

Figure 3. The application of skeletal traction and suspension (wire inserted through the proximal tibia).

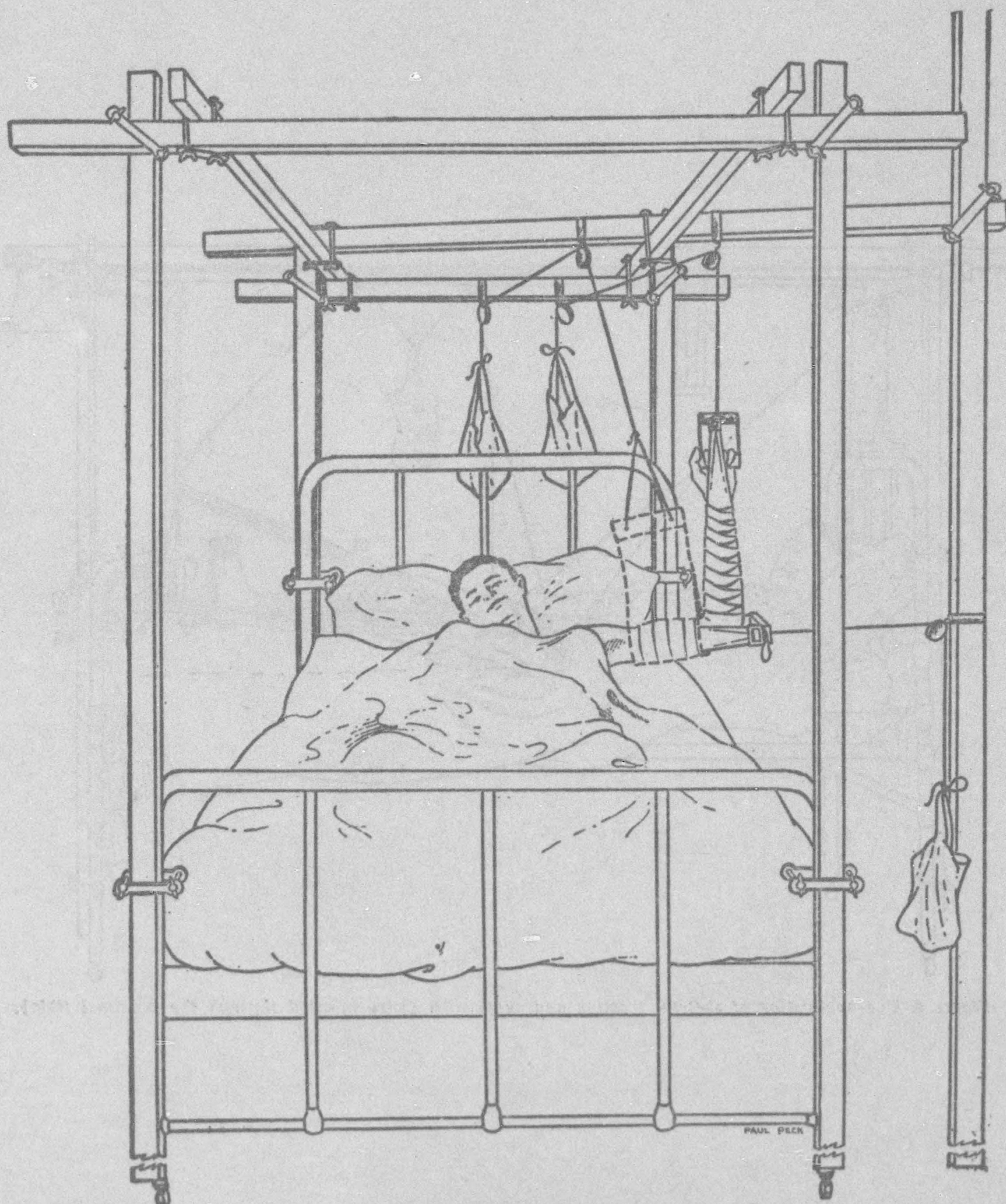


Figure 4. Skin traction and suspension for upper extremity.

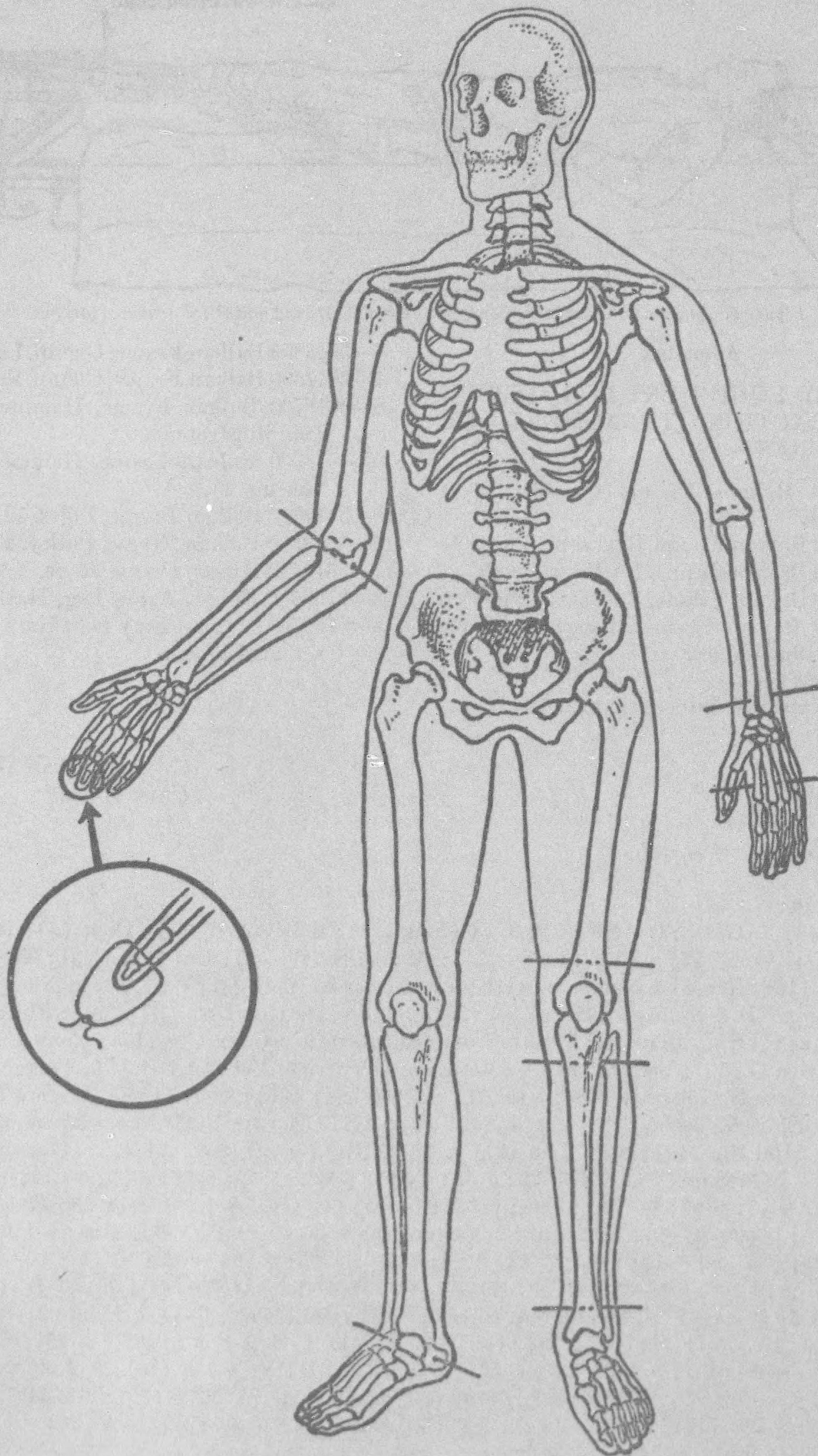


Figure 5. Skeletal traction. Acceptable sites for application.

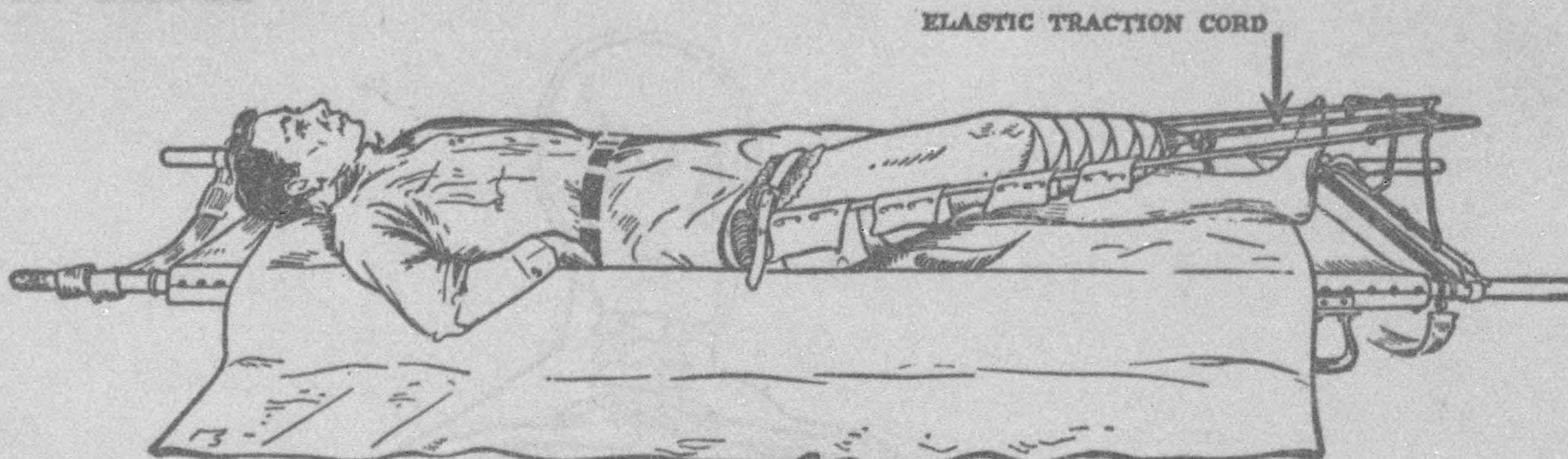


Figure 6. Amputation stump in skin traction and half-ring splint for transportation.

APPENDIX

STANDARD EQUIPMENT FOR SUSPENSION-TRACTION TREATMENT OF FRACTURES

- 1—3617000 Balkan Frame, Complete (see fig. 1).
- 2—3617500 Balkan Frame, Buckshot Bag 3''.
- 3—3617700 Balkan Frame, Buckshot Bag 5''.
- 4—3617900 Balkan Frame, Buckshot Bag 8''.
- 5—3618100 Balkan Frame, Buckshot, Coarse (not illustrated).

[AG 300.5 (23 Dec 44)]

BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL:

J. A. ULIO,
Major General
The Adjutant General

G. C. MARSHALL
Chief of Staff

DISTRIBUTION:

AAF (5); AGF (5); ASF (2); T of Opns (25); S Div ASF (1); Dept (5); Base Comd (5); Is Comd (5); AAF Comds (55); Arm & Sv Bd (2); Def Comd (5); Tech Sv (2); SvC (10); Named & Numbered GH (60); Numbered GH (NP) CZ (45); Named SH Including RH & Numbered SH (40); X Cono G (55); Gen Disp (ZI) (10); Fld H (15); H Tn (2); H Ship Plat (5); H Ship Complements (15); Conv Ctr (15); Conv Camp (10); Vet Gen H (10); Vet Sta H (10); Vet Evac Hosp (5); Vet Conv H (5); Portable Surg H (5); Evac H (750 bed) (40); Evac H (SH-400 bed) (30); Conv H (20); Gen & Sp Sv Sch (5); Enlisted Techn Sch 6 (1); USMA (2); ASTPU (3); ROTC (2); Army Med Tng C (60); Ind Sta (10); Sv C Lab (5); A (5); CHQ (5); D (55); AF (55); One copy to each of the following: T/O & E 3-25; 4-45; 4-145; 4-232; 5-35; 5-72; 5-95; 5-275; 6-35; 6-55; 6-65; 6-75; 6-95; 6-175; 6-325; 6-355; 6-365; 6-395; 7-85; 9-12; 11-25; 17-55; 17-125; 18-25; 19-35; 20-42. Two copies to each of the following: T/O & E 2-22; 4-152; 4-260-1; 5-386; 5-535S; 6-12; 6-45; 8-22; 8-26; 8-520; 9-35; 9-76; 10-22; 10-165; 10-217; 11-15; 17-15; 18-10-1; 18-35; 19-55; 20-46; 44-15; 44-25; 44-75; 44-115; 44-125; 44-225S; 44-315; 55-120-1. Three copies to each of the following: T/O & E 5-192; 7-95; 8-27; 10-45; 10-175; 17-115; 44-135; 44-320; 55-110-1; T/O & E 5-21 (5); 5-251 (6); 5-510S (35); 8-28 (10); 8-510 (15); 8-534 (5); 8-537T (15); 8-550 (60); 8-550S (45); 8-560 (40); 8-572S (5); 8-580 (40); 8-581 (30); 6-590 (20); 8-591T (15); 8-595T (10); 8-650 (10); 8-750 (10); 8-760 (10); 8-780 (5); 8-790 (5); 10-95 (7); 10-125 (6)

For explanation of symbols, see FM 21-6.

3 Copies rec'd

File
2/10/47

TB MED 132

WAR DEPARTMENT TECHNICAL BULLETIN

MEDICAL AND SANITARY DATA ON ITALIAN SOMALILAND

War Department, Washington 25, D. C. January 1945

This bulletin follows TB MED 131, subject, "Treatment of Respiratory Depression and Asphyxia." Distribution given TB MED 131 was as follows: AAF (5); AGF (5); ASF (2); T of Opns (25); S Div ASF (1); Dept (5); Base Comd (5); Is Comd (5); AAF Comds (55); Arm & Sv Bd (2); Def Comd (5); Tech Sv (2); SvC (10); Named & Numbered GH (60); Numbered GH (NP) CZ (45); Named SH (Including RH & Numbered SH) (40); M Conc C (55); Gen Disp (ZI) (10); Fld Hosp (15); Hosp Tn (2); Hosp Ship Plat (5); Hosp Ship Complements (15); Conv Ctr (15); Conv Camp (10); Vet Gen Hosp (10); Vet Sta Hosp (10); Vet Evac Hosp (5); Vet Conv Hosp (5); Portable Surg Hosp (5); Evac Hosp (750 bed) (40); Evac Hosp (SM-400 bed) (30); Conv Hosp (20); Gen & Sp Sv Sch (5); Enlisted Techn Sch 8 (1); USMA (2); ASTPU (3); ROTC (2); Army Med Tng C (60); Ind Sta (10); Sv C Lab (5); A (5); GHQ (5); D (55); AF (55); One copy to each of the following: T/O & E 3-25; 4-45; 4-145; 4-232; 5-35; 5-72; 5-95; 5-275; 6-35; 6-55; 6-65; 6-75; 6-95; 6-175; 6-325; 6-355; 6-365; 6-395; 7-85; 9-12; 11-25; 17-55; 17-125; 18-25; 19-35; 20-42. Two copies to each of the following: T/O & E 2-22; 4-152; 4-260-1; 5-386; 5-5358; 6-12; 6-45; 8-22; 8-26; 8-520; 9-35; 9-76; 10-22; 10-165; 10-217; 11-15; 17-15; 18-10-1; 18-35; 19-55; 20-46; 44-15; 44-25; 44-75; 44-115; 44-125; 44-2258; 44-315; 55-120-1. Three copies to each of the following: T/O & E 5-21 (5); 5-251 (6); 5-5108 (35); 8-28 (10); 8-510 (15); 8-534 (5); 8-537T (15); 8-550 (60); 8-550S (45); 8-560 (40); 8-572S (5); 8-580 (40); 8-581 (30); 8-590 (20); 8-591T (15); 8-595T (10); 8-650 (10); 8-750 (10); 8-760 (10); 8-780 (5); 8-790 (5); 10-95 (7); 10-125 (6).

	Paragraph		Paragraph
Section I. Public Health and Environmental Factors Influencing Health and Sanitation.		III. Disease Information.	
Public Health Department.....	1	General.....	12
Water.....	2	Diseases of Special Military Importance.....	13
Sewage.....	3	Diseases of Potential Military Importance.....	14
Insects and Animals of Importance to Man.....	4	Serious Diseases Not of Military Importance but Likely To Affect Small Numbers of Troops.....	15
Food and Dairy Products in Relation to Health.....	5	Diseases Causing High Morbidity or Mortality Rates Among Native People.....	16
Poisonous and Allergy-Producing Plants.....	6	Miscellaneous Diseases.....	17
Miscellaneous Problems of Sanitation.....	7	IV. Summary and Recommendations.	
II. Medical Facilities.		Summary.....	18
Hospitals.....	8	Recommendations.....	19
Medical Practitioners.....	9	Tables.	
Medical Institutions, Including Laboratories.....	10	Figure.	
Social Services.....	11	Bibliography.	

RESTRICTED

Section I

PUBLIC HEALTH AND ENVIRONMENTAL FACTORS INFLUENCING HEALTH AND SANITATION

I. PUBLIC HEALTH DEPARTMENT. a. Organization. The civilian health service of Italian Somaliland was enlarged and reorganized coincidentally with the Italian conquest of Ethiopia in 1935-36. This campaign brought about 25,000 civilian workers from Italy to Italian Somaliland. Under a "Sanitary Ordinance for the Colony" the Inspectorate of Health was established as the central technical organization responsible for guarding the health of the nonmilitary population, both Italian and native. It was directed by an inspector, assisted by a vice-inspector, a woman specialist in charge of maternal and child welfare, a colonial physician attached to the "Assistenza Lavoratori," and a veterinarian.

The Inspectorate of Health operated in two sections, one under the Direzione Affari Civili e Politici, the other under the Direzione Affari Economici e Colonizzazione. The first section was concerned with handling such affairs as public health and hygiene (Sanità ed Igiene Pubblica), maritime and frontier sanitation (Sanità Marittima e di Frontiera), medical professions and institutions (Professioni ed Istituti Sanitari), and health aid and hospital treatment (Soccorsi Sanitari e di Spedalità). Also included were maternal and child welfare (assistenza Maternità ed Infanzia) and the veterinary medicine branch (servizi zoiatrici) of the Veterinary Service. The second section was concerned with handling such social welfare and economic affairs as were included under the titles "Mutualità e Cooperazione," "Istituti di Previdenza," "Infortunistica," and "Assicurazione Sociale." Also included was the animal husbandry branch (servizi zootecnici) of the Veterinary Service. The second section is not of immediate concern to this survey and will not be described further.

Each Commissariat of Italian Somaliland had a health officer, under whom was a district physician. Veterinarians were assigned to the health officers whose areas included Mogadiscio, Merca, and Chisimaio. Subordinate to the district physicians were the port physicians, of

whom there were 10, with headquarters at Bender Cassim, Alula, Dante, Eil, Obbia, Itala, Mogadiscio, Merca, Brava, and Chisimaio. Facilities operated by the Inspectorate of Health included a leprosarium and 88 hospitals, infirmaries, ambulance stations, quarantine stations, and outpost dispensaries or "medical posts." Subsidiary installations of the Inspectorate of Health were the Laboratory of Hygiene and Prophylaxis (Laboratorio di Igiene e Profilassi) consisting of two sections, microbiology and chemistry; the Antimalaria Center of El Mugne (Centro Antimalarico di El Mugne); the Central Sanitary Supply Depot (Deposito Centrale Materiale Sanitario); and, for the Veterinary Service, the serum-vaccine laboratory of Merca with the "Todowa Iacha" experimental stock farm (Istituto Siero-Vaccinogeno di Merca con Azienda Todowa Iacha).

b. Scope and estimate of effectiveness. No reliable statistics are available for the country as a whole over a period of years which might show how health conditions have been affected by the work of the Inspectorate of Health. Mortality rates for children in all age groups were remarkably high, especially in those over 10 years of age. By contrast, amazingly low and hardly credible morbidity and mortality statistics have been reported for the Italian workmen brought to Italian Somaliland.

Prophylactic measures undertaken by the Inspectorate of Health included vaccination against smallpox of all natives in populated centers, a campaign of rat extermination, the furnishing of quinine to Italian workmen (but not to natives), the application of paris green to pools of stagnant water, and the control of venereal diseases. Measures designed to protect Italian workmen against venereal diseases included registration of prostitutes, biweekly "visits," monthly bismuth injections, and the creation of a "Casa di Tolleranza" staffed with Italian prostitutes "to reduce the damage of moral character which ensues when sexual intercourse with blacks is too frequent."

The scope of the work undertaken by the Inspectorate of Health would seem to extend primarily to the protection of the health of Italians and only incidentally to the care of the natives. If published reports are to be believed, the Inspectorate of Health may be

judged to have functioned effectively so far as Italian nationals were concerned.

2. WATER. The only permanent streams are the Juba River and the Webi Scebeli. Villages along these rivers are assured of water supply throughout the year. Elsewhere springs, wells, and rainpools serve as sources of supply. There is often subsoil water which may be reached by wells along the numerous dry beds of streams known locally as "tugs." On the maritime plain the water is usually brackish. In the interior the water is often hard, due to the presence of magnesium and calcium salts. Table I lists localities where water usually may be found in limited quantities.

Among the larger population centers, Mogadiscio has a piped water supply which is taken from several wells and bore holes. It was reported that in December 1936 the municipal waterworks was able to supply daily about 260,000 gallons via the aqueduct, about 39,000 gallons of water treated with "Zerolit" and chlorine, and about 86,000 gallons of distilled water. A privately operated distillation plant having a daily capacity of about 14,000 gallons offered a "safe" supply of bottled drinking water for sale in the city. The municipal distilled water and that treated with "Zerolit" and chlorine was considered safe for drinking purposes by the Italian medical authorities. The aqueduct water is said to contain enough sodium sulfate to produce a laxative effect in many Europeans but is considered potable. It was not, however, safe from pollution.

At Chisimaio, well water is brackish and unsuitable for drinking. Water for domestic use is brought in drums by truck from Gobuen on the Juba River. For drinking purposes, rain water is collected, and when this supply is low, drinking water is brought in tins by sea from Mombasa in Kenya. Distillation plants have been used.

Dante has a number of wells, the water from which is brackish and nonpotable. Drinking water for the town is obtained from Handa at the foot of the Uareg Hills. It is reported that about 12,500 gallons daily are carried in drums from Handa to Hordio, ferried across North Hafun Bay to Corducci Point, and trucked to Dante.

AGO 489A

Brava is supplied from a sweet-water well located at the base of the foothills some distance from town. Merca has two sweet-water wells, one outside of town toward the northeast, the other about 2 miles south of town on the road to Vittorio d'Africa. At Eil there is an oasis with a good spring of drinking water. Subsoil water may be found by drilling along the banks of the Nogal watercourse. Alula is dependent upon springs at Boho, about 9 miles east of the village. Bender Cassim is 8 miles from the thermal springs at Bio Kulel.

Except for distilled water, the water supplies throughout Italian Somaliland must be considered unsafe for drinking purposes until appropriate treatment had been instituted. Even the distilled water may have been contaminated after distillation.

3. SEWAGE. In Mogadiscio, a piped water supply makes possible the use of flush toilets in the European quarter where sewage is carried to septic tanks or to cesspools. In the native quarters all wastes are collected in drums and incinerated. The efficacy of the collection system depends upon cooperation of the natives, which is said to be unsatisfactory. In most places sewage disposal is by soil pollution.

4. INSECTS AND ANIMALS OF IMPORTANCE TO MAN. a. Vectors of disease. (1) Mosquitoes. (a) Anopheles. Seven species of Anopheles have been found and the presence of seven others is considered to be probable in Italian Somaliland.

Specifically reported:

A. gambiae.
A. funestus.
A. coustani.
A. pharoensis.
A. rhodesiensis.
A. claviger.
A. squamosus.

Probably present:

A. christyi.
A. cinereus.
A. demeilloni.
A. maculipalpis.
A. marshalli.
A. pretoriensis.
A. symesi.

Of these, the important vectors of malaria are *A. gambiae* and *A. funestus funestus*. It is as-

sumed that the type species is meant by the various authors who have reported the presence of "*A. funestus*." Similarly, since *A. mauritanus* is a synonym for *A. coustani coustani*, it is assumed that the type species is meant by the various writers who have reported finding *A. mauritanus* or "*A. coustani*." Distribution of the reported species is shown in table II. Anopheles species have been reported as scarce or absent at Mogadiscio although other genera are abundant. That *A. gambiae* is predominant in some areas is shown in a report of 1936 which identified this species as occurring in the mosquito population in the following percentages:

Locality	Percent
Bardera (Juba)-----	88
Gobuen (Juba)-----	93
Ionte (Juba)-----	95
Belet-Uen (Seebeli)-----	86
Mahaddei (Seebeli)-----	91
"Uar" from Bur Acaba to Bur Eil-----	79

A. gambiae breeds in any casual collection of clear or muddy fresh water (pools, puddles, wells, in roadside drains, hoofprints, tin cans, eavestroughs, etc.) almost always at least partially exposed to direct sunlight. Optimum breeding temperatures range from 63° to 74° F. It is a house dweller and feeds mostly on human blood. It prefers dark and poorly ventilated dwellings which probably accounts for its apparent preference for African to European blood. It bites freely out of doors as well as in the house; the period of greatest activity is from sunset to sunrise, mainly from 0200 to 0400. Its flight range is usually about a mile, although it has been known to migrate as far as 3 miles. It is usually not found above 6,000 feet altitude nor in the desert. It is a most efficient vector of malaria and also is generally regarded as an important vector of filariasis.

A. funestus funestus breeds in clear, fresh water in somewhat shaded locations such as may be found at the margins of swamps, rivers, lakes, or ponds, and sometimes in ditches or seepages fed from underground permanent sources. It seldom breeds in brackish water. Optimum breeding temperatures range from 65° to 68° F. Adults enter houses freely and prefer human to animal blood. Like the *A. gambiae* they prefer dark, poorly ventilated

dwellings, and therefore attack Africans more often than Europeans. The period of greatest activity is around 2300. Their flight range is about ½ mile but dispersal as far as 4½ miles has been noted. The species is found at altitudes up to about 6,500 feet, and is an important vector of both malaria and filariasis.

The remaining Anopheles listed above are of little importance as vectors of malaria in comparison with *A. gambiae* and *A. funestus funestus*. *A. coustani coustani* breeds in clear, stagnant streams having an abundance of vegetation. *A. pharoensis* breeds in swamps and rice fields where vegetation is thick. It has been found naturally infected with malaria but prefers animal to human blood. *A. rhodesiensis* is a zoophilic species. *A. claviger* breeds in marshes, shallow rock pools, and in wells. *A. squamosus squamosus* breeds in clear, stagnant water having some vegetation. It prefers animal to human blood.

(b) *Aedes*. *A. aegypti* is common throughout Italian Somaliland. *A. vittatus*, *A. albicosta*, and *A. cummingsi* also have been reported. A study published in 1943 recorded *Aedes* indices as follows: Mogadiscio 86 percent, Chisimaio 83 percent, Bullo Burti 50 percent, and Genale 35 percent. Most of this breeding was *A. aegypti*, the principal vector of yellow fever and dengue. Under experimental conditions, *A. vittatus* is capable of spreading yellow fever by bite. The relationship of *A. albicosta* and *A. cummingsi* to the disease is unknown.

A. aegypti breeds in clear or muddy, fresh or brackish water and in such small artificial collections as are found in barrels, cisterns, tin cans, puddles, etc. It is an avid biter, particularly in the late afternoon. It may live for 5 months.

(c) *Culex*. *C. quinquefasciatus* and *C. pipiens*, both known vectors of *Wuchereria bancrofti*, have been reported from Italian Somaliland. Also recorded are three other species, not known to transmit human disease, *C. univittatus*, *C. theileri*, and *C. tigripes*. *Culex quinquefasciatus* (syn. *C. fatigans*) is a house-frequenting species which breeds in any collection of stagnant, preferably polluted, water and is most active at night. Under experimental conditions it has been shown to be capable of transmitting the virus of yellow fever by biting. *Culex*

pipiens is a house mosquito which breeds in any collection of stagnant or semistagnant water and bites at night.

(d) *Others*. The finding of *Mansonia* larvae (species not stated) has been reported. Also recorded are *Theobaldia longiareolata* and *T. annulata*.

Except for semidesert areas having no water holes, mosquitoes are found everywhere in Italian Somaliland. A narrow strip along the coast of southern Italian Somaliland (the Benadir Coast) is relatively free from *Anopheles* but *Aedes* and *Culex* abound. Anopheline breeding places occur along both the Juba River and the Webi Scebeli. In its upper reaches the bed of the Juba is wide, and multitudinous small pools are formed during the dry season as the river recedes. Similar pooling is less marked along the lower Juba but enough remains to maintain *Anopheles* breeding even in the absence of irrigation. The Webi Scebeli has a narrow bed and overflows during the rains, forming pools well away from the river itself. Irrigation projects along both rivers to some extent are responsible for the maintenance of anopheline breeding.

Inland, away from the rivers, suitable breeding places are found in seasonal collections of rain water, in areas liable to sheet flooding from temporary water courses, and in the rocky or shingly beds of the many little seasonal streams that are found, particularly at the junction of the inland plain with the northwestern plateau.

Control measures are carried out only in the larger population centers. It would appear, however, that mosquito control work has been inadequate and ineffective.

(2) *Lice*. Specific reports are lacking in regard to the prevalence of disease-spreading lice in this country. It is probable that both head and body lice are common.

(3) *Flies*. (a) *Glossina*. Of the 20 species of tsetse flies known to spread human and animal trypanosomiasis, only 5 are reported from Italian Somaliland, mainly from the Juba region. *Glossina pallidipes* predominates in numbers. Of the species which have been implicated in the spread of human sleeping sickness in Africa, *G. morsitans morsitans* and *G. brevipalpis* have been found in the Juba region. *G. longipennis*, a typically savanna species, and

G. austeni, both of which, like *G. pallidipes*, are vectors of animal trypanosomiasis, complete the list of tsetse flies recorded from this territory.

Glossina morsitans morsitans is an important intermediary host of *Trypanosoma rhodesiense* which causes both the Rhodesian form of sleeping sickness in man and nagana in animals. The fly breeds in shaded savanna country near streams but ranges far afield, preferably over open glades or plains, in search of prey. *G. brevipalpis* has been shown to be capable of transmitting human trypanosomiasis under experimental conditions.

(b) *Simuliidae*. Species of *Simulium* have not been specifically reported from this territory. *S. damnosum* and *S. neavei*, both vectors of onchocerciasis, have been reported from nearby Kenya.

(c) *Culicoides*. Known as biting midges, punkies, or no-see-ums, *Culicoides austeni* and *C. grahami* act as vectors and intermediate hosts of the nematode *Acanthocheilonema perstans*, which is parasitic on man. *C. austeni* is said to be distributed throughout tropical Africa, although it has not been specifically reported from this area. Both *C. austeni* and *C. grahami* are active at night but never bite in the moonlight, and prefer dark skins to light.

(d) *Phlebotomus*. A dengue-like fever spread by *Phlebotomus papatasi* has been reported from Bender Cassim in Migiurtinia. *P. papatasi* is a vector of cutaneous leishmaniasis, or oriental sore, probably by being crushed on the skin rather than by biting. The vectors of visceral leishmaniasis, or kala azar, are considered to be *P. argentipes* and *P. congolensis* in this area. Adults of the species mentioned avoid wind, sun, and bright daylight. They have a painful bite, are most active at dusk and in the dark on warm, still nights, and have a short flight range.

(e) *Stomoxys*. The stable fly (*Stomoxys calcitrans*) has been reported from this country. Resembling the common housefly in size and shape, it is a vigorous biter which enters houses before a rain and attacks man. It is known to spread disease mechanically. It breeds in moist piles of hay, straw, alfalfa, or grain. Other species resembling *S. calcitrans* in feeding habits, *S. nigra*, *S. omega*, and *S. inornata*, are

probably present though not specifically reported.

(f) *Tabanidae*. Species of four genera (Chrysops, Pangonia, Tabanus, and Haematopota) have been reported. Most of them breed in aquatic vegetation or leaves of trees overhanging swamps, ponds, etc. Adults inflict painful bites which often develop infection. *Chrysops silacea* and *C. dimidiata*, the vectors of *Loa loa*, have not been specifically reported. Species recorded are: *Chrysops stigmaticalis*; *Pangonia beckeri*, *P. bricchettii*, *P. magrettii*, and *P. zonata*; *Tabanus africanus*, *T. biguttatus*, *T. conspicuus*, *T. ditaeniatus*, *T. gratus*, *T. maculatissimus*, *T. morsitans*, *T. obliquemaculatus*, *T. par*, *T. serviceiventris*, *T. subelongatus*, *T. taeniola*, and *T. thoracinus* (probably present also are *T. sagittarius* and *T. socius*); *Haematopota albihirta*, *H. coronata*, and *H. mactans*.

(g) *Hippelates*. The eye-fly breeds in decaying matter and animal excreta. Adults do not bite but have a labellum equipped with spines which make minute incisions through which pathogenic organisms gain entrance. The fly feeds on lachrymal secretions, blood, and pus. It serves as a mechanical vector of the organism of yaws (*Treponema pertenue*).

(h) *Others*. Among the vectors of infection found in adjacent territories (Kenya, for example) but not specifically reported from this area are the tumbu fly, *Cordylobia anthropophaga*, which causes cutaneous myiasis; and *Aucheromyia luteola*, the larva of which is a blood sucker leaving wounds that practically always become infected.

(4) *Fleas*. Although rats and their fleas undoubtedly exist in this country, only one recent report has been found concerning plague. The common rat flea of the tropics, *Xenopsylla cheopis*, and the human flea, *Pulex irritans*, both of which may act as vectors of *Pasteurella pestis*, almost certainly are present although not specifically reported. Information is lacking in regard to the presence of *Ctenocephalides canis* (the dog flea) and *C. felis* (the cat flea) which bite rats, cats, dogs, and man indiscriminately and are known vectors of plague and flea-borne (murine) typhus. The European rat flea, *Nosopsyllus fasciatus*, a vector of the

flea-borne type of typhus, has been reported from Eritrea.

The chigoe flea, *Tunga penetrans*, while not a vector of disease, is important as a cause of suffering and incapacity of its victims. The impregnated female, living on the ground, attaches herself to the bare feet of men, burrows into the skin of the soles, between the toes, or at the base of the toenails, and deposits her eggs. A festering sore develops which readily becomes secondarily infected and is sufficiently painful to incapacitate the host. *T. penetrans* may be avoided by never going barefoot while in areas where it is to be found.

(5) *Ticks*. Thirty-five species of nine genera of ticks are reported. Of these, seven species have been incriminated in the dissemination of human disease and two others are injurious to man. *Amblyomma hebraeum*, the bont tick, and *Boophilus annulatus* var. *decoloratus* act as vectors of African tick typhus. *Hyalomma aegyptium aegyptium* has been shown capable of transmitting tularemia and African tick typhus experimentally. *Ornithodoros moubata*, the tampan tick, is abundant throughout the country. It is a nocturnal, notably long lived species which serves as an important vector of relapsing fever, the organisms of which (*Borrelia duttoni*) are passed to its offspring. *Ornithodoros savignyi*, fully as numerous as *O. moubata* in this area, acts also as a vector of relapsing fever. *Rhipicephalus appendiculatus* is a vector of African tick typhus. *Rhipicephalus sanguineus*, the dog tick, is a known vector of relapsing fever and of the rickettsial diseases, African tick typhus, and boutonneuse fever. It is suspected of transmitting *Leishmania donovani*, the cause of kala azar. Not all of the diseases mentioned occur in this country but the presence of known vectors makes it necessary to take precautions against their introduction. The two species which are injurious to man although not vectors of disease are: *Argas persicus*, a nocturnal species, the bite of which produces painful wounds that become secondarily infected, and *Argas brumpti* which has a bite, more painful than that of *O. moubata*, that causes pruritus lasting several days. Table III lists localities from which species of *Argas* and *Ornithodoros* have been reported.

(6) *Rodents*. Rats and mice are abundant in Italian Somaliland but the specific species are not mentioned. The common domestic species throughout Africa is the black rat, *Rattus rattus rattus*. The roof rat, *Rattus rattus alexandrinus*, and the brown rat, *Rattus norvegicus norvegicus*, are also widely distributed in Africa. All three species serve as reservoirs of plague and murine typhus and harbor the disease-spreading flea, *Xenopsylla cheopis*. In the desert areas, gerbils and jerboas are found.

(7) *Others*. (a) *Cockroaches*. In this country where intestinal parasitism is common, the oriental cockroach, *Periplaneta orientalis*, has been reported as a vector of human parasitic diseases. Examination of the intestinal tracts of 93 members of the species, captured in Mogadiscio and Villaggio Duca degli Abruzzi in 1936, revealed ova of *Trichuris trichiura*, *Enterobius*, *Ascaris*, and *Trichostrongylus*, as well as amebae, blastocystis, flagellates, infusoria, and a jumble of spirillae.

(b) *Mollusks*. The only snails reported which might serve as vectors of *Schistosoma haematobium* are species of *Planorbis*, *Ampullaria*, and *Blanfordia*. These have been reported from Aggherrer, Brava, Denoq, Cape Guardafui, Guelidi, Mogadiscio, Merca, Ras Hafun, and Webi-Doboi. In 1931, *Physopsis* was reported abundant in Villaggio, but there was only one case of *S. haematobium* recorded. *Melania tuberculata* and *Bulinus contortus* are reported from Scuseiuban where schistosomiasis is not recorded. The fresh-water mollusks mentioned above seldom leave water and can be controlled by drought or poisonous chemicals. Drainage of pools, basins, irrigation ditches, and the like, which serve as their habitat, and letting them stand dry for a week, burning out vegetation, and clearing away the mud before readmitting water, should be sufficient although the process may have to be repeated every 4 months.

(c) *Crustaceans*. Species of *Cyclops*, intermediate hosts and vectors of dracontiasis (caused by the guinea worm, *Dracunculus medinensis*), are present in this country. Dracontiasis is not encountered frequently, but in the nearby lands across the Gulf of Aden it is common and widespread.

b. Snakes and other dangerous animals.

(1) *Snakes*. Many dangerous snakes have been reported from this country. All are likely to strike when cornered, many will strike at a person who comes upon them stealthily or quietly, and a few are belligerent toward man only if their breeding ground is invaded during the mating season. In general, however, snakes will flee from man if given warning of his approach. The prominent exception to this generality is the sluggish puff adder which often does not get out of the way but strikes at any favorable opportunity. Not all of the snakes listed below have been reported from specific localities in this country. Included are species said to be present in "Somaliland," location not identified.

(a) *Colubridae*. The poisonous genera of this family are rear-fanged snakes. The venom of these reptiles, with one exception which does not occur in this area, is of low toxicity compared with that of the front-fanged genera. Furthermore, the position of the fangs in the mouth makes it unlikely that an adult human attacked by the colubrids listed below would receive much, if any, venom from the bite. Fourteen species are probably to be found in Italian Somaliland.

Psammophis biseriatus.
Psammophis pulcher.
Psammophis punctulatus.
Psammophis schokari.
Psammophis sibilans.
Amplorhinus nototaenia.
Aparallactus concolor.
Brachyophis revoili.
Hemirhagerrhis kelleri.
Micrelaps boettgeri.
Micrelaps vaillanti.
Rhamphiophis rostratus.
Tarbophis guentheri.
Thelotornus kirtlandii.

(b) *Elapidae*. Species of three genera have been definitely recorded. The black-necked "spitting cobra," *Naja nigricollis*, is one of the most dangerous snakes in Africa. Its length is rarely more than 6 feet but it is capable of forcefully ejecting its venom a distance of 8 feet and directing it with great accuracy into the

face and eyes of an intruder. In attacking, this snake rears and "spits" at the same instant, and will do so upon slight provocation. The species usually does not range far from water and is largely nocturnal in habit. Its venom is neurotoxic and may possess some hematoxic powers. The Egyptian cobra or asp, *Naja haje*, attains a length of 8 feet and prefers hot, dry regions where water is not too scarce as it takes to water readily if any is available. The species is largely nocturnal and upon even slight disturbance will attack, striking repeatedly and hissing all the while. This species is capable of "spitting" its venom a distance of 6 feet. The venom is neurotoxic.

Elapechis boulengeri is a cobra-like, aquatic species having a deadly venom. Tree-dwelling snakes are represented in this country by the mamba, genus *Dendraspis*, said to be the most dreaded of all African snakes because of its particularly deadly venom, aggressiveness and quickness. Species of this genus are extremely slender and attain length up to 14 feet. Their fangs are located so far forward in the mouth that deep penetration of their venom is usual when they bite. The mambas attack and even pursue humans who invade their breeding grounds during the mating season. At other times they will avoid man when possible but always will attack if cornered. *Dendraspis angusticeps* is found in low-lying, dry-bush country and moves with incredible speed. *Dendraspis antinorii* is reported from adjacent Ethiopia.

(c) *Hydrophidae*. Only one example of sea snake is reported. *Pelamydrus platurus*, the black and yellow sea snake, seldom more than 3 feet long, abounds in the Indian Ocean. It is said not to attack bathers in the water but will bite if forcibly restrained, as in a fisherman's net. Its venom is toxic to man.

(d) *Viperidae*. Species of five genera are reported. The puff adder, *Bitis arietans*, inhabits rocky regions, especially near streams. It lives around houses if rats and mice are available for food. It has a thick body and attains a length of about 5 feet. It swims well and with remarkable speed. Members of this species strike with startling suddenness considering their sluggish appearance. The venom of this species is primarily a hematoxin al-

though it possesses some neurotoxic properties. It is extremely deadly to man but does not act as rapidly as does cobra venom. A bitten person should avoid physical activity as it aids in disseminating the poison throughout the body. In cases of viper poisoning, the ingestion by the victim of even small amounts of alcohol is uniformly fatal.

Causus resimus, the green night adder, is a small snake about 18 inches in length, which is found in moist, warm, low-lying places. It is not an aggressive reptile and there is little known about the toxic properties of its venom other than that it is relatively slow to act. The common night adder, *Causus rhombeatus*, is said to be present in this country. It attains a length of about 30 inches, normally prefers damp regions, and is nocturnal in habit. Little is known of the toxicity of its venom for man although when injected into laboratory animals (rats) its action is almost immediate.

Echis carinatus, the "carpet viper," usually less than 3 feet in length, prefers sandy regions and is nocturnal by habit. Horned vipers of the genus *Aspis* (*Cerastes*) are reported but the species (probably *Aspis cornuta*) is not specifically identified. Species of *Atractaspis* recorded from this area are *A. engdahlii*, *A. leucomelas*, and *A. microlepidota*. All live on the ground and are nocturnal. They are burrowers but have enormously developed fangs and highly toxic venom.

(2) *Other dangerous animals*. Wild game abounds in some regions but is more scarce in the desertlike areas. Man is seldom bothered by wild beasts although domestic animals are preyed upon. Some animals, monkeys for example, are more of a nuisance than a menace. Among the larger beasts which may be found are: baboon, crocodile (*C. niloticus*), elephant (*Elephas africanus*), hippopotamus (rare), hyena (*Hyaena crocuta*), jackal (*Canis aureus*, *C. mesomelas*), leopard (*Felis pardus*, *Cynaelurus jubatis*), lion (*Felis leo*), onager (wild ass), panther, rhinoceros (*Rhinoceros bicornis*), wart hog (*Phacochoerus aethiopicus*), and wild dog (*Lycan pictus*).

c. *Pests*. (1) *Cimicidae*. The bloodsucking bedbug of the Tropics, *Cimex hemipterus*, has not been reported specifically from this country.

Since it is widespread in adjacent territories, there is no reason to suppose Italian Somaliland is free from this pest.

(2) *Reduviidae* and *Formicoidea*. Reports are lacking concerning the presence of such pests, found elsewhere in Africa, as Reduviidae, the "assassin bugs" and Formicoidea, the biting and stinging ants.

(3) *Scorpionida*. Scorpions are reported to be plentiful but the species is not mentioned. A common tropical species, *Buthus quinquestriatus*, will crawl into shoes left on the floor over night. Its sting is exceedingly painful though rarely fatal to adults.

(4) *Chilopoda*. Centipedes are reported to be present but the species is not stated. The poisonous genus *Scolopendra* is represented in tropical Africa by *S. morsitans*, a species which may attain a length of 6 inches.

5. FOOD AND DAIRY PRODUCTS IN RELATION TO HEALTH. The dietary of most Somalis is meager, sometimes extremely so, and chronic undernutrition is widespread. Although the basic staples of diet may differ in various sections of the country, dietary deficiencies are the rule rather than the exception. Beef is available only in small quantity and pork is forbidden to the great majority of natives on religious grounds; therefore, pigs are neither raised locally nor imported. Camels furnish most of the meat eaten by natives. Poultry is available in some of the larger population centers. Practically all fruits and vegetables are imported and are sold only in the cities, natives living in rural districts being unable to obtain them.

In the northern Migiurtinia section of the country, comprising about 30,000 square miles, only 20,000 pounds of millet are produced annually together with about 5,000 pads (average about 125 pounds each) of dates. Along the coastal zone, rice and tea are the dietary staples, supplemented with a little meat, some milk bread, and sugar. In the interior of this zone the natives do not have bread but have considerably more milk. The nomad population of the interior subsists almost entirely upon the milk of the camel. The grain, rice, tea, and sugar that are consumed are imported. Green vegetables and fruit are lacking entirely.

The Mudugh Division, which includes the towns of Rocca Littorio, Obbia, and El Bur is entirely unproductive, except for ghee (clarified butter) and hides. In the southwestern part of Italian Somaliland, which embraces Bardera, Belet Uen, Bogol, Bulo Burti, Ischia Baidoa, Lugh Ferrandi, Magno, and Oddur, the jeeb nut (*Cordeauxia edulis*) is one of the staple foods; millet is grown in the grain-raising areas of the region.

The southeastern part of the country includes Afgoi, Brava, Chisimaio, Gelib, Genale, Hamarwein, Lower Juba, Mogadiscio, Uanle Uen, and Villaggio Duca degli Abruzzi. Since the area is fertile, most of the agriculture of the country is centered here. The total amount of food-stuffs raised, however, is scarcely more than sufficient for the needs of the area. The Societa Agricola Italo-Somalia (S. A. I. S.) has 16,000 acres at Villaggio Duca degli Abruzzi, of which 3,650 acres were under cultivation in 1942. More than three-fourths of the land was devoted to raising sugarcane. Maize, kidney beans and sesame are raised by the natives of this area. Millet, ground nuts (peanuts), bananas, and some vegetables are produced. Grain crops are cultivated in the Lower Juba area.

In Mogadiscio, it is reported that public markets are "carefully supervised." The slaughter of animals is controlled and diseased meat is not allowed to be offered for sale. Tuberculosis is said to be infrequently observed in meat animals. Dairies are subjected to "careful supervision" in the city of Mogadiscio.

6. POISONOUS AND ALLERGY-PRODUCING PLANTS. Many trees, shrubs, grasses, and herbs are reported, mostly, however, from the northwestern part of the country. No specific information is available regarding the allergy-producing properties of Somaliland flora. It is not unlikely that the pollen of any species of grasses (Gramineae) will produce allergic symptoms in some people. Individuals allergic to ragweed pollens in America will have little to fear in this part of Africa, since ragweed is not common between 20° N. and 20° S. It is considered a good rule of thumb to regard all species of the genus *Rhus* as capable of producing a dermatitis upon contact. Thin-skinned, blond individuals are most susceptible.

Following is a list (not to be regarded as complete) of the flora of medical interest specifically reported from Italian Somaliland.

Acokanthera uabai—a tree, the bark and roots of which yield a substance used by natives to poison their arrowheads.

Adenium coetaneum, *A. somalense*, and *A. tricholepis* are shrubs which yield a poisonous milk toxic for animals, used as arrow poison.

Aristolochia rigida—a shrub used by natives to counteract snake bite.

Commiphora boiviniana—a thorny shrub which exudes a resin that natives call "Duncal," a name they apply to other plants which they regard as poisonous.

Commiphora staphyleiflora yields a juice that is strongly poisonous if taken by mouth.

Commiphora sulcata yields arrow poison.

Derris uliginosa—a climbing shrub, the roots of which yield a fish poison.

Ficus populiflora—a tree or shrub of the fig family which yields a milky, latex-like substance used as arrow poison.

Hagenia abyssinica—the Cusso or Koussou flower, which is anthelmintic.

Verbascum ternacha—a tall herb, the fruit of which yields fish poison.

Species of *Lathyrus*, a legume, are reported. Some cause a spastic paralysis when taken by mouth.

Gramineae of the northwestern region of Italian Somaliland are probably much the same as are found in northeastern British Somaliland, from which region are reported *Amphilophis radicans*, *Cynodon dactylon*, *Eleusine robecchii*, *Erianthus ravennae*, *Pennisetum orientale*, and *Schizachyrium kelleri*.

7. MISCELLANEOUS PROBLEMS OF SANITATION. The religious beliefs and customs of the largely Moslem Somalis, together with a nomadic way of life, intensify the difficulty of disease control. Ordinary hygienic precautions in regard to water sources and waste disposal are ignored to a great extent. Poverty and ignorance are responsible to some degree for overcrowded living conditions in many urban areas and for the dissemination of diseases which the natives accept as natural visitations and for which they seldom seek medical attention. Sand and dust storms favor a high incidence

of eye infections. When the rains are insufficient, meat animals die from lack of forage and the people starve. Standards are low in regard to both personal and community cleanliness. Infant mortality is high, being about 25 percent at birth and 30 percent during the first 6 months.

Section II

MEDICAL FACILITIES

8. HOSPITALS. The hospitals of Mogadiscio were enlarged and improved to care for the influx of Italian soldiers and workmen during the Ethiopian campaign in 1935. The G. de Martino hospital, which in 1934 had about 170 beds housed in 5 buildings, and which cared for both military and civilian Europeans and Africans, was increased to a capacity of about 1,000 beds in 1935, being housed in 35 buildings, some of permanent or semipermanent construction. On 31 July 1935, it became the Principal Military Hospital of Italian Somaliland, for Italian soldiers. The M. Rava Hospital was thereupon enlarged to a capacity of 200 beds to receive Italian civilian workmen, and the A. di Giorgio Infirmary was enlarged to a capacity of 600 or 700 beds and designated as the hospital for African soldiers.

The Lazaret, operated as a part of the de Martino Hospital, had about 200 beds in 1933 and cared for Africans affected with communicable diseases. In 1935 it was enlarged and became a general hospital for civilian Africans providing 120 beds for medical, surgical, obstetric, and pediatric cases, 58 beds for venereal disease, 60 beds for tropical disease, and 40 beds for tuberculosis patients. This hospital was reported (1943) unsuitable for care of Europeans.

Reports of 1943 indicate that the hospitals which were enlarged in 1935 have returned to their pre-war sizes. The Banda hospital of 200 beds, reported not in operation in early 1943, became the Venereal Disease Annex of the British Military Hospital later in the year. Table IV shows various data relating to hospitals in Mogadiscio. The location of hospitals, infirmaries, ambulance stations, dispensaries, and quarantine stations elsewhere in Italian Somaliland is shown in table V.

The "standard" type of infirmary is described as consisting of an examining room; two rooms or wards, one for men, one for women; an isolation room; an operating room; and storage cupboards. Rooms may be added at will to increase the bed capacity of an infirmary. Ambulance stations and dispensaries of the "standard" type are described as consisting of an examining room, a treatment room, and a room having a few beds for emergency cases.

a. Number of beds. Available information relative to the number of beds in hospitals and infirmaries in Mogadiscio and elsewhere is in tables IV and V.

b. Equipment. Hospitals equipped for major surgery of all kinds are located in Mogadiscio. The G. de Martino Hospital and the British Military Hospital are reported suitable for Europeans. The M. Rava Polyambulance had "good" operating room equipment in 1943. The African Civil Hospital "Principe di Piemonte," though not considered suitable for Europeans, is said to have good operating room equipment. The Banda hospital is equipped for minor surgery only. Elsewhere in the country, emergency major surgery can be performed at Chisimaio. X-ray facilities are available in Mogadiscio at the G. de Martino and M. Rava hospitals. Table VI lists the equipment reported for hospitals in Mogadiscio. In Villaggio Duca degli Abruzzi, the A. Cecchi Hospital is equipped with X-ray. Electric current from local power plants is reported available at Mogadiscio, the Aerodrome Barracks (2 miles south of Mogadiscio), Chisimaio, Dante, Hordio, Merca, and Villaggio Duca degli Abruzzi. Cold storage facilities and artificial ice plants are located at Mogadiscio and Merca. The Mogadiscio facilities furnish 109,200 cubic feet for chilled and 70,000 cubic feet for frozen commodities.

c. Supplies. Definite information regarding hospital supplies is scant. There is a Central Supply Depot at Mogadiscio which furnishes supplies to hospitals, infirmaries, ambulance stations, and medical posts throughout the country but the nature and amount of materials disbursed are not described. The hospital at Chisimaio has a small dispensing pharmacy.

9. MEDICAL PRACTITIONERS. a. Doctors.

Reports vary as to the number of physicians and their location in Italian Somaliland. Table VII lists data for Mogadiscio, and table VIII for the remainder of the country, for the year 1939 in both cases. A report of 1943 places one Italian medical officer in each of the following localities: *Migiurtinia*—Bender Cassim, Dante, Gardò, Scusiuban; *Mudugh*—Rocca Littorio; *Alto Scebeli*—Belet Uen, Villaggio Duca degli Abruzzi; *Basso Scebeli*—Afgoi, Brava, Genale, Merca; *Alto Giuba*—Iscia Baidoa, Lugh Ferrandi; *Basso Giuba*—Chisimaio, Ionte, Margherita. In 1941 it was reported that a physician was in attendance at each of the infirmaries located in Brava (Basso Scebeli) and Obbia (Mudugh).

b. Nurses. Very few reports have been found which shed light on the nursing situation in this country. Table VIII lists information for 1936 in localities other than Mogadiscio. It is reported that, in 1933, the G. de Martino hospital in Mogadiscio had 31 nurses and 7 sisters, while the Principe di Piemonte hospital for Africans had 1 female and 5 male nurses, probably natives. In 1935 the M. Rava hospital, which served Italian civilians only, had 40 Italian nurses and 7 sisters. At the same time the Principe di Piemonte hospital nursing staff had increased to 32 native nurses. The British Military Hospital in Mogadiscio had 8 sisters in 1943.

c. Others. In 1943, one Italian dentist was reported serving in each of three Mogadiscio hospitals, the M. Rava, the African Civil (Principe di Piemonte), and the British Military Hospital. No dentists are reported elsewhere in the country. Five veterinarians were reported working in the Serum-Vaccine Institute of Merca and one in that of Chisimaio in 1938. One was stationed in Mogadiscio in 1935-36. Native dressers and vaccinators are not specifically reported as to number or locality.

10. MEDICAL INSTITUTIONS, INCLUDING LABORATORIES. The hospitals of Mogadiscio were reported to have laboratories as follows in 1943:

G. de Martino—Clinical laboratory.

M. Rava—Laboratory for routine clinical work.

British Military—Combined pathology and bacteriology laboratory.

Principe di Piemonte—Laboratory for routine clinical work.

Adjoining the de Martino Hospital is the Laboratory of Hygiene and Prophylaxis which does chemical and bacteriological work for the whole country. The A. Cecchi Hospital at Villaggio Duca degli Abruzzi has a laboratory for routine clinical work.

Other laboratories recorded include the Serum-Vaccine Institute located at El Hagi, 11¼ miles north of Merca, and a similar Institute at Chisimaio. These prepare pharmaceutical products as well as serums and vaccines for use by the Veterinary Service.

11. SOCIAL SERVICES. Social services appear to be largely nonexistent in Italian Somaliland. The Italian Red Cross (Croce Rosso Italiano or C. R. I.) had a medical post in the Amaruin quarter of Mogadiscio. There were reported in 1938 a Protestant Mission at Alessandra, a Catholic Mission with a school for whites and natives at Afgoi, a Catholic Mission with a church and school at Chisimaio, and the "Consolata" Church with a school for white and native children at Villaggio Duca degli Abruzzi.

Section III

DISEASE INFORMATION

12. GENERAL. Prevalent diseases are summarized in table IX, which lists the diseases reported from Italian Somaliland from November 1935 to September 1936, inclusive, but it is felt that the data are not reliable for many diseases. From the reports it is evident that malaria is the most prevalent disease. In southern Italian Somaliland it accounts for at least half of the total morbidity. The northern regions are relatively free from malaria but have a high incidence of tropical ulcer. Intestinal diseases, particularly parasitism and dysentery, are widespread among the natives in the southern part of the country. Tuberculosis is widely disseminated, as are venereal diseases, particularly gonorrhoea and syphilis. Large numbers of natives in the north are afflicted with conjunctivitis and corneal ulcers because of the

dust- and sand-laden winds. Exanthemata common in temperate climates are frequently seen in Somaliland. Respiratory diseases are common in the northern part of the country. Varying degrees of malnutrition are widespread.

During the invasion of Ethiopia in 1935-36 the Italians found it necessary to establish special hospitals for soldiers suffering from malaria, dysentery, pulmonary disease, and infectious diseases. As a precaution against skin infections, mentholated alcohol was used as a lotion with success. Native troops were subjected to daily foot inspection to rid them of chigoes.

13. DISEASES OF SPECIAL MILITARY IMPORTANCE. a. Malaria. Malaria is the most prevalent serious disease, accounting for nearly two-thirds of all the reported illness (table IX). The disease is found mainly in the southern part of the country (fig. 1), centered particularly along the Juba River and the Webi Scebeli. In southern Italian Somaliland a narrow strip along the coast apparently is entirely free from malaria. The cases reported from Mogadiscio come from elsewhere in the colony for hospital treatment. The city itself is said not to have anopheline mosquitoes and therefore no malaria. In northern Italian Somaliland only two noticeable foci are reported, one in the valley of the Darror and the other in that of the Nogal, at Eil.

In the interior of southern Italian Somaliland, malaria is the disease of highest incidence. There are no reliable data available for recent years to show what percentage of the population suffers from malaria. It is estimated that the disease represents at least 20 percent of general morbidity of the colony. In some localities, like Villaggio Duca degli Abruzzi, Genale, Mahaddei Uen, and Gelib, all of which are situated on the great rivers, the index of infection is said to be as high as 50 percent of total morbidity.

The epidemic season for most of southern Italian Somaliland is October through December, when new infections are most likely to occur. The cool season of July through September is said to favor malarial recurrences. Spleen and parasite rates have been recorded by various investigators (table X). It would appear that *Plasmodium falciparum* is the pre-

dominating infecting organism. Blood studies made on whole populations living along the Webi Scebeli and the Juba River show a predominance of falciparum malaria while similar studies made elsewhere show a high percentage of vivax malaria. Since *Plasmodium falciparum* causes the most severe of the three forms of human malaria, it is to be expected that patients suffering with estivo-autumnal (malignant tertian) malaria will be more likely to seek medical care and that hospital reports, therefore, will show a preponderance of falciparum over the other types. However, it is not unusual to find mixed infections and in many areas it is said that *Plasmodium vivax* and *P. malariae* only occasionally are found in pure form; ordinarily one or the other is added to falciparum malaria, aggravating and complicating the clinical picture. The predominance of *P. falciparum* is shown in table X.

Blackwater fever cases occur infrequently; the victims usually are Europeans.

b. Dysentery. (1) *Amebiasis* is said to be the second most important disease in Italian Somaliland and even more important than malaria in the north. It is widespread in the interior, particularly along the rivers and in irrigated districts where as many as 45 percent of the population have been found to harbor *Endamoeba histolytica*. Stool examinations in various localities have shown the organism in the following percentages of persons examined:

Place	Percent positive	Reported by—
Dante, Migiurtinia.....	48	Talamonti.
Alto Webi Scebeli.....	8	Mirra.
Alto Webi Scebeli.....	12	Mattei.
Alto Webi Scebeli.....	30	Basile.
Compensorio S. A. I. S.....	38	Mattei.
Mogadiscio.....	21	Fadda.
Basso Webi Scebeli.....	30	Talamonti.

Amebiasis is much less frequent along the coast and in the desert areas of the country. Hepatic abscess as a complication of *amebiasis* is said to be rare.

(2) *Bacillary dysentery* is common and generally runs a mild course. The para-*Shigella* organism is reported to be the predominating causative agent.

(3) *Balantidium coli* infection was first recorded from Italian Somaliland in 1937 al-

though the organism had been reported in stool examinations done in Mogadiscio in 1935 (table XI). It is obvious from available reports that multiple infection with two or more protozoa, or helminths, or both, is almost the rule in both black and white races.

c. Venereal diseases. No reliable statistics are available showing the number of cases of syphilis, gonorrhoea, chancroid, and lymphogranuloma venereum. Native prostitutes are said to be numerous both in and out of brothels. Gonorrhoea cases outnumber those of syphilis by about nine to one. It is alleged that venereal diseases are common among the Italian population of Mogadiscio but no definite figures are available.

d. Relapsing fever. Tick-borne relapsing fever is common and widespread throughout Italian Somaliland. Locations from which the tick vectors have been reported are listed in table III. The causative organism of relapsing fever, *Borrelia duttoni*, which is hereditary in the tick vectors, is spread by *Ornithodoros moubata* principally, but to some extent also by *O. savignyi*. Control of the tick has been accomplished by burning tick-infested premises. Native rest houses almost without exception are infested with ticks. Louse-borne relapsing fever is not reported from the colony although it occurs in epidemics in the Ethiopian plateau.

e. Dengue. The disease is said to occur annually, particularly in May and June. It is endemic in most of the country and great outbreaks occur every few years. Europeans are readily attacked by the disease. Control is especially difficult because *Aedes* mosquitoes are ubiquitous and natives are prone to hoard water.

f. Heat reactions. Heatstroke and heat exhaustion are not reported among the natives, but may occur among white men unless precautions are taken to avoid overexposure. During the conquest of Ethiopia (1935) the Italian forces are said to have suffered considerably from prickly heat in the low country on the coast. Such severe forms were encountered as to affect materially the fighting strength of Army units. Miliaria, due to dysfunction of small-coil sweat glands, was the commonest form. A pemphigoid condition in which crops

of blebs and bullae appeared in axillae and groins and which was considered to be due to dysfunction of the large-coil sweat glands of those areas, was severe and incapacitating. In the latter condition, improvement was slow unless the patients were transferred to a cool climate. For the miliary rash, the Italians claimed to have found a lotion consisting of zinc oxide 30 gm, menthol 2 gm, alcohol 160 gm, and water 40 gm, useful in allaying irritation. The treatment included avoidance of sweating as much as possible and the constant use of a towel to mop up sweat. Scrupulous cleanliness of all clothing, the wearing of as few clothes as possible, and frequent bathing were found to be helpful. Fluid intake was limited to replacement needs. It was felt that a diet adequate in fresh foods was useful.

g. Eye diseases. In northern Migiurtinia, traumatism by sand-laden winds is responsible for a large percentage of the eye conditions seen in medical centers. Troops whose work requires them to be exposed to the dust and sand-laden monsoon may develop severe conjunctivitis unless protective measures are employed. Trachoma is rare in the north but is more common in Bardera, Lugh Ferrandi, Mogadiscio, Merca, and Brava.

14. DISEASES OF POTENTIAL MILITARY IMPORTANCE. **a. Endemic.** (1) *Epidemic cerebrospinal meningitis.* Sporadic cases are reported from various localities in Italian Somaliland every year. Occasionally, the disease assumes epidemic proportions. Severe outbreaks are said to occur in highland areas but not in the coastal lowlands. There were 12 cases with 7 deaths reported from Mogadiscio in the period 1932-34. In Ischia Baidoa during 1935 the monthly average of deaths among natives was 5 during the first trimester, 12 in the second, 6 in the third, and 3 in the fourth. In 1937, an epidemic was reported from Italian Somaliland and Ethiopia. Its spread was attributed to the opening up of the country after the Italian conquest. In 1938, sporadic cases were reported without tendency to become epidemic.

(2) *Rickettsial infections* (typhus and typhus-like diseases). (a) Louse-borne or epidemic typhus is common in the plateau of Ethi-

opia, whence travelers might bring it into Italian Somaliland. It is probable, on climatic grounds, that the disease would establish itself in the lowlands but the fact that it is considered the most important epidemic disease in Addis Ababa points to the necessity for taking precautions against its introduction into Italian Somaliland from Ethiopia.

(b) Murine typhus, harbored by rats as reservoir hosts and transmitted to man by fleas, is not reported from Italian Somaliland.

(c) African tick-typhus is the rickettsial infection most frequently seen. It is considered that the wild animal reservoir hosts may be gerbils and ground squirrels. Appropriate vectors of African tick-typhus which have been reported from Italian Somaliland include *Rhipicephalus sanguineus*, *R. appendiculatus*, *Amblyomma hebraeum*, and *Boophilus annulatus* var. *decoloratus*.

(3) *Sandfly fever.* The disease is said to be endemic in Italian Somaliland although specific case reports are lacking. The vector, *Phlebotomus papatasi*, has been reported from Bender Cassim, where an epidemic of a dengue-like disease occurred in 1936. In a population of about 2,000 natives and 68 whites, the disease attacked 64 whites and no natives.

(4) *Fungus infections.* A great variety of skin conditions due to fungi has been reported. It is stated that Monilia is commonly found in lichen tropicus (another name for prickly heat.) Tinea nigra, caused by *Cladosporium mansonii*, was reported in 1928. It most often localizes on the neck and trunk but in the cases recorded it was localized on the knee and foot. Some cases of tinea flava or pityriasis versicolor were said to be caused by *Malassezia tropica*. *Torula moniloides* has been isolated from an eruption on the head. *Aspergillus echinulatus* was recovered in Mogadiscio from workers who handled peanuts. *Sterigmatocystis nigra* associated with *Aspergillus flavus* were found on the heads of native children of ages 2 to 4 years. Tinea albigena of the palms and soles was found to be caused by the fungus *Glenospora albiscans*. *Monacrosporium tedeschi*, reported from Mogadiscio, causes a scabies-like dermatosis. The most frequent cause of epidermophytosis in Italian Somaliland is said to be *Epidermophyton cruris*. Tinea cruris, caused

by *Trichophyton rubrum*, is frequently seen. *Trichophyton sabaraudi* also is reported. *Lichtheimia corymbifera* was isolated from a lichenoid dermatitis having the appearance of common prickly heat, in a European patient. *Rhizopus equinus* is said to be transmitted to man from camels and horses. Other fungi isolated from patients in Mogadiscio include *Aspergillus herbariorum major*, found in the urine of a child having cystitis, *Aspergillus candidatus*, found in osseous sequestra of a patient having osteomyelitis of the leg, and *Enotum rubrum*.

Mycetoma, caused by the ray fungus, *Discomyces bovis*, is frequently seen in this country, but natives usually do not seek treatment until the condition is so far advanced that amputation is necessary. Other mycetomata are common although only a few are brought to the hospitals for care. In the period from January 1932 to March 1935 there were 5 cases of madura foot and 57 cases of other mycetomata seen in the civilian hospital of Mogadiscio.

b. Diseases that may be introduced from other regions. (1) *Plague*. Official reports agree that there has been no plague in this country since 1924. Prior to that time there were frequent epidemics. However, one writer stated in 1935: "Probably imported from the Arabian coast, bubonic plague has gained a foothold, though not much diffused, in some localities of Italian Somaliland, situated along the Webi Scebeli and in the hinterland from the coast and the river." Whether or not plague exists in Italian Somaliland, at least it is certain that no cases have been recorded in official reports since 1924. The disease should be considered a potential hazard against which medical officers should be prepared to institute control measures.

(2) *Yellow fever*. Although Italian Somaliland lies within the endemic yellow fever area as defined for quarantine purposes, it is outside the zone where cases are known to occur. Cases have never been reported from this country and mouse protection tests made in Mogadiscio and other coastal towns in 1942 failed to show that the disease had ever been present. Yellow fever is, however, a potential menace because of its presence in adjacent Kenya and because of the presence, in Italian Somaliland, of *Aedes* mos-

quitoes which are capable of spreading the disease. It is necessary, therefore, to take precautions against the introduction of the disease into this area.

(3) *Cholera*. This disease has not been reported from Italian Somaliland for more than 20 years.

(4) *Trypanosomiasis*. Human sleeping sickness is said not to occur. Animal trypanosomiasis is common and serious in the southern part of the country.

15. SERIOUS DISEASES NOT OF MILITARY IMPORTANCE BUT LIKELY TO AFFECT SMALL NUMBERS OF TROOPS.

a. Lacerations and abrasions. Because of the likelihood of invasion by pathogenic microorganisms, it cannot be emphasized too strongly that, in this country, prompt and effective first-aid treatment must be given to all minor cuts and scratches, particularly those occurring on the extremities. Bites of mosquitoes, flies, and other arthropods easily may introduce pathogenic bacteria and any break in the continuity of the skin provides a fertile medium for the growth of secondary invaders which are present in great abundance.

b. Respiratory infections. The climate appears to favor the occurrence of respiratory diseases. Such afflictions as pneumonia, influenza, and bronchopulmonary spirochetosis are common among the natives.

c. Schistosomiasis. The urinary form, caused by *Schistosoma haematobium*, is common and widespread in the marshy regions along the lower Webi Scebeli. Its dissemination is fostered by the Moslem religious custom of bathing in the rivers, many stretches of which are infested. Carcinoma of the bladder is said to be a common sequel. Only one study has been reported (1926), embracing the region from Merca to the Balli marshes, in which 30 percent of the native population from 7 to 45 years of age were found to be infected with *S. haematobium*. The intermediate host was a species of *Ampullaria* which is supposed to be the intermediate host for *S. mansoni*, the cause of the intestinal form of schistosomiasis. Examinations were always negative for *S. mansoni*, however; only the vesical form was seen. Only two or three cases of intestinal schistosomiasis have

been recorded from Italian Somaliland, the disease having been contracted either in Yemen or in India. Cases of *S. haematobium* infection have been reported in Villaggio Duca degli Abruzzi (1930-31) and in Migiurtinia (1934-37).

d. Intestinal parasites. Helminthic diseases are common and widespread. Varying figures are reported in different areas of the country showing the proportion of the population harboring intestinal parasites. Hookworm infection has been found in 55 percent of the population examined in Basso Webi Scebeli. Most of the reported hookworm cases are due to *Ancylostoma duodenale*. *Ascaris lumbricoides* has been reported in 65 percent of subjects examined in Alto Webi Scebeli. *Trichuris trichiura* was reported in 90 percent of stools examined in Basso Webi Scebeli. *Strongyloides stercoralis*, *Enterobius vermicularis*, *Taenia saginata*, and *Hymenolepis nana* infections are less frequent but plentiful, nevertheless. *Taenia solium* is rarely found because pork is not eaten by the predominantly Moslem population. Helminths identified in stools of natives and Europeans in various parts of the country are listed in table XI.

e. Typhoid and paratyphoid fevers. Both diseases are endemic and it is said that cases are always present in both the European and native hospitals of Mogadiscio. No epidemic outbreaks have occurred, however. The number of cases is probably small as these diseases are said to be rare and sporadic in appearance.

f. Filariasis. (1) Filariasis is present but is not common in this country. It is probable that *Wuchereria bancrofti* infection occurs in limited foci. Cases of elephantiasis are said to be not uncommon. Microfilaria are transmitted by bite of infected *Culex* mosquitoes. The genus is widely distributed throughout the colony.

(2) Isolated foci of onchocerciasis have been discovered in northern Kenya. It is possible, therefore, that *Onchocerca volvulus* may exist in southern Italian Somaliland. The appropriate fly vectors are known to be abundant in adjacent territories, *Simulium neavei* in Kenya and *S. damnosum* in Kenya and in Ethiopia; their presence in Italian Somaliland is considered probable.

(3) The medina or guinea worm, *Dracunculus medinensis*, has been reported from Italian

Somaliland but cases of dracontiasis are extremely rare and the infection may have been imported.

(4) No reports of infection with *Loa loa* or with *Acanthocheilonema perstans* have been discovered.

g. Dhobie itch. Outbreaks occurred in the Italian forces during the conquest of Ethiopia. No reports specifically localize the outbreaks geographically.

h. Dermatoses — miscellaneous. Cases of lupus vulgaris, herpes zoster, lichen ruber planus, and verrucous dermatitis were reported from the Lazaret of Mogadiscio in the years 1932-34. Crusted cheilitis, an affection generally localized on the lower lip, is reported from Italian Somaliland. The mucosa becomes irritated by the dust in the monsoon season and common pyogenic organisms become implanted. An exudate forms which dries in large crusts, making it more and more difficult to speak and eat. The condition can be avoided by protecting the lips from the drying action of the dust.

16. DISEASES CAUSING HIGH MORBIDITY OR MORTALITY RATES AMONG NATIVE PEOPLE.

a. Tropical ulcer. The disease is said to be very common throughout the whole country. It is estimated that not less than 10 percent of the native population are afflicted with tropical ulcer. In the period of July 1930 through June 1931, tropical ulcer alone was responsible for attendance at the out-patient clinic of the A. Cecci Hospital in Villaggio Duca degli Abruzzi of 30 percent of the patients seen. While the condition is more frequent among natives, it is not uncommon in Europeans. The etiology of the condition is not definite. An ulcer develops usually following injury to some exposed part of the body and frequently is seen on the lower extremities. Scrupulous cleansing and immediate first-aid treatment of minor cuts, scratches, or abrasions will help prevent the appearance of tropical ulcer.

b. Scabies. The itch mite, *Sarcoptes scabiei*, may be found anywhere in this country. It has specifically been reported from the territory of Alula, in the north, and from Mogadiscio, in the south. Control measures include treatment of infected individuals, sterilization of their cloth-

ing and bedding, and the maintenance of personal cleanliness.

c. Chigoe infestation. The burrowing flea, *Tunga penetrans*, is widespread throughout Italian Somaliland. (See par. 4a(4).)

d. Tuberculosis. The disease is widespread among natives to an extent not accurately known. It is reported to take a rapidly progressive course in this climate. As one goes from the coast toward the interior where contacts between natives and Europeans are fewer, the numbers of cases diminish in proportion except in northern Migiurtinia where, it is stated, more cases are to be seen in the interior than on the coast. Osseous, glandular, and cutaneous forms are seen more frequently in northern Italian Somaliland, while in the population centers of the southern part of the country the pulmonary form predominates. Europeans who contract the disease do not do well in this country and reactivation of silent lesions is likely to occur in Europeans who come to Italian Somaliland to live.

e. Yaws. This disease is widespread in the colony, especially among children. It is reported to be particularly common around Buloburti and in the northern part of the country.

f. Leprosy. Nodular, anesthetic, and mutilating types of leprosy all are said to be common in Italian Somaliland but no data have been found that indicate the morbidity rate among the native peoples. The leper colony at Gelib is inadequate to care for all the lepers in need of medical treatment.

g. Arthritis. A condition which is widespread among mature adults in northern Migiurtinia is a syndrome characterized by articular and muscular pain of rheumatoid type, localized most frequently in the lumbar region, the hip, and the calf of the leg. Exacerbations occur at certain times of the year during which slight elevations of temperature and general exhaustion are common. Reports are lacking regarding arthritis or rheumatism among natives elsewhere in the colony.

h. Deficiency diseases. Scurvy and beriberi are reported to be common in the country as a whole. No mention is made of pellagra. Avitaminoses are reported to be relatively fre-

quently seen in northern Migiurtinia. Fruits and vegetables are scarce in some areas; because of cattle diseases, milk is not plentiful. In areas where camel's milk is a dietary staple, deficiency diseases are said to be less common.

i. Smallpox. Official reports are lacking or misleading as to the incidence of the disease. In 1936, when 76 cases with 32 deaths were officially reported, one author records his experience at Gorioli and Maiagabo where there were 1,142 cases with 471 deaths between 12 November and 31 December. In 1934, when no cases were reported officially, another writer states that there was an epidemic which was not entirely spent at the beginning of 1935 and a vaccination campaign was carried on in populated centers in 1935-36. The number of pock-marked faces seen among the Somalis attests the fact that smallpox is far more prevalent than is suggested by official figures (table IX).

17. MISCELLANEOUS DISEASES. a. Table IX lists figures for 1935-36 showing the relative frequency of such diseases as chickenpox, mumps, measles, cerebrospinal meningitis, whooping cough, and diphtheria. Occasional cases of scarlet fever are reported from northern Migiurtinia. No data are available indicating the mortality among natives caused by these diseases.

b. Kala azar. Visceral leishmaniasis has been reported from this country, although rarely. One case occurred in December 1935 and in 1941 another case was traced to Italian Somaliland. The disease apparently is not uncommon in northern Kenya and southern Ethiopia, both bordering on Italian Somaliland. The infecting organism, *Leishmania donovani*, is transmitted by the flies, *Phlebotomus argenteipes* and *P. congolensis*, and perhaps also by the dog tick, *Rhipicephalus sanguineus*, all of which are known to be present in Italian Somaliland.

c. Rabies. Camels and other domestic animals may be affected by this disease. Infected jackals are not rare. Rabies is stated to be one of the worst scourges of adjacent Ethiopia. No data are given in available reports as to the incidence of the disease in Italian Somaliland.

d. Weil's disease. No reports of cases of leptospirosis have been found.

e. **Undulant fever.** Only one case of brucellosis has been reported. The patient, an Italian, had come to Italian Somaliland from Milan 5 months previous to the appearance of symptoms of undulant fever.

Section IV

SUMMARY AND RECOMMENDATIONS

18. SUMMARY. a. Public health. Coincidentally with the Italian conquest of Ethiopia in 1935-36, the Inspectorate of Health of Italian Somaliland was enlarged and reorganized to conduct public health activities for the civilian population. Prior to the subsequent British occupation of the country, civilian public health work was carried on by a health officer and a district physician in each Commissariat. There was a port physician in each of 10 coastal cities or towns and a veterinarian in each of 3 seaports. Facilities operated by the Inspectorate of Health included a leprosarium and 88 hospitals, infirmaries, ambulance stations, quarantine stations, and outpost dispensaries. The work undertaken by the Inspectorate of Health provided protection of the health of imported Italian workers primarily and care of the natives only incidentally.

Water supplies on the maritime plain are usually brackish; in the interior the presence of magnesium and calcium salts often renders the water unpalatable. There are only two permanent streams, the Juba River and the Webi Scebeli. Mogadiscio has a piped water supply which is said to be chlorinated; a certain amount of distilled water is available in the city. There are no public water-carriage sewerage systems. Flush toilets carrying sewage to individual septic tanks or cesspools are reported in the European quarter of Mogadiscio, while in the native quarter all wastes are supposed to be collected in drums and incinerated, a system which does not work well because of lack of native cooperation.

Mosquitoes capable of transmitting malaria, filariasis, dengue, and yellow fever are widely distributed throughout the country. Other disease vectors, such as lice, flies, ticks, and fleas, are indigenous, as are cockroaches, rodents, mollusks, and crustaceans. Poisonous snakes, scorpions, and centipedes, baboons, elephants, hy-

enas, jackals, leopards, lions, panthers, wart hogs, and wild dogs are potentially dangerous animals which may be encountered.

Only moderate amounts of meat and dairy products and few, if any, vegetables will be available for troops. Public markets, slaughterhouses, and dairies are supervised and controlled in Mogadiscio, but it is not known whether such control is exercised elsewhere in the colony. Many poisonous plants grow in this country and many of the gramineae (grasses) disseminate potentially allergy-producing pollen.

b. Diseases. Diseases that will be of greatest importance to military forces are malaria, amebic dysentery, venereal diseases, relapsing fever, dengue, heat reactions (heatstroke, heat exhaustion, heat cramps, prickly heat, heat boils), and eye diseases, particularly conjunctivitis due to traumatism by dust-laden winds. Diseases of potential military importance endemic in the area are epidemic cerebrospinal meningitis, rickettsial infections (particularly African tick-typhus), sandfly fever, and skin infections due to a variety of fungi. Diseases of military medical importance that could be introduced from other areas are plague, yellow fever, cholera, and human sleeping sickness. Serious diseases of limited military importance likely to affect only small numbers of troops are secondary infection of minor lacerations and abrasions, respiratory infections, schistosomiasis, intestinal parasitism, typhoid and paratyphoid fevers, filariasis, and various dermatoses, including dhobie itch.

19. RECOMMENDATIONS. The following recommendations are for personnel operating in Italian Somaliland and are intended to supplement the general sanitary precautions ordinarily observed in all areas.

a. Water. No water supplies, regardless of source or mode of distribution, should be used for drinking or bathing purposes unless properly treated.

b. Sewage. Provision must be made for local disposal of sewage, garbage, and other wastes as there are no public water-carriage sewerage systems in the country. Native employees must have their own toilet facilities and must be made to use them properly.

c. Food sanitation. Because of the high incidence of dysenteries, careful precautions must be observed in the collection, storage, and preparation of food in Army messes and in Army exchanges. Intestinal parasites are common and all beef should be thoroughly cooked before being eaten. Artificial ice, if obtainable, should not be used in such a way that it contaminates drinking glasses or beverages. If local eating establishments are used by military personnel, such places should be inspected to determine their acceptability, and placed out of bounds if found unsuitable. Vegetables and thin-skinned fruits should not be consumed in a raw state but should be cooked before being eaten. Thick-skinned fruits (bananas, oranges) need not be cooked but should be washed before being peeled and eaten. Personnel should be warned of the dangers of eating in native homes or in other than approved establishments.

d. Mosquito control. Malaria is prevalent in the southern part of the country and in two foci in the north. The methods used in the prophylaxis of malaria as outlined below will serve in large measure to control the spread of other mosquito-borne diseases. Mosquito-control measures should include—

- (1) Use of bed nets (sandfly mesh), repellents, and protective clothing.
- (2) Screening and spraying of military buildings and other structures that may be occupied or frequented by military personnel.
- (3) Treatment of the sites of mosquito breeding. Special attention must be given to small, shallow pools and to standing water which cannot be drained away.
- (4) Provision of suppressive drugs for use when required.
- (5) Camp sites should be located at least a mile away from mosquito-breeding grounds, from places where animals are kept, and from native habitations, to reduce transmission of malaria from natives to troops.

e. Control of flies. The use of screens, bed-nets, insect repellents, and pyrethrum sprays as outlined above should help to protect personnel. In addition, all garbage should be deposited within covered containers and disposed of by burial or incineration.

f. Control of tick-borne diseases. The prevalence of tick-borne relapsing fever makes it

necessary to adopt control measures. Most effective is the burning of infested premises. Coffee houses, bazaars, and native rest houses should be avoided. Native rest houses should not be utilized to shelter troops or materials.

g. Venereal disease control. Venereal diseases are prevalent and easily acquired. Adequate supplies of prophylactic materials will be needed and easily accessible prophylactic stations should be established. Comprehensive educational programs and adequate recreational facilities are recommended. To a great extent the success of control measures will depend upon the accessibility and efficiency of prophylactic stations and on the availability of prophylactic devices.

h. Control of heat reactions. Control measures should include:

- (1) Clothing should be loose and shoes should not fit too tightly. Sun helmets should be worn by troops when exposed to direct sunlight for any length of time.
- (2) Frequent rest periods of adequate length should be provided, when practicable, for troops who must work in the sun.
- (3) Diet should include liberal amounts of cooked fruits and vegetables, if possible. Only light meals should be eaten during the heat of the day.
- (4) Liberal amounts of water should be provided. The amount required per individual varies from $\frac{1}{2}$ gallon for the resting individual up to 3 gallons for one doing manual labor throughout the day.
- (5) Additional salt will be required to provide for that lost in perspiration. A $\frac{1}{10}$ -percent solution is suitable for drinking purposes and can be prepared by adding 1 pound of table salt to 100 gallons of water or by adding one-fourth teaspoonful of table salt or two 10-grain salt tablets to each canteen of water.
- (6) Heatstroke centers and water stations should be established in areas where troops are stationed to give aid and emergency care for threatened heatstroke cases.
- (7) Troops should be instructed in the early warning signs of heatstroke and heat exhaustion (headache, giddiness, dry skin, nausea, fever or a subnormal temperature, abdominal cramps, or muscular cramps), and the necessity

for complete rest and medical care in the event these signs and symptoms appear.

i. First-aid treatment of wounds. Serious infections often result from minor wounds. All personnel should be made aware of the necessity for giving prompt first-aid treatment to all wounds, burns, abrasions, and insect bites, no matter how trivial they may appear. Any skin infection, including chigoes and ringworm, must be given prompt attention.

Table I.—Italian Somaliland—Locations where water is available (mostly in small quantity only)

Abo	Golkayu (Mudugh Oasis)
Adaddel	Golol
Addaddir	Gonderscia
Adalei	Gori Rit
Afgoi	Gungamale
Af Gudud	Hagagable
Afmadu	Handa
Alula	Harardera
Amerel	Hola Wajir
Amolessa	Hordio
Audeglei	Iak Ichevel
Badadda	Iasli
Bahad (Baad)	Ierkud
Bardera	Iet
Belet Uen	Iredame
Bender Beila	Iscia Baidoa
Bender Cassim (Bio Kulel)	Itala
Bender Filluk	Kaldole
Bender Merhagno (Telega Wells)	Karin
Bereda (Berada)	Lamma Guri
Bio Kulel	Laso Dauao
Birikau (Port Durnford)	Lugh Ferrandi
Boho	Madah
Brava	Mahaddel Uen
Bud-Bud	Malka Adl
Bulo-Burti	Manas Wells
Busk Busk	Mansur
Chisimaio (Kismayu)	Matenga-ya-Papa Island
Danane	Meleden
Dante	Merca
Dar	Meregh
Dibdid (Dibdibib)	Meruli
Diglei	Missarole
Dinsor	Modun
Dolo	Mogadiscio
Eil	Mogokori
El Bagal	Mooti
El Bur	Obbia
El Danane	Obo
El Dere	Oddur
El Dubbo	Ola Uafer
El Gulle	Rakan
El Uarega	Revai
El Ure	Rocca Littorio (Gallacalo)
Elo Skidle	Safar Molal
Fanium Dur	Saho Ghedut
Fer-Fer	Salagle
Fullai Duddumal	Scuciuban
Galadi	Shedli
Gambole	Sinadogo
Garbaharre	Sinugif
Gardo	Sola
Gelib	Tac Braviri
Gilib	Tigieglò
Gimbo (Jumbo)	Tite (Tite)
Gobuen	Tohen
Golbio	Ual-Ual
	Uambatti

Uamo-Ido
Uanle Uen
Uargalo
Uar Ual
Uegit

Verega
Villaggio Duca degli
Abruzzi
Vittorio d'Africa
Yesomma (Iesomma)

Table II.—Anophelines identified in Italian Somaliland

Locality	Gambiae	Funestus	Mauritanus Coustani	Pharoensis	Rhodesiensis	Claviger	Squamosus
Somaliland	d	d					d
Somaliland and Oltre Giuba	a-b-e	a-b-e	e	b-e	b-e		
Medio Scebeli	h	h		h			
Afgoi	f-j						
Bulo Burti	i						
Buracaba	i						
Gelib	j						
Genale	f-j	f-j	f	k			j
Iscia Baidoa	f-j						
Lugh Ferrandi	f						
Margherita	f						
Mogadiscio	j	c					
Oddur	j						
Villaggio Duca degli Abruzzi	g-f-j	g-j	g	g			

Sources:

- a. Franchini quoted by Brighenti—Riv. di Malariol. 9(4): 431, 1930.
- b. Magli quoted by Brighenti—Riv. di Malariol. 9(4): 431, 1930.
- c. Fox, p. 9.
- d. Franchini, G—Pathologica 17: 494, Sept. 15, 1925.
- e. LaFace, L.—Riv. di Parrassitol. supp. monog. No. 1. 1:3, Jan. 1937.
- f. Lega, Raffaele, & Canalis—Riv. di Malariol. 16(Sez. 4): 371-377, 1937.
- g. Mattei, A.—Ann. Med. Nav. Colon. 37(2): 597, Sept.-Oct. 1931.
- h. Mattei, A.—Ann. Med. Nav. Colon. 38(2): 555, Sept.-Oct. 1932.
- i. Wilson & Notley—East African Med. J. 10: 253, Aug. 1943.
- k. Lega et al. quoted by Wilson & Notley.

Table III.—Localities in Italian Somaliland from which ticks have been reported

Argas brumpti:	Ornithodoros savignyi:
Uroghei	Afgoi
Argas persicus:	Afmadu
Bur Acaba	Audegle
Lugh Ferrandi	Baduen
Uanle Uen	Balad
Ornithodoros moubata:	Bardera
Afgoi	Belet Uen
Alessandra	Brava
Audegle	Bulo Burti
Balad	Bur Acaba
Bulo Burti	Daddama
Bur Eil	Dolo
Harardera	Dugiuma
Iet	Fer-Fer
Itala	Genale
Lugh Ferrandi	Helliscia
Meregh	Iscia Baidoa
Mogadiscio	Itala
Mustahil	Lugh Ferrandi
Oddur	Malka Re
Uanle Uen	Margherita
Uegit	Matagoi
Uroghei	Merca
Villaggio Duca degli Abruzzi	Mogadiscio
	Obbia
	Oddur
	Tigieglò
	Uegit
	Uroghei

Source: Massa, F.: Contributo alla distribuzione geografica della specie "ornithodoros" nella Somalia italiana, Gior. di Med. Militare 81. 453-459 (May) 1936.

Table IV.—Number of beds reported for hospitals in Mogadiscio, Italian Somaliland

Hospital	Date	Beds available	Bed capacity can be increased to—
G. de Martino Hospital	1943	120	400
M. Rava Civil Hospital	1943	30	70
African Civil Hospital and Lazaret "Principe di Piemonte"	1943	200	235
A. di Giorgio Infirmary	1934	60	
British (C. R. S.) Military Hospital	1943	220	
Banda Hospital (V. D. Annex to British C. R. S. Hospital)	1943	120	200

Table V.—Medical establishments in Italian Somaliland (except Mogadiscio)—Continued

Type of establishment	Number of beds	Location
COMMISSARIAT OF ALTO SCEBELI		
Hospital	100	Villaggio Duca Degli Abruzzi.
Infirmary	20	Belet Uen.
Infirmary	50	Bulo Burti.
Infirmary	10	Itala.
Infirmary	10	Villaggio Duca degli Abruzzi.
Ambulance station		Balad, Belet Uen, Bulo Burti, Itala, Villaggio Duca degli Abruzzi.
Dispensary		Meregh.
COMMISSARIAT OF BASSO SCEBELI		
Infirmary	30	Afgoi.
Infirmary	25	Brava.
Infirmary	80	Genale.
Infirmary	25	Goluin.
Infirmary	50	Merca.
Ambulance station		Afgoi, Brava, Genale, Goluin, Merca, Vittorio d'Africa.
Dispensary		Audegle, Basilio, Bulo Mererta, Lamma Garas, Uagadi, Urbinati.
COMMISSARIAT OF ALTO GIUBA		
Hospital	70	Iscia Baidoa.
Hospital	20	Lugh Ferrandi.
Infirmary	15	Bur Acaba.
Infirmary	(1)	Dolo.
Infirmary	20	Oddur.
Infirmary	5	Uegit.
Ambulance station		Bur Acaba, Dinsor, Ischia Baidoa, Lugh Ferrandi, Oddur, Tigieglò, Uegit.
COMMISSARIAT OF BASSO GIUBA		
Hospital	150	Chisimaio.
Leper hospital	250	Gelib.
Infirmary	15	Bardera.
Infirmary	(1)	Gelib.
Ambulance station		Afmadù, Bardera, Chisimaio, Dugiuma, Gelib. Gobuen, Margherita.
Dispensary		Alessandra, Dugiuma, Gobuen.
Quarantine station		Chisimaio.

Table V.—Medical establishments in Italian Somaliland (except Mogadiscio)

Type of establishment	Number of beds	Location
COMMISSARIAT OF MIGIURTINIA		
Hospital	(1)	Alula.
Hospital	45	Dante.
Infirmary	24	Alula.
Infirmary	30	Bender Cassim.
Infirmary	25	Eil.
Infirmary	(1)	Gardò.
Ambulance station		Alula, Bender Cassim, Dante, Eil, Gardò, Garoe, Hordio.
Dispensary		Bareda, Bargal, Bender Beila, Bender Macaio, Candala, Dante, Gardò, Tohen.
Quarantine station		Bender Cassim, Dante.
COMMISSARIAT OF MUDUGH		
Infirmary	10	El Bur.
Infirmary	25	Obbia.
Infirmary	20	Rocca Littorio.
Ambulance station		El Bur, Obbia, Rocca Littorio.
Dispensary		Galadi, Harardera.

(1) Not stated.

Table VI.—Equipment reported for hospitals in Mogadiscio

Hospitals	Operating room	X-ray	Diathermy	Laboratories		
				Pathology	Clinical	Unspecified
"G. de Martino"	(1942) one	(1933) inadequate. (1943) old type, works well.	(1943) old type, works well.	(1942) two		(1943) excellent.
"M. Rava"	(1943) good equipment.	(1935) one. (1943) modern.	(1943) none		(1943) one	
"Principe di Piemonte"	(1943) good equipment.	(1943) none	(1943) none		(1943) one	
British Military	(1943) one	(1943) none	(1943) none			(1943) one.
Banda	(1943) fair equipment.	(1943) none	(1943) none			(1943) none.

Table VII.—Physicians in Mogadiscio, Italian Somaliland, in 1939

Institution	Number
Inspectorate of Health	1
Department of Health	1
Department of Maritime Sanitation	1
Municipal Department of Hygiene	1
Commissariat and Port	1
Laboratory of Hygiene and Prophylaxis	3
Serum-Vaccine Institute	1
Principal Colonial Hospital	1
"M. Rava" Hospital	6
"Principe di Piemonte" Hospital	5
Unspecified	5
Total	26

Source: Meille, L., p. 736.

Table VIII.—Doctors and nurses in Italian Somaliland (except Mogadiscio)

Commissariat	Physicians (1939)				Nurses (1936)
	Colonial physicians	Port doctors	Private practitioners	Military physicians	
Migiurtinia	1	4		2	20
Mudugh	2	1			9
Alto Seebeli	5	1		2	22
Basso Seebeli	4	2	1		32
Alto Giuba	5		1	5	14
Basso Giuba	2	1			19

Sources:
Meille, L., p. 737.
Vezzoso, B., p. 210.

Table IX.—Diseases reported in Italian Somaliland November 1935 to September 1936, inclusive.

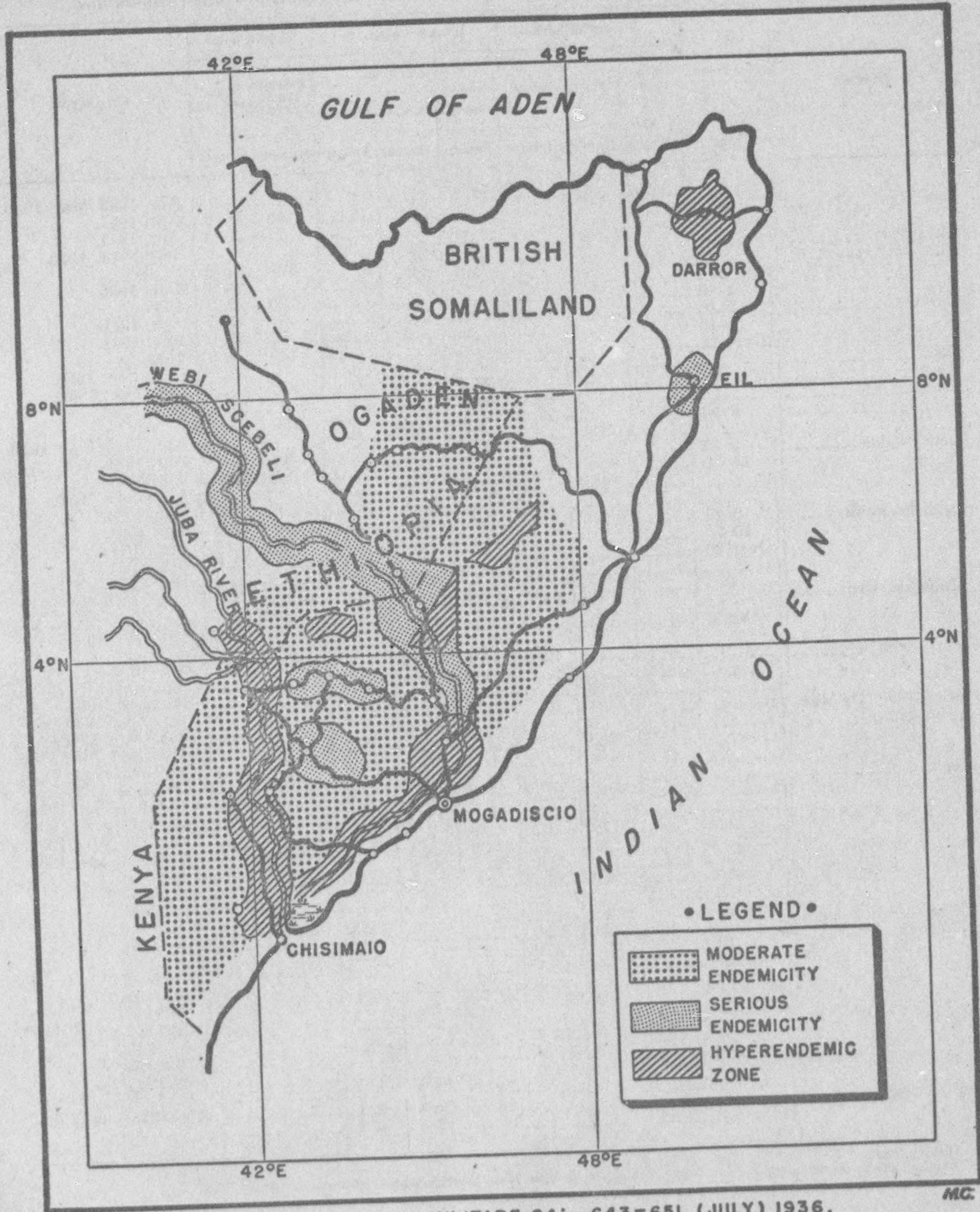
	1935		1936									Totals for 11 months
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	
Malaria	634	928	1,290	893	959	510	654	576	565	578	498	8,085
Dysentery	96	145	94	56	188	190	188	63				1,020
Yaws		56	39	110	55	29	72	72	180	92	69	774
Chickenpox	89	96	93	90	176	72	39	4	35	13	7	714
Mumps	34	59	76	34	98	36	41	24	67	60	42	571
Measles	123	82	51	44	13	27	16	20	81	39	52	548
Ancylostomiasis		47	21	51	53	28	43	18	29	7	18	315
Tuberculosis, pulmonary	34	33	37	36		24	12	7	21	24	14	242
Amebiasis									49	39	28	116
Syphilis				15	10	4	5	2		3	59	98
Recurrent fever	6	6	5		10	1		2	11	2	5	48
Gonorrhoea											37	37
Meningitis, cerebrospinal	3		1					2	10	7	4	27
Typhoid and paratyphoid					7	7	4	3		3		24
Dengue						3	13	7				23
Leprosy		3	2			2	1	1	8	2	4	23
Schistosomiasis		1	5			2	4	3			1	16
Whooping cough	12	3										15
Smallpox	2				1	3	4			1		11
Bubo, climatic											1	1
Diphtheria							1					1
Leishmaniasis, visceral		1										1

Table A.—Plasmodic index, infecting organisms, and splenic index, in Italian Somaliland

Location	Age group	Plasmodic index			Infecting organisms			Splenic index		Time of year
		Smears examined	Positive smears		Plasmodium			Patients examined	Spleen palpable	
			Number	Number	Percent	Falcip.	Vivax			
Years	Number	Number	Percent	Percent	Percent	Percent	Number	Percent		
Belet Uen	2-10		40		87.5	12.5	0	53	16.0	Apr. 1935-Mar. 1936.
	11-20							21	33.0	Apr. 1941.
Bulo Burti			28		46.4	53.5	0			Apr. 1941.
Bulo Mererta	2-12	100	19	19.0	57.9	42.1	0	100	62.0	July-Sept. 1935.
Buracaba										Dec. 1936.
	1-10							200	20.0	1934.
	2-10							56	16.0	Apr. 1941.
	11-20							23	30.0	Apr. 1941.
	Over 20							100	26.0	1934.
Dolo			7		85.7	14.3	0			Oct.-Dec. 1935.
Fer-Fer			12		100.0	0	0			Oct.-Dec. 1935.
Genale				38.0	30.0	70.0	0		59.4	Dec. 1936.
Goluin	2-12	150	42	27.9	50.0	45.2	4.8	150	82.0	
Ischia Ba'doa			137		47.4	52.5	0			Apr. 1935-Mar. 1936.
	2-10							84	40.0	Apr. 1941.
	11-20							25	32.0	Apr. 1941.
Lugh Ferrandi			129		24.0	75.9	0			Apr.-June 1936.
	2-10							48	48.8	Dec. 1936.
	10-20							30	70.0	Apr. 1941.
	Over 20							18	72.0	Apr. 1941.
Mahaddei Uen	2-9			51.4	33.4	66.6	0		38.0	Dec. 1936.
	Adults				90.0 to 95.0				45.0 to 50.0	
Margherita				42.8	38.6	61.4	0		97.3	Dec. 1936.
Mogadisc'o (De Martino Hosp.)		1,825			94.5	5.0	0.5			1930.
			10		60.0	40.0	0			Oct.-Dec. 1935.
			131		64.1	34.3	1.5			July-Aug. 1936.
			12		41.6	58.3	0			Mar.-Aug. 1936.
			330		44.5	49.7	5.7			Mar. 1935-June 1936.
Uegit			486		50.0	45.7	4.3			Mar. 1935-Aug. 1936.
			99		13.1	84.8	2.0			Apr.-June 1936.
			152		90.1	5.9	3.9			Oct. 1934-Jan. 1935.
			2,162		90.6	5.4	3.9			Jan. 1935-Jan. 1936.
			770		88.6	7.9	3.5			Jan. 1936-Apr. 1936.
Villaggio Duca degli Abruzzi			3,084		90.0	6.1	3.9			Oct. 1934-Apr. 1936.
				42.0	29.2	70.8	0		50.0	Dec. 1936.
	2-10							130	84.0	Apr. 1941.
	11-20							61	87.0	Apr. 1941.
	Over 20							30	60.0	Apr. 1941.
	1-5	26	20	76.9						Feb. 1942.
	6-10	25	21	84.0						Feb. 1942.
	2-10							48	65.0	Feb. 1942.
	11-20	29	14	48.3				27	67.0	Feb. 1942.
	Over 20	39	10	25.6				30	63.0	Feb. 1942.
1-5	9	0	0						July 1942.	
6-10	22	6	27.3						July 1942.	
11-20	42	7	16.6						July 1942.	
Over 20	47	5	10.6						July 1942.	
Italian Somaliland					29.3	43.9	26.8			
			525		35.6	62.3	2.1			
					80.6	15.3	4.1			Apr. 1935-June 1936.

*Predominant.

In general, rainy seasons occur in April, May, June, and in October, November, December, with some local variations.



SOURCE: MASSA, F.; GIOR. DE MED. MILITARE 84; 643-651 (JULY) 1936.

Figure 1. Malarious areas in Italian Somaliland.

MC.

AGO 480A

Table XI.—Stool examinations reported from the Laboratory of Mogadiscio, 1935

	Number	Percent
Stools examined.....	3,250	100.0
Stools having positive findings.....	2,730	84.0
Stools showing protozoons:		
Endamoeba coli.....	940	28.9
Endamoeba histolytica.....	685	21.1
Chilomastix mesnili.....	405	12.4
Trichomonas hominis.....	165	5.1
Cercomonas intestinalis*.....	85	2.6
Giardia lamblia.....	54	1.7
Endolimax nana.....	45	1.4
Balantidium coli.....	24	0.7
Stools showing helminths:		
Ancylostoma duodenale.....	1,100	33.8
Trichuris trichiura.....	875	26.9
Ascaris lumbricoides.....	500	15.4
Necator americanus.....	140	4.3
Strongyloides stercoralis.....	90	2.8
Enterobius vermicularis.....	50	1.5
Taenia saginata.....	42	1.3
Hymenolepis nana.....	15	0.5

*The term *Cercomonas intestinalis* was first applied to what is now called *Giardia lamblia*; the term was later used to designate the organism now known as *Chilomastix mesnili*. The protozoon designated by the term *Cercomonas intestinalis* in this report is unknown.

Source: Huard, P.: Ann. Med. Pharm. Colon. 35 (1): 161, 1937.

BIBLIOGRAPHY

Prepared in the Office of The Surgeon General, United States Army, from data on file in the Medical Intelligence Division, Preventive Medicine Service. This matter is supplemented by the following reports and texts:

1. ALBANI, C. B.: La patologia e la terapia presso i Somali, Arch. ital. Sci. med. colon. 19: 439-448 (July) 1938.
2. ALLARD, H. A.: The North American Ragweeds and their Occurrence in other Parts of the World, Science 98: 292-294 (Oct. 1) 1943.
3. ANDERSON, T. F.: Kala Azar in the East African Forces, East African Med. J. 20: 172-175 (June) 1943.
4. ANDERSON, T. F.: The Diet of the African Soldier, East African Med. J. 20: 207-213 (July) 1943.
5. ANDRUZZI A.: Assistenza sanitaria ai bambini europei nei territori coloniali, Arch. ital. Sci. med. colon. 18: 643-666 (Nov.) 1937.
6. ANNALI D'IGIENE: Reported diseases in Italian Somaliland, Ann. d'Ig. 45: 801, 1935; 46: 236, 330, 331, 474, 1936.
7. ARCHETTI, I.: Considerazioni sull'amebiasi nelle terre dell'Impero, Riv. di Biol. colon. 1: 281-291 (Aug.) 1938.
8. AUSTEN, E. E.: Illustrations of African Blood-sucking Flies other than Mosquitoes and Tsetse-flies, London: British Museum (Natural History) 1909.
9. AUSTEN, E. E., and HEGH, E.: Tsetse-flies, Their Characteristics, Distribution and Bionomics, With some account of possible methods for their control. London: Imperial Bureau of Entomology 1922.
10. AZZI, E., and MAGLIANO, G.: Il quadro ematologico nella "Dengue", Bull. Sci. Med. Bologna 109 (No. 3): 218-235 (May-June) 1937.
11. BACHELLI, G.: Sul primo caso di Bilharziosi intestinale da Schi. Mansoni osservato nella Somalia Italiana, Arch. ital. Sci. med. colon. 17: 206-208 (April) 1936.
12. BELDING, DAVID L.: Textbook of Clinical Parasitology, New York: D. Appleton-Century Co. 1942.
13. BEQUAERT, J. C.: The Black-Flies, or Simuliidae, of Belgian Congo, Am. J. Trop. Med. (Supp.) 18: 116-136 (Jan.) 1938.
14. BERNABAI, A.: L'indice splenico e l'indice plasmodico nei bambini di Goluine di Bulu Mererta (Vittorio D'Africa), Gior. Ital. di Clin. Trop. N. S. 1 (No. 8): 243-244 (Aug. 31) 1937.
15. BERNABAI, A.: Profilo sanitario della popolazione metropolitana civile in Somalia nell'anno 1937, Gior. Ital. di Clin. Trop. N. S. 2 (No. 4): 89-90 (April 30) 1938.
16. BERTONI, A.: Le attuali conoscenze sui dermomiceti dell'Africa Italiana, Riv. di Biol. colon. 1: 269-280 (August) 1938.
17. BESTA, B., and MARIANI, G.: Le parassitosi intestinali in Somalia studiate nella popolazione metropolitana durante l'anno 1935, Gior. di Med. Militare 84: 436-452 (May) 1936.

18. BLOMFIELD, D. M.: Prickly Heat, *Trans. Roy. Soc. Trop. Med. & Hyg.* 36: 239-246 (Jan. 30) 1943.
19. BOULENGER, G. A.: A list of the Snakes of North-East Africa From the Tropic to the Soudan and Somaliland, Including Socotra, *Proc. Zool. Soc. London*, 1915, p. 651-658.
20. BOYD, J. S. K.: The Principles of the Prophylaxis of Malaria: With the Administrative and other measures for their Application on Active Service, *Jour. Roy. Army Med. Corps* 43: 95-100 (Aug.) 1924; 182-201 (Sept.) 1924.
21. BRIGHENTI, D.: Gli anofelini delle Colonie italiane, *Riv. Malariol.* 9 (4): 429-433, 1930.
22. BRUMPT, E.: Distribution géographique et rôle en pathologie humaine de l'*Ornithodoros savignyi*, *Ann. de Parasitol.* 14: 640-646 (Nov. 1) 1936
23. CASTELLANI, A.: La Méningite Cérébro-Spinale Endémique en Afrique Orientale Italienne, *Bull. Off. Int. d'Hyg. Publ.* 31 (1): 455-456, 1939.
24. CASTELLANI, A.: Note sur l'Organisation Médicale et l'État Sanitaire des Troupes Italiennes durant la Guerre Éthiopienne (*Journal of Tropical Medicine and Hygiene*.—1^{er} Octobre 1936), *Ann. Med. Pharm. colon.* 35 (1): 181-185 (Jan.-Feb.-March) 1937.
25. CASTELLANI, A.: Note Sommaire sur la Diffusion de la Tuberculose Pulmonaire dans les Colonies Italiennes, *Bull. Off. Int. d'Hyg. Pub.* 31 (1): 83-85, 1939.
26. CASTELLANI, A.: Le "Pian" dans les Colonies Italiennes, *Bull. Off. Int. d'Hyg. Publ.* 31 (1): 294-295, 1939.
27. CAWSTON, F.: Bilharzia Disease. A handbook for Health Inspectors and School Teachers. The Lovedale Press. (Copy in Bartsch Collection, U. S. National Museum, Division of Mollusks, Washington, D. C.)
28. CHANDLER, A. C.: Introduction to Human Parasitology, 5th ed. New York, John Wiley & Sons, Inc., 1936.
29. CHIOVENDA, E.: Vegetali utilizzati nella medicina indigena dell'Eritrea, Somalia, e regioni vicine, *Atti 1° Cong. Studi Colon.* 7: 351-376, 1931.
30. CHIURCO, G. A.: La sanità delle razze nell'Impero Italiano, Rome: Istituto Facista dell'Africa Italiana, 1940.
31. CICCHITTO, A. M.: I primi casi di balan-tidiosi in Somalia: Nota preventiva, *Arch. ital. Sci. med. colon.* 18: 118-119 (Feb.) 1937.
32. CICCHITTO, A. M.: Sulla Patogenica del *Trichomonas intestinalis*, *Ann. di Med. Nav. Colon.* 42: 27-33 (Jan.-Feb.) 1936.
33. CIFERRI, R.; CORRADI, R.; and BIGI, F.: Piante medicamentose e piante amuleto usate dagli indigeni del Basso Giuba, *Riv. di Biol. colon.* 1: 401-433 (Dec.) 1938.
34. COCHRAN, DORIS M.: Poisonous Reptiles of the World, Publication 3727, Smithsonian Institution (March 19) 1943.
35. COLLENETTE, C. L.: North-eastern British Somaliland, *Bull. Misc. Inform. Roy. Bot. Gardens, Kew, London*, No. 8: 401-414, 1931.
36. Consociazione Turistica Italiana: Africa Orientale Italiana, Milan 1938.
37. CONSOLI, N.: La lotta contro le malattie veneree e sifilitiche en A. O. I., *Arch. ital. Sci. med. colon.* 18: 707-716 (Dec.) 1937.
38. CORRADO, E.: Contributo alla Geografia Medica della Somalia Italiana, *Pathologica* 17: 438-441 (Aug. 15) 1925.
39. CULBERTSON, J. T.: Medical Parasitology, New York, Columbia Univ. Press 1942.
40. DE MEILLON, B.: On the Ethiopian Simuliidae, *Bull. Entomol. Res.* 21: 185-200, 1930.
41. DE SENA, M.: Il funzionamento del Laz-zaretto di Mogadiscio nel biennio 1932-1934, *Arch. ital. Sci. med. colon.* 16: 135-147 (Feb.) 1935.
42. Diseases Reported, Italian Somaliland, *Arch. ital. Sci. med. colon.* 17: 125-127, 384, 448, 575-576, 1936; 18: 128, 1937.

43. DITMARS, R. L.: *Snakes of the World*. New York, The Macmillan Co., 1943.
44. DONNELLY, G. R.: *World Trade in Dental & Surgical Goods*, U. S. Dept. of Commerce, 1939.
45. EDWARDS, F. W.: *Mosquitoes of the Ethiopian Region, Part III, Culicine Adults and Pupae*, London, British Museum (Nat. Hist.), 1941.
46. ELLERMAN, J. R.: *The Families and Genera of Living Rodents*, London, British Museum (Nat. Hist.), 1940. 2 vols.
47. *Encyclopaedia Britannica*, ed. 14, Chicago, Encyclopaedia Britannica Inc., 1939.
48. *Encyclopaedia Britannica World Atlas*, Chicago, Encyclopaedia Britannica Inc., 1942.
49. EVANS, A. M.: *Mosquitoes of the Ethiopian Region, II, Anophelini, Adults and Early Stages*, London, British Museum (Natural History), 1938.
50. FALDA, S.: *La Malaria nelle colonie italiane dell'Africa Orientale*, Arch. ital. Sci. med. colon. 17: 105-114 (Feb.) 1936.
51. FOX, L. A.: *Sanitary Survey of Mogadiscio, Italian Somaliland*, (June 7) 1942. (Copy in Medical Intelligence Files.)
52. FRANCHINI, G.: *Brevi note di entomologia sulla Somalia e sulla Eritrea*, Pathologica 17: 494-495 (Sept. 15) 1925.
53. FRANCHINI, G.: *Su di alcune specie di zanzare non ancora descritte nelle nostre Colonie*, Arch. ital. Sci. med. colon. 9: 458-459 (Aug.) 1928.
54. FRANCHINI, G.: *Il parassitismo intestinale nelle nostre Colonie*, Arch. ital. Sci. med. colon. 16: 86-96 (Feb.) 1935.
55. FRANCHINI, G.: *Le colonie italiane dell'Africa Orientale dal punto di vista sanitario ed igienico*, Arch. ital. Sci. med. colon. 16: 485-506 (July) 1935.
56. FRANCHINI, G.: *Le febbri ricorrenti nelle nostre colonie Africane*, Arch. ital. Sci. med. colon. 18: 293-308 (May) 1937.
57. GELONESI, G.: *La Malaria del Benadir*, Ann. di Med. Nav. e Coloniale 37 (2): 527-545 (Sept.-Oct.), 667-688 (Nov.-Dec.) 1931; 38 (1): 48-68 (Jan.-Feb.), 197-225 (Mar.-Apr.) 1932.
58. GERMAIN, L., and NEVEU-LEMAIRE, M.: *Essai de Malacologie Medicale*, Ann. de Parasitol. 4: 286-305, 352-384, 1926.
59. GHIDINI, G. M.: *Ditteri ematofagi dell'Africa Orientale Italiana—Gen. Tabanus s. l.*, Riv. di Biol. colon. 1: 321-364 (Oct.) 1938.
60. GHIDINI, G. M.: *Le Glossine dell'Africa Orientale Italiana*, Riv. de Biol. colon. 1: 53-71 (Feb.) 1938.
61. GIBBONS, E. G.: *Notes on Ethiopian Simuliidae—II*, Ann. Trop. Med. Parasitol. 32: 21-33 (April 28) 1938.
62. GIROLAMI, M.: *La balantidiosi nell'uomo*, Gior. Ital. di Clin. Trop. N. S. 2 (No. 6): 144-150 (June 30) 1938.
63. GIROLAMI, M.: *Un caso di balantidiosi osservato in Somalia*, Arch. ital. Sci. med. colon. 18: 120-124 (Feb.) 1937.
64. GIROLAMI, M.: *La profilassi della schistosomiasi nell'Africa Orientale*, Arch. ital. Sci. med. colon. 16: 844-852 (Dec.) 1935.
65. GITHENS, T. S., and WOOD, C. E. Jr.: *The Food Resources of Africa*, Philadelphia, University of Pennsylvania Press, 1943.
66. DI GIUSEPPE, F.: *Contributo alla conoscenza della nosografia della Migiurtinia*, Gior. Ital. di Clin. Trop. N. S. 1 (No. 2): 45-48 (Feb. 28) 1937.
67. GOODMAN, N. M.: *Office International d'Hygiene Publique; Summary of Proceedings at the April-May 1939 Session of the Permanent Committee*, Bull. Hyg. 14: 655-663 (Sept.) 1939.
68. Great Britain Colonial Office. *Somaliland Colonial Reports—Annual, 1924, 1927-1937, 1939.*
69. Great Britain: *Handbook No. 128—Italian Somaliland*, London, His Majesty's Stationery Office, 1920.

70. HERMS, WM. B.: *Medical Entomology*, ed. 3, New York, The Macmillan Co., 1939.
71. HUARD, P.: *Le Climat et la Pathologie de l'Afrique Orientale Italienne*, *Ann. de med. et de Pharm. coloniales* 35 (1): 157-180 (Jan.-Feb.-March) 1937.
72. HUARD, P.: *The Italian Medical Service During the Campaign in Ethiopia*, Reprinted from *Revue des Troupes Coloniales* (Feb.-Mar.) 1937, in *The Military Surgeon* 82 (No. 3 and 4): 193-228 (Mar. and Apr.) 1938.
73. JORGE, R.: *La peste africaine*, *Bull. Off. Internat. d'Hyg. publ. Supp. No. 9*, 27: 1-67 (Sept.) 1935.
74. KUMM, H. W.: *The Geographical Distribution of The Yellow Fever Vectors*, *Am. J. Hyg. Monog. Series No. 12*, 1931.
75. LA FACE, L.: *Fauna anofelinica dell'Colonie italiane*, *Riv. di Parassitol. suppl. monog. No. 1*, 1: 1-120 (Jan.) 1937.
76. LAVIER, G.: *La Lutte contre les Glossines*, *Ann. de Méd. et de Pharm. Colon.* 37: 27-40, 1939.
77. League of Nations Health Organization: (a) *Statistics of Notifiable Diseases for the Years 1928-1931*; (b) *Annual Epidemiological Reports—Corrected Statistics of Notifiable Diseases for the years 1932-1938*, Geneva, 1930-1941.
78. LEGA, G.; RAFFAELE, G.; and CANALIS, A.: *Missione dell'Istituto nell'Africa Orientale Italiana*, *Riv. di Malariol.* 16 (Sez. 1): 325-387, 1937.
79. LEGA, G.; RAFFAELE, G.; and CANALIS, A.: *Rapporto preliminare della missione dell'Istituto di Malariologia "Ettore Marchiafava" in A. O. I.*, *Arch. ital. Sci. med. colon.* 18: 309-315 (May) 1937.
80. LENTI, P.: *Il problema della tubercolosi negl'indigeni africani; La tubercolosi dei neri*, *Arch. ital. Sci. med. colon.* 18: 515-557 (Sept.), 579-605 (Oct.) 1937.
81. LIGHT, R. U.: *Focus on Africa*, New York: American Geographical Society Special Publication No. 25, 1941.
82. LOVERIDGE, A.: *African Reptiles and Amphibians in Field Museum of Natural History*, *Field Mus. Nat. Hist. Zool. Series* 22: 1-111 (Aug. 15) 1936.
83. LOVERIDGE, A.: *Check List of Reptilia Recorded from British Territories in East Africa*, *Jour. E. Africa and Uganda Nat. Hist. Soc. Special Supplement No. 3* (May) 1924.
84. LOVERIDGE, A.: *Field Notes on Vertebrates Collected by the Smithsonian-Chrysler East African Expedition of 1926*, *Proc. U. S. Nat. Museum* 73: 1-69, 1928.
85. MANSON, P.: *Manson's Tropical Diseases*, Ed. by P. H. Manson-Bahr, ed. 11, Baltimore, Williams & Wilkins Co., 1941.
86. MANSON-BAHR, C.: *Diseases of East Africa*, *Lancet* I: 217 (Feb. 14) 1942.
87. MANSON-BAHR, P.: *The Prevalent Diseases of Italian East Africa*, *Lancet* I: 609-612 (May 10) 1941.
88. MARIANI, G.: *Un caso di schistosomiasi intestinale a Mogadiscio*, *Arch. ital. Sci. med. colon.* 17: 208-310 (May) 1936.
89. MARIANI, G., and BESTA, B.: *La blatta orientale serbatoio di protozoi ed elminti*, *Arch. ital. Sci. med. colon.* 17: 177-184 (March) 1936.
90. MARIANI, G., and BESTA, B.: *Il primo caso accertato di infezione melitense in Somalia*, *Policlinico (Sez. Prat.)* 43: 584-588, 1936.
91. MARIANI, G., and LOPRESTI, A.: *I parassiti intestinali della popolazione bianca in Somalia*, *Ann. d'Igiene* 46: 480-496 (Nov.) 1936.
92. MARIANI, G., and TADDA, L.: *Considerazioni cliniche e morfologiche su alcuni casi di malaria osservati in Somalia*, *Arch. ital. di Sci. med. colon.* 17: 621-627 (Oct.) 1936.
93. MASSA, F.: *Episodio epidemico di febbre ricorrente nella Somalia italiana*, *Gior. di Med. Militare* 84: 107-113 (Feb.) 1936.

94. MASSA, F.: Contributo alla distribuzione geografica delle zecche "ornithodoros" nella Somalia italiana, *Gior. di Med. Militare* 84: 453-459 (May) 1936.
95. MASSA, F.: Malaria somala, *Gior. di Med. Militare* 84: 643-651 (July) 1936.
96. MASSA, F., and GUALDI, L.: L'approvvigionamento idrico di Mogadiscio prima e dopo l'arrivo delle truppe metropolitane, *Gior. di Med. Militare* 84: 214-222 (March) 1936.
97. MASSA, F., and MENNONNA, G.: Vaccino-profilassi nelle truppe indigene, per la meningite cerebrospinale epidemica. *Gior. di Med. Militare* 84: 868-873 (Sept.) 1936.
98. MASSA, F., and DE VIVO, A.: Episodio epidemico di dengue a Bendir Cassim, nel golfo di Aden, *Gior. Ital. di Clin. Trop. N. S. 1* (No. 3): 78-79 (March 31) 1937.
99. MATTEI, A.: Fauna anofeligena e malaria nel Medio Scebeli, *Ann. di Med. Nav. e Colon.* 38 (2): 538-563 (Sept.-Oct.) 1932.
100. MATTEI, A.: Relazione sanitaria annuale (July 1930-June 1931), *Ann. di Med. Nav. e Colon.* 37 (2) 596-612 (Sept.-Oct.) 1931.
101. MATTEI, A.: Su alcuni casi di Schistosomiasi vesicale, *Ann. di Med. Nav. e Colon.* 37 (2): 895-407 (July-Aug.) 1931.
102. MATTEI, A.: Su di alcuni casi di cistite amebica da "*E. vesicalis*", *Ann. di Med. Nav. e Colon.* 38 (1): 24-47 (Jan.-Feb.) 1932.
103. MEILLE, L.: *Annuario Sanitario Italiano*, Turin: Carlo Accame (July 31) 1939.
104. MENNONNA, G.: Contributo alla conoscenza della malaria Somala risultati degli accertamenti microscopici, *Arch. ital. Sci. med. colon.* 17: 678-683 (Nov.) 1936.
105. MENNONNA, G.: Del servizio di igiene e profilassi nel corpo indigeni della Somalia dopo la mobilitazione, *Gior. Ital. di Clin. Trop. N. S. 1* (No. 6): 178-181 (June 30) 1937.
106. MENNONNA, G.: Somalia sanitaria, *Gior. Ital. di Clin. Trop. N. S. 1* (No. 1): 6-9 (Jan. 30) 1937.
107. Ministero della Guerra: Istruzione per l'igiene dei militari del Regio Esercito—No. 3718 Direzione Generale di Sanita Militare, Rome. Istituto Poligrafico dello Stato, Libreria, 1940.
108. MODUGNO, G.: La febbre ricorrente in Somalia, *Gior. Ital. di Clin. Trop. N. S. 1* (No. 2): 35-42 (Feb. 28) 1937.
109. NIRO, S.: Gli Ixodidi delle nostre colonie dell'Africa Orientale—Distribuzione geographica, *Arch. ital. Sci. med. colon.* 16: 602-609 (Aug.) 1935.
110. NUTTALL, G. H. F.; WARBURTON, C.; COOPER, W. F.; and ROBINSON, L. E.: Ticks: A Monograph of the Ixodoidea,
Vol. I:
Part I. Argasidae.; pp. 1-104 (Oct.) 1908.
Part II. Ixodidae; pp. 105-348 (May) 1911.
Part III. Ixodidae—Genus Haemaphysalis; pp. 349-550 (Oct.) 1915.
Vol. II:
Part IV. Genus Amblyomma; pp. 1-302, 1926.
Bibliography:
Of The Ixodoidea; pp. 1-68 (July) 1911.
Of The Ixodoidea II; pp. 1-32 (May) 1915. London: Cambridge Univ. Press.
111. PEEL, C. V. A.: *Somaliland*, London, F. E. Robinson & Co., 1900.
112. PEPEU, F.: Studi sull'Ofidismo nelle Colonie Italiane, *Terapia* 25: 353-363 (Dec.) 1935.
113. PERGOLA, A.: Affezioni oculari da veleno di "*Naja nigricollis*" (Osservazioni cliniche), *Boll. d. Soc. Italiana di Med. e Igiene Trop. (Sez. Eritrea) Asmara* 1 (No. 1): 80-91, 1942.

114. PILSBRY, H. A., and BEQUAERT, J.: The Aquatic Mollusks of the Belgian Congo with a Geographical and Ecological Account of Congo Malacology, *Bull. Amer. Mus. Nat. Hist.* 53: 69-602, 1926-1927.
115. PITMAN, C. R. S.: A Guide to the Snakes of Uganda, Kampala, Uganda, The Uganda Society, 1938.
116. POLIDORI, T.: I Micetomi in Somalia, *Arch. ital. Sci. med. colon.* 17: 19-33 (Jan.) 1936.
117. RAGAZZI, G.: La malaria a Scusciuban, *Arch. ital. Sci. med. colon. e Parassit.* 19: 120-123 (Feb.) 1938.
118. RAGAZZI, G., and ALBANI, C. B.: Contributo alla conoscenza dell'alastrim in Somalia, *Gior. Ital. di Clin. Trop. N. S.* 1 (No. 11) 337-339 (Nov. 30) 1937.
119. ROSS, E. S., and ROBERTS, H.: Mosquito Atlas, Parts I and II, Philadelphia, The American Entomological Society, The Academy of Natural Sciences, 1943.
120. ROSSI, G.: Cenni nosografici della Migrituria settentrionale (Territorio della R. Residenza di Alula), *Arch. ital. Sci. med. colon.* 19: 449-461 (Aug.) 1938.
121. RUSSELL, P. F.; ROZEBOOM, L. E.; and STONE, A.: Keys To The Anopheline Mosquitoes of the World, Philadelphia, The American Entomological Society, The Academy of Natural Sciences, 1943.
122. SARNELLI, T.: La Bilharziosi vesicale nello Yemen e nelle nostre Colonie, *Arch. ital. Sci. med. colon.* 16: 410-424 (June) 1935.
123. SARNELLI, T.: Manifestazioni oculari dell'ofidismo e congiuntiviti da sputo di serpenti nelle nostre colonie (con osservazioni personali), *Arch. ital. Sci. med. colon.* 16: 769-789 (Nov.) 1935.
124. SCORTECCI, G.: I "Mamba" dell'Africa Orientale Italiana, *Riv. di Biol. colon.* 1: 81-90 (April) 1938.
125. SNODGRASS, R. E.: The Feeding Apparatus of Biting and Disease-Carrying Flies: A Wartime Contribution to Medical Entomology, *Smithsonian Misc. Collections* 104, No. 1 (July 19) 1943.
126. SOUTHWELL, T., and KIRSHNER, A.: On the Transmission of Leishmaniasis. *Ann. Trop. Med. Parasitol.* 32: 95-102 (Apr. 28) 1938.
127. SPOTO, F.: Il trachoma ed altre malattie oftalmiche nella Somalia italiana, *Rass. ital. d'Ottal.* 8: 588-611 (Sept.-Oct.) 1939.
128. The Statesman's Year-Book 1941, London: Macmillan and Co., 1941. pp. 1066-1067.
129. STEFANO, U.: Nosografia del Basso Uebi Scebeli (Notizie raccolte in una spedizione del 1933.), *Arch. ital. Sci. med. colon.* 16: 819-829 (Nov.) 1935.
130. STELLA, E.: Gli Ixodidi dell'Africa Orientale Italiana, *Riv. di Biol. colon.* 1: 135-153 (April) 1938.
131. SWAYNE, H. G. C.: Seventeen Trips Through Somaliland, ed. 3, London: Rowland Ward, Ltd., 1903.
132. TADDIA, L.: Febbre esantematica da spirochete in Somalia, *Arch. ital. Sci. med. colon.* 18: 106-110 (Feb.) 1937.
133. Terminology in Human Malaria, Editorial, *Am. J. Pub. Health* 33: 845-847 (July) 1943.
134. TESTI, F.: Ancora sull'ofidismo nelle nostre Colonie, *Arch. ital. Sci. med. colon.* 16: 1-6 (Jan.) 1935.
135. TESTI, F.: Un Colubride proteroglifo da aggiungersi alla fauna erpetologica della Somalia Italiana, *Arch. ital. Sci. med. colon.* 16: 407-409 (June) 1935.
136. VENERONI, C.: La bilharziosi vesicale in Somalia, *Riforma Med.* 42: 9-10 (Jan. 4) 1926.
137. VEZZOSO, B.: Servizio sanitario civile della Somalia italiana nel biennio 1935-1936, *Giorn. Ital. di Clin. Trop. N. S.* 1 (No. 7): 202-215 (July 31); N. S. 1 (No. 8): 247-250 (Aug. 31) 1937.
138. WEYER, F.: Die Malaria-Überträger, Leipzig, G. Thieme, 1939.

139. WHITAKER, J.: *An Almanack for 1941*, London: 12 Warwick Lane, Paternoster Row, 1940. pp. 190, 906.

140. WILSON, D. B., and NOTLEY, F. B.: *Malaria in Southern Somalia (Italian*

[AG 300.5 (19 Dec 44)]

BY ORDER OF THE SECRETARY OF WAR:

Somaliland), *East African Med. J.* 20: 255-262 (Aug.) 1943.

141. *The World Almanac and Book of Facts, 1942*. Published by New York World-Telegram for Washington Daily News.

OFFICIAL:

J. A. ULIO

Major General

The Adjutant General

G. C. MARSHALL

Chief of Staff

DISTRIBUTION:

Dept (Med Lab) (1); Def C (3); S Div ASF (1); Tech Sv (Tng D) (1); SvC (Surg) (3); SvC (Tng D) (1); SvC (Med Lab) (1); AAF Sta (Cont U. S.) (1); PE (1); PE (Surg) (1); PE (Intell O) (1); GH (Cont U. S.) (1); RH (Cont U.S.) (1); SH (Cont U.S.) (1); Med Sv Sch for O (1); Med Techn Sch (1); ASF Unit Tng C (3); Med Lab (1); A (3); A (Med Lab) (1); CHQ (3); D (3); AF (3)

For explanation of symbols, see FM 21-6.

Handwritten initials and marks in the top left corner.

55 copies rec'd

1 ea Medoff + MAC
as far as will go
1 free

TB MED 131

WAR DEPARTMENT TECHNICAL BULLETIN

TREATMENT OF RESPIRATORY DEPRESSION AND ASPHYXIA

War Department, Washington 25, D. C. January 1945

This bulletin follows TB MED 130, subject, "Medical and Sanitary Data on British Somaliland." Distribution given TB MED 130 was as follows: S Div ASF (1); Dept (Med Lab) (1); Def Comd (3); Tech Sv (Tng D) (1); Sv C (Surg) (3); Sv C (Tng D) (1); Sv C (Med Lab) (1); AAF Sta (Continental U. S.) (1); PE (1); PE (Surg) (1); PE (Intell O) (1); GH (Continental U. S.) (1); RH (Continental U. S.) (1); SH (Continental U. S.) (1); Med Sv Sch for O (1); Med Techn Sch (1); ASF Unit Tng C (3); Med Lab (1); A (3); A (Med Lab) (1); CHQ (3); D (3); AF (3).

	Paragraph
Purpose	1
Carbon Dioxide and Carbon Dioxide-Oxygen Mixtures	2
Convulsant Drugs	3
Approved Methods of Resuscitation	4

1. PURPOSE. The purpose of this Technical Bulletin is to explain the dangers in using carbon dioxide, carbon dioxide-oxygen mixtures, and convulsant drugs such as picrotoxin, coramine, metrazol, and alpha lobelin in the treatment of asphyxia, respiratory depression, overdoses of depressant drugs, and atelectasis, and to present approved methods of managing these conditions.

2. CARBON DIOXIDE AND CARBON DIOXIDE-OXYGEN MIXTURES. For many years carbon dioxide or carbon dioxide-oxygen mixtures have been employed in the treatment of asphyxia neonatorum, asphyxia from carbon monoxide inhalation, asphyxia from drowning, and other conditions in which the patient is not breathing or in which respiration is severely depressed. Evidence is now available to show that such a procedure is not rational and is associated with certain dangers.

It has long been known that carbon dioxide will produce narcosis, and recent investigations

have emphasized the dangers associated with the use of this agent when the respiratory center is depressed. When administered for a short time in weak concentrations, it does increase the depth of respiration. This same effect is not exhibited when the centers of respiration are damaged, when the concentration of this gas is high, or when it is used over a prolonged period of time.

It is well known that carbon dioxide produces toxic effects, even in weak concentrations. Continuous breathing of an atmosphere containing as little as 1 percent of the gas will incapacitate men for work. As little as 6 percent in the inspired air will cause subjective symptoms such as malaise, headache, nausea, and, occasionally, unconsciousness. Noticeable hyperpnoea will occur when the inspired air contains as little as 5 percent carbon dioxide and a distinct dyspnoea will occur as the concentration becomes increased. Unconsciousness results with concentrations in excess of 10 percent.

In asphyxiated patients, the blood oxygen concentration is almost nil but the blood carbon dioxide level is elevated above normal. Since in these patients carbon dioxide no longer acts as a respiratory stimulant but is actually a respiratory depressant, there is no rational basis for its administration. This is also true in cases

of severe carbon monoxide poisoning, for medullary damage is present in all states of severe anoxia. *For these reasons, the use of carbon dioxide as a respiratory stimulant is dangerous.* The carbon dioxide level in the blood will adjust itself if oxygen is supplied in adequate amounts to the tissues. This has been demonstrated to be true both experimentally and clinically.

5. CONVULSANT DRUGS. Although the convulsant drugs, for example, metrazol, picrotoxin, alpha lobelin, and coramine, will cause some stimulation of respiration in normal or lightly narcotized individuals, they will increase the depression in deeply narcotized states. *These drugs are all without effect in cases with profound anoxia.* They are all capable of causing convulsions, thus increasing the anoxia and the need for oxygen to the brain. For these reasons, the convulsant drugs are considered dangerous and will not be used.

4. APPROVED METHODS OF RESUSCITATION. *a. Asphyxia in the newborn.* Care in the employment of sedative and narcotic drugs during labor and the administration of anesthetics to the mother are of the greatest importance in the prevention of asphyxia in the newborn. A rigid routine of resuscitative measures should be developed and employed immediately after birth.

The essentials in the treatment of asphyxia in the newborn are: maintenance of body temperature, employment of efficient aspiration of mucus from the pharynx in order to assure clear air passages, and the administration of oxygen intermittently under pressure or continuously at atmospheric pressure. If the baby is not breathing, oxygen should be administered intermittently under a positive pressure seldom in excess of 12 mm mercury, 12 to 15 times per minute, until breathing is established. If, after breathing is established, the baby still needs oxygen, it should be administered continuously, using a face mask, with an oxygen flow of about 4 liters per minute. Only the standard types of resuscitators* using intermittent positive pressure should be used since it has been found that

*Standard items 3725800, 3726100, 3726500 in ASF Catalog MED 3. An infant resuscitator employing the principle of single phase, positive pressure delivery of oxygen is being standardized.

the automatic "suck and blow" type of resuscitator is ineffective in aerating the atelectatic lung. If apparatus for the administration of oxygen is not available, mouth-to-mouth inflation should be employed with due care that excessive pressure is not exerted. Attention should be directed to the fact that all lungs are airless at birth and that *manual methods of artificial respiration should never be attempted on the newborn because it is not possible to draw air into an atelectatic lung in this manner.*

b. Asphyxia in adults. Asphyxia in adults may occur at any place and at any time, consequently, it is necessary to start resuscitative measures immediately. It is necessary to stress the importance of initiating manual respiration without delay. If resuscitative equipment is available, better results may be obtained by using oxygen intermittently under positive pressure at pressures seldom in excess of 20 mm mercury, 12 to 15 times per minute. Only the standard type of resuscitators* using intermittent positive pressure should be used since the automatic "suck and blow" type which employs alternating positive and negative pressure has been found less effective and potentially dangerous and has been declared obsolete; for example, former item 37270, Resuscitator Pump Type, is now obsolete. Any nonstandard resuscitators which do not operate on the principle of the intermittent, single phase, positive pressure delivery of oxygen should likewise be considered obsolete. In oxygen deficiency states, when the patient is breathing, oxygen should be administered continuously at atmospheric pressure by means of a face mask or a nasal catheter. The maintenance of clear air passages by the removal of foreign materials such as blood and mucus from the mouth and pharynx and support of the tongue is essential. Body temperature should be maintained. A position with the head turned to one side and slightly lower than the feet is desirable.

c. States of respiratory depression. States of respiratory depression such as those which follow carbon monoxide poisoning or overdosage with barbiturates, opium and its derivatives, and other sedatives should be treated by general supportive measures, such as the continuous administration of oxygen, maintenance of a clear

airway, frequent tracheobronchial aspiration if an accumulation of fluid is present, maintenance of body temperature, frequent turning of the patient in bed, the administration of sufficient quantities of 5-percent glucose solution intravenously to maintain normal fluid balance and stimulate diuresis, and whole blood transfusions when indicated. In instances of barbiturate or opiate poisoning, the parenteral administration of caffeine sodium benzoate or oral administration of other preparations of caffeine (including coffee) and intelligent efforts to keep the patient awake and exercising are highly efficacious and should always be instituted.

d. Atelectasis. Carbon dioxide inhalations employed as a prophylactic measure postoperatively not only do not prevent atelectasis but may even predispose to it by displacing the nitrogen from the lungs. Effective measures for preventing atelectasis include immediate postoperative aspiration of mucus from the tracheobronchial tree by the introduction of a tracheal catheter suction, or even by bronchoscopic suction when indicated; changing the patient's position at regular intervals during the postoperative period when he is not able to help himself; and encouraging the patient to take 15 or 20 deep breaths every hour.

Once atelectasis has developed, the use of carbon dioxide inhalations is contraindicated, for the violent respiratory efforts incident to the administration of this gas tend to draw mucus or other foreign material deeper into the bronchus, thereby creating a more complete block of the airway to the collapsed segment of the lung. The proper treatment of atelectasis includes regular changes in the patient's position and insistence that he cough up and expectorate the mucus plug responsible for the collapse. As soon as the patient has cleared the tracheobronchial tree of mucus by coughing, he should then be encouraged to take a series of deep breaths to promote reexpansion of that portion of the lung which is collapsed. Should the patient fail to cough up the mucus plug, the tracheobronchial tree should be promptly aspirated with a soft rubber catheter introduced into the trachea through the nose. Such aspiration should be repeated as often as necessary to keep the air passages clear of mucus. Should the above measures prove ineffective after a reasonable period of trial (1 to 3 hours), bronchoscopic aspiration should be performed, following which the conservative measures discussed above should be employed to maintain a clear respiratory tree. Heavy sedation of patients with atelectasis tends to minimize the effectiveness of the above procedures and should, therefore, be avoided.

[AG 300.5 (27 Dec 44)]

BY ORDER OF THE SECRETARY OF WAR:

OFFICIAL:

J. A. ULIO
Major General
The Adjutant General

G. C. MARSHALL
Chief of Staff

DISTRIBUTION:

AAF (5); AGF (5); ASF (2); T of Opns (25); S Div ASF (1); Dept (5); Base Comd (5); Is Comd (5); AAF Comds (55); Arm & Sv Bd (2); Def Comd (5); Tech Sv (2); SvC (10); Named & Numbered GH (60); Numbered GE (NP) CZ (45); Named SH (Including RH & Numbered SH) (40); M Cono C (55); Gen Disp (ZI) (10); Fld Hosp (15); Hosp Tn (2); Hosp Ship Plat (5); Hosp Ship Complements (15); Conv Ctr (15); Conv Camp (10); Vet Gen H (10); Vet Sta H (10); Vet Evac H (5); Vet Conv H (5); Portable Surg H (5); Evac H (750 bed) (40); Evac H (SM-400 bed) (30); Conv. H (20); Gen & Sp Sv Sch (5); Enlisted Techn Sch 8 (1); USMA (2); ASTPU (3); ROTC (2); Army Med Tng C (60); Ind Sta (10); Sv C Lab (5); A (5); GHQ (5); D (55); AF

TB MED 131

(55); One copy to each of the following: T/O & E 3-25; 4-45; 4-145; 4-232; 5-35; 5-72; 5-95; 5-275; 6-35; 6-55; 6-65; 6-75; 6-95; 6-175; 6-325; 6-355; 6-365; 6-395; 7-85; 9-12; 11-25; 17-55; 17-125; 18-25; 19-35; 20-42. Two copies to each of the following: T/O & E 2-22; 4-152; 4-260-1; 5-386; 5-535S; 6-12; 6-45; 8-22; 8-26; 8-520; 9-35; 9-76; 10-22; 10-165; 10-217; 11-15; 17-15; 18-10-1; 18-35; 19-55; 20-46; 44-15; 44-25; 44-75; 44-115; 44-125; 44-225S; 44-315; 55-120-1. Three copies to each of the following: T/O & E 5-192; 7-95; 8-27; 10-45; 10-175; 17-115; 44-135; 44-320; 55-110-1; T/O & E 5-21 (5); 5-251 (6); 5-510S (35); 8-26 (10); 8-510 (15); 8-534 (5); 8-537T (15); 8-550 (60); 8-550S (45); 8-560 (40); 8-572S (5); 8-580 (40); 8-581 (30); 6-590 (20); 8-591T (15); 8-595T (10); 8-650 (10); 8-750 (10); 8-760 (10); 8-780 (5); 8-790 (5); 10-95 (7); 10-125 (6).

For explanation of symbols, see FM 21-6.