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REPORT
of the
Tuberculin Survey
and
BCG Vaccination Campaign
Conducted in the Northern Regions
of the
Somali Republic
August 1966 to April 1967

Under the auspices of
The Ministry of Health and Labor
of the
Somali Republic

W.H.O.

U.N.I.C.E.F.

Peace Corps

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Introduction

The survey described on the following pages was conducted by a group of Peace Corps and Ministry of Health workers during 1966-67 in preparation for a full-scale mass BCG-vaccination campaign in the North. It originated in talks between the Peace Corps Physician, the WHO Senior Advisor on Tuberculosis in Mogadishu, and the Ministry of Health and Labor in January and April of 1966. A plan was drawn up to combine the efforts of all the agencies concerned in order to extend the BCG vaccination campaign, already begun in Mogadishu, to the northern part of the country. In accordance with WHO world-wide policy, a tuberculin survey was designed to include 5,000 to 10,000 people, before beginning direct mass BCG vaccination without prior tuberculin testing. This is considered necessary in order to gain an idea of the prevalence of tuberculosis and to have information for choosing the age group to be given direct vaccination.

During the survey, a Land-Rover has been provided by the Somali Government, and UNICEF has contributed all the necessary tuberculin, BCG vaccine, syringes, and other vaccinating equipment. The WHO Senior Advisor, Dr. K.M. Franziss, has provided overall supervision and valuable encouragement, and has been responsible for seeing that the design of the program conformed to WHO policies. The personnel conducting the campaign were trained at the WHO Anti-tuberculosis Center in Mogadishu under the direction of Dr. Franziss and Miss Fernanda Nicolodi, Technical Advisor for the WHO Somalia II project. The actual testing was done at first by a team consisting of Dr. Andrew Dean, Peace Corps Physician; Virginia Lee Dean, his wife; Gary Brown, Peace Corps Volunteer; and Ali Farah Warsame and Abdullahi Farah Sugul, dressers. In February of 1967 they were joined by Kathleen Quinlan and Mary Wilkins, Peace Corps Volunteers; and Hussein Dualah, dresser.

During the course of the campaign, the members of the teams shared long miles on rough roads and lived together for a total period of many weeks in towns scattered all over the Northern Regions. For the Peace Corps members of the teams, this experience provided invaluable instruction into the nature of Somali culture and language; many friends were made in the places visited. It also gave them an appreciation of the task which the dressers face in trying to bring health services to people scattered in so many small outposts, and in trying to educate the population about the value of preventive medicine. To the dressers and to the driver Abdullahi "Yere", the Peace Corps workers extend their thanks for the many good and often difficult times shared together while "on the road."

Methods

The survey was carried out by a team consisting of two dressers and three Peace Corps workers. All had been trained at the WHO TB Center in Mogadishu, and the field work was directly supervised by Dr. Dean. After appropriate talks with local authorities and usually an announcement on Radio Hargeisa about the program the group, working in two teams, went from house to house in the town concerned, explaining the program and administering Mantoux tests. All persons who agreed to be tested were included, regardless of their age. For each individual, the name of the person, his father, and his grandfather were recorded in the Somali fashion (e.g. Jama Ali Hassan). He was then asked his age, but if he did not know, as is often the case, or if the answer was obviously in error, an estimate was entered by the vaccinator. Hence ages are not accurate except in a general way, although young children's ages are probably correct within one year. A descriptive word such as "daar" (stone house) or "aqal" (nomadic hut) was added to describe the part of the town and type of house in which the person lived. The left arm and shoulder were examined for old BCG and smallpox vaccination scars, and in areas where smallpox vaccination had been done on the right arm (near Jibuti) this was examined as well. Initially everyone was examined for cervical lymphadenopathy, but this proved to be too time-consuming, and for most of the survey only those cases obvious visually were noted. All married women were asked how many children they had delivered and how many of those were living. If any had died, they were asked if those who died had "died young" ("Ma yaryar baa ku dintey, mise waaseyn?"). We discovered that "young" usually means below about age 10. Hence this gives a rough estimate of combined infant and childhood mortality. A Mantoux test was then given on the dorso-lateral surface of the left forearm with two units of the standard WHO tuberculin preparation (RT 23 with Tw80). This had been kept cold either in a refrigerator or in a thermos flask until the time of use and was carried from house to house in a thermos.

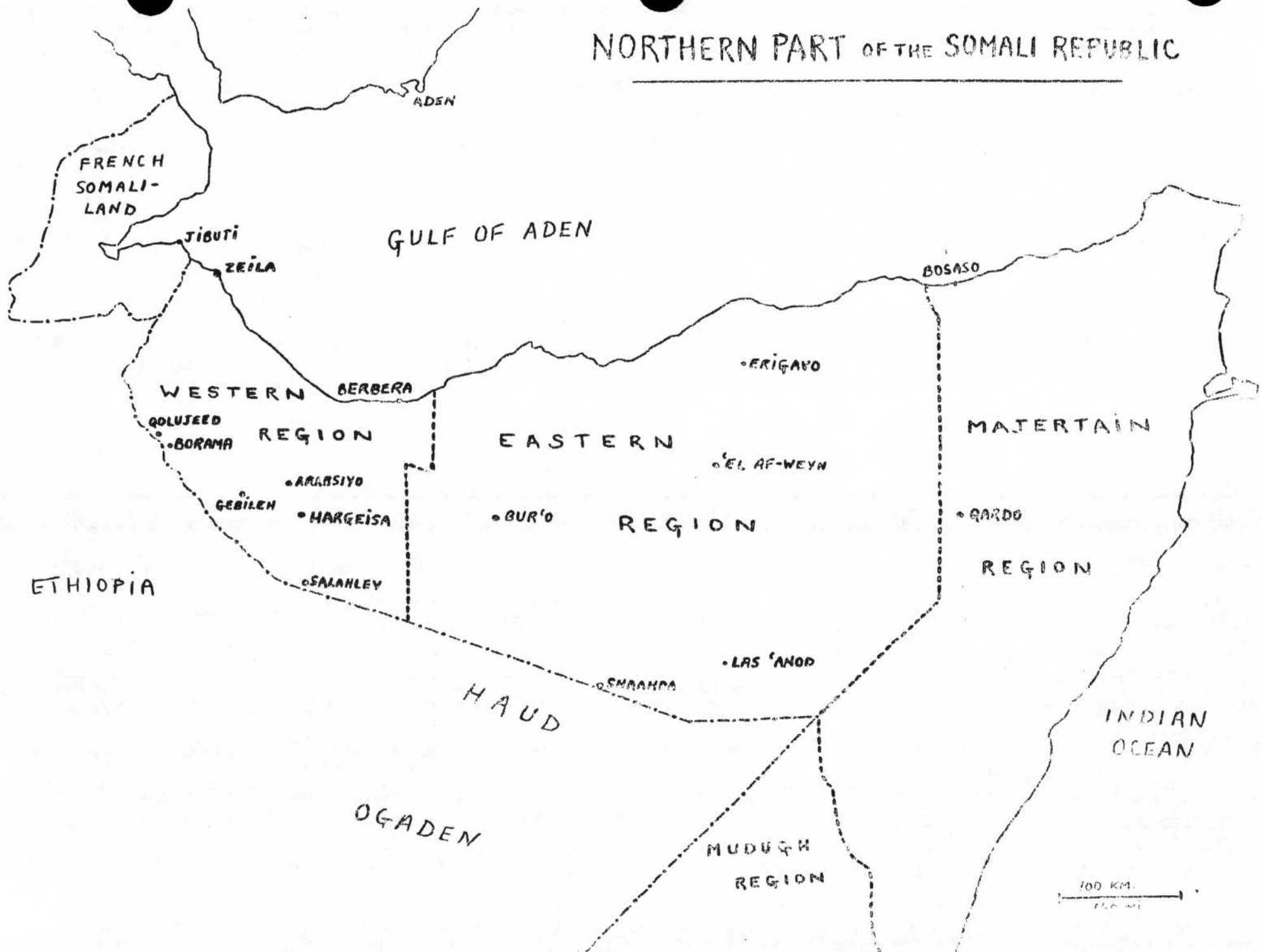
On the third or fourth day, usually the third (72-96 hours) the team returned to the site and read the test in the usual way in mm. of induration. If the test size was between 1 and 10 mm., the left arm and shoulder were usually checked again for an old BCG scar, although this was not always done. BCG was administered to all those with a reaction of 9 mm. or less, except for the aged and debilitated and those who refused.

Records were entered first on sheets of paper accommodating 20 names. Individual cards for each person tested were made from these and were turned in to the WHO Center after statistics had been compiled.

The most successful pattern for vaccinating a medium-sized town (500-800 people) was as follows: radio announcement a few days prior to the campaign on Radio Hargeisa; team arrives the day before beginning work and talks with the local elders (D.C. has already been consulted); first day of vaccination is done in the schools; house-to-

house campaign is begun on the first or second day and usually finished by the third day; on the third day a table is set up near the main teashop in the town and the men (who spend the day near the teashop) are invited to come and be tested. On the fourth day the same pattern is begun again for reading and BCG administration. Hence the whole cycle takes one week, excluding Fridays. Direct vaccination without tuberculin testing will obviously be more efficient, since it eliminates the problem of having to find the people a second time for reading of the test.

NORTHERN PART OF THE SOMALI REPUBLIC



The Northern Part of the Somali Republic

The northern portion of the Somali Republic, most of which was formerly British Somaliland, is a semi-arid region containing perhaps 600,000 to 1,000,000 people. For purposes of this survey it was intended that the Majertain Region would be included along with the Western (Hargeisa) and Eastern (Bur'io) Regions as a logical geographic and social entity which might be called "the North." Difficulties of transport and public acceptance prevented more than a token survey of the Majertain, however. It is hoped that this region will be included along with the other two in the mass vaccination campaign proposed, although intensive preparation and publicity would be required to insure success.

The coastal plain or "Guban" (meaning "burnt") lies along the Gulf of Aden; it varies in width from 5 to 45 miles and forms a hot, dry, barren, and largely uninhabited base for the escarpment that rises more or less steeply behind it to 4,000-7,000 feet and then levels off to form the plateau which comprises the major part of the North. This plateau is not flat, but is tilted toward the south, so that the highest areas overlook the coastal plain. Thus Erigavo is high enough (5,700 feet) to have occasional snowflakes, 'El Afweyn (3,346 feet) and Hargeisa (4,200 feet) in the middle of the plateau have very few extremes of temperature, and Las 'Anod at 2,300 feet can sometimes be uncomfortably warm.

The chief occupation is the herding of camels, sheep, goats, and a few cattle; a large percentage of the people are nomadic. The area west of Hargeisa receives about 15 inches of rainfall in an average year; here many of the people are settled and grow jowari (sorghum), fruits, and vegetables on small farms. The nomadic life, common even in the West and completely predominant in the East, revolves around the seasons, so that the flocks extend far into the Ogaden plain, currently held by Ethiopia, after the rains but are brought back to the wells inside the Republic during the dry season. Although they earn their living directly or indirectly from the nomadic way of life, most of the people can be found in or near towns at some time of the year; many are semi-permanent town residents. Most of the towns, including district centers, have only 200 to 1,000 inhabitants; except for the three big towns of Hargeisa, Bur'io, and Berbera, centers with a population of over 2,000 are very rare. Although the survey does not include any large group of "pure" nomads, the small towns surveyed contained enough nomads to make the sample fairly representative of the people of the North. The area west of Hargeisa is more thickly populated than the East and for this reason the survey includes a larger sample from this area; the Majertain is not adequately represented, however.

The population is quite homogeneous; although the people are divided into several different tribal groups, their language, customs, and physical appearance are very similar. Customs are

greatly influenced by Islam, and its precepts are widely practiced. Men and women in many ways form two separate societies. The men in a nomadic family may be away from home several months at a time with the camels, while the women and children tend the sheep and goats near the dwelling. Women have their own social life revolving around the home; the men have theirs, centering on the teashop, where women do not go.

Both Somali aqals and stone houses are quite adequate for the climate, but they are sometimes overcrowded. Food is simple, but the diet includes most of the essential nutrients (see town descriptions). Camel-herders often exist for months on camels' milk alone. The amount of food tends to be inadequate during periods of drought. Somali children are not usually weaned until they are about one and a half to two years old and receive very little meat until they are about five, but some milk is available and kwashiorkor is unusual.

Other details will be supplied in the town descriptions.

Town: Zeila District: Zeila Survey Date: August 17-22, 1966

Zeila is a coastal town with a venerable history of prominence as an Arab trading center and a port for the slave trade; during the sixteenth century it was one of the chief cities of East Africa. To reach it from Borama, one travels across the coastal plain, approximately fifty miles wide, sparsely sprinkled with low desert vegetation and rutted by water erosion. The town lies at sea level, most of the houses being within three hundred yards of the large salt flat that comprises the shoreline, and there are no hills within many miles. The soil is barren sand of varying textures, bound together in places by salt crystals. There are only occasional tufts of grass, and no trees in the town itself.

The climate approximates that of nearby Jibuti, where the average daily high is one hundred and five degrees Fahrenheit for August and eighty-five degrees for January. Zeila receives an average of two and three-tenths inches of rain yearly. The weather is conditioned by the southwest winds of April through August and the northeast monsoon of October to February, with the hot, windless periods of March and September when the sun is directly overhead in between.

The town itself (see photograph No.) is a disorganized collection of ruined stone buildings in various stages of collapse, interspersed with rectangular huts of dried grass and wooden shacks. Only a few of the old ruins are inhabited, and many of the huts were also unoccupied at the time of the survey. There are no real streets other than the three on which stores and teashops are found; people reach their houses by meandering paths through the sand.

In August, 1966, the time of the survey, the population was reduced to the bare minimum--shopkeepers, government officials, hospital personnel, and a number of others too old or too poor to leave the town for the cooler highlands, to which all the other people had departed for the hot season. The people are of the 'Iise (Esa) tribe, and no others are significantly represented, although a few families of Arab descent also live in town. Since the town contains the district headquarters, a small number of government employees, often not long-term residents, live there. The elementary school was not in session, and the Koranic school had only local students. Two hundred and fifty-eight people were tested and only a handful of others refused. As a rough guess, those tested probably constituted at least ninety percent of the population. Of the two hundred and fifty-eight tests administered, ninety percent were completed.

The diet consists of rice, pasta, tea, moderate amounts of milk, and occasional meat. Fish is available, but we met several people, born in Zeila, who never eat fish because they dislike it. We had no limes or fruit of any kind during our week's stay, although there are a few potatoes and onions. At no season of the year is fruit readily available. Water is piped from wells in a nearby town and carried from the village tap to the houses by the women. It appears free of gross sediment.

The Zeila hospital is well-built and consists of an out-patient department, male and female wards, and an operating theatre. We found only eight in-patients, but the capacity is probably about fifty beds. A dresser is in charge; there is no doctor. The nearest X-ray machine in the Somali Republic is in Hargeisa, two hundred and thirty miles away, but undoubtedly some people are tested or treated in Jibuti, forty miles distant, but across an international boundary. Several patients were under treatment for TB, and INH, PAS, and streptomycin were available at the hospital.

Town: Qolujeed District: Borama Survey Dates: August 23-28, 1966

Qolujeed, located on the Ethiopian border 19 miles west of Borama, was at the time of the survey filled to overflowing with nomads spending the hot season in this location. It lies on the plateau inland from the coastal plain, and its altitude of 4500 feet gives it a pleasant climate even in the hottest months (average minimum temperature in December and January is about 40°F., average maximum temperature in May through September is about 90°F). The rainfall of about 13 inches yearly allows the growth of bushes and small trees which cover the stony, eroded soil near the town.

The town itself consists of one-story houses and shops laid out in rows at the base of a large hill, through the summit of which passes the Ethiopian border. The houses ("arishes") are made of sticks plastered with mud and have dirt floors and thick roofs of sticks covered with earth. About one hundred and fifty Somali aqals (nomadic huts) were located between the town and the hill, although only about 50 to 75 contained families; the others were either empty or were used for storage and cooking. Many of the arishes contained an amazing number of people--sometimes 15 or 20 in a few rooms--because town families were accommodating relatives from the interior temporarily. We were told that these were people who had come to town because of the season and because they had heard about the vaccinations being offered. For this reason we did not think it desirable to distinguish statistically between arish-dwellers and aqal-dwellers, although there was some difference in attitude toward vaccination indicating that the two groups were not identical.

The people are of the Gadabursi tribe and most of them appear to derive their living from herding, although some keep small shops in the town. The students in the elementary school are local residents, and there was no sizeable group of government workers other than the thirteen Illalos working under the District Commissioner of Borama. The citizens were quite cooperative, with the exception of a single row of arishes containing transients, and the aqal-dwellers, many of whom seemed to know nothing about vaccinations and who either left their houses at our approach or refused vaccination. As a rough guess, however, probably 80% or more of the people were given Mantoux tests (of whom 81% could be found for

reading), meaning that the population was around 1,000. In contrast to Zeila, where most of the people tested were "town" people, the majority tested in Qolujeed may be considered nomadic or semi-nomadic.

The diet is that typical of small Somali towns, consisting largely of "lahok" (sorghum flour cakes), rice, pasta, and moderate amounts of meat and milk, with only occasional fruits and vegetables. Potatoes and onions are available but are used only in small amounts. A large "balleh" (pond made of dirt dykes on three sides for the collection of run-off water) constructed by the British is located about a mile from town and supplies grossly turbid water during most of the year except for January and February, when water has to be brought by tank truck from Borama. The water is carried from the balleh to the town and distributed to the houses on donkey-back in four-gallon kerosene tins, four to an animal, in the manner common throughout northern Somalia.

Qolujeed has a single dresser who holds clinic in a tent, but at the time of our visit he had no supplies except a few chloroquin tablets; no INH, PAS, or streptomycin was available. A small dispensary, complete except for windows and the roof, stands near the tent, unused and incomplete, either for lack of funds or of enthusiasm. On several days I held general clinic in the afternoon and found about 15 new cases which clinically appeared to be advanced tuberculosis, in addition to a miscellany of other diseases, most of them minor.

Town: Gebileh District: Gebileh Survey Dates: April 8-13, 1967

Gebileh is a town of about 1,200 people surrounded by many nomadic and semi-permanent "reers". It is in an agricultural area, and in the last few years more and more of the people have begun to grow jowari (sorghum) in small plots outside the town. Like the people of Arabsiyo, they are mostly Reer Jibriil Aboqor of the Sa'ad Mmuse sub-tribe of the Isaaq. Gebileh is the district headquarters and has a District Commissioner in residence. There is a small TB hospital (about 30 beds), a dressing station, an elementary school, and a boarding intermediate school about a mile from town with about 150 students in residence.

The town lies among gently rolling hills at an altitude of 4,700 feet. The area receives an average of 18 inches of rainfall yearly, which is enough to support some scanty grazing land and some jowari cultivation and also to produce massive erosion of the land. Farming and the herding of goats and sheep, cattle, and a few camels are the only main occupations. Plowing is done by oxen or by the few tractors available, which are rented by the day or hour.

The town consists of eight double rows of single-story stone houses (daar) containing both private houses and shops, and a field for the daily market. There is only one teashop in

the town that serves meals, which were at the time of the survey limited to laho, rice, and tea, although families cooking in their own homes add meat and occasionally vegetables. Limes and other fruits are available from Arabsiyo most of the time, but the people consume them only in small amounts. The water for the town is drawn from shallow wells in the tog (dry river bed) between the intermediate school and the town and is distributed by donkey-back to the houses, where it is stored in old oil drums or other containers.

The response of the people to the tuberculin survey and BCG vaccination was excellent, partially because the team showed a series of color slides to explain the purpose of the campaign and the steps in testing and vaccination. These and the accompanying explanation in Somali by one of the dressers were welcomed by the public, who respond well to rational arguments but resent actions which are not properly justified in advance. Probably 85% of the townspeople and nearly all of the students at the two schools were tuberculin tested; of the 1,042 tests administered, 903 were read.

Although the town has a small TB hospital, the dresser in charge says that drugs are often in short supply and consequently treatment is not ideal. Drugs for other medical conditions are also limited to the bare essentials, as is the equipment of the small dispensary, even though two dressers are stationed there full-time. Since Gebileh is only about 40 miles from Hargeisa, however, many people go to the larger town for medical care.

Town: Arabsiyo District: Gebileh Survey Dates: Sept. 3-8, 1966

Arabsiyo is a small gardening community forty-two miles by road from Hargeisa in which 594 people were tested--perhaps 70-80% of the population. The town consists of cement-block houses lying along three streets flanked by aqal settlements on two sides. At the western end of town is a large tog (dry river bed), which during the rainy season fills with swift-flowing water to a depth of one or two feet and a width of fifty yards. It flows for a period of hours and then dries up, so that by the next day only damp sand remains in the bed. The water table, however, remains only a few feet below the surface, and during the dry season water can still be obtained from wells which tap this underground water source. Some of the gardens have gasoline pumps for drawing the water. The combination of a good water supply and the altitude (4,500 feet) makes it possible to grow guavas, pomegranates, papayas, oranges, limes, potatoes, onions, tomatoes, and cabbages. A daily truck takes the produce to Hargeisa for marketing.

The people are almost all from the Sa'ad Muse sub-tribe of the Issaq, and earn their living by working the gardens. Many have spent long periods in Jibuti or travel back and forth to

Jibuti but own gardens in Arabsiyo. Aqal-dwellers and those who live in stone houses, although differing in income and perhaps in sophistication, seem to share the same occupation, and neither population is nomadic. For this reason the two groups were not separated in compiling the results of the survey.

The diet is remarkably unaffected by the abundance of fruits and vegetables. We met women who declared that they never ate guavas, and the dozens who complained of constipation were quite surprised to learn that fruit alleviates this condition. Hence while the average citizen is probably not as vitamin-C deficient as those in other towns, still the majority live on rice, pasta, lakoh, small amounts of meat, canned tomato paste (for sauce), tea, milk, and only occasional fruits and vegetables. Water is carried in tins by donkeys from an open well 20 feet from the tog, and while the water is probably cleaner than that in many towns, the sandy soil assures at least intermittent contamination.

The town has a small dispensary and a single dresser, but the dresser was away during our entire stay and asserts that he had almost no medical supplies with which to work. The reception accorded the BCG team was cool at best, and 33 people refused the test, with many others avoiding the team entirely. This was partly due to a mistake in tactics on our part, because we did not arrive in Arabsiyo the day before beginning vaccination to talk with the elders and to prepare the people for our work. Many people, however, refused because of painful reactions to smallpox vaccination in Jibuti, or because they felt that smallpox vaccination protected against all diseases. This resistance to vaccination was also encountered by the British-sponsored team several years ago when they were in Arabsiyo, old team members say. Our results were fairly good, however, and of the 594 people tested, 510 had their tests read (86%).

Town: Hargeisa District: Hargeisa Survey Dates: Sept. 24-29, 1966

Hargeisa, the largest town in the Northern Regions of the Somali Republic, was estimated to have a population of 40,000-50,000 during the British administration. It sprawls across the large tog which supplies water for the people and for the trees which grow in the Hargeisa valley. The city, 140 miles inland from the port of Berbera, is on the central plateau at 4,200 feet; its climate is pleasant most of the year--the average daily highs in September and March of 88° F. are balanced by average daily lows of 53° F. in June and December. The 13 inches of rain which fall yearly allow crops of sorghum to be grown nearby, although crop failure due to drought is fairly frequent. Despite the large number of trees near the tog, there is no area which has enough grass to be called a lawn or pasture; most of the soil is bare or covered with rocks due to run-off erosion.

The town is a governmental and trading center, but there is no industry other than the drying for export of the hides of sheep and goats slaughtered for the Hargeisa market. Most of

the shops are small and sell a large variety of articles. Food is more plentiful and varied than in most towns; many people eat meat, liver, and vegetables and fruits fairly frequently except during the dry season. Water for most of the people comes from open wells in the tog and is grossly contaminated whenever the tog flows, since several areas draining into the wells are used as public latrines. A piped water system built by the British supplies the "Sha'ab" or expatriates' and government officials' residential area.

A TB hospital of 180 beds, staffed by a physician and a number of dressers, treats cases that are referred from the general medical clinics or that come of their own accord directly to the hospital, but systematic follow-up of families of TB patients has not been done in the past few years. During the past year or two at least, the supply of anti-tuberculous drugs has been adequate. The general hospital of about 200 beds has been less fortunate with regard to supplies, but is the largest hospital in the Northern Regions and employs several physicians in addition to the auxiliary staff.

The sample population tested was from the Biyo Da'ay area of Hargeisa. This is a hillside overlooking the town where there is a large permanent aqal settlement as well as rows of stone houses. The sample includes 343 people from the stone houses and 284 living in aqals as well as 225 students from the elementary school (which draws boys from both areas). Several Koranic schools found in the two areas are included. At the time of the survey there were essentially no nomads near Hargeisa; both of the populations were composed of permanent residents, the difference between them being mainly one of income level. The families living in stone houses pay 40-70 shillings per month in rent; these people appear to be teachers, dressers, and others with a small but steady income. Most houses have several chairs and a table and are much better furnished than the average stone house in a smaller town. The people in the aqals, although permanent residents, have a lower income level and a more miscellaneous occupational pattern, the men often owning a moderate number of animals which are cared for by the women or by others outside the town. The people of both areas come largely from the Sa'ad Muuse sub-tribe of the Isaaq and are genetically similar. The students of the elementary school all live in the general vicinity and represent both populations, although more come from the stone houses than from aqals.

Our reception by the residents of both areas was very good--these people are accustomed to vaccinations and injections--and only a few refused testing. About 90% were found for reading of the tests.

there.

Because of difficulty in obtaining the cooperation of the local population, possibly caused by a local minority group, the survey team was unable to obtain an adequate sample in the aqal section of town. The largest group tested were school children. The sample is divided as follows:

Boys' "Old" Elementary School	206 tests completed
Boys' Intermediate School	133
Girls' Elementary School	109
A Koranic School near the aqals tested	98
People in aqals, mostly women and children	89

This represents the entire local school population except for a boys' elementary school of about 100 students. The town also contains two boarding schools--the Girls' Intermediate School, which we tested and vaccinated but did not include in the survey, and the Bur'o Technical Institute, a secondary-level school which we did not test. A large number of the town's Koranic schools also were not tested.

Although difficulties were met in vaccinating the general public, a mass campaign could probably be accomplished if done with adequate preparation of the population by slide shows, radio broadcasts, and talks with the local elders. A team living in the center of town would become known fairly rapidly, and the resistance to vaccination would diminish as soon as a majority of the people understood about the work. Officials and the more educated people including the elders should be vaccinated first and their help enlisted in doing the rest of the population.

Town: 'El Af-Weyn District: Geradag Survey Dates: October 12-16, 1966

'El Af-Weyn is a village of 500 to 600 people located two-thirds of the way toward Erigavo from Bur'o. It lies on a vast, rock-stream plain broken only by the few rocky hills nearby. Here the altitude of the plateau is 3,350 feet; sixty miles to the north the escarpment drops off sharply to the coastal plain; to the south, the plateau slopes off gradually into the Haud and Ogaden plains. The climate of 'El Af-Weyn is similar to that of Bur'o.

Some residents derive their support from small stores and teashops, but the whole town is virtually dependent on the pastoral economy for subsistence; most of the people either spend part of their time as nomads or have relatives "in the bush." The diet is rice, labok, pasta, milk, and occasional meat, with very few vegetables or fruits. The town's name--"Well with the Big Mouth"--describes the town's water source about a half a mile to the east of the town. During the rainy seasons of April-May and September-

October the "well" is actually a pond about 150 feet across, but as the water dries up the source of the well--a natural fissure in the earth--is revealed. Despite attempts by the British to develop a distribution system for the water, the well is regularly contaminated by livestock.

The town consists of three lines of stone houses and two of mud and stick structures. A few nomadic aqals are found on the east side of town, and many reers (family groups of aqals) were scattered through the area within a few miles of town. An attempt was made to reach these completely nomadic families, but only 110 tests were completed because rain and mud prevented our reaching many of the reers. The elementary school had only about 20 students but more are expected next year.

The dispensary is a pre-fabricated metal hut with a minimal supply of medications, run by one dresser. No cases of obvious TB were detected in our informal clinics.

The people are mostly of the Habar Yuunis sub-tribe of the Issaq. Only 76% of the 534 tested could be reached for reading because of the bad weather, but the reception accorded the team was generally good.

Town: Shaakda District: Buukodleh Survey Dates: Feb. 22-28, 1967

Shaakda is a village of perhaps 500 to 800 people (in February of 1967) which straddles the Somali-Ethiopian border south-west of Las Anod. It is the center of a fairly rich grazing area and one of the gathering points for the Dulbahante tribe. Although the people are not all nomads, they are as close to being so as any group found inside a town can be. Most of them earn a living directly or indirectly from camel herding, and the only foods available are camels' milk, rice, pasta, and meat. The houses are the usual nomadic Somali aqals, as well as quite a number of round or rectangular structures made of closely spaced sticks, with thatched roofs. Only a few stone buildings are found in the town--all of them one-story.

The climate is similar to that of Las Anod--never cold (altitude 2,200 feet). The area around Shaakda has sufficient rainfall to permit grazing even in the dry season. Shallow wells in a grove of trees about three miles away (Buukodleh) provide turbid but sweet water, and the several reservoirs (barkads and ballehs) around the town contain rainwater (and undoubtedly mosquito larvae) most of the year.

The vaccination campaign was carried out in an unusual fashion, partly as an experiment and partly because of the helter-skelter arrangement of the houses. A table was set up in an area, and the houses were visited and the occupants told to come to the table for vaccination. This was satisfactory for administration of the Mantoux tests, but very few people (54% of the 586 tested)

could be found for reading. Undoubtedly the constant movement of people in and out of town contributed, but a strictly house-to-house campaign would have been much more productive, and we did not feel that our "experiment" should be repeated.

The local dispensary is run by a dresser and a nurse and has the usual supplies--sulfadimidine, aspirin, cascara, bandages, and a few instruments. During clinic hours I saw 3 cases with auscultatory signs of tuberculosis and a one-year-old child with suppurating inguino-femoral glands but with a negative TB test. One case of probable malaria and a number of miscellaneous--mostly gynecological--complaints made up the rest. Active TB does not appear to be as common here as in the more western districts.

Town: Qardo District: Qardo Survey Dates: Oct. 23-26, 1966
(Qardo) (Qardo)

Qardo is a district headquarters and, during the hot season, the capital of the Majertain region. It lies 160 miles south of the coastal town of Bosaso and 200 miles inland from the Indian Ocean on the east. An altitude of 2,500 feet provides some relief from the heat, although at midday the sun is still intense. The yearly rainfall of about 4 inches supports tufts of grass and a few shrubs.

The town, like many others, is built near a dry river bed or tog which flows occasionally in the rainy season and which provides water for the shallow wells dug in its bed. There is only one deep well for the town, although more drilling is being attempted.

The town is broken into several sections. The administrative section and government officials' housing, built by the Italians during colonial days, are somewhat removed from the main part of town. A large contingent of police is stationed in an old Italian-style fort; there are also government offices and a hospital and a post office in varying stages of disrepair. The town itself consists of a number of rows of stone shops and teashops and an open market. Houses of thatch, mud-brick structures, and Somali sqals are scattered aimlessly around the periphery. The town is a trading center for goods coming from and going to other parts of the Majertain, and several trucks a week pass through the town on their way to Mogadishu in spite of its isolated location.

The food is mostly rice, pasta, and some meat and milk. Water is piped to the administrative area but must be hauled from shallow wells and collection basins for most of the people. There is no doctor in Qardo; the well-built hospital of 25 to 30 beds is staffed by three dressers. For some reason there were no in-patients at the hospital, although cases of tuberculosis and other illnesses abound in the village. We saw several cases of

Potts' disease and one of tuberculous lymphadenopathy in an infant in just a few minutes' walk through the town.

The people are of the Majertain sub-tribe of the Daarood. In contrast to those people in territories formerly administered by the British, they have not experienced vaccination campaigns before. In this town alone of the ten towns tested, the team encountered massive opposition to vaccination, and even the children of the elementary and intermediate schools could only be tested under strong pressure from their headmasters. The population of the town completely refused vaccination and testing, so that only 241 people, mostly students and the police and their families, were tested; of these, 89% were read. The difficulties seemed to be the following: 1) The people were not accustomed to vaccination campaigns, this being the first of its kind in the Majertain; 2) A radio announcement about the campaign was not made, although local officials had been contacted the preceding week; 3) A few people in the town were rumored to have died shortly after injections of one sort or another; 4) We failed to talk with the local town elders, although the acting D.C. had given his consent; 5) The D.C. was absent; and 6) The three dressers at the local hospital completely refused to cooperate and stated that there was no need for vaccination.

The whole Majertain region would probably be especially difficult to vaccinate, since the people are not accustomed to vaccinations and teams of health workers. A saturation publicity campaign combined with a strong and concerted effort by several teams would be necessary for successful completion of a BCG campaign. Radio broadcasts, movies, and slide shows with soundtracks in the Somali language, help from local dressers, and cooperation from area elders would all be necessary along with determination on the part of the teams to stay in the region for an extended period of time.

Overall Statistics

Dates of survey: August, 1966-April, 1967

Number of tuberculin tests given for survey: 5839

Number of tests completed: 4912 (84% of those given)

Number of people given BCG: 1917

An additional 4578 students of Hargeisa schools and patients of the Ruth Fisher Clinic in Hargeisa were tested and those with negative tests given BCG. They were not included in the survey since a geographically representative sample was desired. This work was done by Ali Farah Warsame and Abdullahi Farah Sugal and Peace Corps Volunteers Gary Brown, Kathleen Quinlan, and Mary Willcins.