Libya

NUTRITION SURVEY OF THE ARMED FORCES AND CIVILIANS

a report by the interdepartmental committee on nutrition for national defense

december 1957

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON 25, D. C.

HEALTH AND MEDICAL

December 31, 1957

On behalf of the Interdepartmental Committee on Nutrition for National Defense, it is my pleasure to transmit the report of the nutrition survey conducted in the United Kingdom of Libya 15 June to 15 August 1957.

The Committee is pleased that the survey included a number of civilians and the Police in addition to the Army and Defense Forces. The interest of the Government of Libya in improving the health and nutrition of the people is stimulating. It is our hope that the findings and recommendations here reported will be helpful in this regard. The cooperation of the Libyan Development Council was of immeasurable assistance in the successful completion of the survey.

A program to improve the health and nutrition of any population group should be continuous. The Committee has a sincere interest in such efforts in Libya and hopes to be able to provide consultative assistance when desired.

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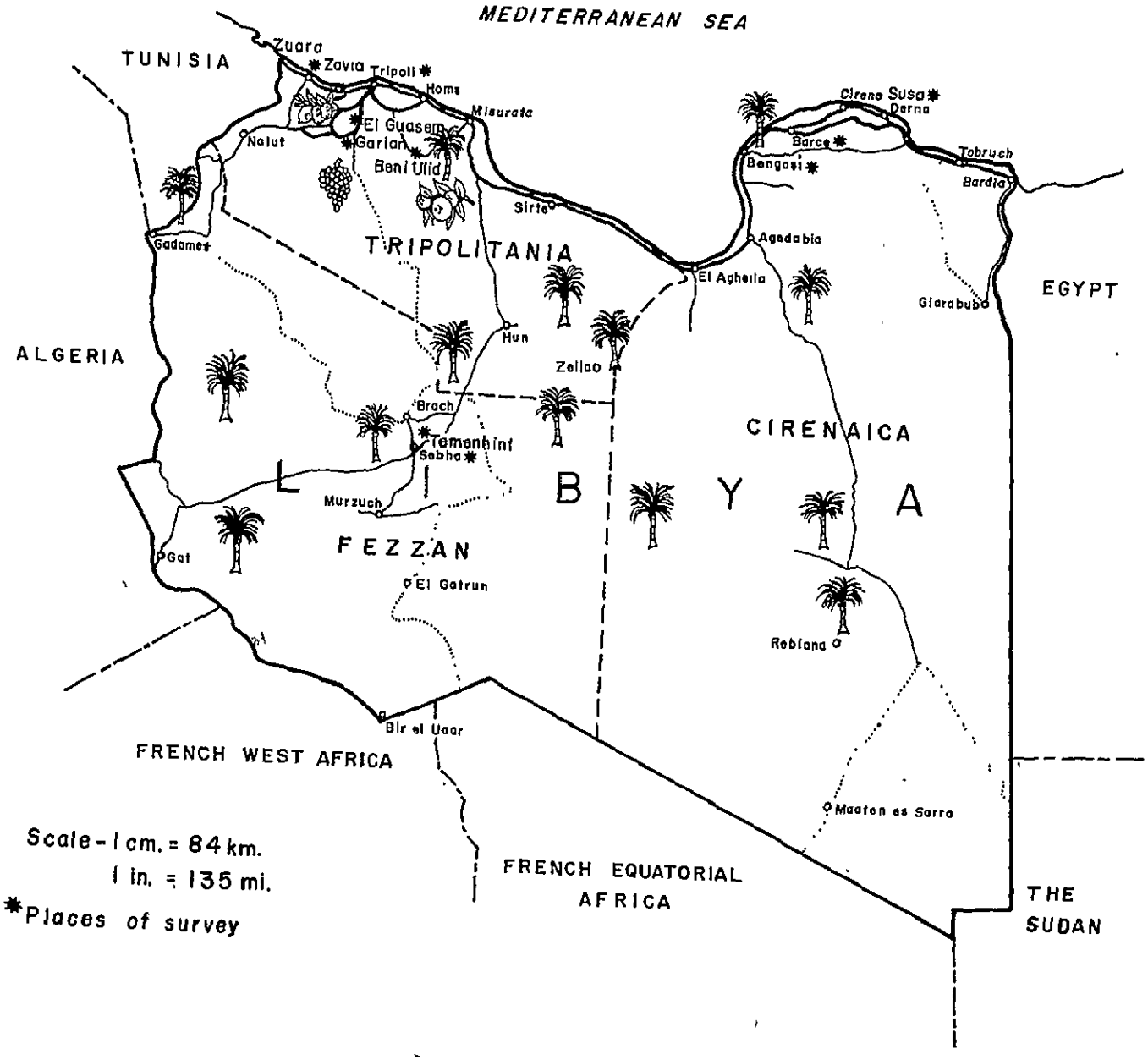

MEDITERRANEAN SEA
TUNISIA
Zuara
Zavia
Tripoli
Homs
Misurata
El Guasem
Garian
Beni Ulid
Nalut
Gadames
Sirte
TRIPOLITANIA
Hun
Zellao
Brach
Temenhint
Sebha
Murzuch
Gat
FEZZAN
El Gatrun
ALGERIA
L I B Y A
Cirene
Susa
Derna
Barce
Bengasi
Tobruch
Bardia
Agedabia
El Agheila
Giarabub
CIRENAICA
EGYPT
Rebiana
Bir el Uaar
FRENCH WEST AFRICA
Maaten es Sarra
FRENCH EQUATORIAL AFRICA
THE SUDAN
Scale - 1 cm. = 84 km.
1 in. = 135 mi.
* Places of survey

SUBJECT: NUTRITION SURVEY OF THE UNITED KINGDOM OF LIBYA

Mission

In response to an invitation from the Development Council, Government of Libya, a nutrition survey was conducted in the United Kingdom of Libya during the period 15 June to 15 August 1957. This survey, made under the auspices of the Interdepartmental Committee on Nutrition for National Defense, had the following objectives: (1) to assess the nutritional status of the Armed Forces and selected civilian groups, and to define the nutritional problems of these segments of the population; (2) to assist in training personnel for nutrition programs in Libya, thereby enabling the nation to utilize its resources to the best advantage.

Summary

A total of 3828 persons was examined clinically in the field, including 1185 Army troops from Susa, Bengasi, Zavia and Sebha; 1014 Defense Forces and Police in Tripoli, Bengasi and Sebha, and 1629 civilians.

1. Libyan Army:

Physical examinations for signs of nutritional deficiency indicated that the nutritional status of the Armed Forces was satisfactory. On the other hand, the biochemical data and food intake studies indicated that the nutritional reserves were borderline. Under conditions of emergency, when less food may be available or more intense physical activity required, serious malnutrition might appear quickly.

2. Police and Defense Forces:

In general, the nutritional status of the Provincial Police and Defense Forces was somewhat less satisfactory than that of the Army.

3. Civilians:

Through discussion with appropriate Governmental agencies, civilian groups were selected and asked to volunteer for examination. Infants, young and adolescent children, young and old adults, men and women (including pregnant women) were studied. Among adult males, agricultural workers, clerical workers, executives, unskilled, semi-skilled and skilled laborers, and artisans were included.

In comparison with the Armed Forces the nutritional status of the civilian groups examined was not as satisfactory.

Numerous hospitalized infants and children were observed who were seriously ill from malnutrition. Of the 93 infants between the ages of 4 and 36 months examined outside of hospitals, over 30 percent had clinical evidence of rickets. A number of the infants seen were grossly undernourished. The general appearance of 15 percent of those examined was classified as "poor".

Anemia was common among the women, especially those who were pregnant. Other deficiencies noted indicated that the intake of calories and protective foods, particularly fresh fruits and vegetables, was inadequate.

The nutritional status of the civilian men was less satisfactory than that of the Armed Forces, but considerably better than that of the women and children. The civilian men examined were found to be shorter and lighter in weight than the men in the Armed Forces. The most common finding was underweight, indicating caloric undernutrition. This was particularly evident in the agricultural labor forces and can be interpreted to mean that work efficiency was reduced. It is a well known fact that work output is affected by food intake. In addition to the suboptimal caloric intake, the consumption of fresh fruits, vegetables and legumes was not sufficient to meet adequately the needs for vitamins and minerals.

Recommendations

1. General:

That the Development Council appoint a National Advisory Committee on Nutrition, composed of authorities in health, nutrition, economics and agriculture, together with administrators and consumers' representatives, and provide it with facilities for the efficient conduct of its work. The Committee should have the definite responsibility and the means to encourage and organize nutrition research, arrange for the training of Libyans as specialists in nutrition, assess levels of nutrition and review and coordinate nutritional activities of other agencies. It should be able to guide at the highest level those responsible for framing national policies on subjects related to nutrition. Where deemed advisable special sections of this Committee could operate at a Provincial level. The Committee through its scientific members, and eventually, trained personnel, should conduct nutrition surveys, determine nutritional standards and provide advice on such shortcomings as may exist. For this purpose it is suggested that:

a. Nutrition surveys be conducted from time to time by a qualified team composed of a physician, a nutritionist and a biochemist, supported by other specialists as may be required, e.g. sanitary engineers and food technologists. The biochemical laboratory which is essential for assessment of nutritional status could also investigate and advise on the nutritive value of local and imported foods.

b. The Committee provide technical advice for national nutrition education programs. Action agencies could carry the program to the rural communities as well as the cities by way of agricultural facilities and institutions, health centers, clinics and schools. For example, the cure and prevention of rickets could be attained by education on the need for proper food and adequate exposure to the sun in infancy. Educational efforts to increase the production and use of carrots, tomatoes, oranges and other fresh fruits and vegetables would greatly improve the nutritional status of the whole population.

2. Army:

a. That the Armed Forces establish an Advisory Committee on Military Nutrition and Food Service, to deal with all problems pertaining to the feeding of troops and to assure the maintenance of a high level of nutrition and physical efficiency of the troops. If desired, this Committee might function as part of, or in conjunction with, the National Advisory Committee on Nutrition. It is suggested that the Committee include representatives of the General Staff, officers who supervise food purchasing and food service (future Quartermaster Corps officers) and medical personnel. The functions of this Committee might be:

(1) Organization of a school for food service personnel. Initially this could consist of apprentice training in selected military kitchens.

(2) Supervision of the planning of the different rations issued to the Armed Forces and the testing of field and emergency packaged rations when developed.

(3) Periodic assessment of the nutritional status of the Armed Forces. The same personnel that conduct such studies under the National Advisory Committee on Nutrition could be used for this purpose.

(4) Arrange for the training of nutrition specialists.

(5) Programming nutritional education for the Armed Forces.

b. That efforts be made to correct the low intakes of vitamin A, thiamine and ascorbic acid. The provision and consumption of the authorized quantities of milk, potatoes and fresh vegetables and reduction of food waste would contribute toward a more adequate intake of vitamins and minerals. Fruits in season such as oranges should continue to be substituted in part for vegetables, as they were during the survey. The soldiers should be permitted and encouraged to take second helpings when such are available.

c. That a redistribution of the food issue during the day be accomplished to allow for greater caloric intake at the start of the working day and also for a wider variety at breakfast. This increased variety for breakfast may reduce the present high levels of bread wastage.

d. That responsibility for maintaining standards of messing be assigned to designated officers in each unit.

e. That consideration be given to the organization of a Quartermaster food service corps.

f. That mess sanitation be improved by screens on kitchen doors and windows, covered garbage cans and hot water for cleansing utensils. The use of solar water heaters should be investigated and they should be installed if found practicable. Smoke in the kitchens should be reduced by periodic cleaning of flues and by equipping pots with tight fitting collars.

g. That mess gear of a uniform pattern be provided for each individual soldier.

h. That practice of having local military gardens, as observed during the survey be encouraged wherever feasible. If possible, the operation of such gardens should be supplemented by an organized program of agricultural instruction, especially for troops who will soon return to civilian life in rural areas.

3. Police and Defense Forces:

Most of the recommendations for the Libyan Armed Forces are applicable to the Provincial Police and Defense Forces subsisting in barracks.

a. That in the interests of economy, each province appoint a representative on the Advisory Committee on Military Nutrition and Food Service. The Advisory Committee might then integrate all matters pertaining to the nutrition of the Provincial Police and Defense Forces.

b. That an official ration be designed for these forces. A ration patterned after the official Army ration could be used.

c. That attention be paid to the nutritional health of those members of the Police and Defense Forces who eat at home. There are at least two methods of achieving this:

(1) By instruction of men and their families in principles of nutrition.

(2) By providing adequate food allowances for those living at home.

4. Civilians:

a. That the Ministry of Education institute a program for recording age, height, and weight of school children each year, since such data are vital in assessing the growth and development of the Nation's children.

b. That the already substantial child feeding and school lunch program be continued.

c. That the maternal and child health centers be strongly supported. Wherever possible, these centers should assist in improving the nutritional status of the population. This could be achieved by practical educational and therapeutic efforts directed at mother and child. The value of such a program would be enhanced by continuing studies of the nutritional status of the women and children attending the centers.

d. That investigations as to the feasibility of increasing the local production of legumes, poultry, eggs, fish and sugar be continued. These products would add much to the nutritional value of the present diet. The effort to develop a date and palm sap sugar industry, from an economic standpoint, is

commendable. Production of domestic syrup and crude (unrefined) sugar would reduce the need to import refined sugar, particularly if the former were sold at a reasonably lower price.

e. That the sizable effort now being put into developing fruit production in Libya be further encouraged. Additional work on fruit, vegetable and grain storage and transport would be justified.

f. That the possibility of the economic production of tea in the Gebel be investigated. Tea is grown in some countries under conditions previously thought unsuitable and in situations similar to those in Libya. Some 10 percent of the foreign exchange expenditure is now being spent for tea.

g. That import-export policies pertaining to food be formulated with consideration given to nutritional values. For instance, when cereals need to be imported for making bread or macaroni, these might be imported as grain and not as flour if the net cost would not be unduly increased by this practice. This would provide work for the already established flour mills and by-products for the animal industry. This would also afford an opportunity for the domestic production of an undermilled flour, which is consistent with local food habits.

Significance of Findings

In the overall interpretation of the survey data, the ratio of those examined to the total population must be considered. One fourth to one half of the Libyan Army and Provincial Police and Defense Forces were examined at all major bases in all geographic areas of the nation. The fact that nearly half of the Libyan Army troops examined were recruits (at Susa) must be considered in the interpretation of the total tabulations.

The civilians examined were not a statistically random sample of the population. Therefore, the means and totals do not provide a statistically satisfactory basis for generalizing with respect to the population of Libya as a whole. Many of the examinees were salaried government workers who enjoy a better situation financially than the majority of Libyans. The men at Beni Ulid (employed agricultural workers), however, were paid 20 piasters (100 piasters = $2.80 U.S.) daily, a wage which perhaps more nearly represents the average income in Libya. Many factors affecting nutrition other than the economic ones varied from area to area. The data by location, therefore, give an accurate estimate of the nutritional status only of the specific population represented. However, despite the statistical deficiencies of the survey of civilians, the findings of inadequate nutrition among all civilian groups studied were so prevalent that one may assume that the nutrition among Libyan civilians taken as a whole is of borderline adequacy.

The general objectives of the survey were to determine the dietary intake and the prevalence of malnutrition as evidenced by signs, both physical and biochemical, which are related to nutritional status. These three approaches - dietary, clinical and biochemical - to the problem give more meaningful information than any one alone. The findings of the physical

examinations in Libya by themselves are considerably less indicative of the inadequate nutritional state of the population than when they are studied together with the biochemical data. Dietary intake and nutrient consumption studies constitute an essential phase of any complete nutrition survey. They yield information on food patterns, how the diets compare with existing standards and where to look for inadequacies. In addition, the same data provide basic information necessary to plan changes in nutritional practices or to modify existing economic, agricultural and food management policies and programs to assure the best use of available food supplies. It must be recognized that the data on dietary intake represent only the situation at a given, limited time. Seasonal variations in food intake and other dietary practices occasioned by custom, religion or taboos may alter significantly the nutritional status of the individual for better or worse. The physical signs reflect mainly long term dietary habits while biochemical data correlate best with more recent food intake. Taken together they provide a basis for estimating the nutritional status of population groups.

Almost any population group, even a well nourished one, will show some of the physical signs as given in Appendix 4. Even though the average intake of a nutrient may be adequate, there will be individuals with higher requirements or individuals who consume less than average amounts and thus are deficient or borderline with respect to the nutrient. Furthermore, few of the physical signs in mild form are "specific" or "diagnostic" of a particular nutrient deficiency, since they may be produced by nonnutritional factors or by any one of a group of nutrient deficiencies. For example, the high prevalence of nasolabial seborrhea among those living in the desert suggests that this finding was due in part, at least, to the wind, sun and dust rather than to inadequate dietary riboflavin. Certain ocular signs of nutritional deficiency cannot be interpreted with certainty when trachoma, bright sun, strong winds and dust are prevalent, since these influences may result in conditions resembling these particular signs. Certain of the physical signs listed are included because they have a relation to general health with but possible secondary nutritional implication. Furthermore, it is known that physical signs of nutrient deficiencies come and go unpredictably in mild deficiency states. In spite of these limitations, it is well established that the prevalence and severity of these physical signs <u>in population groups</u> have diagnostic significance as to the average nutritional state of the group, especially when considered together with dietary and biochemical data.

The dietary intake in Libya was generally inadequate in calories, particularly among many of the civilian groups studied. Since work output within certain limits is dependent on caloric intake, the calorie level of the Libyan diet bears a direct relation to the productivity of the people. From the limited information collected, the average diet of Libyan civilians seemed inadequate in most of the vitamins. The diets of the Army and Police and Defense Force units were borderline to inadequate in many of the vitamins on the basis of calculated intakes. While these deficiencies were not always dramatized by overt physical signs at the time of the survey, physical evidence of nutritional disturbances might quickly appear if the work load on the individual were increased or if food became less plentiful.

Vitamin C (ascorbic acid) nutriture was poor, particularly in the Provincial Police and Defense Forces. The serum concentrations of vitamin C were extremely "low".[1/] Petechial hemorrhages around flea bites, red and swollen gums and peridontal disease were widespread. In the Army unit at Zavia where the gum lesions were less frequent than elsewhere, serum vitamin C levels were well above the average.

Thiamine (vitamin B_1) intakes based on chemical analyses of the diet were particularly "low" in the Cyrenaican Defense Force (0.27 milligrams per 1000 calories). Experimental thiamine deficiency has been produced in man with thiamine intake levels of from 0.185 to 0.22 milligrams per 1000 calories. A high percentage of those examined had "low" urinary excretion of thiamine. From this standpoint civilians living in urban areas (Tripoli, Bengasi) had poorer thiamine nutriture as contrasted to the rural dwellers (Table 30). This may be related to the consumption of highly refined imported flour available in urban markets. When highly refined wheat flour is produced, much of the thiamine originally present in the grain is discarded. The use of less refined flour would improve the thiamine nutriture.

Riboflavin intakes were adequate in the Army but "low" in the Police Forces and "deficient" in the Cyrenaican Defense Force. The levels of urinary riboflavin were normal and did not reflect the "low" dietary intake. This unusual finding may be related to "low" thiamine intake since this same peculiarity has been noted in other countries such as the Philippine Islands where thiamine intakes were "low". Physical examination revealed some signs of lack of riboflavin in the Army and Police and Defense Forces and particularly among civilian women.

Further research is essential on a number of problems revealed by the survey for which answers are not readily available. Examples of such problems are listed below with the hope of encouraging assistance from the cooperating nations and organizations interested in assisting Libya and clarifying problems in nutrition. They are:

1. A high percentage of enlarged livers was found among those examined, particularly among the civilians. Available data are not adequate to determine the exact cause. The problem is serious enough to warrant a study directed at determining the etiology of this condition.

2. A fairly high percentage of goiters was found in the women of the Garian area. The cause of goiter in most instances is lack of iodine. Therefore, with diagnostic studies, the cause might be determined and if found to be lack of iodine, the problem might readily be eliminated.

3. The serum vitamin A levels were very "low" in many of those examined in spite of the fact that the carotene levels were "high". Further investigation is needed to determine if this is due to a metabolic disturbance interfering with the conversion of carotene to vitamin A or to the intake of a colored pigment which interferes with the carotene estimation. Analyses of the composite food samples revealed a pigment which was initially recorded as beta-carotene, but later was separated from beta-carotene by chromatographic studies.

1/ Terms "deficient", "low", "acceptable" and "high" - See Appendixes 2 and 3.

4. Trachoma is prevalent throughout Libya. A possible relationship between nutritional deficiency and trachoma could be studied to advantage.

5. Children under four years of age appeared in poorer health than those from four to fifteen. Whether this is due to survival of the fittest, or to a possible improvement in nutrition in relation to need after four years, is a problem worthy of investigation.

6. The relationship between diet, serum cholesterol level and coronary heart disease should be thoroughly studied in the population as soon as possible. Both the intake of fat and the serum cholesterol level are much lower than those in the United States. Dietary intake in Libya will change over the next 20 years, and the rate of coronary heart disease should be closely followed.

7. N'methylnicotinamide (excretion product of niacin) in the urine was "low" in most instances even though the dietary intake of niacin was "acceptable" and physical signs indicative of pellagra were not found. To properly evaluate these findings in a predominantly cereal-eating population, numerous factors need investigation, such as tryptophan metabolism, possible excretion of another niacin metabolite and determination of niacin saturation.

THE NUTRITION SURVEY

Organization

The United States personnel of the Nutrition Survey Team consisted of two nutritionists, four clinicians, one medical consultant, two dentists, three biochemists, one dietician and a food technologist. In addition, two physicians, two biochemists, four clerk-interpreters, four laboratory assistants and six dietary assistants were assigned to the team from the Federal and Provincial Government services to work with the United States team members.

The base laboratory was established in the Libyan-American Joint Services Building, Federal Compound, Tripoli. All laboratory equipment and supplies were furnished by the United States.

The survey consisted of physical, biochemical, dietary and food production assessment.

Background Information

After centuries of successive domination by Egyptians, Phoenicians, Greeks, Romans, Vandals, Byzantines, Arabs, Spaniards, Turks and Italians, on December 24, 1951, Libya became an independent nation. The new United Kingdom of Libya is a constitutional monarchy under King Idris consisting of the federated provinces of Tripolitania, Cyrenaica and the Fezzan.

Libya is situated on the northern coast of Africa, and is bounded on the East by Egypt, on the West by Tunis and Algeria, and on the South by French West Africa, Equatorial Africa, and the Sudan. It is almost one fourth the size of the United States. The climate of a narrow strip of Libya's Mediterranean coastline is like that of southern Italy with the annual rainfall reaching 24 inches in some places. The interior is largely a vast desert, except for scattered cases, where daytime temperatures are commonly above 100° F. and the annual rainfall averages below two inches. Rainfall is erratic in Libya and serious droughts occur in parts of the country every year. Lack of water is a major problem, and this is aggravated by the "ghibli", a sand-laden hot wind-blowing from the Sahara.

Over 90 percent of the population of about 1,200,000 lives in the narrow coastal belt stretching to the two low-mountain areas near the coast, the Gebel Nefusa in Tripolitania and the Gebel el Akhdar in Cyrenaica. Beyond the Gebel is the Sahara. About half of the population is nomadic or semi-nomadic. Arabs are the dominant ethnic group and about 95 percent of the inhabitants are Moslems. There are approximately 40,000 Italians in Tripolitania, living mostly in and around Tripoli. The literacy rate in Libya is approximately 10 percent.

Of the total area of Libya, only some five percent is agricultural land. Less than one third of this is under cultivation in any given year, the rest remaining fallow or providing grazing ground for livestock. There is a lack of natural resources, including minerals and ores, and a shortage of domestic capital and skilled labor. Present industries are confined to handicraft and local food processing. Large scale oil prospecting is in progress and the

first oil strike some 560 miles inland from Tripoli was announced late in 1957. Animal husbandry is the main occupation of the majority of inhabitants and the country's main source of income. Growing of cereals, especially barley, is the next most important income source. Other important cash crops are olives, dates, almonds, citrus fruits and esparto grass.

The per capita share of the gross national product is only $90.00 per year (1955) indicating low purchasing power. The value of imports in recent years has been threefold that of exports. A substantial part of Libya's food supply is imported (Table 1) whereas food exports in 1955-1956 with minor exceptions consisted of 10,000 metric tons: peanuts, 6000; olive oil, 2000; mutton and goat meat, 1000; and fish 1,000.

Since World War II, Libya has been receiving substantial foreign aid, in the form of grants and technical assistance. Foreign economic and technical assistance will be important in the continued development of Libya for some time to come.

During the past seven years, Libya's resources and potentials have been extensively studied. As a result, some excellent and detailed reports are available on all phases of the economy, including agriculture and agricultural development programs, food production and processing prospects, export possibilities, etc. Some of the key reports are listed in Appendix 1.

Procedure

1. Selection of Sample:

a. Army, Police and Defense Forces

During the period of survey, 1,185 enlisted men of the Army and 1,014 men from the Police and Defense Forces were examined at different camps and training centers. The sample was designed to include Army, Police and Defense Forces located in the three provinces. All the enlisted men at each of the Army or Police camps or schools selected were examined. Approximately one fourth to one half of the total Armed Forces and Police were examined. Of the Army examinees approximately 48 percent were new recruits who were just completing three months basic training, and only 20 percent had been in the Army longer than two years. All the recruits at the Susa Recruit Training Center were examined. The total tabulations for the Army, therefore, are based to a great extent on personnel who have been in the service for a relatively short time.

One out of two or three of the subjects examined in detail was examined biochemically by analyses of blood and urine samples except at Susa where only one in six was examined biochemically.

b. Civilians

Through discussion with appropriate governmental agencies, groups of people were selected from the civilian population who fulfilled two criteria among others: (1) they were willing to be examined; (2) they were a relatively

homogeneous sample of the population they represented. Selections for examination were made to include the following: (1) people from each of the provinces (Tripolitania, Cyrenaica, Fezzan); (2) individuals of both sexes; (3) those of various age groups; (4) both urban and rural dwellers; (5) coastal, Gebel (mountain) and desert populations; (6) different economic classes; (7) pregnant as well as nonpregnant women. Since the schools were closed during the months of the survey, it was not possible to assemble groups of school children. Hence, only 120 boys and 13 girls between the ages of 5 and 15 were examined. The Food and Agriculture Organization of the United Nations, however, had previously made a survey on the nutrition of the school children. 1/

One out of every two or three men examined in detail was also examined biochemically with the exception of men at Bengasi where only abbreviated examinations were done and only one in five had blood and urine analyzed. Approximately one in six of the women given detailed examinations had blood drawn and urine collected for analyses. Where the examinees were few in number and at the locations where only pregnant women were examined, either all or one out of two were studied biochemically. In some instances, as with the government workers in Bengasi, the first men reporting were selected for blood and urine examinations in order to meet plane transportation schedules instead of a systematic selection throughout the whole day's sample.

The sample was as follows:

ARMY AND POLICE AND DEFENSE FORCES

Army		Police and Defense Forces	
Zavia	198	Tripoli	428
Bengasi	370	Sebha	179
Susa	577	Bengasi	399
Sebha	40	Federal Police	8
	1185		1014

CIVILIANS

Men		Women	
Beni Ulid	150	Pregnant	61
Garian	126	Nonpregnant	303
El Guasem	52		364
Tripoli	307	Girls	
Bengasi	194	(5-15 years)	13
Sebha and Temenhint	200	Boys	
	1029	(5-15 years)	120
		Infants (1-36 mo.) Boys and Girls	103
			236

Total physical examinations = 3828

1/ Reference 4 in Appendix 1.

2. Dietary Intake Surveys:

a. Army, and Police and Defense Forces:

The average amounts of each food item consumed per man per day during five two-day periods and one three-day period were measured at three Army messes (including the recruit training center at Susa) and the three training centers for the Provincial Police and Defense Forces. The amount of food consumed per man per day in canteens based upon average food sales was estimated in five of the six installations surveyed. Each camp or school had only one kitchen for the enlisted men. Since the foods varied very little from day to day, the two-to-three day study was considered adequate.

Rations were drawn daily and nearly always disposed of the same day. The cooking and messing procedures were quite simple and hence direct weighing was employed to determine the quantities of food prepared for each meal. Food prepared but not served and plate waste were also weighed. Breakfast invariably consisted of tea and bread. Lunch and dinner consisted of one main dish (such as stew), bread, tea and occasionally a fruit. The number of men messing at each meal was determined by two independent counts. These counts included men on guard duty, infirmary patients and any other individuals who obtained food from the mess. An estimate was obtained of the food purchased in the post canteen at each camp with the exception of the camp at Sebha.

Nutrient intakes were computed using the food composition tables in Handbook No. 8 published by the U. S. Department of Agriculture, June 1950. Losses of nutrients due to cooking were applied as listed in Appendix 5.

A composite ration for one day at each mess surveyed was collected for subsequent chemical analysis. The portions for each meal were taken from the serving line and 5 percent oxalic acid solution added. At the end of the day enough additional 5 percent oxalic acid solution was added to permit ready homogenization of the whole ration in a Waring Blendor. After weighing and thorough mixing, 20 percent of the total homogenate was transferred to a plastic bottle and forwarded to the United States for analysis by the laboratories of the Wisconsin Alumni Research Foundation.

b. Civilians:

Whenever possible, some of the civilians who were given physical examinations by the clinical section of the team were interviewed regarding their food intake. A total of 172 persons was interviewed, including 144 women and 28 men, living in Suk el Giuma, Garian, El Guasem (Tripolitania), Bengasi, Barce (Cyrenaica), Sebha and Temenhint (Fezzan). These data are useful in identifying food habits and customs, but in this instance do not lend themselves to quantitative interpretation.

3. Physical Examinations:

The physical examinations were conducted in general according to the procedure set forth in the "Manual for Nutrition Surveys", Interdepartmental Committee on Nutrition for National Defense, February 1957, for military

populations and the National Research Council Bulletin No. 117, for civilian populations.

Two types of physical examinations were performed; namely, (a) detailed examination covering over 60 items of possible nutritional significance, and (b) an abbreviated examination covering only the major items of nutrition significance. Choice of individuals from the sample for the abbreviated and detailed examinations was, as a rule, systematic. Circumstances permitted only abbreviated examinations of the civilian men in Bengasi and of the women in Temenhint. Detailed examinations were done on all the pregnant women and on all the women examined in Bengasi and Barce. Most women, therefore, received detailed examinations. Children were given abbreviated examinations modified to include nutritional disease signs common to their age group. In the Army, Police and Defense Forces as well as at most locations where civilian men were examined, one out of every five individuals was given a detailed examination.

Height without shoes was recorded to the nearest inch. For the Armed Forces, weight in undershirts and shorts only, without shoes or other clothing, was recorded to the nearest pound. Where the measurement was exactly on the half pound or half inch, it was recorded to the nearest even number. Civilian men were often weighed partially clothed. The weight of the clothing (two to five pounds) was deducted from the total observed weight. Women were weighed fully dressed, and a standard correction of 8 pounds for clothing was deducted. Infants were not clothed when weighed.

The age of individuals, particularly of the group over 30 years of age, cannot be considered to be known with exactness. Approximately 30 percent of the civilian men in this group have ages listed as ending in zero and 19 percent as ending in five. The fact that ages are not known with accuracy must be considered in making comparisons with known standards.

For a basis of general comparison, standard weight for adults was taken from the modified U. S. Medico-Actuarial Tables.[1/] Children of the ages five to fifteen were compared to Baldwin-Wood Tables [2/] and infants compared to Stuart's graphs. [3/]

1/ U. S. Medico-Actuarial Tables came from insurance data during the years 1880 to 1895. These tables, for both men and women, were adjusted to nude weight and no shoes (1 inch and 5 pounds deducted from each height-weight category). The ICNND uses these adjusted tables as a standard of reference.

2/ From Heights and Weights of Children and Youth in the United States, Home Economics Research Report No. 2, U. S. Department of Agriculture, October 1957, "as presented in Mother and Child, suppl. to July issue, 1923."

3/ Stuart's Graph was developed by Dr. Harold Stuart, Professor of Maternal and Child Health, School of Public Health, Harvard University, from a study of U. S. Children. (1947)

A total of four U. S. physicians assisted in the survey, but usually no more than two of these were active at any one location. In addition, two physicians and four clerk-interpreters were assigned to the team by the Libyan Ministry of Health. The physician for personnel of the Tripolitania Police Depot, the Deputy Director of Medical Services in Cyrenaica, the physicians for Army personnel and for the Cyrenaican Defense Force Depot in Bengasi also assisted in the examination of their particular units or personnel in their area. Several female physicians participated in the examination of women and children in Tripolitania and Cyrenaica. Two dental officers from the U. S. Air Force were assigned to the survey team. One performed dental and oral examinations at some locations in Tripolitania and Cyrenaica and the other at all locations in the Fezzan.

The contribution of differences in examiner standards must be weighed in any evaluation of the prevalence of a given sign when one location is compared to another. Abbreviated examinations were performed by the same U. S. physician on almost all the men of the Army and Police and Defense Force units as well as on the majority of the civilian men. Other U. S. physicians did the abbreviated examinations on the women, infants and on some of the civilian men. In the Susa Army, Barce women, and Bengasi civilian male examinations, differences in examiner standards were reduced by having all points of each detailed examination checked by the same U. S. team physician.

Throughout the survey a number of physicians recruited locally were attached temporarily to the team. Frequently they could be briefed for only a few minutes before they started to perform their portions of the examination. These physicians assisted in the detailed examinations. They were usually assigned to perform the more objective portions of the examination (e.g. pulse rate, blood pressure, and general examination of the skin) while those portions requiring subjective interpretation were performed by a team physician who was assisted at times by a U. S. A. F. dental officer.

4. Biochemical Determinations:

Ten separate laboratory determinations were made on the blood and urine obtained. Blood was analyzed for hemoglobin, hematocrit, plasma protein, vitamin A, carotene and ascorbic acid. Urine samples were analyzed for creatinine, riboflavin, thiamine, and N'methylnicotinamide. All of these analyses were done at the base laboratory in Tripoli, with the exception of a few determinations of blood specific gravity done on samples from children in the field.

Samples collected in Tripolitania were transported by automobile to the base laboratory within one to eight hours after collection. Samples obtained in Cyrenaica were refrigerated and held for the first available commercial or military flight to Tripoli. In general, samples were in the laboratory within eight hours of the time of collection with the exception of two occasions when it was necessary to hold samples in Bengasi for more than 24 hours, due to lack of transportation.

The "vacutainer" technique was used for the collection of blood. Approximately 5 milliliters of oxalated (Heller and Paul ammonium and potassium oxalate mixture) blood was used for the hemoglobin, hematocrit and plasma protein determinations. Vitamin A, carotene and ascorbic acid were determined on the serum from about 20 milliliters of clotted blood.

Blood and urine samples were collected in the morning (post-absorptive) in all areas, except in Susa and Sebha. The samples obtained from the Army at Susa and the Sebha Police unit were six-hour fasting samples collected between midnight and 6 A.M. After measuring urine volume, 50 milliliter dark brown bottles, containing 0.2 milliliters of concentrated hydrochloric acid were filled with urine and returned to the laboratory for analyses. Calculations were based on quantities of metabolite per gram of creatinine excreted.

All analyses were conducted according to the procedure outlined in the ICNND "Manual for Nutrition Surveys". Reduced ascorbic acid was determined by the Mindlin and Butler dye method. Evaporation of the petroleum ether in the analysis for vitamin A was accomplished by carefully heating the small colorimeter tubes in a water bath at approximately 40° C.

A total of 313 blood samples from adults was analyzed. There were 144 samples obtained from Police and Army units, 66 from male government workers, and 103 from male and female civilians. A corresponding number of urine samples was analyzed. In addition, 34 samples of blood were drawn from children for estimation of hemoglobin by blood specific gravity determination.

5. Collection of Ancillary Data:

Discussions were held with physicians working in Libya who were particularly interested in problems of nutrition and with various U. S. and Libyan specialists who were involved with work output and efficiency of labor forces, performance of school children, health of the population and aspects of food purchasing, production, distribution, storage and consumption. Patients were examined in the hospitals; laboratories were visited and observations were made on Libyan patterns of eating, food habits, sanitation and environmental health.

Additional information was obtained from the United States Air Force Medical Service which has over the past years carried out pre-employment physical examinations on Libyans seeking work at Wheelus Air Base.

Findings

1. Agriculture and Food Production:

According to most observers, agriculture is Libya's biggest potential. Yet today and for some years to come much of the effort will have to go into conservation and better utilization of water and soils. Soil erosion and drifting sands have resulted from centuries of over-cutting, over-grazing, and over-tilling, followed by diversion to the grazing of goats or even abandonment. Reconstruction and development are in progress on a wide front. In 1956 a committee including representatives from Libya, the United Nations and the United States drafted a six-year plan of development, the various projects falling under public works, agriculture, water resources, electric power and health. Education and training programs are the necessary bases for all these activities and progress will of necessity be slow. The rate of progress cannot be greatly increased until general basic education reaches a larger proportion of the population.

Since there are many good discussions available of the agricultural economy of Libya and of the various development programs (Appendix 1), only brief observations are presented.

Native agricultural methods, for the most part, are primitive; they provide a minimum subsistence and in time of drought Government relief becomes essential. Only a very small portion of the agricultural population applies modern practices in crop and livestock production.

It is estimated that 80 percent of Libya's inhabitants are engaged in agriculture. Livestock production is of major importance. Sheep are by far the most numerous (1,390,000 in 1951), followed by goats, cattle and camels. The native Barbary sheep are fat-tailed and withstand the hot dry climate well. An extensive sheep improvement program is under way. Besides wool, sheep furnish meat, milk, butter and cheese. Swine are raised by the Italians. The use of proper breeds, supplemental feeding and the prevention of over-grazing are major needs of the animal industry. Since Libya's greatest asset is its natural grazing land, range improvement is important although difficult due to the lack of water and nomadic life of the desert population.

Barley is the principal cereal grown and constitutes the main food supply of the population; only about one tenth as much wheat as barley is grown, but year-to-year variations in production are enormous. For instance, barley production in 1947, 1948 and 1949 amounted to 22,100, 62,300, and 177,400 metric tons, respectively. Average per acre production is low, but the Libyan farmer does not think in terms of yield per unit land. Seed generally is spread thinly to reduce risk, to save water and to induce branching in the free-standing plants. The yields are measured in fold-return of the seed sown and are low by most standards. Millet and sorghum are grown in some gardens.

The 1957 harvest was reported to be sufficiently good even to provide a slight surplus of wheat. The situation concerning bread grains is complicated by the importation of considerable quantities of refined (highly milled)

flour which was cheaper at the time of the survey than local wheat.

Olives are grown mainly under dry conditions in the coastal belt and in the low mountains of Tripolitania and Cyrenaica. Dates are extensively grown and are consumed locally or used for the distillation of alcohol. In famine years dates constitute a substantial part of the diet of many Libyans. The production of citrus fruit, tomatoes and grapes is increasing. Strawberries, peas, beans, and cauliflower are grown in home gardens and marketed in small quantities. Potato production is being increased significantly. Improvement is needed in the quality of peaches, apricots, plums and figs if their export possibilities are to be realized. The improvement and testing of varieties is pursued in many places in Libya, but the whole field of horticulture warrants additional effort both from the standpoint of national nutrition and in order to facilitate the development of the basic food processing industries.

Approximately two fifths of the locally produced milk is from goats, one third from sheep, one fifth from cattle and one twentieth from camels. Dairy production is low and is decreasing. Meanwhile, large quantities of canned milk, butter, cream and cheese are imported. Stock improvement and provision for adequate fodder are the major problems of milk production. Poultry production is promising.

Lack of trained fishermen is one of the limiting factors in the development of the fishing industry. Considering the long coastline, the catch is small and much of that is exported to Italy and Egypt.

The current development program touches most of the mentioned phases of agriculture as well as well as agricultural research and extension. Libya is still dependent on foreign sources for a considerable part of its food requirements. This dependence on outside food may increase if domestic production does not keep pace with the growing population. Today, wheat and other cereals and all of the sugar are imported from overseas. Table 1 illustrates this dependence on food imports and indicates the average calculated availability of food per person per day. Importing food may in some instances be cheaper than raising it in Libya, but in time of an emergency it might be difficult to obtain what could be imported economically in peacetime.

2. Food Processing:

The almost universal need for irrigation, together with the high summer temperatures, puts a serious limitation on fruit and vegetable production. The production of fruits, other than olives and dates, is very low and there is no local excess which could be preserved by canning or other means of food processing. Olive production and utilization is well developed in Libya and there are some 30 modern olive oil pressing plants in operation in addition to many primitive types of presses. The only date packing plant is that established by the Government in Tripoli, and the whole production of this plant now consists of compressed dates for use in the school feeding program.

There is only one tomato paste factory in Libya, the El Mansura plant in Tripoli. Tomato production is being increased considerably. It was hoped that in 1957 this plant would produce some 1,450 tons of paste. This would almost entirely satisfy the domestic requirements which now are met almost entirely by imported paste. However, much remains to be done to attain the production of large lots of uniform tomatoes, a prerequisite of efficient paste production. The factory was clean and well-operated and a promising enterprise. It must be realized that tomato growing is a much shorter-range undertaking than tree fruit production and, therefore, the success of the tomato paste cannery cannot be taken as an indication that a successful cannery for tree fruit could be operated for the domestic and export market.

Libya has four modern flour mills and (in Tripoli) eight macaroni factories, some of these with the most modern type equipment. Two breweries, some wineries and some small tunny and sardine canning factories complete the list of food processing plants. A visit to one of the sardine factories in Tripoli revealed lack of sanitation and cleanliness. No doubt the recently established training school in Bengasi for sanitary inspectors and engineers will lead to eventual improvements in such matters.

In spite of prospective increases in fruit and vegetable production in Libya, it seems too early to think in terms of processing industries for these products. First of all, much of the increased production of fruits and vegetables will be consumed in fresh form by the local population. Only when production attains a level to assure an adequate supply for processing will the establishment of a processing plant be warranted, and then only if there seems reasonable certainty of a profitable domestic market for the products. To count on any substantial volume of exports of processed foods in the near future seems premature for the following reasons: (1) the lack of large lots of uniform product, (2) the lack of adequate transportation and storage facilities, (3) the uncertainties of year-after-year production, (4) the lack of assurance of quality and (5) the keen competition from many other countries with well developed processing industries and foreign markets. At present Libya's best hope seems to be the off-season foreign fruit market but even here much remains to be done in product uniformity, quality and marketing arrangements. There are several excellent reports dealing with this subject (Appendix 1).

Preserved foods are usually an important part of military feeding and are essential for the development of field rations. Substantial research and development will be required to realize Libya's potential for producing such items.

Findings (Continued)

3. Nutritional Appraisal:

a. Libyan Army

(1) Dietary Intake

(a) Food Habits and Supply. Food habits are relatively simple. The main item for lunch or dinner is a thick soup or stew which may contain several ingredients such as macaroni, fat, tomato, onion, potato and spices. If meat is available, it is cooked in the same pot but removed and served separately. Bread and sweetened tea are the other mainstays of the diet. There are no widely held taboos on food except the religious objection to pork. Canned milk, tea, sugar and flour used in military messes were all imported and were, therefore, rather expensive. Local supplies of fruits and vegetables were inadequate for the demand and as a result prices were high.

(b) Official Ration. The Libyan Army official ration is listed in Table 2 and its computed nutrient content is presented in Table 3. The list of foods comprising the official ration was published at intervals of six months and bids were invited from interested contractors. A contract to furnish food for a certain army unit, e.g., the recruit training center at Susa, was awarded to the lowest bidder. The ration cost in the Army varied from approximately 10 to 13 piasters (U.S. 28 to 36 cents) per day and was deducted monthly from the soldier's pay. The official ration was evidently fixed some time in the past and has not been changed from one year to the next. There is neither a medical nor a quartermaster corps in the Army and hence no group with a particular responsibility in messing and its associated problems. Usually the noncommissioned officer in charge of the mess purchases food locally. In neither Army nor Police and Defense Forces was there much interest in mess operations among the commissioned officers. In both the Army and Police and Defense Forces the Duty Officer (Officer of the Day) tastes the main dish at lunch and dinner, and is also responsible for checking the weights of food issued against the official list. On two occasions it was possible to recheck these weights on scales of the survey team and they were generally found to agree. At Zavia (Army) the contractor's scales were actually giving the mess an overage of 1.4 percent on all weighed items. In general the system of supplying food by contract appeared to function satisfactorily. It would be desirable to consider establishment of a food supply and service section under jurisdiction of a quartermaster.

(c) Messing Procedures. Cooking is almost invariably done in large copper pots which are tinned on the inside, but none of the pots examined had an intact coat of tin. Exposed areas of copper in contact with hot food may result in destruction of some nutrients. With the exception of an oil-fired stove in the Tripolitania Police Training Establishment, the stoves were all of masonry construction and burned wood. A great deal of smoke escaped into the kitchen, causing irritation of the eyes of kitchen personnel and leaving the walls dark and sooty. Food was frequently cooked three or four hours when half of that time would have sufficed.

Serving of food was simple and generally satisfactory except for the heterogeneous mess gear. Only a cup, spoon and bowl or plate were required to accommodate the food as served. All sorts of containers from china plates to wash basins were used for the main dish and some individuals had none and shared a bowl with a friend. Sharing a single cup of tea was also not an uncommon occurrence. Soldiers were not encouraged to return for second helpings of food. On several occasions significant quantities of prepared food were discarded when it could and should have been offered to the men (Table 7).

In mess sanitation the greatest single defect was the lack of hot water. With the sunshine available in Libya, solar water heaters, if inexpensive and practicable, could solve this problem. Kitchen utensils, mess gear and floors in kitchen and mess hall were cleaned with cold water, with little or no soap or other cleanser. Flies were numerous and screens are generally nonexistent or badly damaged. There was a tendency to use insecticide spray rather liberally with little regard as to whether the spray contaminated the food. Garbage was often left lying in the open and collections seemed to be made at irregular and infrequent intervals.

(d) Nutrient Intake.

Mess Surveys. The calculated average nutrient intake per man per day in the Army units surveyed is shown in Table 4. It will be observed that the intake of water soluble vitamins, as calculated from food tables, was "low" with the exception of niacin which was "acceptable." Calculated intake of beta-carotene was "deficient" or "low". Protein intake was "acceptable". Specific food consumption of the units is shown in Table 6. The consumption of canned milk was only 68 to 80 percent of the 93 grams per day authorized (Table 2). Increasing the milk consumption to the full quantity authorized would make important contributions to the riboflavin and calcium content of the diet. Although this increase would be small, if accomplished it would add to the daily food intake approximately 50 milligrams calcium, 1.5 grams high quality protein, 0.01 milligram thiamine, 0.07 milligram riboflavin and 80 International Units of vitamin A. The consumption of potatoes in two units was 33 to 65 percent below the 60 grams authorized. Also, the full allowance (100 grams) of fresh vegetables was seldom used. The vitamin and mineral intake would be improved if the authorized quantities of the above items were consumed.

As indicated in Table 7, food waste was not excessive except for bread at breakfast when no other solid foods are served. Waste of the main food item at lunch and dinner was excessive in the unit at Zavia. If the authorized quantities of milk, potatoes and fresh vegetables were consumed and food waste reduced, the diet for the Army would be generally acceptable.

In Tables 9 and 10 the chemical analyses of one-day food composite samples, along with corresponding values obtained by calculation from food tables for the two to three day survey, are recorded. It is evident that with few exceptions the analytical values are somewhat greater than the values obtained by calculation. Only in the vitamin A and niacin content of certain samples the analytical values were lower than calculated values.

There are several possible explanations of these variations: (1) The calculated values include cooking loss corrections which may be in excess of those actually encountered with Libyan military cooking procedures; (2) The sample obtained for analysis was for only one day and thus may not be representative of the ration served during the entire mess survey; (3) Water used in homogenizing the sample undoubtedly contributed calcium and iron; (4) The assumed values for various foodstuffs used in calculation of dietaries may not be entirely applicable to Libyan foods.

If the calculated values and the analytical values of the food composite are scored as "deficient", "low", "acceptable" and "high", according to Appendix 2, it is apparent that the discrepancies rarely are greater than one category in score (Appendix 6). This suggests that the differences between the calculated values and the analytical values are not great enough to warrant differences in interpretation. If the cooking losses are minimized, the differences in score are also minimized. The one exception is in niacin levels where three out of five analytical values were lower than calculated values.

Mean fluoride level of water samples from 20 wells in the Tripoli area was 0.63 parts per million. 1/ Only one well had a fluoride level greater than 0.8 p.p.m. This value was significantly greater than the average and more samples are being analyzed. Chemical analyses for fluoride on the five composite food samples, to which only small amounts of water were added, ranged from 2.1 to 4.2 milligrams of fluoride per person per day. This is four to eight times the common intake in the United States. 2/

(2) Physical Findings

None of the 1,185 soldiers examined was found to be suffering from far-advanced nutritional deficiencies. However, a number of men had physical signs which have been associated elsewhere with less than adequate intakes of certain vitamins as well as total calories. The percentage of troops with the various physical findings is given in Tables 19 and 20.

Height and weight data are given in Table 11. The mean height of the soldiers examined was 66.2 inches. Troops at Zavia were shorter while those at Bengasi and Sebha were taller than the mean for the Army. The mean weight was 133.1 pounds, which is equivalent to 96.4 percent of "standard weight" when compared with the adjusted (to nude weight, no shoes) U. S. Medico-Actuarial standard. The percent of "standard weight" was lowest in the desert at Sebha in the Fezzan (95.0 percent) and highest at Zavia (98.3 percent). While only 4.4 percent of all troops were over 110 percent of "standard weight", 20.4 percent were under 90 percent of "standard weight". Only 13 soldiers (1.1 percent) were less than 80 percent of "standard weight".

1/ Preventive Medicine Section, 7272D USAF Hospital, Wheelus Air Base, Tripoli.
2/ F. J. McClure, Public Health Reports, 64, 1061-1073 (1949).

No magenta tongues were observed, but angular lesions of the lips occurred in 3.7 percent of those given abbreviated examinations and 5.7 percent of those undergoing the detailed examinations. There were a few cases of scrotal dermatitis. Nasolabial seborrhea was one of the most frequent findings and was much more common and more severe in the regions of Susa and Sebha than in any other areas surveyed, suggesting that this finding was due in part, at least, to the wind, sun and dust. However, these findings do suggest early ariboflavinosis in a few individuals.

Marginal redness and swelling of the gums were very common. Occasionally hypertrophied, reddened, edematous gingivae were seen from which a purulent exudate could be expressed and which bled at the slightest provocation. The majority of such individuals had heavy calculus. Little attention, as a rule, had been given to oral hygiene. Gum lesions were not as common at Zavia. Serum vitamin C levels were higher here also. This area, however, is in the center of the best agricultural land in Libya where oranges and other sources of vitamin C are more readily obtained. Scurvy with its typical gum signs was not seen during the survey.

The dental caries rate was moderate. Few large cavities were seen. Malposition of the teeth occurred infrequently. Mottled teeth were commonly found in Bengasi and in the Fezzan. This may sometimes be due to fluorosis. Mottled enamel was common in the teeth of Italians surveyed by Massler in Italy soon after World War II, even though the fluoride intake was not very high (1.3 parts per million). Calcium intake, however, was very low. 1/ Animal experiments have shown that mottled teeth may appear with low calcium and normal fluoride intakes. Fluoride levels in the water around Tripoli were not high, according to analyses, although there are indications that they are higher in certain other parts of the country. Composite food samples, however, were high in fluoride (Page 21). Teeth from the Bengasi area are now being analyzed for their fluoride content.

There was a fairly high prevalence of liver enlargement (4.5 percent). Ankle edema and parotid enlargement were not seen among the soldiers. In the Army only one case of enlarged thyroid was seen. Out of a total of 244 examined, blood pressures were elevated about 140 millimeters mercury systolic or 90 millimeters mercury diastolic in only three of 74 soldiers located at Bengasi (Table 23).

Loss of ankle jerks (0.1 percent in abbreviated examinations and 0.4 percent in detailed) or calf tenderness (none in abbreviated and 0.4 percent in detailed examinations) was found in very few soldiers.

The prevalence of follicular keratosis was not high in the abbreviated examination. Greater prevalence in detailed examinations probably reflects the difference in examiner standards. Neither pellagrous lesions nor xerosis was observed.

1/ Massler, M. and Schour, I., Journal of the American Dental Association, pp. 156-165, February 1952.

The Susa recruits formed that segment of the military population most recently removed from civilian life. In theory, therefore, they should have shown signs of their transition from civilian to military nutrition and environment. An appraisal suggests either that the transition had in most respects been completed during their three months of training or that only those civilians with good nutriture had been selected for military careers. Among the few objective findings compatible with a state of transition were a higher than average prevalence of nasolabial seborrhea and the lower average body weight associated with average height.

(3) Biochemical Findings

Interpretation of the various analyses of blood and urine is based on the suggested guide outlined in the "Manual for Nutrition Surveys", 1957. (Appendix 3).

In general, the biochemical blood findings (Table 26) indicate that in this group serum carotene and plasma protein were "satisfactory".

Ten and four tenths (10.4) percent of the soldiers were found to have hematocrits less than 41 percent and none was less than 36 percent. A number of soldiers showed evidence of inadequate hemoglobin levels. This was most prevalent in the recruits at Susa where 10.5 percent had hemoglobin levels classified as "deficient" (less than 12 grams per 100 milliliters) with 31.6 percent more having "low" levels (less than 14.0 grams per 100 milliliters).

Serum ascorbic acid may be considered extremely low. Only four samples were found to have ascorbic acid greater than 0.4 milligrams per 100 milliliters. Thirty-two samples (93.9 percent) from the Army in Bengasi were "deficient" in ascorbic acid (less than 0.1 milligrams per 100 milliliters).

Serum vitamin A levels tended to be low with 7.5 percent having a "deficient" level of less than 10 micrograms per 100 milliliters; 13.4 percent were considered "low" (10-19 micrograms per 100 milliliters) and 79.1 percent had levels of 20-49 micrograms per 100 milliliters. In contrast to the low vitamin A levels, serum carotene values were in the "acceptable" to "high" range. No sample was found to have less than 50 micrograms of carotene per 100 milliliters and 92.5 percent had values of 100 micrograms or more per 100 milliliters. This was probably due to an interfering carotenoid pigment. After the survey was completed, it was found, upon analysis of the composite food sample by the regular carotene method, that the values were high. Further study revealed that these high values were due to a carotenoid pigment (not beta-carotene) apparently contributed by the red pepper. This pigment could be separated from beta-carotene by chromatography.

Because of the low vitamin A (14.7 percent of troops with less than 20 micrograms per 100 milliliters) and ascorbic acid (93.9 percent of troops having less than 0.1 milligrams per 100 milliliters) levels observed in the serum obtained from the Army at Bengasi, an attempt was made to repeat these

analyses on the same individuals. Eleven days after the initial analyses, four of the soldiers provided blood for another analysis. Vitamin A, carotene and ascorbic acid were determined on this second sample.

The following table indicates that there was little difference between the initial analyses and those made eleven days later.

	Units per 100 ml serum	Soldier 1 1st Anal.	1 2nd Anal.	2 1st Anal.	2 2nd Anal.	3 1st Anal.	3 2nd Anal.	4 1st Anal.	4 2nd Anal.
Vitamin A	mcg	31	26	26	29	20	18	21	11
Carotene	mcg	226	250	297	294	149	186	190	172
Ascorbic Acid	mg	0.03	0.15	0.03	0.02	0	0.01	0	0

Urinary excretion of riboflavin was, in general, "acceptable". No sample was considered to be "deficient" (less than 27 micrograms per gram creatinine). Two samples were found to be "low" (27 to 79 micrograms per gram creatinine)(Table 29).

Urinary thiamine excretion was "low" (less than 66 micrograms per gram of creatinine) in 45 percent of the troops. The samples obtained from the Recruit Training Center (Susa) had lower thiamine levels than other units, 31.6 percent being "deficient" (less than 27 micrograms per gram of creatinine) and an additional 52.6 percent "low". In the other areas the values bordered between "low" and "acceptable" with only 5.9 to 7.7 percent considered to be "deficient" and 15.4 to 26.5 percent considered "low", depending on location, and the remainder were "acceptable". The differences between these groups and other units may be a reflection of a lower dietary intake prior to entry into service.

N'methylnicotinamide excretion in the Army was "low" to "deficient". Only 7.6 percent of the troops had an excretion level classified as "acceptable" (1.6 milligrams per gram creatinine and above). Fifty-four and five tenths (54.5) percent of the samples of the Army were considered "low" and 37.9 percent were considered "deficient". The calculated and analytical values for daily intake of niacin at the time of the survey are "acceptable" or at worst "low". There were no physical signs suggestive of pellagra. These excretions of N'methylnicotinamide may have been peculiarly influenced by the dietary constituents. Hence, these values alone cannot be used as an argument that the diet was deficient in niacin.

Findings (Continued)

3. Nutritional Appraisal: (Continued)

b. Police and Defense Forces

(1) Dietary Findings

The training schools for Provincial Police and Defense Forces operated their messes as autonomous units and the composition of the ration was determined locally. In general their rations cost less (approximately 10 piasters or 28 cents U.S. per ration) and provided diets which were correspondingly less adequate than those of the Libyan Army.

The average calculated nutrient intake and daily food consumed per man per day at the Police and Defense Forces training schools of the three provinces are summarized in Tables 5 and 6. The calculated intake of most of the nutrients, except protein, iron and niacin, was definitely "low". The calculated intake and chemical analysis (Table 10) of the composite food sample indicates that the diet at the Cyrenaica training school was "low" to "deficient" in calcium, vitamin A, thiamine, riboflavin, vitamin C and borderline in niacin. Caloric intake at Cyrenaica was also lower than at the other units (2538 calories per man per day consumed at the mess compared to 3281 at the Fezzan training center). In general the calculated intake of vitamins, niacin excepted, was 25 to 50 percent below the quantity considered "acceptable".

The lack of an official guide for food procurement is reflected in the variation among the three establishments represented in Table 6. It would be desirable to adopt an official ration such as that of the Libyan Army or one of equal or better nutrient value. The diets of the Police and Defense Forces were low in meat, milk, fresh vegetables, and fruit.

A comparison of the data in Tables 7 and 8 indicates that food waste was much less in the Police and Defense Forces than in the Army.

(2) Physical Findings

A total of 1006 Tripoli, Bengasi and Sebha Police was examined. The mean height was 66.6 inches, mean weight, 134.3 pounds, and mean percent of "standard weight", 95.0 (Table 11). The Police in the desert at Sebha (Fezzan) were considerably lighter in weight than those of other areas, over 10 percent being less than 80 percent of "standard weight". The average percent "standard weight" of the Police was slightly less than that of the Army troops.

Angular lesions of the mouth, commonly associated with riboflavin deficiency, occurred more frequently than in the Army (Tables 17 to 20). Red, swollen and bleeding gums were common. There was a high incidence of severe attrition of the teeth in the police of the Fezzan. This finding was not limited to the Police, but was seen among all those examined in this area. This may possibly be due to abrasive materials in the food. The incidence of mottled teeth was also high in this area.

The finding of enlarged livers was frequent (6.6 percent), but ankle edema was not observed (Table 20). Blood pressures were higher among the Police at Sebha with 14.3 percent being elevated above 140 millimeters mercury systolic or 90 millimeters mercury diastolic. Pulse rates were also faster (Table 23).

The Federal Police Force is a small but efficient force. Only a few of these men, who were from the seacoast area of Tripolitania, were examined. These examinees showed no evidence of nutritional deficiencies.

(3) Biochemical Findings

The findings in the Police and Defense Forces were similar to those in the Army (Tables 26 and 29).

The incidence of low hemoglobin was approximately the same in this group as in the Army. "Low" hemoglobin (less than 14 grams per 100 milliliters) was found in 40 percent of the Sebha Police sampled. Serum ascorbic acid was extremely low; 89.7 percent of the samples in the Cyrenaican Defense Force were in the "deficient" range (less than 0.1 milligrams per 100 milliliters). Even though serum carotene of the Police was adequate, 7.8 percent had "low" serum vitamin A (less than 20 micrograms per 100 milliliters). This may indicate the presence of the same carotenoid pigment found in the diet.

Urinary riboflavin excretion was satisfactory. Thiamine excretion was particularly low among the troops of the Cyrenaican Defense Force, 25 percent being "deficient" and 50 percent "low". This was similar to the findings in the Recruit Training Center at Susa. This may reflect the short time in service of these men. As in the Army the excretion of N'methylnicotinamide was low.

Findings (Continued)

3. Nutritional Appraisal: (Continued)

c. Civilians

(1) Dietary Studies

The civilian dietary study was limited to the interview procedure and included a relatively small sample; hence conclusions pertaining to the whole population are not justified. There was some indication that the men tended to be optimistic about their incomes, to overestimate the amount of money spent for food, and to have little knowledge of the details of preparing food. The women, in general, had inadequate comprehension of weights and measures and knew very little about family income and the amount of money spent for food. These situations arise from the fact that the men always handle the money and usually buy the food and other family necessities.

The rural people, whether nomadic or not, have rather simple tastes and food habits. Home-ground barley or wheat flour, olive oil or other fat, onions, tomatoes (fresh or canned paste), potatoes, tea and sugar, constituted the mainstays of the diet. Meat, eggs, milk, fresh fruit, and vegetables were relatively rare in the diet, primarily due to short supply and high cost. In the poorer families the women and children seemed to fare rather worse than the adult males. Many individuals were found to subsist largely on bread and tea.

Lindberg stated the situation well when he said: "The food supply of the Libyan people is, as already shown, highly sensitive to crop fluctuations. Cereals represent the mainstay of the diet, and in years of drought it is certain that, in spite of government relief, average consumption falls considerably below the level of good years. It has been estimated, however, that domestic consumption runs from some 80 to 100 thousand tons of cereals a year in Tripolitania; on an average the daily consumption per head then turns out to be just about 300 grams. This average may be higher in good times and lower in bad; moreover, it hides large variations between different income groups." 1/

Food and dietary habits have been influenced by the Italian population. Most of the 40,000 Italians now live in Tripolitania, but their macaroni and tomato paste combination is known and used in all parts of Libya. It is often modified to resemble a stew and may contain whatever vegetables are available and on rare occasions some meat. If macaroni or commercial flour are either not available or prohibitively high-priced, local wheat and barley are ground at home in a small hand-operated stone mill. Whole grain flour is used to make bread, gruel and a number of cooked dough dishes which are either eaten plain or dipped in a sauce which usually contains olive oil, onions, tomatoes, garlic, pepper or other flavoring materials. Semolina or "pearled" grain is used in kus-kus (couscous) which is a favorite Libyan dish. The semolina is cooked separately by the steam which is generated

1/ Quoted from page 67 of "A General Economic Appraisal of Libya" by John Lindberg of the United Nations Technical Assistance Mission to Libya. A/AC.32/Council/R. 143/Rev. 1 24 September 1951.

during the boiling of the other items (variety of vegetables, seasonings and some meat) of the kus-kus. Kus-kus is too expensive for everyday use and is found mainly in homes of the well-to-do and only on special occasions in other homes.

Dates, which constitute one of the important tree crops, along with olives and figs, were not included in Army or Police rations. Furthermore, they were not important in the diets of the 172 civilians who were interviewed. Either the dates were considered as an emergency food supply in times of severe drought or other disruption of normal food supply, or the civilians interviewed were referring only to the diet eaten at the time of the survey when fresh dates were out of season.

Breakfast usually consists of tea. Lunch and dinner consist of a single dish of various items all cooked together and served hot. The bread that goes with it is often freshly baked and eaten hot. Tea is the fluid drunk with meals and this, of course, is also served hot and very sweet.

A low level of intake of high grade protein was evident everywhere. There was no dairy industry and what little fresh milk was available was obtained primarily from sheep and goats under the most primitive conditions. The farmer who happened to have a few hens was quite likely to sell the eggs for cash instead of feeding them to his family. Many people could not afford meat except on feast days. Preservation of meat was difficult, but salting and drying seemed to be effective. Dried meat was stored in olive oil for as long as a year.

Through the efforts of UNICEF last year 60,000 school children received skim milk powder at the rate of 40 grams per day per child for 200 days. As already noted, pressed dates, produced in the Government packing plant in Tripoli, were used in the child feeding program. In addition, cheese supplied by CARE was also used. No striking and general peculiarities in food tastes, habits and taboos were observed except the religious objection to pork.

(2) Physical Findings

(a) Men

A total of 1,029 civilian men 15 years of age or older was examined. Their mean height was 65.0 inches. Table 14 gives a comparison of the military with the civilian sample by age, height and weight. The military group is taller for each age than the civilian sample, possibly due to selection. The clerical and executive Government workers in Tripoli were the tallest of the civilian groups studied (Table 12). The shortest civilians were the unsalaried workers in the small villages. The Government workers in Tripoli were the only groups of the survey with a mean percent of "standard weight" over 100, with over one fourth having a "standard weight" greater than 110 percent. All other groups examined were very thin. Over 70 percent of those examined in Sebha and Temenhint and over 46 percent of the men at the other locations were less than 90 percent of "standard weight". Mean weight of all civilian men examined was 128.8 pounds and mean percent of "standard weight", 93.2.

The general appearance of the men at Sebha and Government workers in Tripoli was fair to good (Table 22). In Beni Ulid and Garian 20.7 and 33 percent, respectively, of the men examined were considered to be poor in general appearance.

Trachoma and residual corneal scars as well as staphylomas were frequently observed. Bitot's spots were seen in one individual in Beni Ulid. Nasolabial seborrhea was not seen often among the Government workers in Tripoli, but occurred in 20.1 percent of the Government laborers in Bengasi (Table 21) and in 36.4 to 42.1 percent of the men in the Fezzan (Tables 21 and 22). Angular lesions of the lips were found in from 0 to 12.5 percent (Tables 21 and 22) of the various groups studied. This was similar to the prevalence of those lesions in the military groups studied. Magenta tongues and cheilosis were rarely encountered. Follicular keratosis of the skin was observed (13.4 percent), but pellagrous lesions were not seen among those examined in detail. There was a 1.8 to 2.1 percent incidence of loss of ankle jerks. Residual defects from childhood rickets were not found among the adults.

Approximately 7 percent of civilian men examined were edentulous. In the Fezzan, where the attrition of the teeth was much more marked, 15.8 percent were edentulous. The prevalence of caries and red, swollen gums was higher among the better paid Government office workers in Tripoli (76.5 and 88.2 percent respectively) than in other groups. The caries incidence may well be related to the high consumption of tea, coffee and soft drinks consumed since these beverages are highly sweetened.

There was a high incidence of liver enlargement (18.9 percent). Splenomegaly was seen in 2.6 percent of those examined in the Fezzan. Bilateral ankle edema was not found. Only three persons had blood pressures with a systolic higher than 140 millimeters mercury or a diastolic higher than 90 millimeters mercury (Table 23). Two of these occurred in the Fezzan where pulse rates were faster (91) than those of other areas.

(b) Women

A total of 364 women was examined, including 61 who were pregnant. Mean height of the nonpregnant women was 60.4 inches and the median weight 108.5 pounds which is equivalent to 91.1 percent of "standard weight" (Table 13). Twenty-three percent of the women were under 80 percent of "standard weight" while 17 percent were over 110 percent of "standard weight".

(1) Barce, Cyrenaica

In Barce 82 women were examined, 5 of whom were pregnant (Table 25). The pregnant women did not appear to differ from the others nutritionally. According to local informants, most of the examinees came from prosperous families in the village, with a small minority coming from the Bedouin tent communities surrounding the town. Over three quarters of these women complained of current diarrhea. Although none was cachetic, over 6 percent were regarded as "poor" in general appearance. Nasolabial

seborrhea was noted in one fifth of the nonpregnant women, but follicular keratosis was practically absent. Glossitis was seen in only one woman. Red or swollen gums were present in 67.5 percent and bleeding gums in 9.1 percent of the examinees (Table 25). Four had fillings and the prevalence of worn teeth was far less than elsewhere in the country, perhaps attesting to the relatively wealthy status of the Barce subjects. Ankle jerks could not be elicited in approximately one fourth and knee jerks in one seventh of those examined.

An appraisal of the data suggests that in this particular community poor quality, not small quantities, of food and lack of good personal hygiene were the major nutritional problems. Seventeen percent of those examined were obese. The gum lesions and the petechial hemorrhages surrounding flea bites suggest a lack of dietary vitamin C. This is also supported by the high prevalence (77 percent) of "low" serum vitamin C (less than 0.20 milligrams per 100 milliliters). The nasolabial seborrhea and acne may be attributed in part to poor hygiene. The high prevalence of current diarrhea, circumcorneal injection, papillary atrophy, papillary hypertrophy and loss of deep tendon reflexes suggest the possibility of a B-complex deficiency. The high prevalence of caries and the relatively low prevalence of worn teeth raise the possibility that these women use diets high in refined carbohydrates.

(2) Sebha, Fezzan

In Sebha 34 women were examined in detail, including two who were pregnant (Table 25). These women were similar to those of Barce in that they had signs suggesting low intakes of vitamin C and the B-complex vitamins. There was a higher prevalence of papillary hypertrophy of the tongue (40.6 percent) and of follicular keratosis (6.2 percent). There was little acne. The prevalence of circumcorneal (34.4 percent) and conjunctival injection (40.6 percent) was high and was most probably a result of exposure of the sclerae to sun, wind, dust and trachoma. There was a lower prevalence of dental caries (25.0 percent) and a higher prevalence of worn teeth (100 percent) compared to women from other areas which correlated well with the lower consumption of refined carbohydrates and the generalized use of crudely milled barley flour containing much grit. The high prevalence of mottling, ridging and hypocalcification (65.6 percent) could have been due either to fluorosis or developmental abnormalities in the teeth. The prevalence of hepatomegaly was high. Local physicians of French origin in the Fezzan spoke of a high prevalence of schistosomiasis in the population. Infectious hepatitis also was a commonplace disease throughout the area. Echinococcus disease was present, but not of such high occurrence. Since splenomegaly did not accompany the hepatomegaly, malaria was an unlikely cause of the hepatomegaly.

(3) Bengasi, Cyrenaica

The largest group of women examined (107) in one place was in Bengasi. The exact economic group represented by the sample was not definitely known but can be assumed to be the urban and suburban

lower class. The prevalence of chronic diarrhea (40.2 percent) was lower than in other female groups. The number with good general appearance was appreciably less than in Barce and Sebha (Table 25). The prevalence of nasolabial seborrhea was low. Gum recession (80.4 percent) and bleeding gums (20.6 percent) were comparatively high in occurrence. Malposition of the teeth was observed more frequently than elsewhere in Libya. Splenomegaly was noted in three women and bilateral edema in twelve. This high prevalence of edema was not observed elsewhere among either women or men, military or civilian.

(4) Garian and El Guasem

A total of 68 nonpregnant women was examined (Tables 24 and 25) in the towns of Garian and El Guasem, both of which are in the Gebel of Tripolitania just a few miles from each other. Only twelve were given detailed examinations. Thyroid enlargement occurred in ten of the 68 women, suggesting a possible iodine deficiency in this arid, mountainous region. Angular lesions of the mouth occurred in 26.5 percent of the 68 women, nasolabial seborrhea in 5.9 percent and magenta tongue in 7.4 percent. One case of scorbutic gums and a high prevalence of peridontal disease were observed. Follicular keratosis occurred in 51.5 percent of the women examined. There was one woman with a Bitot's spot. Glossitis was seen in 11.8 percent of these women. Pellagrous lesions occurred in only one individual. Hepatomegaly occurred in two of the twelve women examined in detail. Ankle edema appeared in 5.9 percent of the 68 women given both abbreviated and detailed examinations. Differences in examiner standards may account for the high prevalence of many findings at this location as compared to others.

(5) Pregnant Women

The majority of the pregnant women examined was seen at the Maternal and Child Health Centers in the Old City of Tripoli and in Suk El Giuma which is adjacent to Tripoli. All the pregnant women (61) were given detailed examinations (Table 25).

Follicular keratosis, angular lesions of the mouth, swollen and bleeding gums, caries, hepatomegaly and thyroid enlargement were observed more frequently in the pregnant group. Many of these women obtained nutritional supplements for their diet from the clinics. It appeared from these observations that the extra nutritional requirements of pregnancy and presumably of subsequent lactation are only partially being met by their present diet and the additional supplements received at the maternity clinics.

(c) Boys

Abbreviated examinations were conducted on 120 boys six to fifteen years of age in four locations. Height and weight were recorded (Table 15). The leveling plateau of growth appeared to occur at age 16 or 17 years. Throughout childhood the rate of growth appeared to be similar to that in the U. S. A., but there is a lag of approximately three years in height at a given age. There was also a lag in weight of from two to three years at a given age for the children in the mountain villages in Tripolitania and of three to four years for the children in the Fezzan. These weight differences between children at these two locations were similar to those found in the adults at these same locations.

Follicular keratosis and angular lesions were the only findings of appreciable prevalence (Table 24). Clinical impressions suggested that this age group was reasonably well nourished and in comparatively good health. The same could not be said for the younger children between the ages of one and four who appeared small, lethargic, pale and cachectic. It appears that many of these children die before the age of five or six years. Thirty-seven pregnant women who had among them delivered a total of 134 live births, stated that only 75 of these children were alive at the time of the survey. It is possible, therefore, that the 6-to-15-year-old boys represented the hardy survivors of a much larger group of children.

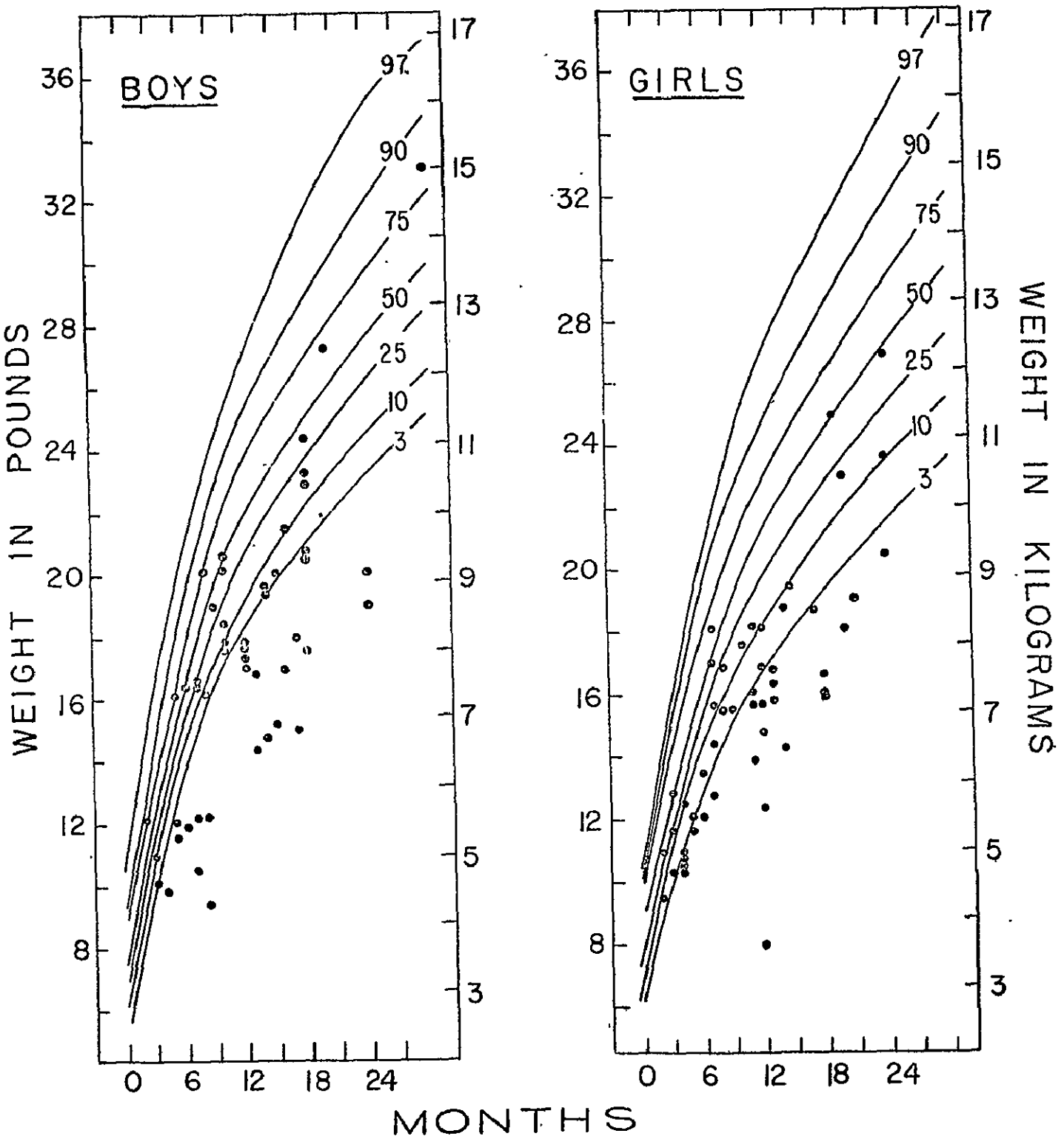
(d) Girls

It was gratifying to find that some schools had been recording weights of their students. Table 16 gives the weights of 262 girls from a school in Tripoli. Most of the students attending this school were from the higher economic class. When compared with growth tables produced in the United States (i.e., Baldwin-Wood or other such tables), it can be seen that the lag in weight was greater in the younger years than in the adolescent group.

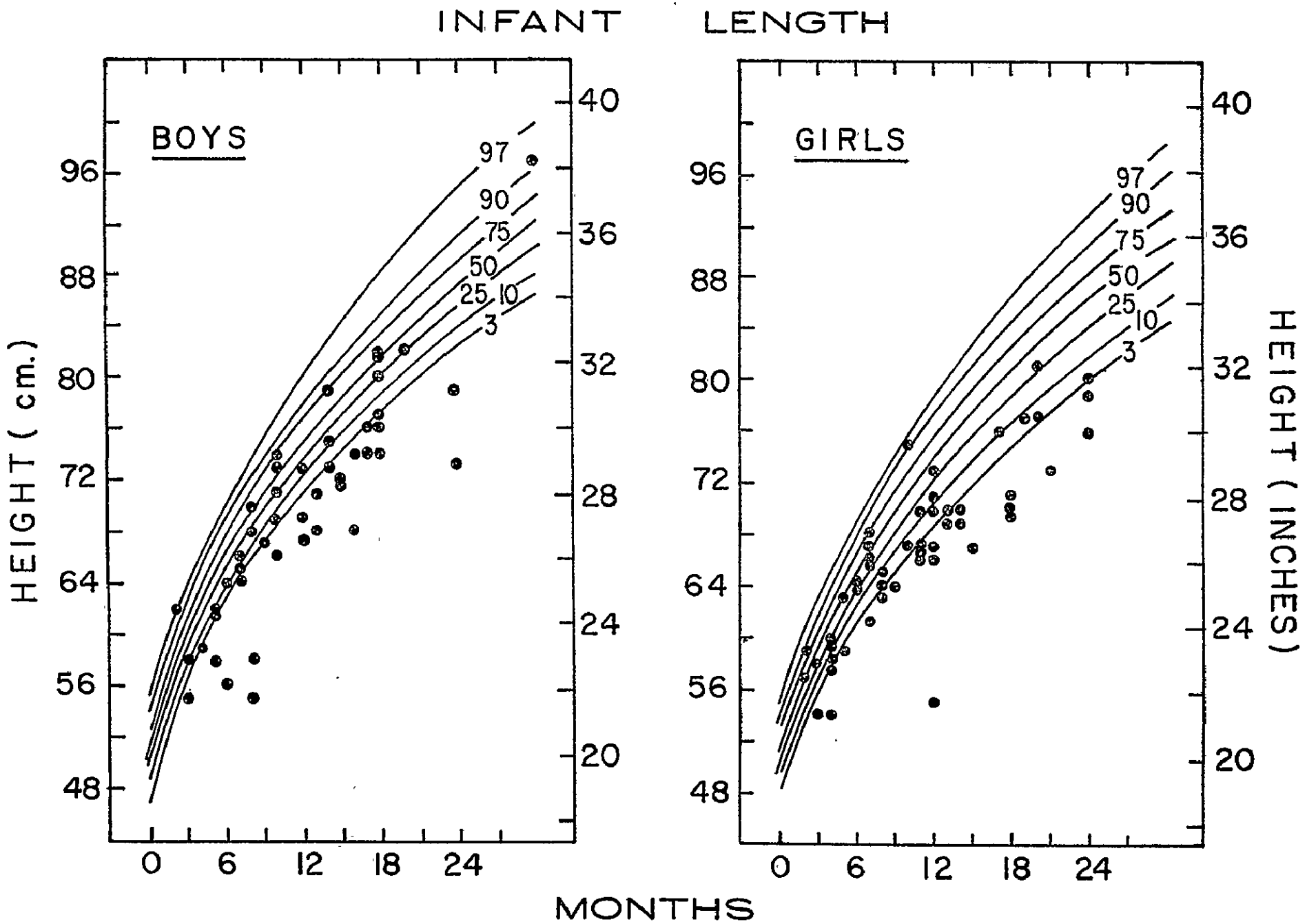
(e) Infants and Small Children

One hundred and two children up to the age of three years were examined at the Maternal and Child Health Center in the Old City of Tripoli. The general physical appearance was "fair" in 37 percent and "poor" in 17 percent. Physical evidence of gross rickets was found in 29 children. Only one child had evidence of scurvy as shown by swollen, painful knee joints. The liver was enlarged in 23 infants. This enlargement was usually associated with a "pot-belly" (10 cases) and umbilical hernia (6 cases). Kwashiorkor was suspected in four children and marasmus was noted in three. The weights and body length of those up to 30 months in age have been plotted on growth curves for normal U. S. infants. It can be seen in the accompanying graphs that mean weights and heights would approximate the lower percentiles of U. S. children as illustrated in Stuart's charts. (See Pages 33 and 34).

INFANT WEIGHTS



Maternal & Child Health Center, Old City,
Tripoli, Libya, 1957


INFANT LENGTH
BOYS
GIRLS
97
90
75
50
25
10
3
HEIGHT (cm.)
HEIGHT (INCHES)
MONTHS
0
6
12
18
24
48
56
64
72
80
88
96
20
24
28
32
36
40

(f) Ancillary Data

Patients were examined in hospitals for evidence of primary nutritional and associated diseases and discussions were held with the staff of hospitals regarding the admission of cases of nutritional disease. Cases of the following primary nutritional diseases or associated diseases were seen in pediatric wards: starvation, marasmus, marasmus with ascites (infantile cirrhosis), kwashiorkor, xerophthalmia, celiac disease, rickets (with and without fractures), and Barlow's disease. X-ray films were seen of osteomalacia and Milkman's syndrome (Looser's lines) in women. Nutritional anemia and complications of pregnancy were stated to be common. With regard to men, nutritional anemia and primary cancer of the liver were seen but no case of pellagra, beriberi or scurvy was seen.

Stool tests have been run routinely on some of the new Libyan employees at Wheelus Air Base which is adjacent to Tripoli. It was found that 20.2 percent of 791 persons examined had Endoamoeba histolytica in the stools. However, when repeat examinations were done at monthly intervals for five months. it was found that almost one-half of the group had Endoamoeba histolytica. Of the 791 that were examined in May 1957, 11.6 percent had Trichuris trichiuria, 9.7 percent Ascaris lumbricoides, and 3.8 percent Giardia lambia, while only 0.6 percent had hookworm.

Of the 1,053 persons examined at Wheelus Air Base between 1 January 1957 and 30 September 1957 (prior to employment) approximately 3 percent were disqualified because of positive serologic tests for syphilis. Only 0.85 percent were disqualified because of tuberculosis as found by chest x-ray. Tuberculosis of the lungs and pleura was thought by some team physicians to be clinically present in a number of individuals. In Garian, serafula (tuberculous adenitis of the neck) was found in twelve out of 42 women.

A number of samples of serum from Libyan men were analyzed for cholesterol in the United States. Eighty-seven have thus far been completed. The mean was 152 with a median of 145 (mode = 135) milligrams per 100 milliliters of serum. The range was 85 to 280 milligrams. These figures are similar to the results obtained by Dr. Modica of Tripoli and are considerably lower than would be found in a similar age group in the United States.

(3) Biochemical Findings

(a) Men

Blood and urine data are given in Tables 27 and 30, respectively. Biochemical evaluation of the civilian men indicates that nutrition problems are similar to but somewhat greater than those in the Armed Forces. There was considerable variation between geographical areas and classes of workers.

The highest prevalence of "low" to "deficient" hemoglobin was found in men from Sebha, Garian and El Gwasem (33 to 50 percent having hemoglobins of less than 14 grams per 100 millileters of blood). Vitamin C, vitamin A

and thiamine nutriture of the Government clerical workers of Tripoli was poor, the percentage of the men having values classified as "deficient" being 46.7, 18.8 and 33.3 respectively. The blood levels of vitamins C and A of the laboring class in Tripoli were better. Men from Sebha, Garian and Bengasi apparently had a better intake of thiamine than the other groups examined, since a very low percentage had urinary excretions of less than 27 micrograms per gram of creatinine.

An inadequate excretion of N'methylnicotinamide was also observed in the civilian men. Almost 90 percent had values of less than 1.6 milligrams per gram of creatinine.

(b) Women

Twenty-four percent of the 37 nonpregnant women examined had hemoglobin determinations of less than twelve grams (Table 28). The normal range is considered to be from 12 to 15 grams per 100 milliliters of blood. This is comparable to the 22 percent of civilian men found to have hemoglobins below the "acceptable" level. Of the 35 pregnant women studied, 29.4 percent had hemoglobins of less than 10 grams per 100 milliliters of blood. In the United States 12 percent of 7,835 pregnant women studied also had hemoglobins in this range. 1/ Hematocrits of pregnant women paralleled the hemoglobin ranges with 32.4 percent being less than 32. Serum vitamin C was lower than in the sample of men studied except for those pregnant women receiving medical attention at the Maternal and Child Health Centers in the Old City of Tripoli and Suk el Giuma. Serum vitamin A's and urinary excretion of thiamine, riboflavin and niacin in the nonpregnant women were similar to those of the male population. Serum vitamin A's were lower in the pregnant group which was to be expected as vitamin A normally falls during pregnancy. The urinary excretion of thiamine, N'methylnicotinamide excretion, and riboflavin (Table 31) was greater in the pregnant group than that of the male sample.

(c) Boys

Blood specific gravities were determined by the copper sulfate method on thirteen samples from boys in El Guasem and on 27 samples from boys in Temenhint. Assuming a normal plasma specific gravity of 1,0264, the mean hemoglobin per 100 milliliters of blood at El Guasem was 12.7 with a range of 11.1 to 13.5. The mean at Temenhint was 14.5 grams with a range of 13.5 to 15.9. This difference between the two areas is great enough to warrant further investigation.

1/ Adair, F. L., Dieckmann, W. J., and Grant, K: American Journal of Obstetrics and Gynecology, vol. 32, 1936.

TABLE 1

LIBYA: FOOD SUPPLY AND CONSUMPTION, 1955-56

Items	Supply Available 1/ Total	Supply Available 1/ Percentage Imported	Consumption 2/ Calories per person per day Number	Consumption 2/ Calories per person per day Percentage of Total
	(In 1000 Metric Tons)			
Grains			1220	59.0
Wheat	93	83		
Barley	93	3		
Other grains	10	50		
Fruits and nuts	82	2	410	19.8
Sugar	15	100	135	6.5
Oilseeds, oil, fats	6	17	90	4.3
Pulses	6	0	40	1.9
Vegetables, roots, tubers	43	19	30	1.4
Meat (mutton and goat)	18	0	55	2.7
Milk 3/	49	8	80	3.9
Eggs and fish	2	0	10	0.5
Total			2070	100.0

1/ Domestic production, plus imports, less exports.
2/ The data on consumption indicate the quantity of food available at or near the detail level; they do not represent the ingestion of food. Data from Foreign Agricultural Service, USDA.
3/ In terms of whole milk equivalent. Libyan milk production from various types of livestock is approximately as follows: goats, 2/5; sheep, 1/3; cattle, 1/5; camels, 1/20.

TABLE 2

LIBYA: OFFICIAL ARMY RATION

Item	Quantity Per Man Per Day (grams)
Meat (Lamb or Beef)	100
Rice or macaroni	100
Potatoes	60
Bread (wheat)	600
Onions	20
Olive oil or local butter	50
Beans, chick peas or lentils	20
Fresh vegetables	100
Tomato paste (or 85 gm fresh tomatoes)	25
Sugar	60
Milk (evaporated, unsweetened)	93
Tea	6
Spices	2

TABLE 3

LIBYA: NUTRIENTS FURNISHED PER MAN PER DAY BY THE OFFICIAL ARMY RATION[1/]

Nutrient	Quantity
Calories	3189
Protein	95 gm
Fat	81 gm
Carbohydrate	500 gm
Calcium	408 mg
Phosphorus	1143 mg
Iron	11 mg
Vitamin A	2372 I.U.[2/]
Thiamine	0.76 mg
Riboflavin	1.18 mg
Niacin	14 mg
Ascorbic Acid	28 mg

1/ This calculation includes data for summer squash as the "100 gm of fresh vegetable" specified in the ration (see Table 2). The fat allowance was equally divided between olive oil and local butter, and correction for cooking losses of water soluble vitamins was made according to ICNND "Manual for Nutrition Surveys" as listed in Appendix 5.

2/ I.U.=International Units.

TABLE 4

LIBYA: CALCULATED AVERAGE NUTRIENT INTAKE PER MAN PER DAY IN THREE LIBYAN ARMY UNITS

Values Corrected for Conservative Cooking Losses[1/]

Nutrient	Zavia[2/]			Bengasi[3/]			Susa[4/]		
	Mess	Canteen	Total	Mess	Canteen	Total	Mess	Canteen	Total
Calories	2961	268	3229	2697	214	2911	3169	269	3438
Protein,gm	85	9	94	84	4	88	91	7	98
Fat,gm	82	6	88	76	5	81	84	1	85
CHO,gm	458	47	505	434	30	464	533	50	583
Calcium,mg	281	13	294	313	5	318	339	16	355
Phosphorus,mg	1054	61	1115	934	78	1012	1059	76	1135
Iron,mg	11	1	12	10	1	11	10	1	11
Vit. A, I.U.	2023	0	2023	1883	5	1888	2473	13	2486
Thiamine,mg	0.71	0.08	0.79	0.69	0.02	0.71	0.76	0.04	0.80
Riboflavin,mg	1.03	0.06	1.09	1.00	0.03	1.03	1.11	0.05	1.16
Niacin,mg	14	1	15	13	1	14	14	1	15
Vit. C,mg	19	0	19	28	0	28	23	0	23

1/ Appendix 5.
2/ Average number of men fed, 263. More than 6 mos. service.
3/ Average number of men fed, 357. More than 6 mos. service.
4/ Average number of men fed, 610. This is the recruit training center and all men had less than 6 months of service.

TABLE 5

LIBYA: CALCULATED AVERAGE NUTRIENT INTAKE PER MAN PER DAY IN TRAINING SCHOOLS OF PROVINCIAL CONSTABULARY

Values Corrected for Conservative Cooking Losses 1/

	Tripolitania 2/			Cyrenaica 3/			Fezzan 4/
Nutrient	Mess	Canteen	Total	Mess	Canteen	Total	Mess
Calories	3007	269	3276	2538	346	2884	3281
Protein, gm	94	9	103	85	11	96	94
Fat, gm	58	4	62	71	4	75	88
CHO, gm	494	45	539	389	60	449	523
Calcium, mg	225	38	263	152	23	175	297
Phosphorus, mg	1037	75	1112	856	66	922	1231
Iron, mg	12	1	13	9	1	10	14
Vit. A, I.U.	1201	70	1271	2345	45	2390	1317
Thiamine, mg	0.83	0.05	0.88	0.49	0.06	0.55	0.97
Riboflavin, mg	0.81	0.09	0.90	0.71	0.10	0.81	0.78
Niacin, mg	11	2	13	13	3	16	12
Vit. C, mg	17	0	17	14	0	14	18

1/ Appendix 5.
2/ Average number of men fed, 187.
3/ Average number of men fed, 189.
4/ Average number of men fed, 71.
No data were obtained from the canteen.

TABLE 6

LIBYA: DAILY FOOD CONSUMPTION
(Grams per man per day)

	Libyan Army			Provincial Constabulary		
	Zavia	Bengasi	Susa	Tripoli-tania	Cyren-aica	Fezzan 1/
Cereal Products						
Bread	607	594	692	711	606	432
Macaroni	95	87	51	129	83	270
Rice			53		28	
Fats						
Butter	23	24	23		52	
Ghee, veg.					3	45
Oil, Olive	23	24	23	40		40
Fruits						
Tomato, fresh			36			
Tomato paste	22	17	11	32	29	65
Plums, fresh	55			131		
Honey dew melon		50				
Watermelon	55	54	106			
Legumes						
Beans, dry navy	18	8		24		61
Beans, dry lima			6			
Chick peas		9	8	18		32
Lentils				15	5	
Meats & Fish						
Beef, boneless					90	
Mutton	106	96	113	32	37	
Tuna, canned	4	2	2	8	13	
Milk & Cheese						
Cheese, brick	1			2		
Milk, evap. canned	76	63	75	16	16	16
Sugar - granulated	54	40	70	31	29	18
Vegetables, Leafy, Green & Yellow						
Cabbage			19			
Vegetables, other						
Marrow			23			
Onions	22	17	25	36	5	26
Potatoes	106	39	20			
Zucchini		64				
Miscellaneous						
Pepper, dry, red	4	2	2	7	8	14
Spice	1			4	8	
Tea, dry	6	6	7	2	7	3
Walnuts, in shell	6					

1/ Meat is served occasionally, but was not served during the two days of the survey.

TABLE 7

LIBYA: PERCENTAGE OF PREPARED FOOD CONSUMED, WASTED AND NOT SERVED BY THREE LIBYAN ARMY UNITS

	Zavia			Bengasi			Susa		
	Consumed	Plate Waste	Not Served	Consumed	Plate Waste	Not Served	Consumed	Plate Waste	Not Served
Breakfast Tea	78.0	0	22.0	58.0	1.3	40.7	89.0	2.2	8.8
Breakfast Bread	87.0	13.0	0	81.8	18.2	0	90.4	9.6	0
Lunch Tea	81.4	2.3	16.3	45.0	0	55.0	97.0	1.2	1.8
Lunch Main Dish	86.0	9.3	4.7	92.0	0.3	7.7	97.0	1.4	1.6
Lunch Bread	90.8	9.2	0	90.1	9.9	0	97.0	3.0	0
Dinner Tea	89.0	1.7	9.3	79.0	0	21.0	73.6	4.9	21.5
Dinner Main Dish	83.0	7.6	9.4	78.0	2.0	20.0	66.0	5.2	28.8
Dinner Bread	95.0	5.0	0	96.7	3.3	0	96.7	3.3	0

TABLE 8

LIBYA: PERCENTAGE OF PREPARED FOOD CONSUMED, WASTED AND NOT SERVED BY PROVINCIAL CONSTABULARY

	Tripolitania			Cyrenaica			Fezzan		
	Consumed	Plate Waste	Not Served	Consumed	Plate Waste	Not Served	Consumed	Plate Waste	Not Served
Breakfast Tea	81.0	0	19.0	65.0	2.5	32.5	91.0	0	9
Breakfast Bread	99.7	0.3	0	96.6	3.4	0	100	0	0
Lunch Main Dish	89.0	1.8	9.2	67.0	2.2	30.8	96.0	2.9	1.1
Lunch Bread	97.4	2.6	0	99.0	1.0	0	0	0	0
Dinner Main Dish	82.0	3.0	15.0	96.0	1.1	2.9	88.0	1.4	10.6
Dinner Bread	97.3	2.7	0	98.0	2.0	0	97.6	2.4	0

TABLE 9

LIBYA: AVERAGE NUTRIENT INTAKE PER MAN PER DAY IN ARMY UNITS, COMPUTED FROM MESS DATA AND FROM CHEMICAL ANALYSIS OF A COMPOSITE SAMPLE RATION[1/]

	Bengasi		Susa	
	By Computation	By Chemical Analysis	By Computation	By Chemical Analysis
Calories	2697		3169	
Protein gm	84		91	
Fat gm	76		84	
CHO gm	434		533	
Calcium mg	313	552	339	571
Phosphorus mg	934	1152	1059	998
Iron mg	10	40	10	33
Fluorine mg		3.34		2.45
Iodine mg		0.56		0.44
Sodium chloride gm		14.9		12.5
Vitamin A I.U.[2/]	1883	1746	2473	1876
Thiamine mg Total	0.69	1.33	0.76	1.33
Thiamine mg/1000 cal.	0.26	0.49	0.24	0.42
Riboflavin mg	1.00	1.53	1.11	1.21
Niacin mg	13	10	14	9
Vitamin C mg	28	42	23	54
Pyridoxine mg		1.01		0.93
Folic Acid mg		0.040		0.064
Panthothenic Acid mg		1.33		2.37
Vitamin B_{12} mcg		1.33		1.25

1/ Chemical analysis represents composite sample for one day, calculated values 2 or 3 days.

2/ Chemical analyses figures are for beta-carotene, expressed as I.U. of vitamin A. Analyses did not detect the small amounts of preformed vitamin A.

TABLE 10

LIBYA: AVERAGE NUTRIENT INTAKE PER MAN PER DAY
IN TRAINING SCHOOLS OF PROVINCIAL POLICE AND DEFENSE FORCES
COMPUTED FROM MESS DATA AND CHEMICAL ANALYSIS OF A COMPOSITE SAMPLE RATION[1/]

	Tripolitania		Cyrenaica		Fezzan	
	By Computation	By Chemical Analysis	By Computation	By Chemical Analysis	By Computation	By Chemical Analysis
Calories	3007		2538		3281	
Protein gm	94		85		94	
Fat gm	58		71		88	
CHO gm	494		389		523	
Calcium mg	225	483	152	282	297	631
Phosphorus	1037	1238	856	640	1231	1380
Iron mg	12	40	9	28	14	47
Fluorine mg		2.14		2.08		4.22
Iodine mg		0.43		0.25		0.71
Sodium chloride gm		9.3		11.7		25.1
Vitamin A I.U.[2/]	1201	1444	2345	593	1317	2293
Thiamine mg Total	0.83	1.27	0.49	0.69	0.97	1.94
Thiamine mg/1000 cal.	0.28	0.42	0.19	0.27	0.30	0.59
Riboflavin mg	0.81	0.96	0.71	0.69	0.78	1.00
Niacin mg	11	12	13	7	12	12
Vitamin C mg	17	27	14	21	18	39
Pyridoxine mg		0.87		0.64		1.47
Folic Acid mg		0.040		0.025		0.104
Pantothenic Acid mg		2.14		0.76		2.70
Vitamin B_{12} mcg		1.96		1.14		1.18

1/ Chemical analysis represents composite sample for one day, calculated values 2 or 3 days.

2/ Chemical analyses figures are for beta-carotene, expressed as I.U. of vitamin A. Analyses did not detect the small amounts of preformed vitamin A.

TABLE 11

LIBYA: DESCRIPTION OF SAMPLE OF ARMY AND POLICE AND DEFENSE FORCES

	Police and Defense Forces				Army				
	Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Sebha	Total
No. of Exams									
Abbreviated	345	319	144	808	151	296	462	32	941
Detailed	83	80	35	198	47	74	115	8	244
Total	428	399	179	1006	198	370	577	40	1185
Age in years	Percent of Troops by Ages								
15-19	10.0	11.8	6.1	10.0	3.5	5.1	19.8	20.0	12.5
20-24	44.2	47.6	48.0	46.2	64.6	53.0	64.5	45.0	60.3
25-29	25.2	27.6	24.6	26.0	28.8	35.9	14.9	35.0	24.5
30-39	18.5	11.5	19.6	15.9	3.0	5.7	0.9	0	2.7
40+	2.1	1.5	1.7	1.8	0	0.3	0	0	0.1
	Percent of Troops by Length of Service								
< 3 mo.	27.3	1.0	19.0	15.4	0	0.3	0.2	0	0.2
3 mo. to 6 mo.	9.6	55.6	8.4	27.6	0	0	98.8	0	48.1
6 mo. to 1 yr.	10.0	6.8	31.8	12.6	21.7	42.4	0	80.0	19.6
1 yr. to 2 yr.	9.8	8.8	5.0	8.5	51.0	6.2	0.2	17.5	11.1
2 yr. to 3 yr.	7.0	16.5	5.6	10.5	22.7	14.6	0.2	2.5	8.5
3 yr. to 5 yr.	19.9	5.8	19.6	14.2	3.5	34.6	0.2	0	11.5
> 5 yr.	16.4	5.5	10.6	11.0	1.0	1.9	0.5	0	1.0
	Percent of Troops by Area of Origin								
Tripolitania									
desert	15.0	0	7.3	7.7	14.1	4.6	6.4	2.5	7.0
mountains	36.0	0	1.7	15.6	9.6	19.7	17.7	15.0	16.9
coast	49.1	0.5	11.2	23.1	27.3	23.8	20.3	15.0	22.4
Cyrenaica									
desert	0	3.0	0	1.2	1.0	2.2	1.4	0	11.5
mountains	0	38.8	0.6	15.5	8.6	6.8	21.3	10.0	14.3
coast	0	57.4	0	22.8	19.2	20.5	23.4	10.0	21.4
Fezzan									
desert	0	0.3	79.3	14.2	20.2	22.4	9.5	47.5	16.6
	Percent of Troops by Urban Origin								
Percent	17.5	42.4	0	24.3	11.6	14.1	14.9	0	13.6
	Average Heights (inches)								
Mean	66.7	66.6	66.4	66.6	65.9	66.4	66.2	66.8	66.2
	Average Weights (pounds)								
Mean	136.0	135.7	126.9	134.3	134.8	135.6	131.0	133.5	133.1
	Average Percent of "Standard Weight"								
Mean	95.8	96.3	90.2	95.0	98.3	96.5	95.9	95.0	96.4
S.D.	11.1	8.1	9.0	9.89	8.2	7.8	7.8	7.2	7.90
S.E.	0.5	0.4	0.7	±0.3	0.6	0.4	0.3	1.1	±0.2
	Percent of Troops by Percent of "Standard Weight"								
70-79%	3.5	1.0	10.1	3.7	1.0	1.1	1.2	0	1.1
80-89	29.0	20.6	45.8	28.6	14.7	19.2	21.0	20.0	19.3
90-99	37.4	46.4	30.7	39.8	42.6	45.1	49.2	60.0	47.2
100-109	21.3	27.3	11.7	22.0	32.5	31.1	25.1	17.5	28.0
110-119	6.3	4.3	1.1	4.6	9.1	3.0	3.1	2.5	4.1
120-129	0.7	0.5	0.6	0.6	0	0.5	0.3	0	0.3
130-139	1.2	0	0	0.5	0	0	0	0	0
140-149	0.7	0	0	0.3	0	0	0	0	0

TABLE 12

LIBYA: DESCRIPTION OF SAMPLE OF MALE CIVILIANS

	Tripolitania					Cyrenaica	Fezzan	
	Ben Ulid	Garian	El Guasem	Tripoli 1/	Tripoli 2/	Bengasi	Sebha 3/	Total
No. of Exams								
Abbreviated	121	99	40	138	111	194	162	865
Detailed	29	27	12	34	24	0	38	164
Total	150	126	52	172	135	194	200	1029
Age in years				Percent by Ages				
15-19	6.7	22.2	17.3	4.1	3.0	8.8	15.0	10.2
20-24	30.0	21.4	13.5	39.5	23.0	31.4	27.0	28.6
25-29	20.0	18.3	19.2	17.4	20.7	18.6	16.0	18.4
30-39	18.7	13.5	15.4	26.7	23.7	22.2	12.5	19.3
40-49	10.7	4.0	7.7	6.4	11.9	9.3	9.5	8.6
50-59	12.0	5.6	13.5	5.8	10.4	5.7	12.5	8.9
60-90	1.3	15.1	13.5	0	7.4	4.1	7.5	5.9
				Percent by Area of Origin				
Tripolitania								
desert	100.0	0	0	0	0	0	1.0	14.8
mountains	0	100.0	100.0	2.9	2.2	0	1.0	18.3
coast	0	0	0	97.1	96.3	0.5	4.0	29.7
Cyrenaica								
desert	0	0	0	0	0	0	0	0
mountains	0	0	0	0	0	1.5	0	0.3
coast	0	0	0	0	0.7	97.9	0.5	18.7
Fezzan								
desert	0	0	0	0	0.7	0	93.5	18.3
				Percent of Urban Origin				
Percent	0	0	0	93.6	98.5	97.9	0	47.0
				Average Heights (inches)				
Mean	64.4	64.0	65.1	66.7	65.0	65.6	65.0	65.0
				Average Weights (pounds)				
Mean	121.6	120.9	121.9	142.8	144.3	129.5	118.1	128.8
				Average Percent of "Standard Weight"				
Mean	89.3	90.7	87.6	102.4	102.9	92.4	85.5	93.2
S.D.	8.7	9.6	10.0	15.4	17.3	13.7	10.6	14.3
S.E.	0.7	0.9	1.4	1.2	1.5	1.0	0.8	0.4
				Percent of Examinees by Percent of "Standard Weight"				
60-69%	0.7	0.8	7.7	0	1.5	2.1	4.0	1.9
70-79	12.7	11.9	5.8	1.7	2.2	13.4	26.5	11.9
80-89	40.0	34.9	55.8	19.2	19.3	30.9	40.0	32.3
90-99	36.7	39.7	21.2	30.8	25.9	31.4	20.5	29.7
100-109	8.7	11.9	7.7	18.6	24.4	12.9	6.5	13.1
110-119	0.7	0	1.9	14.5	11.1	4.6	1.5	5.2
120-129	0.7	0	0	11.0	9.6	3.1	1.0	4.0
130-139		0.8		2.3	2.2	1.0	0	1.0
140-149				0.6	2.2			0.4
150-159				0.6	0.7	0.5		0.3
160-169				0.6	0.7			0.2

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 13

LIBYA: DESCRIPTION OF SAMPLE OF NON-PREGNANT WOMEN

	Garian and El Guasem	Bengasi	Barce	Sebha and Temenhint	Total 1/
Number of Examinations	68	107	77	47	303
	Percents by Ages (years)				
15-19	8.8	3.7	3.9	0	5.0
20-24	13.2	6.5	13.0	21.3	11.9
25-29	20.6	15.9	24.7	17.0	19.1
30-39	39.7	28.0	26.0	19.1	28.7
40-49	2.9	24.3	14.3	25.5	16.8
50-59	8.8	14.0	9.1	8.5	10.9
60-90	5.9	7.5	9.1	8.5	7.6
	Average Heights (inches)				
Mean	60.3	60.3	60.6	60.7	60.4
	Median Weights (pounds)				
Median	109.5	118.2	110.1	94.1	108.5
	Median Percent of "Standard Weight"				
Median	92.8	95.7	92.2	78.5	91.1
	Percents by Percent of "Standard Weight"				
<70%	1.5	4.7	6.6	31.9	8.6
70-79	13.2	11.2	14.5	21.3	13.9
80-89	27.9	18.7	23.7	36.2	24.8
90-99	29.4	24.3	15.8	8.5	20.9
100-109	20.6	16.8	15.8	0	14.6
110-119	5.9	15.9	9.2	2.1	10.3
120-129	0	5.6	7.9	0	4.0
≥130	1.5	2.8	6.6	0	3.0

1/ Includes four women given abbreviated examinations in Tripoli.

TABLE 14

LIBYA: AVERAGE HEIGHT AND WEIGHT, BY AGE, OF SPECIFIED GROUPS

Age (years)	Army and Constabulary Sample			Male Civilian Sample		
	Number of Men	Mean Height (in.)	Mean Weight (lb.)	Number of Men	Mean Height (in.)	Mean Weight (lb.)
15	1	67.0	137.0	6	60.8	99.0
16	7	64.9	111.1	6	64.3	110.7
17	25	64.7	112.8	18	63.4	109.6
18	93	65.9	121.8	42	64.0	112.9
19	123	65.7	126.8	33	65.3	117.2
20	313	66.2	129.6	71	64.8	123.5
21	259	66.5	132.0	55	66.0	131.9
22	284	66.6	134.5	75	65.3	126.3
23	163	66.7	135.7	48	65.4	131.2
24	160	66.5	136.5	45	64.8	130.7
25-29	551	66.5	136.7	189	65.5	130.5
30-34	131	66.6	140.0	114	65.4	135.6
35-39	61	67.1	145.3	85	65.0	140.9
40-49	16	65.1	143.6	89	64.3	127.3
50-59	3	65.7	131.3	92	64.6	133.0
60-69	0	--	--	44	64.6	123.6
70+	0	--	--	17	63.5	114.6
Total	2190	66.4	133.7	1029	65.0	128.8

TABLE 15

LIBYA: AVERAGE HEIGHT AND WEIGHT OF BOYS, BY AGE, AT TWO LOCATIONS

Age (Completed years)	El Guasem and Garian			Sebha and Temenhint		
	No.	Height (in.)	Weight (lb.)	No.	Height (in.)	Weight (lb.)
6	2	41.5	36.5	1	41.0	34.0
7	1	47.0	44.0	4	44.0	37.0
8	0	--	--	8	46.0	44.8
9	0	--	--	6	47.2	44.2
10	2	50.0	52.5	18	49.5	52.0
11	6	52.0	62.8	7	52.9	57.1
12	9	53.9	65.2	17	54.3	63.5
13	3	57.3	83.7	13	55.2	65.6
14	4	57.0	87.5	5	56.8	76.0
15	7	61.0	91.1	6	56.9	86.7
16	2	63.5	112.5	1	66.0	106.0
17	7	63.7	110.4	6	63.7	106.7
18	16	63.6	109.4	10	63.4	107.9
19	8	64.5	119.5	11	65.6	112.0
20	11	64.3	120.3	19	64.0	113.5
21	8	65.5	128.5	7	65.7	119.7
22	8	64.8	121.5	16	65.1	112.3

TABLE 16

LIBYA: AVERAGE WEIGHT OF GIRLS, BY AGE

(In Pounds)

Age	No.	Mean	Median	Range	Comparison with Baldwin-Wood Tables[1/] Short	Medium	Tall
5	8	34.8	34.1	28.6-41.8	38	41	46
6	40	37.0	35.8	29.7-50.6	41	45	50
7	66	40.6	39.6	33.0-55.0	45	50	56
8	51	52.5	47.3	37.4-93.3	50	57	67
9	50	56.4	57.2	37.4-94.6	55	64	74
10	32	60.3	59.6	42.9-84.3	59	70	82
11	15	70.0	66.0	47.3-110.0	65	78	90

1/ From Heights and Weights of Children and Youth in the United States, Home Economics Research Report No. 2, U. S. Department of Agriculture, October 1957, "as presented in Mother and Child, suppl. to July issue, 1923."

TABLE 17

LIBYA: PHYSICAL FINDINGS IN ABBREVIATED EXAMINATIONS, BY SURVEY GROUPS

	Men			Boys	Women	Girls
	Police	Army	Civilian	5-15 yr.	Non-pregnant	5-15 yr.
Number examined	808	941	865	120	75	13
			Percent			
Thyroid enlarged	0.1	0	0.2	0	10.7	0
Nasolabial seborrhea	9.7	12.1	15.3	0.8	4.0	0
Follicular keratosis	1.6	1.4	1.8	4.2	48.0	7.7
Scrotal dermatitis	2.8	2.8	0	0	-	-
Pellagrous lesions	0.1	0	0.1	0	1.3	0
Bitot's spots	0	0.6	0	0	1.3	0
Lips, angular lesions	6.6	3.7	5.1	5.0	20.0	23.1
Lips, angular scars only	2.7	4.7	3.6	2.5	25.3	0
Lips, cheilosis	0.7	0.6	0.5	0.8	1.3	15.4
Filiform pap. atrophy, Mod., sev.	0.5	0.5	1.5	0.8	13.3	0
Glossitis	1.0	0.6	2.0	0.8	12.0	7.7
Magenta colored tongue	0	0	0.5	0	6.7	0
Bilateral edema	0	0	0	0	5.3	0
Calf tenderness, slight	0	0	0.9	0.8	0	7.7
Loss of ankle jerk	1.0	1.0	2.1	1.7	2.7	0

TABLE 18

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS, BY SURVEY GROUPS

	Men			Women	
	Police	Army	Civilian	Non-pregnant	Pregnant
Number examined	198	244	164	228	61
		Percent			
Current diarrhea	16.2	18.4	27.4	57.9	68.9
General Appearance:					
Fair-Good	98.5	100.0	90.2	89.9	91.8
Poor	1.5	0	9.8	8.8	8.2
Cachexia	0	0	0	1.3	0
Thyroid enlarged	0.5	0.4	0	1.3	4.9
Parotid enlarged	1.0	0	1.2	0.4	1.6
Submaxillary enlarged	.0	0	0.6	0.4	16.4
Nasolabial seborrhea	16.2	25.0	19.5	10.5	14.8
Other seborrhea	2.0	7.0	3.0	1.3	0
Face and neck erythema	0	0	0	1.8	1.6
Face and neck pigmentation	3.5	2.0	1.2	2.6	11.5
Scrotal dermatitis	2.0	0.4	1.2	-	-
Follicular keratosis	10.1	9.8	13.4	2.6	18.0
Perifolliculosis	0	0	0	0	1.6
Crackled skin	5.6	2.0	9.1	25.4	4.9
Acneform eruption	38.4	57.0	23.2	6.6	0
Thickened pressure points	1.5	0.8	12.8	1.3	3.3
Purpura or petechia	0.5	1.2	0.6	0	1.6
Hyperpigmentation	5.6	4.1	5.5	4.8	8.2
Pellagrous lesions	1.0	0	0	0	0
Thickened conjunctiva	0	4.9	4.9	23.2	9.8
Pingueculae	71.2	48.8	65.9	51.8	24.6
Bitot's spots	0	0	1.2	0.9	1.6
Circumcorneal injection	15.2	4.5	1.8	14.5	14.8
Conjunctival injection	22.7	9.8	32.3	41.7	23.0
Blepharitis	0.5	0.4	1.8	10.1	4.9
Lips, angular lesions	8.6	5.7	3.0	4.8	9.8
Lips, angular scars only	7.1	5.7	6.1	7.5	27.9
Lips, cheilosis	0.5	0	0.6	0.9	0

TABLE 18 (CONTINUED)

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS, BY SURVEY GROUPS

	Men			Women	
	Police	Army	Civilian	Non-pregnant	Pregnant
Number examined	198	244	164	228	61
	Percent				
Filiform pap. atrophy,mod.,sev.	3.0	2.9	0	5.3	14.8
Papillary hypertrophy,mod.,sev.	8.6	9.0	4.3	12.3	1.6
Furrows	29.3	57.0	41.5	58.9	54.1
Red,tip and/or lat. margins	6.1	7.4	6.1	19.3	14.8
Glossitis	0	0	1.2	1.3	4.9
Magenta colored tongue	0.5	0	0	0.9	1.6
Geographic tongue	9.1	1.6	9.8	8.8	1.6
Red or swollen gums	48.0	55.7	38.4	46.1	85.2
Atrophy of papillae	1.5	0.4	2.4	7.0	9.8
Recession of papillae	14.6	15.6	5.5	54.8	9.8
Bleeding gums	9.1	7.4	2.4	16.7	26.2
1-2 carious teeth	21.2	19.7	20.7	19.7	18.0
3+ carious teeth	26.3	54.5	28.7	38.6	75.4
Any fillings	1.5	2.0	4.9	2.6	8.2
Edentulous	1.0	0.4	6.7	11.0	0
Worn teeth	46.0	32.0	67.9	59.2	42.6
Mottling	17.2	16.8	28.6	11.0	19.7
Malposition	4.0	7.0	2.1	15.8	6.6
Hepatomeglia	6.6	4.5	18.9	7.5	11.5
Splenomeglia	0.5	1.6	0.6	1.3	0
Bilateral edema	0	0	0	5.3	0
Calf tenderness, slight	0.5	0.4	2.4	0.9	0
Vib. sensation absent	0	0.4	0	0	0
Loss of ankle jerk	3.0	0.4	1.8	24.6	1.6
Loss of knee jerk	1.5	0	0	13.6	1.6
Position sense toes impaired	0	0.4	0	0.9	0

TABLE 19

LIBYA: PHYSICAL FINDINGS IN ABBREVIATED EXAMINATIONS OF ARMY, POLICE AND DEFENSE FORCES

	Police and Defense Forces				Army				
	Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Sebha	Total
Number examined	345	319	144	808	151	296	462	32	941
				Percent					
Thyroid enlarged	0.3	0	0	0.1	0	0	0	0	0
Nasolabial seborrhea	6.1	7.8	22.2	9.7	4.0	7.8	16.5	28.1	12.1
Follicular keratosis	0.9	1.9	2.8	1.6	2.0	1.7	0.9	3.1	1.4
Scrotal dermatitis	--	3.4	1.4	2.8	--	--	3.2	0	2.8
Pellagrous lesions	0.3	0	0	0.1	0	0	0	0	0
Bitot's spots	0	0	0	0	0	1.7	0.2	0	0.6
Lips, angular lesions	7.5	4.1	9.7	6.6	2.0	3.0	4.8	3.1	3.7
Lips, angular scars only	3.8	1.6	2.8	2.7	7.9	5.4	3.5	0	4.7
Lips, cheilosis	0.3	0	3.5	0.7	0	0	0.6	9.4	0.6
Filiform pap. atrophy, mod., sev.	0	0	2.8	0.5	0	0.3	0.6	3.1	0.5
Glossitis	1.2	0.6	1.4	1.0	0	0	1.1	3.1	0.6
Magenta colored tongue	0	0	0	0	0	0	0	0	0
Bilateral edema	0	0	0	0	0	0	0	0	0
Calf tenderness, slight	0	0	.0	0	0	0	0	0	0
Loss of ankle jerk	1.7	0.3	0.7	1.0	0	0	1.9	0	1.0

TABLE 20

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS OF ARMY, POLICE AND DEFENSE FORCES

	Police and Defense Forces				Army				
	Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Sebha	Total
Number examined	83	80	35	198	47	74	115	8	244
	Percent								
Current diarrhea	14.5	17.5	17.1	16.2	12.8	25.7	17.4	0	18.4
General Appearance:									
Fair-Good	98.8	97.6	100.0	98.5	100.0	100.0	100.0	100.0	100.0
Poor	1.2	2.5	0	1.5	0	0	0	0	0
Thyroid enlarged	1.2	0	0	0.5	0	0	0.9	0	0.4
Parotid enlarged	2.4	0	0	1.0	0	0	0	0	0
Submaxillary enlarged	0	0	0	0	0	0	0	0	0
Nasolabial seborrhea	0	8.8	71.4	16.2	6.4	13.5	34.8	100.0	25.0
Other seborrhea	0	3.8	2.9	2.0	2.1	10.8	5.2	25.0	7.0
Face & neck erythema		0	0	0	0	0	0	0	0
Face & neck pigmentation	7.2	1.2	0	3.5	4.3	1.4	1.7	2.7	2.0
Follicular keratosis	15.7	6.2	5.7	10.1	19.1	13.5	4.3	0	9.8
Perifolliculosis	0	0	0	0	0	0	0	0	0
Crackled skin	1.2	0	28.6	5.6	0	2.7	1.7	12.5	2.0
Acneform eruption	27.7	35.0	71.4	38.4	38.3	31.1	79.1	87.5	57.0
Scrotal dermatitis	0	5.0	0	2.0	0	1.4	0	0	0.4
Thickened pressure points	0	1.2	5.7	1.5	0	2.7	0	0	0.8
Purpura or petechia	0	1.2	0	0.5	0	4.1	0	0	1.2
Hyperpigmentation	10.8	1.2	2.9	5.6	10.6	4.1	1.7	0	4.1
Pellagrous lesions	2.4	0	0	1.0	0	0	0	0	0
Thickened conjunctiva	0	0	0	0	0	16.2	0	0	4.9
Pingueculae	67.5	77.5	65.7	71.2	76.6	79.7	18.3	37.5	48.8
Bitot's spots	0	0	0	0	0	0	0	0	0
Circumcorneal injection	27.7	7.5	2.9	15.2	6.4	10.8	0	0	4.5
Conjunctival injection	9.6	25.0	48.6	22.7	10.6	17.6	0.9	62.5	9.8
Blepharitis	0	0	2.9	0.5	0	1.4	0	0	0.4
Lips, angular lesions	7.2	12.5	2.9	8.6	2.1	6.8	5.2	25.0	5.7
Lips, angular scars only	9.6	7.5	0	7.1	6.4	13.5	0.9	0	5.7
Lips, cheilosis	0	1.2	0	0.5	0	0	0	0	0

TABLE 20 (CONTINUED)

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS OF ARMY, POLICE AND DEFENSE FORCES

	Police and Defense Forces				Army				
	Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Sebha	Total
Number Examined	83	80	35	198	47	74	115	8	244
				Percent					
Filiform pap. atrophy mod., sev.	0	7.5	0	3.0	0	4.1	3.5	0	2.9
Papillary hypertrophy, mod., sev.	1.2	17.5	5.7	8.6	0	1.4	17.4	12.5	9.0
Furrows	21.7	37.5	28.6	29.3	27.7	45.9	75.7	62.5	57.0
Red, tip and/or lat. margins	2.4	7.5	11.4	6.1	2.1	8.1	5.2	62.5	7.4
Glossitis	0	0	0	0	0	0	0	0	0
Magenta colored tongue	0	1.2	0	0.5	0	0	0	0	0
Geographic tongue	1.2	2.5	42.9	9.1	0	0	1.7	25.0	1.6
Red or swollen gums	37.3	70.0	22.9	48.0	17.0	60.8	67.8	62.5	55.7
Atrophy of papillae	0	2.5	2.9	1.5	0	1.4	0	0	0.4
Recession of papillae	0	28.8	17.1	14.6	17.0	1.4	25.2	0	15.6
Bleeding gums	2.4	12.5	17.1	9.1	0	5.4	12.2	0	7.4
1-2 carious teeth	19.3	20.0	28.6	21.2	19.1	16.2	21.7	25.0	19.7
3+ carious teeth	10.8	36.2	40.0	26.3	36.2	60.8	59.1	37.5	54.5
Any fillings	3.6	0	0	1.5	4.3	1.4	1.7	0	2.0
Edentulous	0	0	5.7	1.0	0	0	0.9	0	0.4
Worn teeth	53.0	27.5	71.4	46.0	44.7	40.5	18.3	75.0	32.0
Mottled teeth	3.6	16.2	51.4	17.2	0	39.2	6.1	62.5	16.8
Malposition	0	6.2	8.6	4.0	0	6.8	10.4	0	7.0
Hepatomeglia	4.8	7.5	8.6	6.6	8.5	5.4	0	37.5	4.5
Splenomeglia	0	0	2.9	0.5	0	0	2.6	12.5	1.6
Bilateral edema	0	0	0	0	0	0	0	0	0
Calf tenderness, slight	1.2	0	0	0.5	0	0	0.9	0	0.4
Vib. Sensation absent	0	0	0	0	0	0	0.9	0	0.4
Loss of ankle jerk	4.8	0	5.7	3.0	0	0	0.9	0	0.4
Loss of knee jerk	2.4	0	2.9	1.5	0	0	0	0	0
Position sense toes impaired	0	0	0	0	0	0	0.9	0	0.4

TABLE 21

LIBYA: PHYSICAL FINDINGS IN ABBREVIATED EXAMINATIONS
CIVILIAN MEN, BY LOCATION

	Tripolitania					Cyrenaica	Fezzan	
	desert	mountains		coast		coast	desert	
	Ben Ulid	Garian	El Guasem	Tripoli 1/	Tripoli 2/	Bengasi	Sebha 3/	Total
Number examined	121	99	40	138	111	194	162	865
				Percent				
Thyroid enlarged	0	0	0	0	1.8	0	0	0.2
Nasolabial seborrhea	14.0	2.0	25.0	0.7	3.6	20.1	36.4	15.3
Follicular keratosis	0.8	0	0	3.6	1.8	2.6	1.9	1.8
Scrotal dermatitis	0	0	0	0	0	0	0	0
Pellagrous lesions	0	0	2.5	0	0	0	0	0.1
Bitot's spots	0	0	0	0	0	0	0	0
Lips, angular lesions	9.9	2.0	7.5	6.5	1.8	3.6	5.6	5.1
Lips, angular scars only	6.6	4.0	7.5	3.6	3.6	1.0	3.1	3.6
Lips, cheilosis	0.8	0	0	0	0	0	1.9	0.5
Filiform pap. atrophy, mod., sev.	0.8	0	0	0	0	4.2	2.5	1.5
Glossitis	0.8	4.0	0	4.3	0.9	1.5	1.2	2.0
Magenta colored tongue	0	0	0	0	3.6	0	0	0.5
Bilateral edema	0	0	0	0	0	0	0	0
Calf tenderness, slight	0	8.1	0	0	0	0	0	0.9
Loss of ankle jerk	0.8	6.1	0	0	0	2.6	3.7	2.1

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 22

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS, CIVILIAN MEN, BY LOCATION

	Tripolitania					Fezzan	
	Ben Ulid	Garian	El Guasem	Tripoli 1/	Tripoli 2/	Sebha 3/	Total
Number examined	29	27	12	34	24	40	164
			Percent				
Current diarrhea	6.9	40.7	33.3	23.5	20.8	39.5	27.4
General Appearance,							
Fair-Good	79.3	66.7	91.7	100.0	100.0	100.0	90.2
Poor	20.7	33.3	8.3	0	0	0	9.8
Thyroid enlarged	0	0	0	0	0	0	0
Parotid enlarged	0	3.7	0	0	4.2	0	1.2
Submaxillary enlarged	0	0	0	2.9	0	0	0.6
Nasolabial seborrhea	41.4	0	33.3	0	0	42.1	19.5
Other seborrhea	10.3	0	0	0	0	5.3	3.0
Face & neck erythema	0	0	0	0	0	0	0
Face & neck pigmentation	6.9	0	0	0	0	0	1.2
Follicular keratosis	3.4	25.9	0	11.8	25.0	10.5	13.4
Perifolliculosis	0	0	0	0	0	0	0
Crackled skin	13.8	7.4	8.3	0	0	21.1	9.1
Acneform eruption	0	14.8	8.3	38.2	25.0	36.8	23.2
Scrotal dermatitis	6.9	0	0	0	0	0	1.2
Thickened pressure points	58.6	0	16.7	0	0	5.3	12.8
Purpura or petechia	0	0	0	2.9	0	0	0.6
Hyperpigmentation	0	18.5	0	2.9	12.5	0	5.5
Pellagrous lesions	0	0	0	0	0	0	0
Thickened conjunctiva	0	0	0	2.9	25.0	2.6	4.9
Pingueculae	96.6	92.6	58.3	50.0	45.8	52.6	65.9
Bitot's spots	3.4	0	0	2.9	0	0	1.2
Circumcorneal injection	0	0	8.3	5.9	0	0	1.8
Conjunctival injection	48.3	11.1	16.7	23.5	0	68.4	32.3
Blepharitis	0	0	0	2.9	8.3	0	1.8
Lips, angular lesions	0	0	8.3	0	12.5	2.6	3.0
Lips, angular scars only	10.3	11.1	8.3	2.9	0	5.3	6.1
Lips, cheilosis	0	0	0	0	0	2.6	0.6

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 22 (CONTINUED)

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS, CIVILIAN MEN, BY LOCATION

	Tripolitania					Fezzan	
	Ben Ulid	Garian	El Guasem	Tripoli 1/	Tripoli 2/	Sebha 3/	Total
Number examined	29	27	12	34	24	40	164
			Percent				
Filiform pap. atrophy moderate, severe	0	0	0	0	0	0	0
Papillary hypertrophy moderate, severe	0	0	0	2.9	0	15.8	4.3
Furrows	41.4	37.0	8.3	64.7	20.8	47.4	41.5
Red, tip and/or lat.margins	0	0	0	8.8	4.2	15.8	6.1
Glossitis	0	3.7	0	0	0	2.6	1.2
Magenta colored tongue	0	0	0	0	0	0	0
Geographic tongue	6.9	0	0	0	0	36.8	9.8
Red or swollen gums	44.8	14.8	33.3	88.2	0	31.6	38.4
Atrophy of papillae	0	0	8.3	2.9	0	5.3	2.4
Recession of papillae	0	0	16.7	2.9	12.5	7.9	5.5
Bleeding gums	3.4	0	0	8.8	0	0	2.4
1-2 carious teeth	24.1	40.7	8.3	11.8	20.8	15.8	20.7
3+ carious teeth	17.2	25.9	16.7	64.7	16.7	18.4	28.7
Any fillings	0	0	16.7	2.9	20.8	0	4.9
Edentulous	6.9	7.4	0	0	4.2	15.8	6.7
Worn teeth	69.0	66.7	16.7	52.9	-	97.4	67.9
Mottled teeth	0	0	0	17.6	-	89.5	28.6
Malposition	0	0	0	8.8	-	0	2.1
Hepatomeglia	3.4	11.1	8.3	17.6	50.0	21.1	18.9
Splenomeglia	0	0	0	0	0	2.6	0.6
Bilateral edema	0	0	0	0	0	0	0
Calf tenderness, slight	0	0	0	5.9	8.3	0	2.4
Vib. Sensation absent	0	0	0	0	0	0	0
Loss of ankle jerk	0	0	0	2.9	0	5.3	1.8
Loss of knee jerk	0	0	0	0	0	0	0
Position sense toes impaired	0	0	0	0	0	0	0

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 23

LIBYA: BLOOD PRESSURE AND PULSE RATE

Military Sample, by Location

	Police and Defense Forces				Army				
	Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Sebha	Total
Number of Subjects	82	80	35	197	47	74	115	8	244
Average Systolic Blood Pressure	123.6	117.2	128.7	121.9	111.7	118.6	113.4	128.1	115.1
Average Diastolic Blood Pressure	75.1	78.4	83.4	77.9	71.1	81.6	69.4	71.2	73.5
% > 140/90	3.7	0	14.3	4.1	0	4.1	0	0	1.2
Average Pulse Rate	78.2	84.0	85.5	81.9	73.9	74.3	77.7	78.5	76.0

Male Civilian Sample, by Location

	Tripolitania					Fezzan	
	Ben Ulid	Garian	El Guasem	Tripoli 1/	Tripoli 2/	Sebha 3/	Total
Number of Subjects	29	27	12	34	24	38	164
Average Systolic Blood Pressure	117.9	119.6	119.2	119.0	130.6	124.9	122.0
Average Diastolic Blood Pressure	74.5	72.4	80.0	78.5	77.1	77.4	76.4
% > 140/90	0	3.7	0	0	0	5.3	1.8
Average Pulse Rate	79.8	81.4	78.2	82.1	81.7	90.6	83.2

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 24

LIBYA: PHYSICAL FINDINGS IN ABBREVIATED EXAMINATIONS, NON-PREGNANT WOMEN AND BOYS

	Non-pregnant Women					Boys					
	Garian	El Guasem	Tripoli	Temen-hint	Total	Garian	El Guasem	Sebha	Temen-hint	Other	Total
Number examined	32	24	4	15	75	15	19	54	29	3	120
					Percent						
Thyroid enlarged	18.8	4.2	25.0	0	10.7	0	0	0	0	0	0
Nasolabial seborrhea	9.4	0	0	0	4.0	0	0	0	3.4	0	0.8
Follicular keratosis	53.1	75.0	0	6.7	48.0	0	10.5	3.7	3.4	0	4.2
Pellagrous lesions	3.1	0	0	0	1.3	0	0	0	0	0	0
Bitot's spots	3.1	0	0	0	1.3	0	0	0	0	0	0
Lips, angular lesions	28.1	25.0	0	0	20.0	0	5.3	5.6	6.9	0	5.0
Lips, angular scars only	34.3	29.2	0	6.7	25.3	20.0	0	0	0	0	2.5
Lips, cheilosis	3.1	0	0	0	1.3	0	0	0	3.4	0	0.8
Filiform pap. atrophy, mod., severe	25.0	8.3	0	0	13.3	0	0	0	0	33.3	0.8
Glossitis	9.4	20.8	25.0	0	12.0	6.7	0	0	0	0	0.8
Magenta colored tongue	15.6	0	0	0	6.7	0	0	0	0	0	0
Bilateral edema	9.4	4.2	0	0	5.3	0	0	0	0	0	0
Calf tenderness, slight	0	0	0	0	0	6.7	0	0	0	0	0.8
Loss of ankle jerk	0	0	0	13.3	2.7	6.7	0	1.9	0	0	1.7

TABLE 25

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS OF WOMEN

	Non-pregnant					Pregnant					
							Tripoli				
	Garian & El Guasem	Bengasi	Barce	Sebha	Total	Garian & El Guasem	Old City	Suk el Giuma	Barce	Sebha	Total
Number examined	12	107	77	32	228	8	29	17	5	2	61
					Percent						
Current diarrhea	83.3	40.2	75.3	65.6	57.9	50.0	75.9	64.7	80.0	50.0	68.9
General appearance,											
Fair-Good	83.3	86.0	93.5	96.9	89.9	75.0	89.7	100.0	100.0	100.0	91.8
Poor	16.7	11.2	6.5	3.1	8.8	25.0	10.3	0	0	0	8.2
Cachexia	0	2.8	0	0	1.3	0	0	0	0	0	0
Thyroid enlarged	25.0	0	0	0	1.3	12.5	0	11.8	0	0	4.9
Parotid enlarged	8.3	0	0	0	0.4	12.5	0	0	0	0	1.6
Submaxillary enlarged	0	0.9	0	0	0.4	0	0	58.8	0	0	16.4
Nasolabial seborrhea	8.3	1.9	19.5	18.8	10.5	12.5	24.1	0	20.0	0	14.8
Other seborrhea	0	0	2.6	3.1	1.3	0	0	0	0	0	0
Face & neck erythema	16.7	1.9	0	0	1.8	12.5	0	0	0	0	1.6
Face & neck pigmentation	16.7	2.8	1.3	0	2.6	0	24.1	0	0	0	11.5
Follicular keratosis	0	2.8	1.3	6.2	2.6	12.5	13.8	35.3	0	0	18.0
Perifolliculosis	0	0	0	0	0	12.5	0	0	0	0	1.6
Crackled skin	0	22.4	23.4	50.0	25.4	0	0	11.8	20.0	0	4.9
Acneform eruption	8.3	2.8	14.3	0	6.6	0	0	0	0	0	0
Thickened pressure points	0	0	3.9	0	1.3	0	0	0	40.0	0	3.3
Purpura or petechia	0	0	0	0	0	12.5	0	0	0	0	1.6
Hyperpigmentation	25.0	0.9	9.1	0	4.8	12.5	0	17.6	20.0	0	8.2
Pellagrous lesions	0	0	0	0	0	0	0	0	0	0	0
Thickened conjunctiva	50.0	34.6	9.1	9.4	23.2	0	17.2	5.9	0	0	9.8
Pingueculae	83.3	54.2	46.8	43.8	51.8	100.0	3.4	17.6	60.0	0	24.6
Bitot's spots	0	0.9	1.3	0	0.9	12.5	0	0	0	0	1.6
Circumcorneal injection	41.7	6.5	13.0	34.4	14.5	0	13.8	22.5	20.0	0	14.8
Conjunctival injection	58.3	47.7	31.2	40.6	41.7	25.0	10.3	41.2	40.0	0	23.0

TABLE 25 (CONTINUED)

LIBYA: PHYSICAL FINDINGS IN DETAILED EXAMINATIONS OF WOMEN

	Non-pregnant					Pregnant					
							Tripoli				
	Garian & El Guasem	Bengasi	Barce	Sebha	Total	Garian & El Guasem	Old City	Suk el Giuma	Barce	Sebha	Total
Number examined	12	107	77	32	228	8	29	17	5	2	61
					Percent						
Blepharitis	25.0	7.5	13.0	6.2	10.1	0	10.3	0	0	0	4.9
Lips, angular lesions	25.0	4.7	3.9	0	4.8	0	6.9	17.6	0	50.0	9.8
Lips, angular scars only	50.0	3.7	7.8	3.1	7.5	87.5	10.3	41.2	0	0	27.9
Lips, cheilosis	8.3	0	1.3	0	0.9	0	0	0	0	0	0
Filiform pap. atrophy, mod., severe	8.3	4.7	7.8	0	5.3	12.5	27.6	0	0	0	14.8
Papillary hypertrophy, mod., severe	0	8.4	7.8	40.6	12.3	0	0	0	0	50.0	1.6
Furrows	66.7	40.2	63.6	71.9	53.9	50.0	44.8	70.6	60.0	50.0	54.1
Red, tip and/or lat. margins	50.0	30.8	1.3	12.5	19.3	12.5	3.4	35.3	0	50.0	14.8
Glossitis	0	1.9	1.3	0	1.3	0	0	17.6	0	0	4.9
Magenta colored tongue	0	1.9	0	0	0.9	0	3.4	0	0	0	1.6
Geographic tongue	0	4.7	1.3	43.8	8.8	12.5	0	0	0	0	1.6
Red or swollen gums	83.3	25.2	67.5	50.0	46.1	50.0	93.1	100.0	40.0	50.0	85.2
Atrophy of papillae	58.3	6.5	0	6.2	7.0	25.0	6.9	5.9	20.0	0	9.8
Recession of papillae	58.3	80.4	39.0	6.2	54.8	25.0	6.9	0	40.0	0	9.8
Bleeding gums	58.3	20.6	9.1	6.2	16.7	12.5	51.7	0	0	0	26.2
1-2 carious teeth	58.3	18.7	14.3	21.9	19.7	50.0	17.2	0	20.0	50.0	18.0
3+ carious teeth	0	30.8	70.1	3.1	38.6	37.5	79.3	100.0	60.0	0	75.4
Any fillings	0	1.9	5.2	0	2.6	0	13.8	5.9	0	0	8.2
Edentulous	0	8.4	7.8	31.2	11.0	0	0	0	0	0	0
Worn teeth	83.3	75.7	15.6	100.0	59.2	100.0	44.8	11.8	20.0	100.0	42.6
Mottled teeth	0	0.9	3.9	65.6	11.0	0	3.4	52.9	0	100.0	19.7
Malposition	0	32.7	1.3	0	15.8	0	6.9	5.9	20.0	0	6.6
Hepatomeglia	16.7	1.9	5.2	28.1	7.5	12.5	6.9	23.5	0	0	11.5
Splenomeglia	0	2.8	0	0	1.3	0	0	0	0	0	0
Bilateral edema	0	11.2	0	0	5.3	0	0	0	0	0	0
Calf tenderness, sl	8.3	0	1.3	0	0.9	0	0	0	0	0	0
Vib. sensation absent	0	0	0	0	0	0	0	0	0	0	0
Loss of ankle jerk	--	27.1	27.3	18.8	24.6	0	0	0	0	50.0	1.6
Loss of knee jerk	--	15.0	14.3	12.5	13.6	0	0	0	0	50.0	1.6
Position sense toes impaired	--	1.9	0	0	0.9	0	0	0	0	0	0

TABLE 26

LIBYA: BLOOD FINDINGS, BY ARMY AND POLICE AND DEFENSE FORCES

		Police and Defense Forces				Army			
		Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Total
Number of blood samples		26	29	20	77	14	34	19	67
Plasma Proteins (gm/100 ml)	MEAN	7.74	8.08	7.97	7.93	7.70	8.08	8.10	8.01
	S.D.	.37	.35	.45	.41	.35	.46	.54	.48
	S.E.	.07	.06	.10	.05	.09	.08	.12	.06
Hemoglobin (gm/100 ml)	MEAN	15.20	14.92	14.12	14.82	15.00	14.99	13.86	14.67
	S.D.	1.20	1.38	2.10	1.58	1.50	1.13	1.41	1.38
	S.E.	.23	.26	.47	.18	.40	.19	.33	.17
% Distribution	<12.0	0	3.4	10.0	3.9	0	0	10.5	3.0
	12.0-13.9	21.4	17.2	30.0	22.1	21.4	17.6	31.6	22.4
	14.0-14.9	21.4	31.0	35.0	28.6	21.4	35.3	42.1	34.3
	≥15.0	57.1	48.3	25.0	45.5	57.1	47.1	15.8	40.3
Hematocrit (%)	MEAN	47.2	48.2	47.5	47.6	46.1	47.4	46.6	46.9
	S.D.	2.6	3.3	4.2	3.3	3.6	3.1	3.3	3.3
	S.E.	0.5	0.6	0.9	0.4	1.0	0.5	0.8	0.4
% Distribution	<36	0	0	5.0	1.3	0	0	0	0
	36-41	0	3.4	0	1.3	21.4	5.9	10.5	10.4
	42-45	32.1	20.7	20.0	24.7	21.4	26.5	31.6	26.9
	≥46	67.9	75.9	75.0	72.7	57.1	67.6	57.9	62.7
M.C.H.C. (%)	MEAN	32.2	31.0	29.6	31.1	32.7	31.7	29.7	31.3
	S.D.	1.7	2.0	2.3	2.2	1.5	1.2	1.5	1.7
	S.E.	0.3	0.4	0.5	0.3	0.4	0.2	0.3	0.2
% Distribution	<28.0	0	3.4	15.0	5.2	0	0	10.5	3.0
	28.0-29.9	7.1	24.1	25.0	18.2	0	2.9	36.8	11.9
	30.0-33.9	75.0	65.5	55.5	66.2	71.4	91.2	52.6	76.1
	≥34.0	17.9	6.9	5.0	10.4	28.6	5.9	0	9.0
Serum Vit. C (mg/100 ml)	MEDIAN	0.10	0	0.14	0.07	0.2	0	0.20	0.10
% Distribution	<0.10	50.0	89.7	25.0	58.4	7.1	93.9	5.3	50.0
	0.10-0.19	17.9	6.9	55.0	23.4	14.3	0	42.1	15.2
	0.20-0.39	10.7	3.4	15.0	9.1	50.0	6.1	52.6	28.7
	≥0.40	21.4	0	5.0	9.1	28.6	0	0	6.1
Serum Vit. A (mcg/100 ml)	MEAN	40.3	35.0	40.0	38.2	33.5	26.7	22.2	26.9
	S.D.	15.4	8.7	17.7	14.0	10.2	7.8	11.4	10.1
	S.E.	2.9	1.6	4.0	1.6	2.7	1.3	2.6	1.2
% Distribution	<10	0	0	5.0	1.3	0	2.9	21.1	7.5
	10-19	10.7	6.9	0	6.5	14.3	11.8	15.8	13.4
	20-49	64.3	89.7	65.0	74.0	85.7	85.3	63.2	79.1
	≥50	25.0	3.4	30.0	18.2	0	0	0	0
Serum Carotene (mcg/100 ml)	MEAN	140	151	136	143	166	168	154	164
	S.D.	42	40	39	41	45	53	51	50
	S.E.	8	7	9	5	12	9	12	6
% Distribution	<50	0	0	0	0	0	0	0	0
	50-99	17.9	3.4	20.0	13.0	7.1	8.8	5.3	7.5
	≥100	82.1	96.6	80.0	87.0	92.9	91.2	94.7	92.5

TABLE 27

LIBYA: BLOOD FINDINGS, CIVILIAN MEN, BY LOCATION

		Tripolitania			Cyrenaica	Fezzan	
		Garian & El Guasem	Tripoli 1/	Tripoli 2/	Bengasi	Sebha 3/	Total
Number of blood samples		12	16	12	38	19	97
Plasma Proteins (gm/100 ml)	MEAN	7.78	7.95	8.04	8.13	7.72	7.97
	S.D.	0.39	0.48	0.42	0.43	0.45	0.46
	S.E.	0.11	0.12	0.12	0.07	0.11	0.05
Hemoglobin (gm/100 ml)	MEAN	15.25	15.59	15.71	14.99	13.67	14.96
	S.D.	1.72	1.11	1.08	1.13	1.56	1.44
	S.E.	0.50	0.28	0.31	0.18	0.37	0.15
% distribution	<12.0	8.3	0	0	0	11.1	3.1
	12.0-13.9	25.0	12.5	0	18.4	38.9	19.8
	14.0-14.9	0	6.2	25.0	34.2	33.3	24.0
	≥15.0	66.7	81.2	75.0	47.4	16.7	53.1
Hematocrit	MEAN	45.8	48.8	47.2	46.9	46.3	47.1
	S.D.	3.4	2.1	3.2	2.2	3.5	2.9
	S.E.	1.0	0.5	0.9	0.4	0.8	0.3
% distribution	<36	0	0	0	0	0	0
	36-41	8.3	0	8.3	2.6	5.6	4.2
	42-45	33.3	6.2	25.0	39.5	27.8	29.2
	≥46	58.3	93.8	66.7	57.9	66.7	66.7
M.C.H.C. (%)	MEAN	33.1	32.0	33.0	31.8	29.5	31.7
	S.D.	1.8	1.7	1.3	1.8	2.4	2.2
	S.E.	0.5	0.4	0.4	0.3	0.6	0.2
% distribution	<28.0	0	0	0	2.6	11.1	3.1
	28.0-29.9	0	12.5	0	7.9	38.9	12.5
	30.0-33.9	58.3	81.2	66.7	78.9	50.0	69.8
	≥34.0	41.7	6.2	33.3	10.5	0	14.6
Serum Vit. C (mg/100 ml)	MEDIAN	0.24	0.12	0.34	0.27	0.32	0.26
% distribution	<0.10	16.7	46.7	8.3	14.3	21.1	20.4
	0.10-0.19	16.7	13.3	25.0	20.0	10.5	17.2
	0.20-0.39	41.7	20.0	25.0	42.9	26.3	33.3
	≥0.40	25.0	20.0	41.7	22.9	42.1	29.0
Serum Vit. A (mcg/100 ml)	MEAN	28.3	19.6	20.8	28.5	60.6	32.4
	S.D.	14.1	12.4	8.6	11.8	20.1	19.9
	S.E.	4.1	3.1	2.5	1.9	4.6	2.0
% distribution	<10	16.7	18.8	0	2.7	0	6.2
	10-19	8.3	43.8	58.3	24.3	0	25.0
	20-49	66.7	37.5	41.7	70.3	31.6	53.1
	≥50	8.3	0	0	2.7	68.4	15.6
Serum Carotene (mcg/100 ml)	MEAN	75	156	167	165	90	138
	S.D.	34	72	52	54	30	63
	S.E.	10	18	15	9	7	6
% distribution	<20	8.3	0	0	0	0	1.0
	20-39	8.3	0	0	0	0	1.0
	40-99	50.0	18.8	0	10.8	63.2	26.0
	≥100	33.3	82.2	100.0	89.2	36.8	71.9

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 28

LIBYA: BLOOD FINDINGS, WOMEN, BY LOCATION

		Non-pregnant				Pregnant			
		Garian & El Guasem	Bengasi	Barce	Total	Garian & El Guasem	Tripoli	Suk el Giuma	Total
Number of blood samples		6	17	14	37	8	12	15	35
Plasma Proteins (gm/100 ml)	MEAN	7.79	8.21	8.60	8.29	8.01	6.99	7.76	7.55
	S.D.	0.32	0.48	0.40	0.49	0.38	0.48	0.77	0.72
	S.E.	0.13	0.10	0.11	0.08	0.14	0.14	0.21	0.12
Hemoglobin (gm/100 ml)	MEAN	13.00	12.19	13.68	12.88	12.25	11.12	10.39	11.09
	S.D.	0.76	1.45	1.05	1.37	2.95	1.00	2.28	2.18
	S.E.	0.31	0.35	0.28	0.23	1.04	0.29	0.61	0.37
% distribution	<9.0	0	0	0	0	25.0	0	28.6	17.6
	9.0-9.9	0	11.8	0	5.4	0	16.7	14.3	11.8
	10.0-10.9	0	0	0	0	0	25.0	21.4	17.6
	11.0-11.9	16.7	29.4	7.1	18.9	0	33.3	14.3	17.6
	12.0-13.9	83.3	52.9	42.9	54.1	62.5	25.0	14.3	29.4
	14.0-14.9	0	5.9	42.9	18.9	0	0	7.1	2.9
	≥15.0	0	0	7.1	2.7	12.5	0	0	2.9
Hematocrit (%)	MEAN	40.8	41.1	43.2	41.9	37.4	34.8	35.7	35.8
	S.D.	2.4	4.4	2.5	3.6	5.6	3.3	6.6	5.3
	S.E.	1.0	1.1	0.7	0.6	2.0	0.9	1.8	0.9
% distribution	<32	0	5.9	0	2.7	25.0	33.3	35.7	32.4
	32-35	0	0	0	0	12.5	16.7	21.4	17.6
	36-41	50.0	52.9	35.7	45.9	62.5	50.0	28.6	44.1
	42-45	50.0	35.3	64.3	48.6	0	0	7.1	2.9
	≥46	0	5.9	0	2.7	0	0	7.1	2.9
M.C.H.C. (%)	MEAN	32.2	29.9	31.9	31.0	31.7	32.0	29.2	30.8
	S.D.	1.7	2.2	1.9	2.2	3.4	1.5	2.7	2.8
	S.E.	0.7	0.5	0.5	0.4	1.2	0.4	0.7	0.5
% distribution	<28.0	0	11.8	0	5.4	12.5	0	28.6	14.7
	28.0-29.9	0	29.4	7.1	16.2	0	0	28.6	11.8
	30.0-33.9	66.7	52.9	85.7	67.6	62.5	83.3	42.9	61.8
	≥34.0	33.3	5.9	7.1	10.8	25.0	16.7	0	11.8
Serum Vit. C (mg/100 ml)	MEDIAN	0.09	0.21	0.11	0.16	0.14	0.80	0.31	0.33
% distribution	<0.10	60.0	17.6	46.2	34.3	28.6	0	6.7	8.8
	0.10-0.19	0	29.4	30.8	25.7	42.9	0	20.0	17.6
	0.20-0.39	40.0	35.3	7.7	25.7	14.3	25.0	40.0	29.4
	≥0.40	0	17.6	15.4	14.3	14.3	75.0	33.3	44.1
Serum Vit. A (mcg/100 ml)	MEAN	18.3	29.8	27.4	27.0	20.3	0	9.2	8.0
	S.D.	6.6	9.9	12.7	11.1	4.9	Median	5.0	Median
	S.E.	2.7	2.4	3.4	1.8	1.9		1.3	
% distribution	<10	0	0	7.1	2.7	0	91.7	57.1	57.6
	10-19	50.0	23.5	28.6	29.7	42.9	8.3	42.9	30.3
	20-49	50.0	76.5	64.3	67.6	57.1	0	0	12.1
	≥50	0	0	0	0	0	0	0	0
Serum Carotene (mcg/100 ml)	MEAN	63	219	151	168	78	218	155	162
	S.D.	25	74	49	81	28	34	37	62
	S.E.	10	18	13	13	11	10	10	11
% distribution	<20	0	0	0	0	0	0	0	0
	20-39	16.7	0	0	2.7	14.3	0	0	3.0
	40-99	66.7	5.9	7.1	16.2	57.1	0	7.1	15.2
	≥ 100	16.7	94.1	92.9	81.1	28.6	100.0	92.9	81.8

TABLE 29

LIBYA: URINARY EXCRETION FINDINGS, ARMY, AND POLICE AND DEFENSE FORCES

	Police and Defense Forces				Army			
	Tripoli	Bengasi	Sebha	Total	Zavia	Bengasi	Susa	Total
Number of urine samples	28	28	20	76	13	34	19	66
			Median					
Thiamine Excretion (mcg/gm Creatinine)	99	45	90	80	88	78	41	71
			Percent of Samples					
<27	0.0	25.0	5.0	10.7	7.7	5.9	31.6	13.6
27-65	29.6	50.0	10.0	32.0	15.4	26.5	52.6	31.8
66-129	33.3	7.1	55.0	29.3	53.8	47.1	10.5	37.9
≥130	37.0	17.9	30.0	28.0	23.1	20.6	5.3	16.7
			Median					
Riboflavin Excretion (mcg/gm Creatinine)	250	210	140	190	220	170	160	170
			Percent of Samples					
<27	.0	3.6	0	1.3	0	0	0	0
27-79	3.6	0	5.0	2.6	7.7	0	5.3	3.0
80-269	50.0	67.9	80.0	64.5	76.9	91.2	89.5	87.9
≥270	46.4	28.6	15.0	31.6	15.4	8.8	5.3	9.1
			Median					
N'methylnicotinamide Excretion (mg/gm Creatinine)	0.73	0.62	0.66	0.65	1.15	0.51	0.62	0.56
			Percent of Samples					
<0.50	39.3	35.7	15.0	31.6	23.1	52.9	21.1	37.9
0.50-1.59	35.7	57.1	75.0	53.9	69.2	41.2	68.4	54.5
1.60-4.29	21.4	7.1	10.0	13.2	7.7	2.9	10.5	6.1
≥4.30	3.6	0	0	1.3	0	2.9	0	1.5

TABLE 30

LIBYA: URINARY EXCRETION FINDINGS, CIVILIAN MEN

	Tripolitania				Cyrenaica	Fezzan	
	Ben Ulid	Garian & El Guasem	Tripoli 1/	Tripoli 2/	Bengasi	Sebha 3/	Total
Number of urine samples	12	10	15	12	35	19	103
			Median				
Thiamine Excretion (mcg/gm Creatinine)	--	265	38	35	85	361	98
			Percent of Samples				
<27	--	0	33.3	41.7	3.1	5.3	13.6
27-65	--	10.0	40.0	25.0	34.4	0	23.9
66-129	--	10.0	20.0	16.7	31.2	0	18.2
≥130	--	80.0	6.7	16.7	31.2	94.7	44.3
			Median				
Riboflavin Excretion (mcg/gm Creatinine)	330	180	240	230	210	230	230
			Percent of Samples				
<27	0	0	0	0	0	0	0
27-79	0	0	0	0	0	0	0
80-269	33.3	80.0	73.3	75.0	82.9	63.2	70.9
≥270	66.7	20.0	26.7	25.0	17.1	36.8	29.1
			Median				
N'methylnicotinamide Excretion (mg/gm Creatinine)	1.20	0.87	0.66	0.75	0.56	1.04	0.75
			Percent of Samples				
<0.50	16.7	0	33.3	25.0	40.0	11.1	25.5
0.50-1.59	50.0	90.0	53.3	66.7	57.1	72.2	62.7
1.60-4.29	16.7	10.0	13.3	0	2.9	16.7	8.8
≥4.30	16.7	0	0	8.3	0	0	2.9

1/ Government workers consisting of executives and clerks.
2/ Public Works Department employees composed of semi-skilled and unskilled laborers.
3/ This includes data from examinations conducted in Temenhint.

TABLE 31

LIBYA: URINARY EXCRETION FINDINGS, WOMEN

	Non-pregnant				Pregnant			
	Garian & El Guasem	Bengasi	Barce	Total	Garian & El Guasem	Tripoli	Suk el Giuma	Total
Number of urine samples	6	16	13	35	8	11	14	33
			Median					
Thiamine Excretion (mcg/gm Creatinine)	360	70	90	80	340	290	270	306
			Percent of Samples					
<27	0	12.5	0	5.7	0	0	0	0
27-65	0	37.5	30.8	28.6	0	9.1	0	3.2
66-129	0	37.5	30.8	28.6	12.5	9.1	16.7	12.9
≥130	100.0	12.5	38.5	37.1	87.5	81.8	83.3	83.9
			Median					
Riboflavin Excretion (mcg/mg Creatinine)	240	250	290	260	290	290	280	280
			Percent of Samples					
<27	0	6.2	0	2.9	0	0	0	0
27-79	0	0	0	0	0	0	0	0
80-269	66.7	50.0	46.2	51.4	37.5	45.5	42.9	42.4
≥270	33.3	43.8	53.8	45.7	62.5	54.5	57.1	57.6
			Median					
N'methylnicotinamide Excretion (mg/gm Creatinine)	1.27	0.67	0.77	0.78	1.00	1.30	2.25	1.60
			Percent of Samples					
<0.50	0	43.8	0	20.0	25.0	9.1	0	9.4
0.50-1.59	83.3	50.0	92.3	71.4	37.5	45.5	38.5	40.6
1.60-4.29	16.7	6.2	7.7	8.6	37.5	45.5	38.5	40.6
≥4.30	0	0	0	0	0	0	23.1	9.4

APPENDIX 1

SOME IMPORTANT PUBLICATIONS AND REPORTS DEALING WITH LIBYA

1. Anon: Report to the Government of Libya on Agriculture. FAO Report No. 21. ETAP, Rome, 1952.

2. Hilda M. Canady: The Agricultural Economy of Libya, Foreign Agricultural Service, USDA, Washington, D. C., 1956.

3. F. Vieira de Sa: Report to the Government of Libya on the Development and Organization of a Dairy Industry. FAO Report No. 487, ETAP, Rome, 1956.

4. P. Descoudres and M. Autret: Report on the Possible Organization of a School Feeding Programme in Libya. FAO, Rome, 1956.

5. Foreign Agricultural Service, USDA: Food Balances, Consumption Year 1955-56. Washington, D. C., 1956.

6. Benjamin Higgins: The Economic and Social Development of Libya. UN TA Programme, UN, New York, 1953.

7. Agnes N. Lockwood: Libya - Building a Desert Economy. International Conciliation, No. 512, Carnegie Endowment for International Peace, New York, New York, 1957.

8. E. M. Rascovich: Export of Agricultural Perishables from Libya. FAO Mission to Libya, Tripoli, 1956.

9. Gustave Roebben: Report to the Government of Libya on the Establishment of a Fruit and Vegetable Cannery. FAO Report No. 613, ETAP Rome, 1957.

10. Henry S. Villard: Libya, the New Arab Kingdom of North Africa. Cornell University Press, Ithaca, New York, 1956.

APPENDIX 2

GUIDE USED IN INTERPRETATION OF NUTRIENT INTAKE DATA - YOUNG ADULT MALES 1/

		Deficient	Low	Acceptable	High
Niacin	mg./day	< 5	5-9	10-15	> 15
Riboflavin	mg./day	<0.7	0.7-1.1	1.2-1.5	> 1.5
Thiamine	mg./1000 cal.	<0.2	0.20-0.29	0.3-0.5	> 0.5
Ascorbic Acid	mg./day	<10	10-29	30-50	> 50
Vitamin A	I.U./day	<2000	2000-3499	3500-5000	> 5000
Calcium	gm./day	<0.3	0.30-0.39	0.4-0.8	> 0.8
Iron	mg./day	<6.0	6-8	9-12	> 12
Protein	gm./kg	<0.5	0.5-0.9	1.0-1.5	> 1.5

These guides are intended to apply to 25 year old physically active males of 67 in. (170 cm.) in height and 143 lb. (65 kg.) in weight, living in a temperate climate and consuming a varied diet. The quantities specified should never be considered as inflexible "requirements". In interpreting nutrition surveys of population groups, average values falling in one or another of the above categories conceal the fact that some individuals will receive more and others less than average. In addition, it is known that there is much variability from one to another individual in their requirement for various nutrients. Variations in body size, activity, climate, types of food available, and other factors, modify requirements and, consequently, interpretation of survey data. The nutrient content of food may be altered materially during food preparation, a fact which must always be considered in evaluating dietary intake data.

1/ Manual for Nutrition Surveys, Interdepartmental Committee on Nutrition for National Defense, May, 1957, U. S. Government Printing Office.

APPENDIX 3

A. GUIDE USED IN INTERPRETATION OF URINARY VITAMIN EXCRETION DATA - ADULT MALES 1/

	Deficient	Low	Acceptable	High
N'methylnicotinamide				
mg./6 hrs.	<0.2	0.2-0.59	0.6-1.6	>1.6
mg./gm. creatinine	<0.5	0.5-1.59	1.64-4.3	>4.3
Riboflavin				
mcg./6 hrs.	<10	10-29	30-100	>100
mcg./gm. creatinine	<27	27-79	80-270	>270
Thiamine				
mcg./6 hrs.	<10	10-24	25-50	> 50
mcg./gm. creatinine	<27	27-65	66-130	>130

The urinary values indicated above are based on an average creatinine coefficient of 23 and a 65 kg. man who would be expected to excrete 1.5 gm. of creatinine daily.

B. GUIDE USED IN INTERPRETATION OF BLOOD DATA YOUNG ADULT MALES

	Deficient	Low	Acceptable	High
Hemoglobin gms./100 ml.	<12.0	12-13.9	14.0-15.0	>15.0
Hematocrit (PVC) %	<36	36-41	42-45	>45
Total Serum Protein (TSP) gms./100 ml.	<6.0	6.0-6.39	6.5-7.0	>7.0
Serum Ascorbic Acid mg./100 ml.	<0.1	0.1-0.19	0.2-0.4	>0.4
Serum Vitamin A mcg./100 ml.	<10	10-19	20-50	>50
Serum Carotene mcg./100 ml.	<20	20-39	40-100	>100

1/ Manual for Nutrition Surveys, Interdepartmental Committee on Nutrition for National Defense, May, 1957, U. S. Government Printing Office.

APPENDIX 4

SUGGESTED GUIDE FOR INTERPRETATION OF PHYSICAL FINDINGS[1/]

Nutrient	Physical sign	Abnormal
Calories:		
Obesity	Skin Thickness:	
	Scapulae	Over 30 mm.
	Lower axillae	Over 25 mm.
	Height-weight tables	Over 10 percent.
Leanness	Skin Thickness:	
	Scapulae	Under 8 mm.
	Lower axillae	Under 8 mm.
	Height-weight tables	Under 10 percent.
Protein	Dependent edema	Over 0 percent under age 50 in absense of beriberi and starvation.
Vitamin A	Follicular keratosis of arms	Over 5 percent in adults.
Thiamine	Absent Achilles tendon reflexes	Over 1 or 2 percent.
Niacin	Tongue lesion more advanced than hypertrophy of papillae at tip.	Over 5 percent.
	Reddened Tongue	Over 1 or 2 percent.
	Pellagrous dermatitis	Over 0 percent.
Riboflavin	Angular stomatitis	Over 5 percent in nondenture wearing population.
	Conjunctival hyperemia (circum-corneal injection).	Over 5 percent.
	Magenta tongue	Over 0 percent.
Ascorbic Acid	Red hyperemic gums	Over 5-10 percent (in adults).
	Perifolliculosis	Over 0 percent.

1/ It should be obvious that these guides are designed for population group surveys since the presence of any one of the clinical findings may have significance in individuals.

Manual for Nutrition Surveys, Interdepartmental Committee on Nutrition for National Defense, May, 1957, U. S. Government Printing Office.

APPENDIX 5

PERCENTAGE OF NUTRIENTS LOST DURING COOKING[1/]

(Conservative losses based on good cooking practices)

Food	Thiamine	Riboflavin	Niacin	Vitamin C
Meats	35	20	25	--
Meats, plus drippings	25	5	10	--
Eggs	25	10	0	--
Cereals	10	0	10	--
Legumes	20	0	0	--
Vegetables, L, G & Y.	40	25	25	60
Tomatoes	5	5	5	15
Vegetables, Other	25	15	25	60
Potatoes	40	25	25	60

1/ U. S. Department of the Army TM 8-501, Nutrition, p. 19, September, 1949.

APPENDIX 6

NUTRIENT INTAKE RATED ACCORDING TO ICNND INTERPRETIVE GUIDE[1/]

Location	Bengasi		Susa		Tripolitania		Cyrenaica		Fezzan	
Method	A	B	A	B	A	B	A	B	A	B
Nutrient										
Calcium	2	3	2	3	1	3	1	1	1	3
Iron	3	4	3	4	3	4	3	4	4	4
Vitamin A	1	1	2	1	1	1	2	1	1	2
Thiamine	2	3	2	3	2	3	1	2	3	4
Riboflavin	2	4	2	3	2	2	2	2	2	2
Niacin	3	3	3	2	3	3	3	2	3	3
Ascorbic Acid	2	3	2	4	2	2	2	2	2	3

1/ CODE: A - By computation from food composition tables.

B - By chemical analysis of composite food sample.

1 - Deficient.

2 - Low.

3 - Acceptable.

4 - High.