I

CLASS II

CLASS III

CODE :

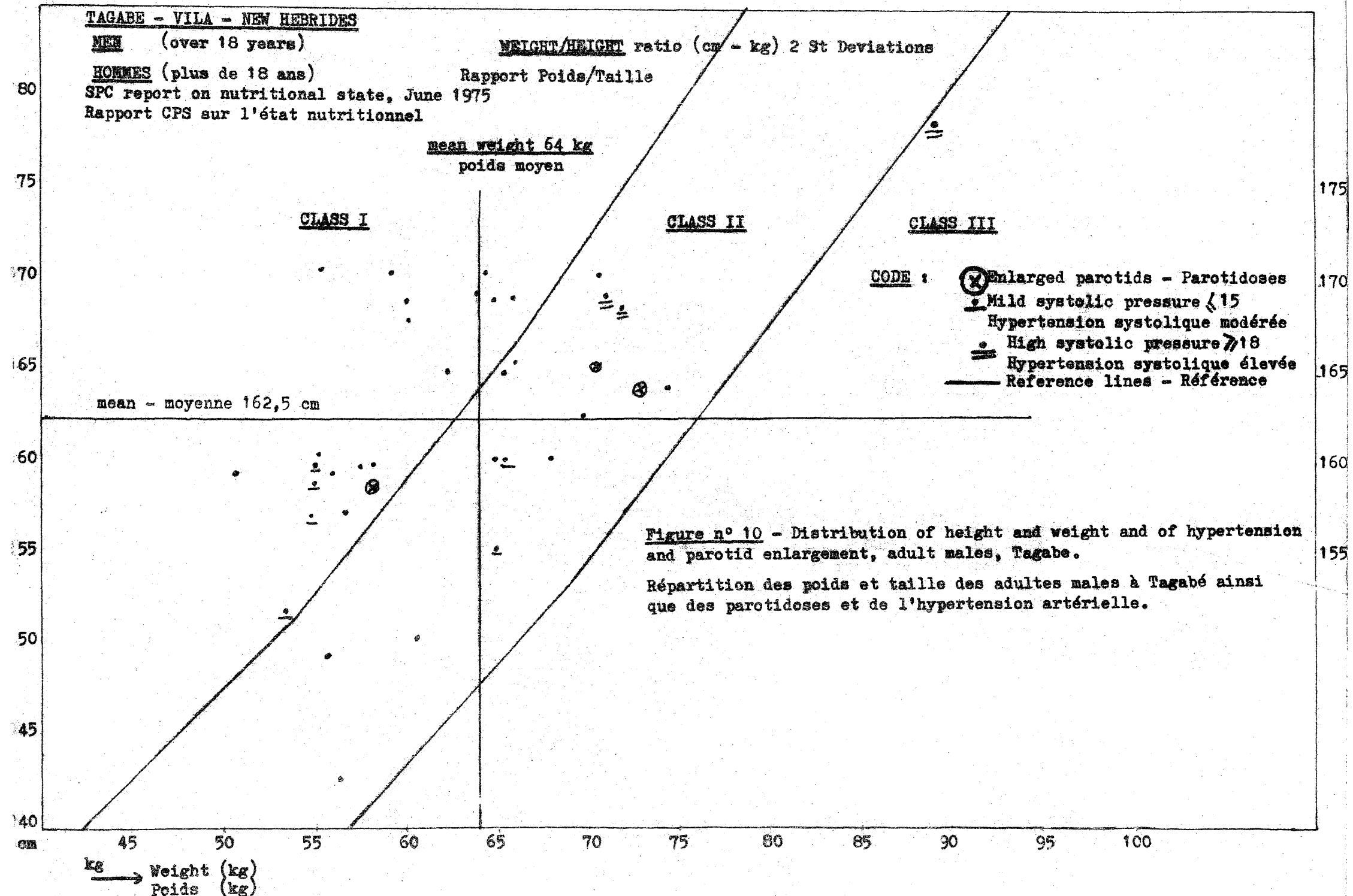
- ⊗ Enlarged parotids - Parotidoses
- Mild systolic pressure <15
Hypertension systolique modérée
- ⊖ High systolic pressure >18
Hypertension systolique élevée
- Reference lines - Référence

mean - moyenne 162,5 cm

Figure n° 10 - Distribution of height and weight and of hypertension and parotid enlargement, adult males, Tagabe.

Répartition des poids et taille des adultes males à Tagabé ainsi que des parotidoses et de l'hypertension artérielle.

kg → Weight (kg)
Poids (kg)

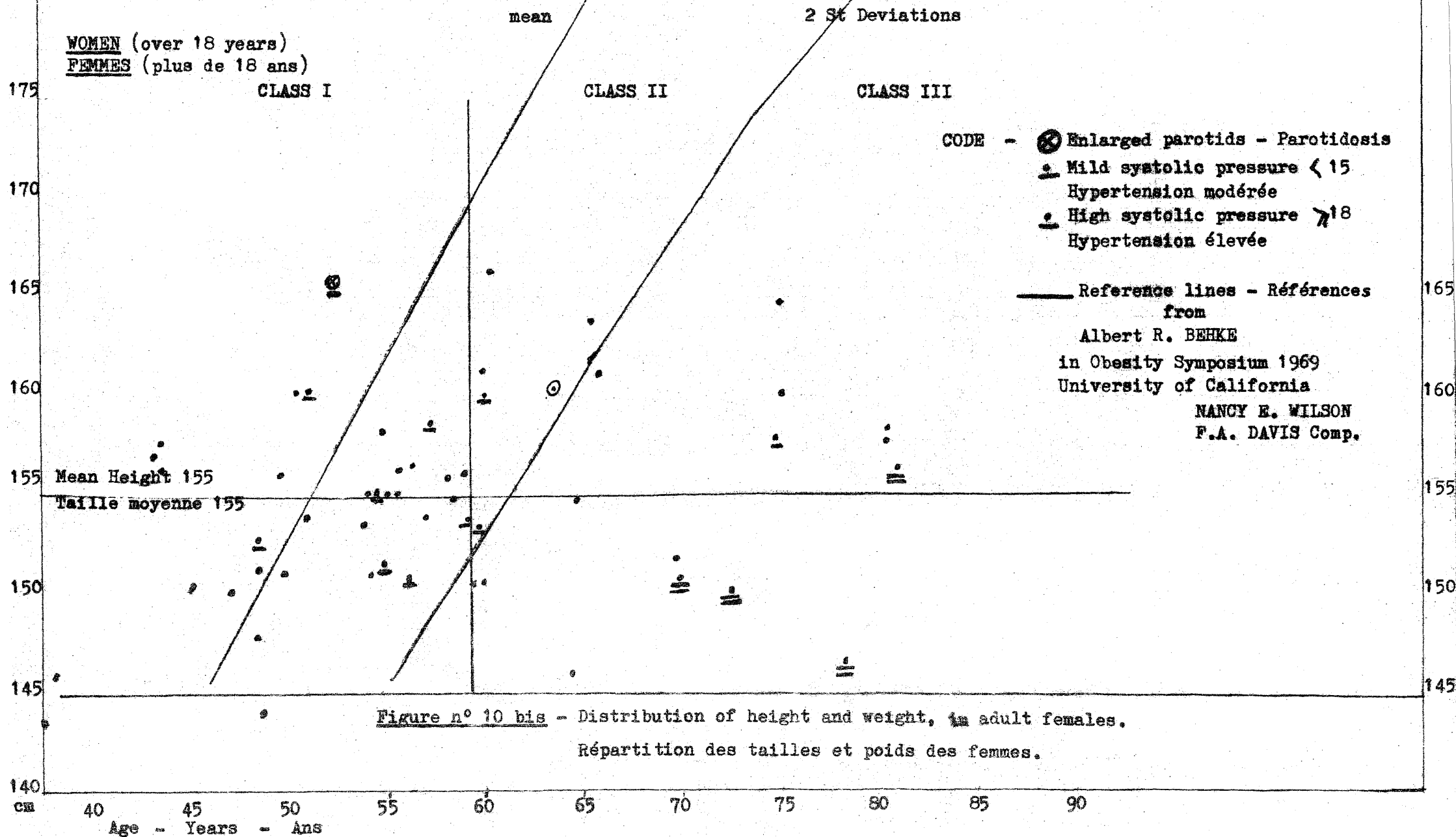


TAGABE - VILA - NEW HEBRIDES

SPC report on nutritional status, June 1975
Rapport CPS sur l'état nutritionnel, juin 1975

WOMEN (over 18 years)
FEMMES (plus de 18 ans)

WEIGHT/HEIGHT ratio (cm-kg)
Rapport Poids/Taille



TAGABE - VILA - NEW HEBRIDES

SPC report on nutritional state, June 1975
Rapport CPS sur l'état nutritionnel, juin 1975

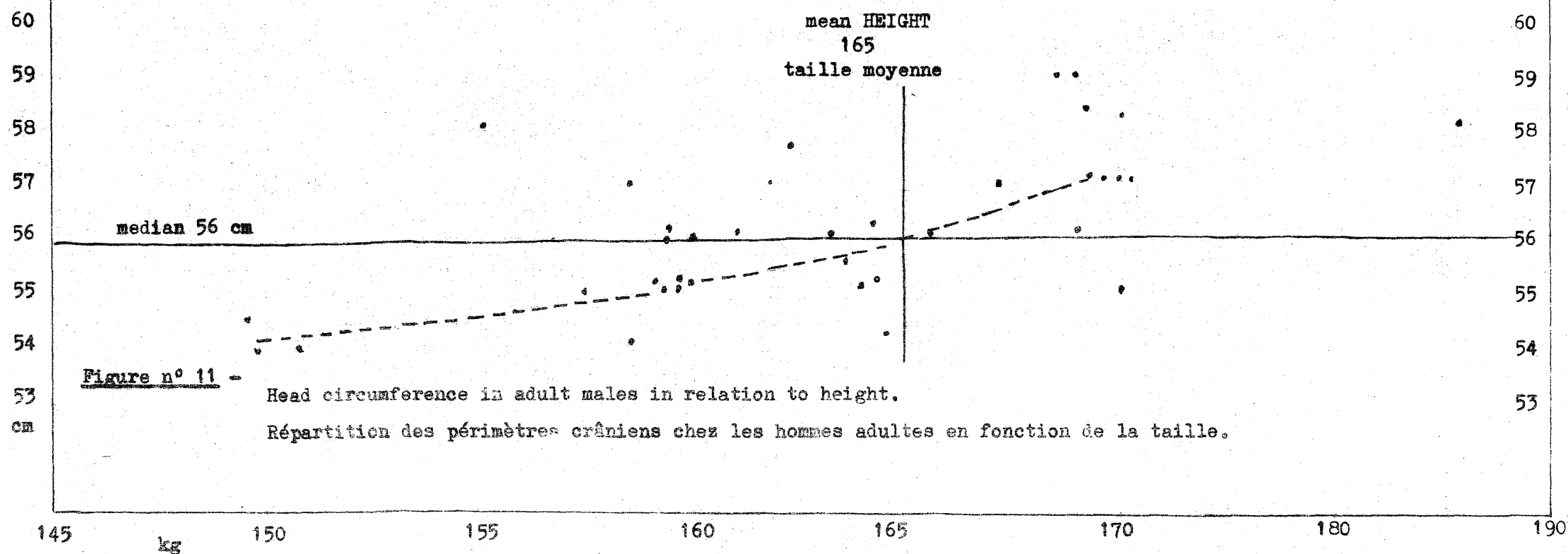
HEAD CIRCUMFERENCE - HEIGHT (cm)

PERIMETRE CRANIE - TAILLE (cm)

MEN - adults (over 18 years)

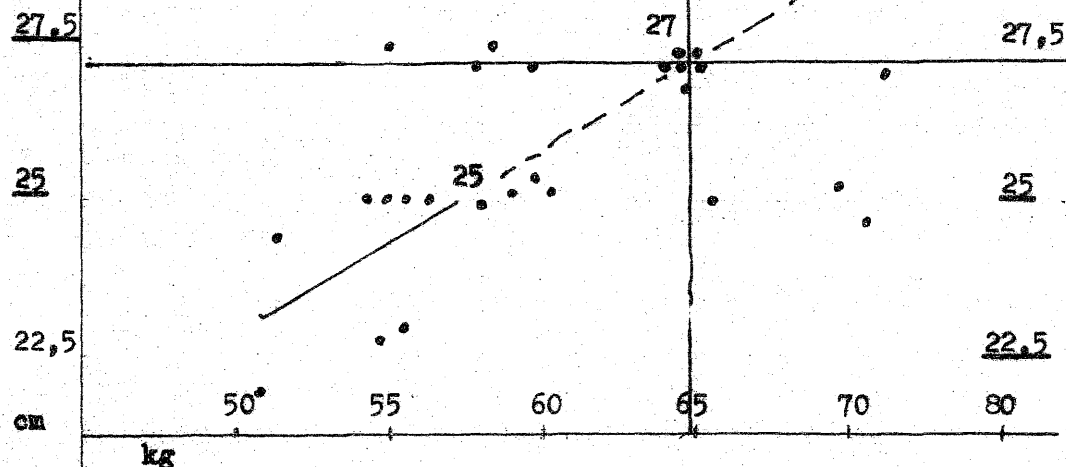
HOMMES - adultes (plus de 18 ans)

CODE :Local median



TAGABE - VILA - NEW HEBRIDES

ADULT MEN (over 18 years)
HOMMES adultes (plus de 18 ans)
ARM CIRCUMFERENCE (cm) Périmètre
 du bras.
Figure n° 12.



Figures n°s 12 et 13

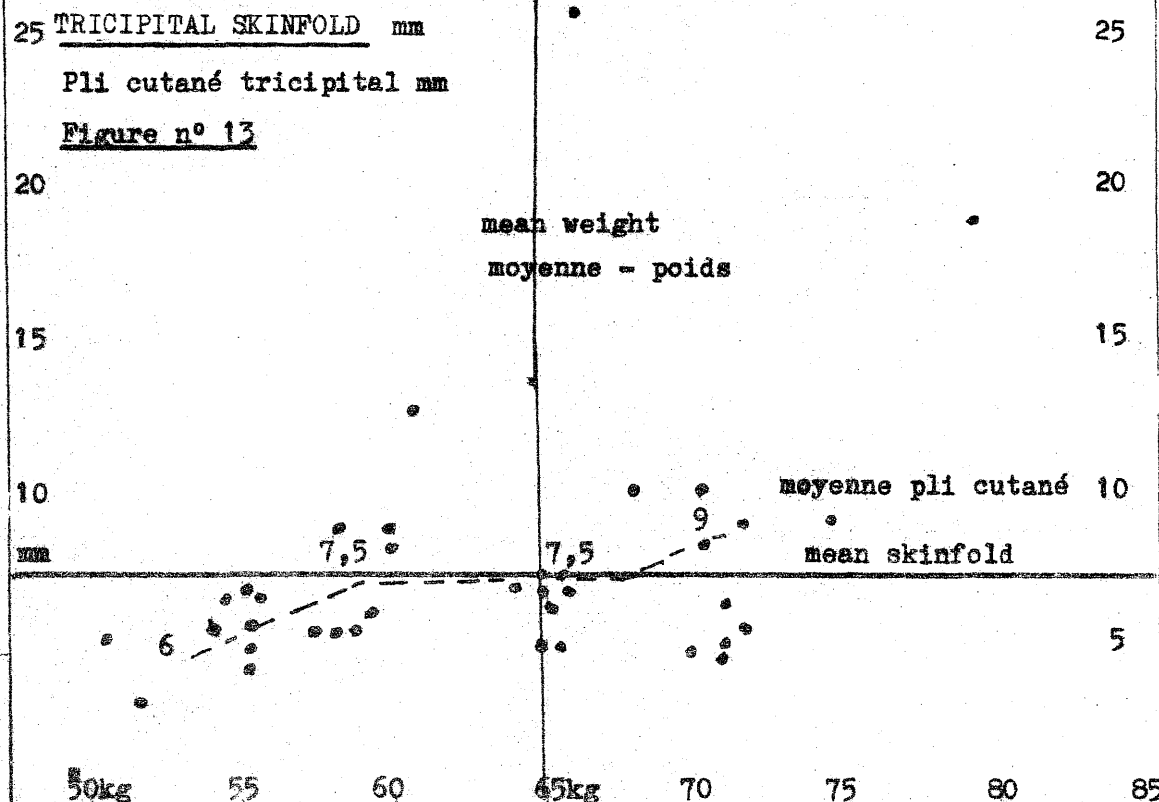
Weight arm circumference and
 skinfold in TAGABE men.

Poids périmètre du bras
 et pli cutané des hommes
 de TAGABE.

SPC report on nutritional state, June 1975
 Rapport CPS sur l'état nutritionnel, juin 1975

Code :----- Median Tagabe.
 Médiane Tagabe.

TRICIPITAL SKINFOLD mm
 Pli cutané tricipital mm
Figure n° 13



WOMEN adults over 18 years - Figure 12 bis.

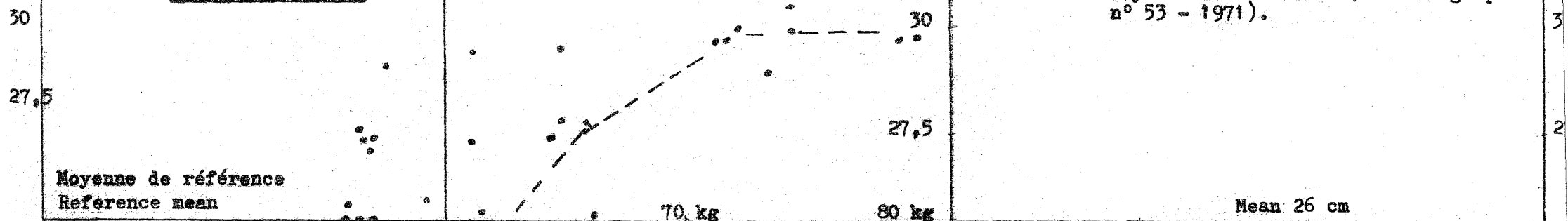
FEMMES adultes de plus de 18 ans

ARM CIRCUMFERENCE

Périmètre du bras

CODE : ——— Local median - Médiane local
 ——— Reference mean (in WHO Monograph n° 53, 1971).

Moyenne de référence (OMS monographie n° 53 - 1971).



SKINFOLD tricipital

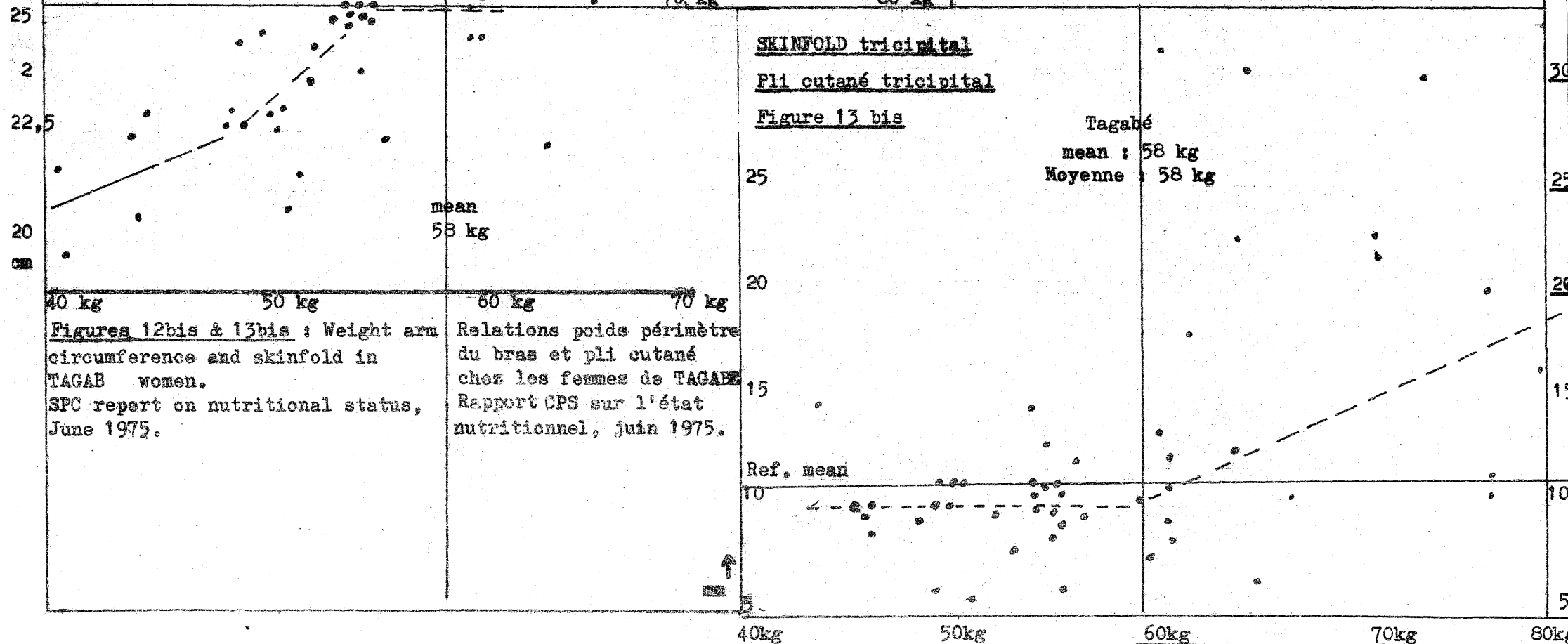
Pli cutané tricipital

Figure 13 bis

Tagabé

mean : 58 kg

Moyenne : 58 kg



Figures 12bis & 13bis : Weight arm circumference and skinfold in TAGAB women.
 SPC report on nutritional status, June 1975.

Relations poids périmètre du bras et pli cutané chez les femmes de TAGAB
 Rapport CPS sur l'état nutritionnel, juin 1975.

PART VITAGABE SURVEY: SUMMARY OF DENTAL RESULTS,
COMMENTS AND RECOMMENDATIONS

by Dr J. D. Speake
Dental Health Officer
South Pacific Commission

I. Dental Caries1.1. Deciduous DentitionTable 1

Average number of df teeth per subject
According to age.

No. examined	Age in Years	Average df teeth
11	3	0.8
13	4	0.9
23	5	4.7
12	6	3.9
17	7	2
5	8	2
17	9	1.5
4	10	1.3

1.2. Permanent DentitionTable 2

Average number of decayed, missing and/or
filled teeth per person.

No. examined	Age in Years	Average DMF teeth
4	5	0
8	6	0.87
16	7	1.2
11	8	2.5
16	9	0.94
7	10	2.3
18	11	2.1
10	12	2.8
10	13	2.1
1 ⁺	14 ⁺	4 ⁺
24	15 - 19	3.5
20	20 - 24	3.7

+ only one subject examined.

No. examined	Age in years	Average DMF teeth
9	25 - 29	3.3
16	30 - 34	4.5
13	35 - 44	5.4
5	45 - 54	8
7	55 - 64	17.4

1.3. Percentage of Population affected by Caries (permanent teeth)

Table 3

Age	Percentage with one or more carious teeth
5	0
6	50
7	50
8	82
9	50
10	58
11	84
12	80
13	70
14	-
15 - 19	79
20 - 24	80
25 - 29	67
30 - 34	82
35 - 44	93
45 - 54	100
55 - 64	86

II. Periodontal Disease

2.1. Percentage of Population suffering from some degree of periodontal disease (including gingivitis).

Table 4

No. examined	Age in years	Average DMF teeth
11	3	0
13	4	11
23	5	25
12	6	44
17	7	40
11	8	30
17	9	26
7	10	75
18	11	35
10	12	0
10	13	0
1	14	0
24	15 - 19	33
20	20 - 24	55
9	25 - 29	60
16	30 - 34	68
13	35 - 44	75
5	45 - 54	66
7	55 - 64	66

III. Melanodontia

Table 5

Percentage of children with one or more deciduous teeth affected by Melanodontia.

No. examined	Age in years	% Affected
11	3	23
13	4	33
23	5	25
12	6	22
17	7	15

IV. Discussion

A national dental health survey of school-age children was undertaken by Hollis⁽¹⁾ in 1970 which included sample groups from Vila, Baofatu, Santo (Town), South Santo, Aoba and Ambrym. A lack of published data, however, precludes the possibility of making "statistically significant" comparisons. In any case, the relatively small sample numbers for the various age groups in Tagabe make such an exercise of dubious value. The following comparisons and comments are therefore of a general nature.

4.1. Dental Caries in Deciduous Teeth

With the exception of the 9-10 year old group, the children examined in Tagabe appear to have marginally lower deciduous caries rates than those in Vila as a whole.

4.2. Dental Caries in Permanent Teeth

Although the average DMF rates by age group recorded for Tagabe children do not show a superficially consistent relationship either to each other or to the rates recorded⁽¹⁾ for Vila as a whole, it seems probable that they are comparable with the latter. No previous data is available for age groups in excess of 19 years. Amongst persons over 35 years of age, periodontal disease is responsible for some degree of tooth loss, so the figures recorded in table 2 are not a valid measure of caries alone.

4.3. Percentage of Persons with one or more carious Teeth (Permanent Dentition)

The lack of consistent relationship between the rates of one age group to another in Tagabe makes it difficult to assess the import of the figures. In general it seems likely that a slightly higher percentage of children in Tagabe are affected by caries than in Vila as a whole.

V. Periodontal Disease

It is generally accepted that poor oral hygiene and/or calculus formation are the two principal factors involved in the development of periodontal disease. Unfortunately neither of these parameters was included in the survey form for proper assessment. It was noted, however, that oral hygiene amongst the school-age children in particular was extremely bad. It is not possible to draw any direct comparisons with previous data since different criteria and indices were used. A very crude comparison with Hollis' figures indicates that early periodontal disease in the form of gingivitis is higher in Tagabe children than in those of Vila as a whole. This is consistent with the very poor oral hygiene noted above. The figures collected in the Tagabe survey appear to indicate an increase in gingivitis during the period of the mixed dentition (approx. 6-12 years).

(1) Hollis M. J. - Report of a visit to New Hebrides (1970), SPC. Noumea.

VI. Melanodontia

Table 4 shows that between a quarter and a third of the children examined suffered from Melanodontia in the deciduous dentition. This finding cannot be considered abnormal amongst Pacific Islanders. The significance of this condition is that it predisposes to rampant caries when refined carbohydrate is included as part of the regular diet. Since the aetiology of the condition is thought to include both dietary deficiency and enteric fevers, it is probable that a general improvement in the nutritional status and environmental conditions would lead to a reduction in the incidence of the condition.

VII. General Conclusions

Within the statistical limitations of the survey it would appear that:

1. Dental decay rates are consistent with an urbanised Pacific community which are of course considerably higher than that of populations living in the traditional manner.
2. Oral hygiene amongst school children is particularly poor and it is in this area that an organised programme would be most effective.
3. An improvement in general nutritional status and environmental conditions could result in an improvement in oral health status in the younger age group.

VIII. Recommendations for a Public Health Programme

1. Prevention: Tooth brushing in schools with fluoride tooth paste.
2. Regular examination and treatment of caries in the schools.
3. Increase in personnel:
 - (a) The training of 4 dental officers at the Fiji School of Medicine or the Port Moresby Dental College.
 - (b) The training of 12 dental therapists (2-year course) at the Port Moresby Dental College or 3 years at the Fiji School of Medicine.
In view of the training time involved Papua New Guinea would seem to be preferable at the moment.
 - (c) Local training of dental assistance for:
 - (i) dental health education
 - (ii) supervision of school tooth brushing programmes
 - (iii) chairside assisting.
4. Whilst some fixed dental clinics are desirable it is important not to lose sight of the need for mobile facilities and equipment.

IX. Recommendations for Future SPC Assistance

1. That subject to the approval of the New Hebrides authorities, the Dental Public Health Officer assist the Dental Staff of the Health Departments to implement a tooth brushing programme in Primary and Secondary schools.
2. That such a programme be supported by a health education project aimed at:
 - (a) School Teachers
 - (b) Public Health Nurses
 - (c) Parents.

PART VII

GENERAL COMMENTS: SUMMARY AND CONCLUSIONS

The credit and the responsibility for the observations and recommendations in this report go to the specialists concerned, individually. Clearly, however, it is the duty of the Head of the Project on Nutrition to summarize:

1. Because the combined influence of environmental, sanitary, economic, cultural and educational factors is reflected in the state of nutrition of the most exposed groups.
2. On the basis of clinical data and measurements compared to those of rural communities living under natural conditions, the following conclusions concerning the state of health of these groups may be drawn:
 - (a) The main danger, both present and potential, stems from the nutritional crisis in early childhood. 50% of the one- to five-year age group in Tagabe suffer from undernutrition, mild or latent protein malnutrition and anaemia.
 - (b) The latter affections or their sequels, continue through to school age and adolescence.
 - (c) Pregnant and lactating women are often anaemic.
 - (d) Dental health is generally deplorable.
3. This state of affairs may be ascribed to:
 - (a) Extremely bad sanitary and living conditions, overcrowding, water and ground pollution, and a wide variety of vectors of disease.
 - (b) A low economic level with the resultant emergence of an urban sub-proletariat.
 - (c) Inadaptation of cultural concepts to urban living, and the pre-requisites for a balanced diet.
 - (d) A change in dietary habits; the transition to a market economy has brought with it the switch to imported foodstuffs.
 - (e) The great difficulty - resulting from uneven distribution of arable land - in developing even partial self-sufficiency in food production.

PART VIII

RECOMMENDATIONS

1. Urban Development - Public Works - Sanitation - Welfare

- Provide accommodation, a road network and drinking water mains, up to basic sanitational standards, and corresponding to true urban development.

Immediate measures:

- Have accumulated rubbish removed by truck and bulldozer.
- Demolish all insanitary and overcrowded dwellings.
- Provide facilities and low-cost housing for those to be settled, as well as for future immigrants.
- Protect immigrants against exorbitant rents.
- Make drinking water and electricity available at a price which even the poorest can afford.
- Bring the excreta problem under control by the construction of latrines (SPC model for example).
- Continue the mosquito control programme.

Long-term measures:

Organise housing facilities in a more suitably located development site, further from the river.

2. Public Health Programmes

- Integrate preventive health activities and those of the Health Centres.
- Actively involve trainee nurses, as early as possible, in field preventive and educational activities.
- Expand MCH activities:
 - . Intensify nutritional screening, surveillance and recovery of children in the 0 to 5-year age group, and in particular in the 1 to 3-year group.
 - . Organise surveillance of the state of nutrition of mothers.
 - . Carry out periodic nutritional surveys.
 - . Develop family planning.
- Intensify Health Education measures as recommended in Part II (Miss Bushra Jabre).

3. Education

- Develop a health and nutritional education programme, geared to local problems. The course should be given at the primary school level first of all, and subsequently at the secondary schools.

4. Agriculture

- Develop small-scale stock raising, orcharding and family vegetable gardening, with the help of the Agricultural Department, and with technical assistance from the Tagabe School of Agriculture.
 - If possible, enlarge the areas intended for gardening.
 - In priority development areas, provide areas for family gardening, and organise small-scale stock raising.
 - Provide for the installation of waste digesters.
5. Set-up a municipal health and sanitation committee for the co-ordination of the programmes and activities mentioned above. The Committee should comprise community representatives, and representatives of the departments and organisations mentioned above.
-