

# Dietary Patterns in Urbanised Blacks\*

## A STUDY IN GUGULETU, CAPE TOWN, 1971

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### SUMMARY

A survey of dietary patterns was made in Guguletu, an urban Black township near Cape Town. The subjects comprised Black children and adults eating adult-type food. They were divided into 5 groups—3 groups of families according to income (well-to-do, medium and poor), one group of bachelors and one group recently removed from the coastal district of Simonstown. Dietary patterns were studied quantitatively and qualitatively. A computerised food table was compiled for obtaining data on the intake of 28 nutrients by families and individuals, per week and per day. Qualitative data were provided by respondents interviewed in their homes and bachelor quarters. Interviews included questions on taboos, cooking methods and meal patterns, as well as daily food intake and weekly purchasing.

Transition from rural to urban living brings about a taste for sophisticated 'town foods' but the basic anthropological predilection for carbohydrate remains unchanged, and meat was found to be the most valued food. Fat consumption increases in an urban community. Total food consumption was inversely related to family size, the highest calorie intake being noted among the bachelors. Riboflavin intake fell short of the National Research Council's recommended daily allowances as did niacin, tryptophan and calcium. The dietary pattern developing in an urban Black township clearly needs modification to ensure adequate nutrient intake and to prevent destruction of nutrients by faulty cooking methods.

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This study was carried out to obtain a representative and complete picture of the food spectrum in an urban Black township. A survey was made of meal patterns and the food voluntarily chosen and eaten in the township of Guguletu which is 10 miles from the centre of Cape Town.

Information is available concerning the dietary pattern of rural (tribalised) Blacks,<sup>1,2</sup> and surveys have been made of specific segments of the urbanised Black population

(e.g. Black schoolchildren in Pretoria,<sup>3</sup> and Venda urban male workers).<sup>4</sup> There is no detailed report of how overall patterns change when Blacks come to live in the urban townships and undergo the process of gradual sophistication including changes in fundamental food attitudes, habits, preferences and cooking methods.

The study was carried out in the belief and hope that it might be of assistance in preventive medicine when food supplementation and dietary health education presuppose an understanding of home food habits. In therapeutic dietetics, a knowledge of basic dietary patterns at home is essential, especially for the dietary management of diabetes, obesity, undernutrition, renal disease and other metabolic conditions. A knowledge of the nutritional background may also assist in providing additional evidence of nutritional aetiological factors in diseases as a result of transition from a rural to an urban environment.

### DIETARY SURVEYS CARRIED OUT IN SOUTH AFRICA

Many dietary surveys have been undertaken since Smith first studied the diets of unemployed cotton workers in England in 1863.<sup>5</sup> Only those surveys conducted in South Africa will be briefly considered here.

One of the earliest pioneering dietary surveys in South Africa was carried out in 1952 in the Reserves of the Ciskei and Transkei in the Eastern Cape, Zululand, Northern Natal and in the Letaba district of the Northern Transvaal.<sup>1</sup> This survey has almost become an historical document and is the only complete record of dietary patterns in rural communities 20 years ago. The subjects of the survey were a rural population consisting mainly of women and children; most of the young males being away from home as migratory workers outside the Reserves. Maize was the staple food in all these areas, and one of the most striking findings was the very low intake of animal protein. An interesting protein source was utilised in the Northern Transvaal, where termites, worms and red ants were consumed in large quantities.

In 1958 Smith investigated the nutritional habits of Zulus in the Valley of a Thousand Hills in order to advise on nutrition education in that area, where undernutrition was rife.<sup>2</sup> Maize, dried beans, wild edible leaves, tubers, *amasi* (naturally soured milk) and occasionally meat, were found to be the tribal Zulu's principal foods. Eggs and fish were taboo for many. Frequent crop failures were felt to be the chief cause of undernutrition and this drove the tribal Zulus to a more urban existence with the inevitable introduction of new foods and the adoption of White eating habits. Particularly striking were the introduction of re-

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\*The term 'Blacks' refers to Africans of Nguni descent.

finer foods and the increased consumption of saturated fat.

Keyter<sup>6,7</sup> undertook a food consumption survey among 600 unskilled Black workers in Pretoria. Information concerning feeding customs and food habits were utilised to assist employers and organisations wishing to implement feeding schemes. The workers' diets were measured against a balanced diet consisting of meat, fish or eggs daily, fresh milk or *amasi* daily, vegetables daily, bread or maize meal daily and fruit twice a week. It was found that deficiencies lay chiefly in the intake of vegetables, milk and fruit.

Lubbe<sup>8</sup> made a survey of the nutritional status of White schoolchildren in Pretoria. The nutrients which were most frequently deficient in their diets were calcium, iron, vitamin A and niacin. The intake of other nutrients was adequate.

Leary<sup>8</sup> conducted a dietary survey on rural Pedi children, in conjunction with an anthropometrical and clinical survey of 301 schoolchildren. It was believed that the changing pattern of Black life may also change the diet of rural families. The children's diet was found to be exceedingly monotonous and seriously deficient in protein. Calories were also deficient, as were the B group vitamins. Pedi pastoral tradition precludes the slaughtering of sheep and cattle, and eggs are seldom eaten as they are taboo. Milk was scarce due to poor grazing and the tendency to reserve all milk for the calves.

Lubbe<sup>8</sup> made a detailed evaluation of rural and urban Venda males as part of a wider study involving an anthropometrical, clinical, socio-economic and haematological evaluation. Quantitative dietary surveys were carried out on 266 rural and 241 urban males. Qualitative information was also collected to acquire a general picture of the daily food consumption of the subjects for the season studied. The mean daily nutrient intake of each individual was calculated and the intakes compared with the National Research Council's Recommended Daily Allowances.<sup>9</sup>

Great differences were found between the urban and rural mode of living, which obviously affected habitual dietary patterns. Rural Venda, for instance, had the traditional 2 meals a day, one at noon and the other after sunset, while the urban Venda had become accustomed to 3 meals a day with snacks in between.

Maize-meal porridge, made from home-pounded maize, was the rural staple food and only 2% of the subjects had bread. In the towns, 81% ate bread and the maize used was the highly-refined, specially sifted, granulated variety. The most marked difference, however, between rural and urban diets lay in the high meat consumption by urban subjects of whom 98% ate meat at least once, and frequently 2 or 3 times a day. More vegetables were eaten by the rural Venda but fruit consumption was negligible—only 2% in both groups. More calories were consumed in the urban groups. Total protein consumption was similar in both groups, but whereas animal protein predominated in the urban group, the protein of the rural group was largely derived from vegetable sources. Biochemical data and muscular development indicated that the protein nutritional status of the urban group was superior to that of

the rural Venda, the serum albumin levels being higher in urban subjects.

Much more animal fat was eaten by the urban group (106 g) than by the rural group (18 g). There were startling differences in sugar consumption, the rural diet containing only 0.4 g daily in contrast to 62.0 g in urban subjects. Although niacin intakes were classed as satisfactory, the availability of the niacin could not be assessed, and it was noted that as cereals were the predominant source of niacin in the rural group, the amount utilised may have been considerably less than that consumed. Also, additional niacin, made available through conversion from tryptophan, was not measured, but as the rural subjects had so little meat, niacin from this source must have been negligible. Vitamin C was derived almost entirely from vegetables and here the rural group attained a much larger intake than the urban group. Although fruit was easily obtainable, Venda men considered fruit a food for women and children only.

Lubbe, in his comprehensive survey, showed that the nutritional status of the urban Venda, consuming a semi-Western diet, was superior to that of the rural group. This was in contrast to the findings of Smith<sup>2</sup> in her investigations of the Zulus in the Valley of a Thousand Hills. The most notable shortcomings in the diet of the rural Venda were lack of animal protein, imbalance between preformed vitamin A and carotene, possible unavailability of niacin and low vitamin C intakes. In urban Venda, the intakes of calcium, carotene and vitamin C were low.

A survey was carried out by Walker *et al.*<sup>10</sup> to determine sugar intakes among various population groups in South Africa. Whites, Coloureds, Asiatics and Blacks were included and a questionnaire was used for rural and urban samples with different socio-economic circumstances.

The sucrose intake of Whites was found to be similar to that in the UK, which is between 80 and 100 g/day in the higher socio-economic group and between 120 and 140 g for those in lower income groups. Indians consumed between 70 g and 90 g of sucrose per day. The rural Black sucrose intakes varied between 65 g and 75 g/day and those in urban areas consumed between 55 and 85 g/day. Males ate more sucrose than females and the intake fell with increasing family size. In Black populations the higher consumption of sucrose in tea and soft drinks was offset by low amounts derived from cakes and puddings.

### Dietary Survey Methodology

Local conditions are probably the most important factor when selecting a dietary survey method. Suitable times and places should be chosen for the interview. If questionnaires are used, they should be intelligible to those filling them in, and field workers should have an understanding of racial characteristics, such as religion, taboos, holidays and feast days. Field workers of the race being surveyed are usually able to elicit more accurate information than is imparted to foreigners or outsiders. Clearly, choice of method will also be influenced by the funds and number of trained personnel available, and also by the accuracy of

the data required. Seasons of the year play an important role in the choice of methodology since a complete dietary survey must take into account crop, temperature and rainfall variations which affect the supply of foods available. Potgieter and Fellingham<sup>11</sup> compared 24-hour and 7-day weighing methods and concluded that the 24-hour record is as satisfactory as the 7-day method. Marr<sup>12</sup> expresses a contrary view, noting an entirely different dietary pattern at week-ends. Burke's diet history method is probably the most commonly used method for estimating dietary intake in free-living population samples.<sup>14</sup> There have been many modifications of Burke's diet history method.<sup>15,16,21</sup> Of great interest is that devised by Lubbe who combined the precise weighing method and a modified diet history (which was in turn a modification of Burke's method). This method was employed with considerable success in two of her surveys.<sup>3,4</sup>

There is a great need for a satisfactory dietary survey method for epidemiological investigations. Wiehl and Reed<sup>13</sup> have suggested a series of carefully planned questions which would show differences in dietary patterns rather than quantitative estimates. This method has yet to be tested in epidemiological work. Marr has recommended an ingenious method based on obtaining information through the post and using frequency rather than measured or weighed intake,<sup>22</sup> but this method also requires to be tested for reproducibility.

## SUBJECTS AND METHODS

Field work for the survey took place between January and December 1971. Permission and a permit to visit the houses and bachelor quarters were obtained from the administrative offices in charge of the 3 sections into which Guguletu is divided.

The subjects of the survey were 80 Black families living in 2-, 3- and 4-roomed houses, or in 2 adjoining 3-roomed houses. They were interviewed in their homes. Twenty bachelors were interviewed in their living quarters. In the case of one group, the geographical area (Simonstown) from which they came was the essential criterion. The general dietary pattern and quantitative data were obtained from 5 groups in all.

**Group A** consisted of comparatively well-off families with an earning capacity of R12 - R18 per head of family per week (in 1971). These families included university lecturers, shopkeepers, taxi drivers, undertakers, teachers, nurses and construction foremen.

**Group B** comprised families of medium income earning between R10 - R15 per head of family per week. They tended to be families where the father worked as a construction worker, garage attendant, road worker, hospital porter, lorry driver, caretaker, or in a shop, factory or warehouse, the mother generally either stayed at home or worked several days a week as a charwoman.

**Group C** consisted of poor families with an average income of R5 - R12 per head of family per week and less in some cases. These were the old-age pensioners, families in which the bread winner was an alcoholic or out of work because of illness, or lived away from home (*rondlopers*),

or had an exceptionally large family on a very low income, for instance a 'tea boy's wage'.

**Group D** comprised 20 families who had been moved to Guguletu from Simonstown, where many had been employed as fishermen. They formed a separate group because it was felt that their diet might differ (particularly in fish consumption) from that of inland households. These families were divided as closely as possible into the 3 income groups.

**Group E** consisted of 20 men living in bachelor quarters where 2, 3 or 4 occupied a room. They earned R8 - R12 a week. These men were working as dairymen, night watchmen, railway cleaners, and many worked in bakeries where they alternated day and night shifts. Sometimes a bed was occupied in the daytime by a man who was working on night shift, and at night by another working a day shift. In this group all the men, buying, cooking and consuming meals together, constituted a unit, which could be one man doing his own catering or 2, 3 or 4 room-mates or 'home-boys', or even a block of 16 who shared a common commissariat. Families were selected according to the type of housing, which varied according to rents paid, in which they lived.

## Dietary Methods used in Guguletu Survey

**The food table:** A computerised food table utilising South African food values wherever possible was compiled to assess nutrient intake. Various authorities were consulted<sup>23-26</sup> and supplementary nutrient data were obtained from journals and special tables for specific nutrients.<sup>27-30</sup>

**Collection of dietary data:** The dietary method was a modification of Burke's diet history. A dietitian (E.B.M.) and Black social worker (E.S.) interviewed the respondents at home. Seasonal variations in diet were allowed because the survey lasted all year and families in the 5 groups were seen throughout the year.

It was feared that the 1971 change-over to the metric system would confuse the collection of dietary data but the reverse, in fact, proved true. The respondents were eager to discuss the new weights and measures as they found them difficult to comprehend and often felt cheated by traders. For this reason they were enthusiastic about producing packets from under a bed or locked tin box to compare weights and measures and learn about the new system.

Quantitative as well as qualitative data were acquired at interviews lasting 1 - 1½ hours. If the interview lasted longer the informant tended to become fatigued and bored. No written questionnaire was used, as many of the informants were unable to write.

The interview commenced with a preliminary meeting and greeting between the Black social worker-interpreter and the informant to explain the purpose of the visit and to find out if he or she was agreeable to the interview. This was never refused and the courtesy and co-operation received contributed to the ease with which the interviews were carried out.

A record was then taken of all members of the household eating an adult type of food and of their ages, occupations, food eaten away from home and frequency of

visitors. There followed questions on the distribution and times of food eaten during the day and on what the meals consisted of, with special reference to weekends. One of the earliest informants remarked that 'weekends are feast days' and this was corroborated throughout the survey, even by the poorest families. These questions were followed by those about a grocery list. This included all food in daily use and weekly consumption of these foods. It served as a cross check on the foods reported earlier when meal patterns were being discussed.

Storage facilities, cooking utensils and methods of cooking were noted. The informant was asked last about his or her favourite food. This never failed to cause surprise, astonishment or mirth. Salt consumption was difficult to assess.

Shops were also visited—these included a supermarket close to the township train station, and a butcher's shop and trading stores within the township. Items most popularly purchased were a sound indication of food preferences.

Lower primary, primary, higher primary and a secondary school were visited as the tuckshop makes a considerable contribution to a child's daily food intake, and many parents are held to ransom by their children for comparatively large sums of pocket money (20 cents per child per day is not unusual) which are spent on food. A school-feeding scheme (bread daily and soup or milk on alternate days) operates in all the schools and contributes to daily total food intake.

A crèche, a day hospital and a child welfare clinic were visited, making their contributions to the frame of reference for general food practices, patterns and preferences.

**Calculation of quantitative data:** Total food intake per week was calculated from the data collected as described above. Each family consisted of all members eating an adult type of food. Babies who were breast-fed or eating baby food were not included. Using the computerised food table described and the amounts of each food substance consumed per week by each family, the family's weekly and daily intake of each of the 30 nutrients given in the food table was computed. Weekly and daily intakes were obtained from the number of members in each family who consumed the adult type of food. The mean values for all families in each group were calculated and an analysis of variance<sup>21</sup> was written into the computer programme so that any differences among groups could be detected. Except where otherwise indicated, differences quoted as statistically significant were at the 5% level.

## QUALITATIVE RESULTS

Examples of typical diets of the 5 groups are given in Appendix A and a brief description of typical Black foods, dishes and drinks in Appendix B.

### Food, Drink and Fuel Available

Most staple foods used in the Guguletu township are purchased for cash once a week (normally on Saturday morning) at a supermarket close to the township railway

station. Great disparity exists between retail supermarket prices and trading store prices in the township, where certain items, such as fruit cordials, were as much as one-third more expensive. This is particularly hard on pensioners and those unable to carry parcels or afford train fares.

Meat is generally purchased at township butcher shops and these are open all of Saturday and Sunday, catering for a community in which refrigeration is rare. Butchers appear to be affluent. The wholesale cuts are usually fore-quarters of beef as customers cannot afford more expensive hindquarters. Ropes of lung hang from butcher's hooks 'mostly for dogs, but also for humans'. Sheep's heads are sold in lots of 5, 10 or 15, to be halved or left whole, cleaned, boiled and resold. Chickens for Sunday are generally bought alive. Some housewives buy several, fatten them for a day or two, and resell them thereby covering the price of their own weekend fowl.

Fresh fish is difficult to obtain and also to keep without refrigeration. Prepared fish and chips are therefore growing in popularity, especially among children. The ex-Simons-town group in the survey sadly missed the fresh fish they had previously enjoyed, obtained free if they helped to unload the boats. They found meat a poor substitute and expensive.

Milk is delivered daily in the township, either fresh, or sour (*amasi*) or as buttermilk. Many households buy fresh milk and sour it at home.

Vegetables, including maize, being extremely expensive, are very seldom grown, and only one family had collected *imifino*, or wild green leaves, on the veld for use as a vegetable.

Fruit is available from trading stores and hawkers. The greatest prevalence of hawkers is outside schools. Minutes before the school recess, old men and women may be seen hurrying to place their basins, steaming cauldrons and baskets on old rusty paraffin tins. When the bell rings there is a stampede of feet in the playground and a barrage of hands is thrust through the wire fence for chicken's feet, hard-boiled eggs, *vetkoeke* (fat cakes), mineral drinks, frikkadels and fruit (whatever is in season).

Live animals for feasts and sacrifices are available in the township, and it is estimated that between 40 and 50 animals are slaughtered every weekend at Guguletu. Prices range from R70 for an ox to R11 or R12 for a sheep (less if several are purchased), and R18 for a goat of any colour although the goat must be white at a witch-doctor's induction for a healing sacrifice and at a circumcision.

Brewing, despite the regulations, is carried on at shebeens. The City Council beer is unpopular and beer is brewed by elderly women for consumption in their houses and bachelor quarters. The pub atmosphere is infinitely more congenial than the vast and dreary beer halls, and in a warm kitchen men frequently send out for meat which is fried for them as they drink their beer. Shebeens are a regular feature of township life, and although illegal, have amusing names to distinguish them.

Paraffin is the fuel most commonly used, and is purchased at trading stores generally by children who are sent on a daily errand with an empty bottle and a few extra cents to buy sweets for themselves. Wood is expensive and

sold in small bundles or collected on the outskirts of the township. Gas and electric stoves are found only in the houses of people with a high income.

### Storage

Storage facilities depend chiefly on income. In well-off households there may be an electric refrigerator. It is generally kept locked and serves more for status than storage. In homes of medium income a kitchen cabinet, which may be fairly elaborate with a built-in clock in the middle, serves as pantry and there may also be metal-lined bins for samp and maize meal. If butter is used, it is kept with the milk in a basin of cold water. In poor households and in the bachelor quarters a tin box under the bed serves as a larder.

### Cooking Methods, Facilities and Equipment

Boiling is the chief cooking method used for preparation of the two staple foods—samp and maize meal. Meat for the weekend is generally pot-roasted. Bread is baked or steamed on top of the stove or on a Primus stove or Beatrice burner. Oven-roasting is only possible in the majority of houses if a woodstove is lit, and this presupposes both a stove and cool weather.

*Amasi* is occasionally prepared in bottle calabashes both in households and in bachelor quarters. A little *amasi* is added to fresh milk and this is left to sour in the calabash. In most instances, any jug or china, plastic or stoneware jar is used for making *amasi*, or it is bought ready-made.

Primus stoves are the general cooking medium in the township. In bachelor quarters and many households these are the sole cooking equipment. In winter they may be placed on the floor for use as foot warmers. Beatrice burners, a modified form of primus, are used with primus burners in many households of medium income, or two Primus stoves and a Beatrice were a frequent combination. Beatrice stoves are ideal for the long slow cooking of samp and maize meal. In winter woodstoves are lit once a day, at about 1500, but many houses do not possess one. A small rectangular hot-water tank is generally attached to the stove. Gas and electricity for cooking are rare. Only affluent families use electricity and only one gas ring was seen in the survey.

Three-legged iron pots are used only for feasts. Aluminium pots and pans are used in both houses and bachelor quarters. Heavy cast-iron pots or cauldrons, in a variety of sizes, are used on the stove for baking bread and pot-roasting meat or chicken. Carved wooden stirring sticks for maize meal are becoming rare and have been almost entirely replaced by metal spoons. Although water and electricity are not provided, they may be brought into the house by the tenant.

### Eating Habits

A hurried cup of coffee at 0500 constitutes breakfast for the bachelors and a majority of families. Children may have maize meal or bread.

Snacks of bread or leftovers are taken at home at any time during the day. Men at work pause at 0900 or 1000 for tea and bread, either dry or accompanied by 'smeerwurst' or liver polony, a tin of pilchards or occasionally meat roasted on an open fire if they are road or construction workers. A portion of the bread is kept to finish with tea again at noon.

The main meal of the day takes place in the evening, with carbohydrate—either samp or maize meal—predominating. (These are often served on alternative evenings.) The meal usually ends with tea or *amasi*.

On Sunday many households have a Western breakfast of porridge or cold cereal, and bacon, eggs and sausages. Sunday lunch is a full meal consisting whenever possible, of meat, rice, and potatoes. Only at week-ends do the majority of households have vegetables (squash, pumpkin, cabbage, tinned peas, tinned beans in tomato sauce) or pudding, the favourites being tinned peaches or guavas and custard, jelly or jelly whipped up with evaporated milk, or trifle as a special treat. Ginger beer, soft or mineral drinks accompanies the Sunday lunch.

Blacks have recently become great bread-eaters and working mothers frequently substitute bread for maize meal. Quickly-prepared food is becoming popular—Minit-samp and Minitmeel being two examples.

Tea is replacing *maheu*, a non-alcoholic maize gruel, as tea is considered to be more sophisticated, and can be prepared in minutes, whereas *maheu* takes twelve hours before it is ready. Tea, coffee and mineral drinks are tending to reduce milk consumption.

Rice and potatoes are gradually assuming greater prominence in the urban Black diet. Most households have these on Sunday, well-off households will also use them during the week. This gradual change in towns is reflected in the Transkei where rice is now seen in country shops. In areas where crafts are sold, a cash economy develops and a good proportion of the money is spent on new foods introduced by workers returning from the towns.

It was expected at the outset of the survey that fish might make a large contribution to the diets of the ex-Simonstown group. This was not, in fact, true, but it was found that the years of urbanised living had given this group a preference for rice and potatoes instead of samp.

Many Blacks are developing an increasing fondness for fat, and there is a tendency to use much oil. In Guguletu, cooking fat is often added to samp and beans if no meat is used. Urban Blacks have no access to seeds or insects (e.g. locusts) which were a natural source of fat, but they tend to compensate for this by excessive frying of meat and potatoes, and a fondness for *vetkoeks* which are fried balls of flour and water raised with yeast. It is perhaps ironic that much saturated fat in Black households originates in the kitchens of Whites where the trend is strongly toward poly-unsaturated fats. There is a tendency in schools, particularly in secondary schools, for *vetkoeks* to replace bread.

Blacks appear to have an inherent fondness for carbohydrate, and it is interesting to note that as they become urbanised their preferences are almost always directed to new starchy foods such as rice, potatoes, ginger beer, sugar and biscuits.

There is a growing preference among young women for a slim figure. This has been chiefly inspired by magazine pictures and the power of advertising.<sup>22</sup>

### Taboos

In this survey it was found that the chief taboo was eggs for women, and if strictly observed, prevented them from eating cakes, puddings and soufflés containing eggs. Young and middle-aged women may not eat eggs as it makes them 'lascivious and unfaithful to their husbands,' but old women, past their prime, are permitted to do so. Men are encouraged to eat eggs and believe they increase virility. Hard-boiled eggs bought for 3c each from hawkers, were popular among schoolchildren.

Fish was regarded as taboo by people from inland areas. The symbolism is obscure and fish were connected with snakes, especially eels, which are associated with the shades.<sup>23</sup> Practical considerations have broken down this fish taboo. For example, a couple from the Transkei who came to Simonstown would soon have become fish eaters because it was cheap and plentiful. Children's liking for fish and chips would appear also to influence parents, and there is a growing liking for tinned fish.

Milk used to be a rigid taboo for men and women. Women could take milk only at their own kraal or that of blood relations but not in a kraal where they were likely to marry.<sup>24</sup> These milk taboos are not observed at all in the township.

A meat carcass was traditionally divided up according to a strict ritual—the right side for the men and the left for women. Broster describes how there is, in the Transkei men's meat, women's meat, young people's meat, children's meat and dog's meat. Half the liver, the intestines, the upper joints of the legs and some rounds of beef are allotted to the women. Men's meat consists of the head, the other half of the liver, the breast, the lower joints of the legs and part of the ribs. The heart and lower joints are for the boys and the lungs are kept for the dogs.<sup>24</sup> Each part of the animal possesses a particular quality, a special significance associated with health and development, and it is believed that this power is transmitted to the consumer. At Guguletu this strict order of precedence is observed only at ritual killings, but sheep's heads are always regarded as 'men's meat' and lungs are usually reserved for dogs.

Various vegetables, although not strictly taboo, are considered women's food. Swazi men have little interest in vegetables and many Zulu men do not care for vegetable dishes. Xhosa men traditionally do not eat pumpkin. In Pondoland, Hunter observed that men may eat boiled greens, and occasionally do so, but it is taboo for them to touch the more popular *isigqwampa* (spinach mixed with maize meal).<sup>25</sup> At Guguletu men do not eat pumpkins, although they are highly regarded by women who differentiate between male and 'she' pumpkins and will even bring them back from the Transkei.

### Tribal and Religious Differences in Diet

Tribal and religious differences are noticeable in food patterns within the township. The chief difference lies in the large consumption of samp and beans by people from the Transkei and of maize meal by those north of the Transkei. The majority of Elacks living in the township are Xhosa who were originally more pastoralised than any other southern Black tribe. They lived on *amasi* and cultivated small vegetable gardens. Later, however, when confined to smaller areas they came to rely more on maize and other cereals, and so samp, maize and beans came to be eaten.<sup>6</sup>

Sotho-speaking tribes attach enormous importance to maize meal and prefer the white, highly-refined type, with the germ removed. These tribes from Lesotho make a thick maize-meal porridge, *umqu*, which is accompanied by meat and gravy as a side dish, but in northern Lesotho the maize meal is soured before it is cooked and made into a thick mould which is cut into slices and called *tingpap*.

The Black Seventh-day Adventists make certain dietary demands. Strict adherents abstain from hot food on Saturday and from meat, tea, coffee and alcohol at all times. There was a distinctly American influence in the houses and food patterns of the Seventh-day Adventists in the township. Zionists are not permitted to eat pork or to drink beer and a strong tradition for tea-drinking has evolved among them.

### Food Preferences and Special Feeding

Meat is the favourite food in the township. Samp comes next and is the favourite of migrant and less urbanised people. *Amasi* has always been a great favourite with Xhosa, Swazi and Zulu people. Buttermilk is also enjoyed. Brown bread is preferred to white, possibly because it is cheaper.

An interesting preference for sweet-sour foods was noted in the survey. Three examples are vinegared beets, a drink of sugar, water and vinegar, and the addition of tartaric acid and sugar to the morning maize meal. Families who were really too poor to buy prepared foods purchased pickled beets for Sunday. Tartaric acid thins maize meal, making the addition of milk unnecessary. Many families unable to afford milk used tartaric acid from necessity, but others used it from preference.

Special feeding was only noted for babies, and an example of the tremendous care lavished on babies by Black mothers was the extravagant manner in which they purchased expensive proprietary baby-food preparations.

### Seasonal and Income Variations

The greatest variation noted in the survey was between weekday and weekend meals, although both followed a pattern which seldom varied.

Seasonal variation affected fruit consumption as only fruit in season was purchased. Oranges and bananas were

eaten throughout the year. In the winter months apples were the favourite; in spring, guavas; in summer, melons and peaches, and in autumn, pears.

In summer children ate sweet water-ice suckers and drank large quantities of soft drinks, and adults enjoyed *maheu*. In winter, a nourishing and delicious split-pea and vegetable soup (and sometimes meat or bones) was prepared once or twice a week in many households of all income groups.

The variations between the income groups were all obvious ones, related to cash expenditure, such as more and better cuts of meat. One interesting fact which emerged from the survey was the comparatively basic similarity in the food habits of all the groups. Well-off families tended to have a more westernised cuisine, or 'high food' as it was called in the township. For example, bacon and eggs at breakfast, afternoon tea at 1600 on Sundays, and noticeably more salads. Fruit tarts and cheese were also eaten. Despite this, samp, beans, or maize meal were the staple food used in every household. It was stated by the Black social worker that among Blacks no foods are status symbols.

### Comments on Specific Foods

**Cereals and cereal products:** Samp, the chief cereal product, was found in practically every house in the survey. This is the basic difference between the diet in the Guguletu township and that of Whites. It is interesting that samp is cooked in one way only—boiling—although it may be reheated several times. It may be prepared in the following ways: by adding tomato paste or sauce; by adding meat—offal, lungs, tripe, mutton flank or beef brisket depending on income; by adding spices such as curry, or cayenne, either alone or in combination; or by adding fat which may be meat or chicken fat, or cooking fat, or oil.

Samp takes 2½ hours of simmering before it is cooked, but with the increasing pace of life and great distances of townships from cities, there is a risk that samp may not always be adequately cooked, and therefore indigestible. Many men in the bachelor quarters either cook enough to last for several days, or pay others, who finish work early, to start boiling the samp at about 1600 in the afternoon.

Maize meal is either the secondary (for Xhosa) or the most important food in the Black diet, yet after a high degree of refinement, little of the nutritive value is left, and enrichment is almost impossible as this impairs the maize-meal flavour. It has been found that unsifted maize meal has a folate content greater than 100 µg/kg, while refining reduces this to about 3 µg/kg, in the popular sifted meals.<sup>36</sup> Maize meal is the staple cereal for Zulus, Swazis, Basutos and for Coloured women married to Blacks.

Maize rice, the poor man's rice, is rarely used in the Guguletu township and only by the poorest families unable to afford real rice. It is milled by grinding samp into smaller particles. Maize rice, or maize grits (which are maize-rice granules), is chiefly used in the brewing of City Council beer or *jabellani*. Rice is an increasingly popular item in the Black diet.

The speciality of Black housewives is their magnificent bread usually made with white bread flour, occasionally with cake flour for lightness, but never with whole-wheat flour. The bread may be baked in the oven, or steamed over hot water. Another method is baking on a Primus stove or Beatrice burner. The loaf is placed in a heavy, greased iron cauldron on top of the burner and baked until the bottom and sides become a golden brown. Raisins and fruit peel are sometimes added to the bread. A few families included self-raising flour in their grocery list, which was used for cakes. Dumplings and scones were two popular items encountered in the survey. Dumplings were prepared either with bread flour or with a combination of maize-meal and bread flour.

The preference in many families was for whole-wheat baker's bread and it was preferred by the majority of bachelors. This may be explained by the fact that whole-wheat bread costs one cent less than white bread.

**Starchy roots:** Potatoes are not a natural food for tribalised Blacks but are one of the first foods to be added when migrants move to cities and tribal diets become urbanised. In the township, potatoes are always included in Sunday lunch if money permits, and well-off families, and those from Simonstown, ate them during the week as well. They were prepared by boiling or frying and served with stew or a pot-roast. Sweet potatoes were enjoyed by many families at weekends.

**Sugar and jam:** Five pounds of sugar per family per week remained a constant figure throughout the survey, regardless of family size. Sugar is used almost entirely in tea, coffee and on porridge. Sugar consumption increases with urbanisation, but the taste for sugar by Blacks has a long history. It was the favourite luxury in early trading store days, and there may be a certain symbolical significance attached to sugar.<sup>37</sup> A great liking for sugar among tribalised Blacks in the Transkei has also been reported.<sup>32</sup>

Jam was not as popular as expected, apricot jam being the cheapest and most commonly used. This was possibly because, if income was low, jam had no place in the food budget, and if the income was medium or high, less bread was eaten, and butter or peanut butter replaced the wish for jam. Children were allotted a definite ration and went without when that was used up. Jam was made at home in only three well-off households.

**Legumes and nuts:** Beans were used in every family eating samp, with which they were cooked in the proportion of one-third beans to two-thirds samp, the proportion of beans diminishing if the family was poor, and increasing to as much as half beans to half samp for well-off families. The most popular varieties were butter beans, haricot beans, Natal (or Van Zyl) beans, yellow beans (which were dark-brown and shiny) and sugar beans which were the most expensive. One variety, or a mixture of beans, was cooked with the samp. This is a most important natural supplementation of protein to accompany the amino acid-deficient samp. Not only in South Africa but also in Brazil is this natural selection of cereal with legumes observed.<sup>38</sup>

In winter, split peas and occasionally lentils formed the basis of substantial soups which were the main course of the meal. Peanuts were the only nuts noted in the survey and were immensely popular with parents and children.

Proof of great fondness for peanuts is their unusual use of a person's name, *Nomandomgomane* or monkeynuts. Children bought peanuts with pocket money and adults often included a 250 g bag in their weekly shopping. Peanut butter was the children's favourite and mothers admitted to locking it away to make it last for several days.

**Vegetables:** Fresh vegetables are definitely considered a luxury by urbanised Blacks, and a high price in the township keeps vegetables in this category. They are included at weekends by almost every family and by bachelors. The use of fresh vegetables was one marked difference between the income groups. Onions, cabbage, carrots, sweet potatoes, squash and pumpkin were the favourites.

*Imifino*, of the species *Sonchus oleraceus* L., was only observed in one household, but its use may be more widespread. It contributes some valuable protein when used as a dietary supplement,<sup>39</sup> and dried *imifino* may be received from Basutoland and Zululand.

Tinned haricot beans in curry or tomato sauce and tinned peas were very popular and given to children for Sunday lunch if the family was too large for everyone to have a helping.

**Fruit:** Fresh fruit was popular among urban Blacks, those who grew up in the southern Cape Province, and among children. A definite amount per week was difficult to estimate.

Tinned fruit on Sunday is almost a ritual. Tinned peaches, guavas and fruit cocktail, accompanied by tinned cream or custard whenever possible, are the favourites. Home-made bottled fruit was only noted in one household—peaches of prize-winning quality.

**Meat:** Meat was the favourite food in the township. Beef brisket and mutton flank were in greatest demand. Ox liver was extremely popular. Fat meat was always requested and tripe and offal were used on weekdays, as they were cheap. Sausages were frequently eaten on Saturdays for lunch. Polony and *boerewors* were also popular. Well-off families have meat twice a day. Many families of medium income stretch their food budget to include meat once a day. Poor families try to have meat on Sunday and may manage offal once or twice during the week. The bachelors, although many lived very frugally, generally had meat (flank, brisket, or a leg) on Saturday and Sunday, and many had offal, tripe or lungs during the week as well.

**Poultry:** Chickens were the general Sunday speciality for families, although rarely for bachelors. They were most often purchased alive, also fresh or frozen. They were usually pot-roasted, with an accompanying piece of mutton; or they were pot-roasted and then browned. Chickens fattened in the township were large birds weighing 3-4 kg and the fat was always kept for later use.

**Fish:** The bulk of fresh fish used in Guguletu was purchased as fried fish and chips. This was attributable to the growing popularity of fish and chips shops and to the difficulty in keeping fish fresh without refrigeration. Tinned pilchards in tomato sauce were the only tinned fish noted in the survey.

**Eggs:** Eggs, although taboo for many pagan women, were popular fried for Sunday breakfast or eaten hard-boiled by children at home and at school.

**Milk and milk products:** Milk was one of the most popular items. Fresh milk was used on porridge and in tea and coffee as well as for drinking and pouring over chunks of bread. Many families bought an extra pint of milk on Saturday for custard on Sunday.

*Amasi* was found to be more popular than fresh milk for drinking and for adding to a bowl of broken-up brown bread. *Amasi* was bought from the dairy or soured from fresh milk, or combined with buttermilk. Buttermilk was frequently bought and consumed at work in the absence of *amasi*.

Sweetened condensed milk was used in many households of all income groups, although in poor families it was the only milk used. As with peanut butter and jam, children were allotted a certain amount of condensed milk each week and, that finished, they went without until their next ration was due.

Skim-milk powder was not noted to any great extent, and it seemed that poor families were not aware that they could buy it cheaply. Whole powdered milk was used only for babies. Tinned cream was a popular accompaniment for tinned fruit or jelly on Sunday. Tinned evaporated milk was not used.

Cheese only contributed in small measure to the diet of most families, although well-off households did include cheddar.

**Oils and fats:** Fish oil is the oil most commonly used in the township—a misnomer, deriving its name from the fact that fish has always been fried in this type of oil. It is dispensed from a drum in the township trading stores and its composition varies.<sup>40</sup> A few families purchased the more expensive sunflower-seed cooking oil.

Butter is used in the township and it may be mixed with margarine but margarine is seldom used alone, dry bread being preferred. As butter is sold in such small amounts (as little as 60 g) it is very expensive.

Cooking fats are often added to samp. These consist of saturated and poly-unsaturated fats.<sup>41,42</sup> These fats and fish oil are used to satisfy a craving for fat among many urban Blacks.

**Tea and coffee:** Tea and coffee were used in all households except in those of strict Seventh-day Adventists, and by every man in the bachelor quarters. There was a preference for tea, and a minority preferred the *rooibos* or bush tea. There is a predilection for early-morning tea, *invuko*.<sup>43</sup>

**Salt, spices and condiments:** There was much uncertainty with regard to the amount of salt used at Guguletu until a plastic container holding 500 g of salt was left with co-operative families who were requested to use the salt in cooking and on the table, and to record the date on which it was finished. In two instances the recipients thought that a spell had been put on the salt. They accepted but did not use it. The average (added) salt consumption per person per day was 9 g. The usual daily intake of salt quoted by Proudfit and Robinson is between 5 and 15 g.<sup>39</sup>



Questioning on the subject of salt consumption led to the conclusion that there is great disparity in people's taste for salt.

Startling quantities of cayenne pepper were used, many families preferring it to the black or white varieties. It was liberally added to tripe or offal as often as 2 or 3 times during cooking, more being added when the dish was cooked. Cayenne pepper is prepared from the *Capsicum annum* plant, which is grown in South Africa (a plant with small, narrow bright red pods), but the degree of pungency varies according to the area of production.

Curry powder was widely used and scarcely a family omitted to mention cayenne as the first condiment that came to mind, the next being curry.

Vinegar was used in most households for tenderising meat, adding to gravy and stews, and making vinegared beets and salads.

Tartaric acid was added to maize meal, making the addition of milk unnecessary.

Baking powder, flavouring extracts and other spices such as cinnamon and nutmeg were only used in households where cakes were baked.

**Alcohol consumption:** The difficulty in assessing calories provided by beer, wine and brandy has already been expressed, but the average amount spent on liquor in November 1970, in the Guguletu and Langa townships, was estimated to be R6 per person per month (this figure includes babies and children).<sup>44</sup>

**Patent cures, leaf and root remedies:** Cures are not, strictly speaking, within the scope of a study of dietary habits, but they do appear on the grocery list, a few of the most widely used being extract of lettuce, Bell's lung tonic, peppermint cure for coughs, Cape aloes and gripe water.

Roots are used largely for home remedies. They are gathered in the veld by herbalists who then sell them in the township and the purchaser simmers them in water. The infusion is drunk as a tisane justifying inclusion of the more widely-used types in this survey. Samples of roots, leaves and herbs were purchased from herbalists at Guguletu and in Cape Town, and these were identified at Kirstenbosch Botanical Gardens:

*Disparago anomala Schlechter*—for women's complaint or 'womb-trouble'.

*Agathosma crenulate* (Hook) Phillans; *Peucedanum galbanum Benth.* and *Hok.* (blisterbush) and *Cliffortia hirsuta E.* and *Z.* are all used for kidney complaints and rheumatism.

*Melanthus major L.* is used for skin sores, and *Leonotis leonotis R. Br.* for asthma.

A variety of the species *Indigofera* is brewed for ulcers, and of asparagus for tuberculosis.<sup>45</sup>

## QUANTITATIVE RESULTS

The detailed results showing mean calorie intake and nutrient consumption for families and individuals in each group are given in Table I. Significant differences in nutrient intake among groups are indicated in Table II.

## DISCUSSION

The Guguletu dietary survey showed the semi-Westernised pattern which is emerging among Blacks who have left the rural areas and discarded tribal taboos, traditional cooking methods and utensils. In the urban townships a taste is acquired for many new foods but despite this, Blacks retain their basic traditional predilection for a predominance of complex carbohydrate.

A big difference was noted between the foods eaten by bachelors (meat and bread were the mainstays and their calorie intake was high) and family units who had a far more varied diet with less meat, less carbohydrate and a calorie intake below the Recommended Daily Allowances. Meat is regarded as the favourite food, with fat, liver and kidneys being the greatest delicacies. Protein sources are chiefly milk, beans and meat. There appears to be little variation in the amount of food purchased by family groups of varying income, but individual consumption is regulated by family size.

All groups adhered to a similar meal pattern, with one big meal in the evening and extra meat, rice, potatoes and vegetables at week-ends. This special difference in the weekend meal pattern differs from the findings of Fellingham and Potgieter in Pretoria, who reported that a 24-hour weighing method was as satisfactory as a 7-day weighing method.<sup>11</sup>

It was interesting to note that no food 'snobberies' were found, and even well-to-do families enjoyed the traditional samp and beans, despite many accretions to their diet such as cheese, fish and chips, rice and potatoes.

Cooking methods have changed, and a Primus stove is the general cooking medium in the township, accompanied very often by a Beatrice burner. Cooking utensils show a transition from cast-iron to aluminium pots, although the cast-iron are still used by most households for cooking bread and meat at the week-end. Gourds, used to sour milk for *amasi*, have been largely replaced by plastic, enamel or china jugs, and the carved wooden stirring sticks for maize meal were replaced by metal spoons.

Food costs in Guguletu were higher by as much as one-third for some items than in Cape Town supermarkets, and this made shopping particularly difficult for those too poor to afford train-fare or too frail to carry parcels from the supermarkets.

Mean daily calorie consumption for individual family members in all groups was significantly lower than group E which consisted of bachelors and which was the only group to exceed the RDA. However, it should be borne in mind that in the family groups, babies and children were included, and their daily requirements would have been far below the RDA for adult males. The daily requirement of women is lower than that of men. Another factor contributing to the low calorie intake among family groups is the fact that not all snacks eaten by men at work and by children at school could be included in the food consumption figures. The snacks are likely to have been predominantly carbohydrate. The similar calorie consumption figures for families per week in all groups verified the impression during the interviews that families in all income groups bought similar quantities of food (sugar

TABLE I. MEAN CALORIE INTAKE AND NUTRIENT CONSUMPTION

		Calories (kcal)	Joules	Carbohydrate	Sucrose	Fructose	Fibre	Total fat	Sat. fat	Unsat. fat	Linoleic acid	Water	Ash	Total protein	Animal protein
		(g)		(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)	(g)
Group A	Individual/day	2,314	9 712	339,4	81,4	39,3	5,8	78,4	30,1	46,0	15,1	483	11	74,4	34
	Family/week	96 353	404 384	14 028,7	3 249,5	1 559,5	244,9	3 311,5	1 244,6	1 971,5	673,6	20 147	472	3 077,0	1 421
Group B	Individual/day	2 005	8 410	309,3	65,8	32,0	4,6	63,3	25,2	35,4	13,6	321	10	58,6	19
	Family/week	96 227	403 707	15 318,7	3 288,8	1 613,0	206,0	2 800,1	1 142,5	1 554,7	578,6	14 423	480	2 869,6	974
Group C	Individual/day	1 981	8 317	327,0	62,0	30,7	4,2	52,4	21,7	27,6	10,8	253	9	57,0	15
	Family/week	101 448	426 059	17 436,2	3 258,5	1 620,5	206,1	2 406,3	1 035,3	1 253,8	468,3	11 502	507	2 863,9	678
Group D	Individual/day	2 090	8 778	333,9	76,9	37,9	4,5	61,4	22,6	37,4	14,9	336	9	63,9	22
	Family/week	95 679	40 181	15 454,8	3 508,5	1 731,1	205,6	2 743,6	1 013,6	1 663,9	672,5	13 758	389	2 841,5	897
Group E	Individual/day	4 137	17 376	720,9	136,9	68,3	9,8	96,3	47,3	46,7	9,5	635	15	124,7	33
	Family/week	76 252	320 278	14 022,2	2 668,1	1 336,4	160,0	1 522,8	748,7	741,5	137,4	9 977	281	2 186,5	478
		3 000†	1 260†											65,0	

\* 'Available' niacin = total niacin minus niacin derived from samp, maize meal and maize rice.  
 † Recommended Daily Allowances for South African male of moderate activity weighing 73 kg.<sup>9</sup>  
 ‡ Recommended Daily Allowance for American male of moderate activity weighing 70 kg.<sup>9</sup>

being the most consistent). Distribution of calories varied with family size.

Carbohydrates provided between 62% and 70% of total calorie intake, which is considerably higher than the Western type of diet in which carbohydrate provides approximately 50% of the calories.<sup>30</sup> The nature of the dietary carbohydrate varies with income. The Blacks' archetypal predilection for starchy food should be borne in mind, especially when undertaking nutrition education or considering diets for obesity and diabetes.

The similarity of sucrose consumption in this study to the findings by other workers is remarkable.<sup>30</sup> Groups A and D acquired much of their fructose from fruit. These groups included the well-off families who had lived for a long time in the southern Cape and were accustomed to eating fruit. In group E the fructose was largely derived from sugar.

Fibre intake averaged 4 - 6 g per person per day in groups A, B, C and D, while group E averaged 10 g per person per day. Although there are no Recommended Daily Allowances for fibre, it has been estimated that a 73 kg man requires 6,5 - 7 g fibre/day.<sup>36</sup> Trowell noted that the daily crude fibre intake per adult was 4,7 g for South African White male prisoners, 5,7 g for urban Blacks and 24,8 g for rural Blacks.<sup>47</sup> The Guguletu fibre consumption was low in the family groups, indicating dependence on refined carbohydrates such as samp, sugar, maize meal and white bread. The higher fibre intake among bachelors may have been due to the whole-wheat bread they consumed—many worked in bakeries and consumption of 500 g of bread

a day was not exceptional.

The transition from rural to urban life is accompanied by considerable reduction in dietary crude fibre, due to increased consumption of refined carbohydrate foods. Cleave *et al.*<sup>48</sup> have attributed many disorders of urban society to the reduction of fibre.

Fat consumption in the township decreased significantly with income and appeared to be a nutrient of affluence. The fat content in the diet of group A, with 30% of total daily calories derived from fat, is similar to a Western type of diet.<sup>30</sup> Saturated fat sources were chiefly milk, meat and cooking fat. Cheese was rarely eaten. Large amounts of cooking oil and a good quantity of peanuts account for much of the unsaturated fat content of the diets in groups A, B, C and D, all of whom derived two-thirds of their total intake from unsaturated sources. But group E, using no cooking oil whatsoever, obtained only half their total fat from unsaturated sources. Absolute fat (g/day) was highest in group E, but the percentage of calories is less due to the high caloric intake. Sunflower-seed cooking oil was the chief source of linoleic acid in groups A, B, C and D. Group E, which did not use cooking oil, consumed only half the linoleic acid consumed by the other groups. Margarine was seldom encountered during the survey.

The percentage of total calories derived from total protein attained 12% and was very similar in all groups, despite the difference in actual amounts. Group C seldom ate meat, but had a higher milk consumption, although one must question the accuracy of the interview, when perhaps, through pride, an exaggerated amount may have

## THE GROUPS AND RECOMMENDED DAILY ALLOWANCES

	Calcium	Phosphorus	Iron	Sodium	Chloride	Potassium	Magnesium	Vit. A	Thiamine	Riboflavin	Niacin	'Available' niacin*	Ascorbic acid	Folic acid	Vit. E	Vit. B <sub>12</sub>
	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(IU)	(mg)	(mg)	(mg)	(mg)	(mg)	(μg)	(mg)	(μg)
896	287	1 105	13	1 842	2 735	2 138	258	5 931	1,5	0,9	18,1	17,3	80,6	48,9	4,1	4,7
665	11 422	45 437	548	82,920	124,127	90 212	10 867	249 899	59,3	34,8	738,7	705,4	3 399,6	2 035,5	164,4	180,3
690	193	870	11	2 149	3 173	1 573	235	4 744	1,2	0,7	12,9	11,9	45,7	33,6	3,3	4,6
961	8 639	41 962	514	105 968	158 791	70 583	11 361	187,214	57,0	30,9	617,7	565,0	1 850,1	1 554,2	149,2	163,5
650	169	841	10	2 016	2 996	1 352	226	2 106	1,1	0,6	11,1	9,7	31,9	32,0	3,0	1,7
312	8 587	42 275	498	137 149	207 789	64 431	12 070	91 722	58,3	26,9	530,6	453,1	1 378,7	1 441,3	145,5	74,9
757	204	924	11	1 620	2 439	1 669	224	2 903	1,3	0,7	14,5	13,7	39,1	45,4	3,8	2,0
655	9 165	41 684	492	76,204	114,512	71,856	10 455	117 543	58,1	29,8	617,3	579,4	1 676,0	1 851,2	166,4	84,6
540	391	1 916	23	2 735	4 025	3 595	473	7 746	2,7	1,6	29,6	27,0	92,5	93,0	10,3	18,8
896	6 647 700†	31 131 800‡	383 9†	57 538	86 063	55 833	7 842 350‡	69 305 4 000†	47,2 1,0†	25,6 1,6†	483,6 15,0†	431,8	1 275,4 40,0†	1 347,8	159,9	157,2 5,0‡

been reported. Animal protein consumption reflected the amount of meat eaten by each group. Group A obtained half, groups B, D and E one-third and group C one-quarter of their protein from animal sources.

Tryptophan, the amino acid from which niacin is synthesised in the body, is almost absent in zein, which forms half the protein of maize.<sup>45</sup> Milk, liver and kidneys are good tryptophan sources and as consumption of these foods was fairly high in the township, the urban diets were well supplied with this nutrient. The association of tryptophan with niacin is important in Black diets as tryptophan is one of the two most deficient amino acids in maize. On niacin-deficient diets more tryptophan is needed to form blood pyridine nucleotides than to maintain nitrogen balance.<sup>46</sup> Therefore, the first claim on tryptophan is that of protein synthesis. Only when this requirement is satisfied can tryptophan be converted to niacin. In the Guguletu diets tryptophan intake was generous, while that of niacin tended to be low, due to the unavailability of bound niacin in maize. It could be assumed, therefore, that tryptophan was being used to synthesise niacin, 60 mg of tryptophan being required to synthesise 1 mg of niacin.

Calcium results in the Guguletu survey were low in all groups, and daily intake ranged from 169 mg/day in group C to 391 mg/day in group E. Walker reported similar findings and has suggested that the physiological requirement for calcium is probably well below the RDA of 600 mg.<sup>45</sup> Despite the low calcium consumption, he was able to find no unequivocal evidence that an increased intake was followed by a clinically detectable benefit.

Iron intake from bought foods did not appear excessive in any group. Iron overload or siderosis is extremely com-

mon in the adult male Black population. Charlton *et al.* note that this condition appears to be due to the presence of large amounts of ionic iron in home-brewed beer.<sup>50</sup> Cast-iron cooking pots are another factor contributing to excessive intake of non-dietary iron but these have been replaced to a large extent by aluminium cooking utensils. The heavy iron pots are still used, however, for the baking of bread, a weekend pot-roast and in beer brewing.

Restricted consumption of vegetables accounts for the low intake of vitamin A in group C. Vitamin A content of foods was not assessed separately as preformed vitamin A and beta-carotene. In the more affluent families preformed vitamin A would predominate (in liver and dairy products). In the lower income families vegetable sources would provide beta-carotene, particularly rich sources being pumpkin, carrots and sweet potatoes, but these foods are eaten by poor families only as a treat on Sunday.

Each of the study groups met the RDA for thiamine. Day-to-day adequacy is essential as thiamine cannot be stored. Nutrition education can contribute to thiamine-retention by improved cooking methods. As the vitamin is water-soluble, a cooking-loss of 20% may occur if the water is discarded. As cereals become more refined, thiamine content is diminished.

Riboflavin showed up poorly in the quantitative analysis. It is destroyed by exposure to light, and milk left in a sunny window to sour may lose much of its riboflavin. This occurs frequently in Guguletu. Riboflavin, like thiamine, is water-soluble, making it inadvisable to boil vegetables in too much water, or to discard the cooking water. Here again nutrition education is essential for vitamin conservation.

TABLE II. SIGNIFICANT DIFFERENCES IN NUTRIENT INTAKE AMONG GROUPS

Calories	Carbohydrate	Sucrose	Fibre	Total fat	Unsat. fat	Linoleic acid	Total protein	Animal protein	Tryptophan	Calcium	Iron	Sodium	Vit. A	Thiamine	Riboflavin	Niacin	Vit. C	Folic acid	Vit. B <sub>12</sub>
E	E	E	E	E	NS	NS	E	EA	E	E	E	NS	E	E	E	E	AE	E	E
ABCD	ABCD	ABCD	ABCD	ABD			A	BCD	ABCD	ABCD	A		AB	ABCD	ABCD	A	BCD	ABCD	AB
				C			BCD			BCD			CD		BCD				CD

NS = no significant difference among groups.

A line below a group indicates that the calculated intake per individual in that group was significantly higher than group(s) below the line.

Niacin is one of the most important vitamins in South Africa as deficiencies are endemic to large areas where maize forms the chief dietary constituent.<sup>50</sup> In the Guguletu survey the RDA of 15-mg niacin was not met by all groups. Dietary intake figures can be misleading, because biological availability depends on whether it is in bound or free form. Niacin in maize is in a bound unabsorbable form unless hydrolysed. Furthermore, tryptophan, the other source of niacin in the body, is a limiting amino acid in maize, refined maize meal and samp containing less tryptophan and less niacin than whole-meal maize. Niacin is concentrated in the aleurone and outer endosperm of the maize kernel. In samp (commercially prepared) the aleurone is removed, and in refined maize meal, the germ and pericarp are removed. It appears that in Guguletu, niacin consumption is probably adequate in the well-off families and bachelors, considerable amounts of the vitamin being derived from animal sources such as kidneys, liver and offal, and present in an available form. Among the lower income groups, however, where niacin was obtained chiefly from maize and samp, the vitamin would be largely unavailable, and this was borne out by the fact that pellagra was the major disease of malnutrition in adults treated in the Guguletu day hospital in 1971.

Ascorbic acid consumption in the survey was below the RDA in group C who could not afford citrus fruit or vegetables. Ascorbic acid is one of the most unstable vitamins, being destroyed by light, heat, and traces of metal, and as it is soluble in water and easily oxidised, there is no doubt that considerable cooking losses decreased the actual consumption of ascorbic acid among all groups.

Folic acid and total folate content of the diet in South Africa is of considerable importance because a deficiency is sometimes manifested among Black populations, especially during pregnancy, lactation and infancy.<sup>50</sup> The Guguletu survey figures for folic acid were all far below the American RDA of 0.4 mg per day, but the consumption figures fail to give a fair representation of total intake, as folic acid values were not obtainable for all foods in the computerised food table. A folate deficiency is common in people whose dietary staple is maize.<sup>51</sup>

Metz *et al.*<sup>30</sup> examined the folate content of various forms of maize and showed that it suffers as much as two-thirds' destruction of total folate concentration when degerminated and refined to 'sifted granulated' and 'granulated special' consistency. The folate content of maize is still further destroyed by boiling and it is water-soluble. Metz *et al.*<sup>30</sup> also noted that encouragement in the use of coarser meals, such as germ meal, would be of little use due to the popularity of the highly-refined maize meals, and that supplementation of maize meal with folic acid would be expensive and of little value unless accompanied by the addition of ascorbic acid to protect the folic acid during cooking.<sup>34</sup> In Guguletu the best sources of folic acid are green vegetables and liver, but these are too expensive for low-income families.

Vitamin B<sub>12</sub> met the American RDA in groups, E, A and B. As the chief sources of vitamin B<sub>12</sub> are liver, meat, fish and eggs, poor families are prone to a deficiency, and there is also evidence that the ability to absorb vitamin B<sub>12</sub> may decrease with age.<sup>9</sup>

The Guguletu dietary survey emphasises how essential it is to know the home food paradigm among the urban Black population. There is clearly a move away from the traditional tribal porridge-bowl pattern, and until such time as socio-economic conditions permit a Western type of diet, food supplement or enrichment may be necessary for such nutrients as protein, niacin, vitamin C and folic acid.

Nutrition education should also assist in the transition from a tribal to an urban cuisine. An example is the necessity of instruction in the multiple uses of skim-milk powder. Many Blacks mistrust the inexpensive and unimpressive-looking powdered skim milk, preferring expensive whole-milk powder sold in shiny tins.

Therapeutic diets, if they are to be properly carried out at home, must be based on the food patterns of everyday living. A special diabetic diet is used at Groote Schuur Hospital for Black patients, as their high carbohydrate consumption makes modification of the standard diabetic diet necessary. High protein diets must also be modified for Black patients, to include legumes and high protein soup powder, as a low income excludes nearly all the high protein foods. As the influence of fibre on digestion is

studied, the content of the urban Black diet may be found to be deficient due to the increased consumption of highly-refined carbohydrate.

Diabetic and reducing regimens are among the most difficult to adjust to a home diet which is high in complex carbohydrate and tea, to which both sugar and condensed milk may be habitually added. Increased protein, frequently recommended in diabetic diets, must come from inexpensive sources such as lentils, split-peas, beans, and skim-milk powder.

Modified Giovenetti diets, prescribed for renal disorders, are generally limited to 40 g or less protein daily, and this requires careful dietary adjustment for urban Black patients whose favourite foods included meat and milk, and whose philosophy of life includes as large a meal of meat as possible on Sunday.

Coronary heart disease is now beginning to emerge in the urban Black population<sup>22</sup> and it may be that the increasing consumption of saturated fat is a contributing factor. Perhaps timely nutrition education in this field may prevent the disease from reaching the epidemic proportions in which it occurs in other sections of the Southern African community.

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## APPENDIX A

## Typical diet of a well-off family

In the particular family quoted the father is a university lecturer. The day starts with early tea for the adults and Milo for the children. This is followed by breakfast consisting of porridge (sour maize meal, rolled oats or Maltabella) with milk and sugar. Whole-wheat or white bread with butter and peanut butter or jam always appear on the table, and occasionally eggs are eaten. Snacks are always available for family members at home in the middle of the day and these usually comprise sandwiches made with French polony, cheese and tomato, fish-paste or ham-spread. Occasionally fish and chips or fried eggs are served together with bread. Tea or coffee is drunk at midday. Meat (mutton or beef) is always served at the evening meal. During the week under discussion the following vegetable combinations were served together with the meat: samp, beans and potatoes; rice, carrots and cabbage; rice, pumpkin and sweet potatoes or homemade dumplings. The meal always ended with tea or coffee. Tea and homemade cake were usually provided at midmorning; tea and coffee and soft drinks in the afternoon for any members of the family who happened to be at home. The meal pattern on Sunday is totally different from that observed during the rest of the week. Breakfast consists of fried sausages or fish and eggs, eaten with bread and butter. Lunch starts with soup (bean, split-pea, or made from soup packets) followed by chicken, leg of mutton or beef (always roasted), and one of the following vegetable combinations: rice, samp and homemade dumplings; carrots, peas and potatoes; pumpkin, sweet potatoes and onions; cabbage, egg and mayonnaise or carrots, pineapple and currant, were served instead of vegetables. The meal usually ended with one of the following varieties of sweets: tinned fruit, jelly with custard or tinned cream, instant pudding or ice cream. Coffee or tea was always served.

### Typical diet of a family of medium income

The breadwinner of the family in this group works in a warehouse, has no food before he leaves for work and takes nothing with him. The rest of the family start the day with bread (homemade or bought whole-wheat or white) and there is usually maize-meal porridge for the children. This is always eaten with sugar and milk (when available) or tartaric acid is added.

During the course of the day adult members of the family usually have to be satisfied with bread, leftovers from the night before, and tea. Children have bread and a cup of soup or milk on the school-feeding scheme. The smaller children are given 5 cents each day and the older ones 10 cents. With this money they buy extras, such as chicken's feet, frikkadels, hard-boiled eggs, sweets and *vetkoeks*. After work and school, and before supper, tea and bread are eaten. Sometimes the bread is eaten with jam or peanut butter and at other times it is crumbled in a bowl with *amasi*.

Four times during the week under investigation the evening meal consisted of samp and beans. This was served either with beef or with offal, tomato paste, dripping or cooking fat. On two evenings the meal comprised *mphokoqo* and *amasi*. The meal always ended with tea. On Sunday, breakfast comprised cornflakes and eggs. For lunch, chicken and a piece of mutton were usually pot-roasted together. Occasionally beef brisket was prepared. Rice and cabbage, pumpkin and tinned baked beans in tomato sauce were less frequent vegetable sources. Tinned peaches or guavas and custard and jelly in winter (when it will set) were the usual sweet sources. Home-made scones provided an occasional treat for tea on Sunday afternoons, and supper was made up of leftovers from lunch.

### Typical diet of a poor family

For these people, the day starts at 0500 with tea served with fresh milk and sugar. The men go to work without further sustenance. Women and children usually eat an early morning meal consisting of bread (almost always baked or steamed at home) or maize meal with tartaric acid and sugar. During the day, tea, bread and leftovers from the previous evening are the only foods eaten. Children have the bread and soup or milk provided by the school-feeding scheme, plus usually 2 cents each to purchase extras.

Supper every night of the week consists of samp and beans. Once a week it was served with offal and once with cooking fat. Occasionally there was *umpokoqo*, but there was seldom enough money to buy the 4 pints of *amasi* required to go with it. On Sunday the midday meal consisted of chicken and samp and rice, potatoes, carrots, cabbage or pumpkin when they could be afforded.

### Typical diet of a family of medium income from Simonstown

The father works in a refrigeration plant and leaves home after the early morning cup of tea. The remaining members of the family eat the usual breakfast of bread or maize meal with sugar and milk or tartaric acid. During the day bread and leftovers and sometimes eggs are eaten, with the usual school-feeding scheme food available for the children, who, in this group, are also given 5 or 10 cents (depending upon age) for extras. After work and school and before supper, bread and tea, or sugar-water and occasionally fruit are eaten. Supper in winter starts with thick soup (made with meat or bones and beans and split-peas) 3 times a week. This was followed by beef brisket, sausages or mince with rice or potatoes. Samp and beans were only eaten occasionally. Sunday breakfast consisted of rolled oats and eggs and bacon and lunch of chicken served with potatoes, rice, onions, carrots or pumpkin. Jelly or tinned fruit once again provided the sweet.

### Typical diet from the bachelor quarters

The man in this example had been in Cape Town for 15 years and worked in a dairy. He left home without having anything to eat and at work ate bread (whole-wheat) and tea, with or without milk, but always with sugar at regular intervals during the day. On arriving home from work he would

make tea and then prepare his supper which consisted of samp and beans with cooking fat or offal, or alternatively *mphokoqo* and *amasi*, or occasionally brown bread broken into chunks and *amasi* or fresh milk poured over it. On Sunday beef brisket with samp, beans and cabbage, or rice and potatoes, was prepared.

## APPENDIX B

Typical Black foods, dishes and drinks are:

*Amasi*: This popular dish is milk soured and curdled in a bottle-calabash.

*Dumplings*: These are generally made with half flour and half maize meal. Baking powder is added and they steam on top of a stew.

*Imifino*: Wild green leaves collected on the veld, and prepared like spinach by boiling in a little water and adding salt.

*Isidudu*: This is the soft breakfast maize meal with salt added, and eaten with sugar and milk. Vinegar or tartaric acid may be stirred into it and then milk is not needed.

*Umtwala* (Kaffirbeer) is made from maize meal cooked with water and cooled. Malt is added to ferment it and brown sugar may be added.

*Maheu*: A non-alcoholic fermented maize-gruel drink, taken in continuous sips and never swallowed all at once. It is thicker but has the same cooling qualities as barley water. *Maheu* is made from cooked maize meal and flour and a leaven which is usually fermented maize meal with sugar and warm water. After 12 hours the *maheu* is ready to drink. On the second day sugar may be added if it has become sour.

*Maize meal*: At the mills maize meal is produced by cleaning the seed and removing the bran. The seed, which contains the maize germ, is then progressively ground and sifted, resulting in an ever-finer granular maize meal. Special sifted and sifted granulated are the most popular types of maize meal, in which the folate concentration is only one-third that of the crude meal<sup>31</sup>. It is traditionally made by grinding the whole grain on a stone. The grain may first be soaked to loosen the husk.

*Maize-meal bread*: This is made with maize meal, a little flour to bind it, yeast, salt and water. Strips of thin wood are placed in a pot of boiling water. The loaf is placed on the strips and steams rather than boils.

*Mphokoqo*: This is maize meal prepared by adding the meal to a small quantity of rapidly-boiling water and allowing it to steam dry, until it is crumbly.

*Offal*: These are the intestines, mesentery (with its fat) and stomach (tripe). Liver, kidneys and head are sold separately.

*Samp*: The whole maize grain is traditionally stamped with a stamping block to remove the husk. It has the appearance of small white kernels and to be properly cooked takes at least 2½ hours of slow boiling. Samp is prepared commercially at the mills first by cleaning the seed and removal of the bran or outer husk. The maize germ is then removed, the seed being split down the centre in the process. Samp is the resulting degerminated seed.

*Soured maize meal*: Maize meal is allowed to ferment with boiling water overnight, to become sour before cooking. Salt is added.

*Tingpap*: Very similar to *umqu*, but the maize meal is soured before cooking until thick. It is then moulded and cut into slices to accompany meat, tinned fish or vegetables. *Tingpap* is a Basuto favourite.

*Umqu*: This is simply stiff maize meal with salt added and is eaten with a rich gravy or fried onion and tomato or with meat by people from Lesotho.

*Umqu wethanga*: Stiff maize meal cooked with pumpkin.

*Umqu womoxozi*: Stiff maize meal cooked with white kaffir-melon which has been boiled until it has the consistency of apple sauce.

*Umvubo*: A traditional Xhosa dish of *mphokoqo* cooled and fixed with *amasi*.

*Vetkoeks*: Flour and water are leavened with yeast. This is set to rise overnight. In the morning the cakes are fried in deep fat. No sugar is added.