

*The rest*

THESIS FOR THE M.D. DEGREE OF THE UNIVERSITY OF EDINBURGH.

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NOTES ON 208 CASES OF SCURVY TREATED IN THE VICTORIA  
HOSPITAL, LOVEDALE, SOUTH AFRICA, - DURING THE 12 MONTHS  
NOV. 1927 - NOV. 1928.

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In the Eastern part of the Cape Province of South Africa a prolonged drought has reduced the native population to great straits. It has lasted the greater part of three years. These native people are mainly pastoral and agricultural in their mode of life and their methods are primitive in the extreme. The result is that when no rains fall for months and years on end both their means of livelihood are almost entirely destroyed. In this district they have been unable to raise any crops for three years or grow any green stuff or fruit. Their cattle have also died off till only about 10% of them remain, and these are too thin to give milk.

Under ordinary conditions the staple diet of the native people consists of maize and milk. Either the crushed maize grain is eaten boiled or it is ground into meal for porridge. They also grow millet or Kaffir corn which is sometimes eaten crushed and boiled but more often is brewed into beer. Sugar beans, dried, are widely used boiled along with the maize. Very few grow green vegetables, with the universal exception of pumpkins. Milk forms a large part of their dietary when they can get it. It is generally allowed to go very sour before they drink it. Meat is only an occasional luxury and is indulged in rather freely when available.

The Anti-scorbutic element in their diet under ordinary conditions lies mainly in the milk and pumpkins, the vitamin

value of both of which is known to be low. It is not their custom to grow other green vegetables or fruit to any great extent even when climatic conditions allow of it. Only in the short few weeks season when the maize is ripening can they eat it green, - for the rest of the year they subsist mainly on dried maize and beans. The millet or Kaffir corn is allowed to germinate before being brewed into beer which would seem to be a useful source of vitamin, but the malted grain is subjected to one to two hours hard boiling in the subsequent process of beer manufacture. This greatly diminishes its anti-scorbutic quality and there is no evidence to prove that the subsequent fermentation has any anti-scorbutic value. (E. Marion Delf). The beer is not a daily article of diet as it is too troublesome to make and does not keep well. A large quantity is made every now and then and all the village indulges freely and is incapacitated for several days.

Thus it may be seen that even in normal circumstances the Natives' diet is not rich in anti-scorbutic elements, while in drought conditions they have to struggle along on maize and beans only. Almost every man, woman and child in time of drought has scurvy in some degree or other and bad cases are frequent. Infants at the breast are better off than most but if the mother has been without anti-scorbutic diet for some months her milk seems to be poorer in vitamin content than normal and the child may develop symptoms. *vide* (Case 27). Children who have just been weaned - i.e. from one to three years, suffer badly. Being fed entirely on

maize meal porridge and maize water they rapidly develop symptoms of infantile scurvy (extreme oedema, anaemia, weakness and dysentric diarrhoea). The death-rate amongst cases in hospital has been highest in this class. Men coming from the <sup>labour</sup> ~~(labour)~~ centres provide the best examples of adult scurvy, typical cases, unable to walk, with legs swollen and acutely painful from haemorrhages <sup>in</sup> ~~with~~ the muscles and under the periosteum, fungating gums and loose teeth. Such typical cases are not so common among women, though pains in the legs, small of back and shoulders and sometimes swelling of the legs, are frequent.

The disease is well-known among the natives who call it "umtshetsha", literally "creeping", with reference to the victims' mode of progression.

#### The Etiology of Scurvy.

I am indebted for my facts mainly to the work of E. Marion Delf D.Sc., F.L.S., "Studies in experimental Scurvy with Special Reference to the Anti-scorbutic Properties of some of the South African Food Stuffs," published by the South African Institute for Medical Research, Johannesburg.

The efficacy of lemons in the treatment of Scurvy was being discovered by sailors as early as 1747 and in 1795 lemon juice was universally introduced into the Navy and Scurvy was no longer the scourge of British seamen. Lime juice, by some confusion of terms, acquired a great but quite undeserved reputation as an anti-scorbutic. "It was

conclusively proved by researches in the Lister Institute in 1917 that the fresh juice of the lime has not more than one quarter of the anti-scorbutic value of the fresh juice of the lemon."

Many theories as to the causation of scurvy have been held - the acidosis theory, the toxic theory, the theory of bacterial invasion - even up to a very recent date, in spite of the fact that the cure, known for centuries, pointed to a diet deficiency as being responsible. This has been established by the work of many investigators beginning with Holst and Frölich in 1912. By their researches it has been shown that Scurvy is due to "deficiency of a certain chemically unidentified substance probably present in varying amounts in all living, turgid cells whether of animal or vegetable origin." This water-soluble, anti-scorbutic vitamin C "is unstable if heated, stored or dessicated" and its value is lessened in alkaline solutions.

The relative anti-scorbutic values of food stuffs have been determined as follows by Dr. Harriet Chick, taking as the standard raw cabbage 100%

<u>Food stuff.</u>	<u>Anti-scorbutic value in Percentages.</u>
Raw cabbage	100
Lemon Juice	66
Orange juice	33
Cooked cabbage	20
Lime juice	10 - 15
Boiled potato	5

Grapes and meat juice (raw) less than	5
Cows milk	1

E. Marion Delf of the South African Institute for Medical Research has further experimented on South African food stuffs with the following results:-

<u>Food stuff.</u>	<u>Anti-scorbutic value.</u>
Lean meat (raw)	+
Lean meat (cooked) less than	+
Cows milk (raw)	+
Cows milk (boiled) less than	+
Germinated pulses or cereals(raw)	++
Germinated pulses or cereals (cooked)	+
Cabbage, fresh (raw)	+++
Cabbage, fresh (cooked)	+
Swede juice (raw)	+++
Potato (cooked not longer than 15 mins.)	+
Lemon juice, fresh	+++
Lemon juice, preserved	++
Tomatoes (raw)	+++
Tomatoes (canned)	++

To which may be added further observations by E.Marion Delf :-

- (1) That Kaffir beer is equivalent in anti-scorbutic factor to cows milk. These of course are both variable quantities as the Kaffir beer can be manufactured by 200 different methods (E.M.Delf) and Cows' milk varies with the diet of the cow.

- (2) That sweet potatoes are of slightly greater value even than ordinary potatoes.
- (3) That green maize has a fair anti-scorbutic value while that of pumpkins is very slight.

Methods of treatment at the Victoria Hospital.

Applying these principles the diets used at the Victoria Hospital, Lovedale, for cases of scurvy, are as follows:-

- (1) Diet A.S. (anti-scorbutic) for those who can take solid food.

Fresh milk (sweet or sour) fresh meat, potatoes (ordinary or sweet, boiled " in their jackets ")maize, beans, green vegetables as far as procurable, - maize porridge, bread and tea.

- (2) Diet S.A.S. (soft anti-scorbutic) for children and for those whose teeth are loose and gums fungating.

Fresh milk (sweet or sour), vegetable soup, potato-cream, pumpkin, green vegetables, maize porridge, bread and tea.

Medicinally all cases of scurvy get lemon juice containing much of the pulp and prepared by a cold process. This is obtained in bulk (50 gallon casks) from wholesale growers in the Transvaal. It is treated with a simple preservative which presumably lessens its anti-scorbutic value from +++ to ++ but clinically we have not noticed any difference between it and fresh lemon juice in the results obtained. The amount given varies. In adults bad cases get one ounce four

hourly in five ounces of water, ordinary cases half to one ounce three times a day, and milder cases two drachms three times a day. Children get from a half to two drachms four hourly or three times a day according to the age and the severity of the case. Where there is diarrhoea and vomiting the lemon juice is diluted with Dill water, equal parts, which seems quite sufficient to settle the gastro-intestinal disturbances. We have never found it necessary to decitrate the lemon juice with Calcium Carbonate and alcohol as advised by some.

Diluting the lemon juice with water seems sufficient to prevent over-acidity, and this is done as a routine, except in the cases in which it is combined with Cod Liver Oil Emulsion to provide the other vitamins lacking in the meagre home diet of the native people.

When oranges are in season babies and severe cases among adults are given a daily ration of orange juice, ~~which~~ while adults on A.S. diet get one or two fresh oranges a day in addition to the above régime.

We have noticed on the one or two occasions in which we ran out of lemon juice that diet alone is slow in effecting improvement.

#### Types of Scurvy with Age groups.

The 208 cases under consideration fall naturally into five classes with very marked differences.



<u>Patients.</u>	<u>Ages.</u>	<u>Number.</u>	<u>Recovered.</u>	<u>Died.</u>
(1) Adult men	20-80 yrs.	60	60	0
(2) Adult women	18-80 yrs.	33	33	0
(3) Children	4-14 yrs.	36	35	1
(4) Small children	1-3 yrs.	77	69	8
(5) Infants under	1 yr.	<u>2</u>	<u>2</u>	<u>0</u>
	Total	<u>208</u>	<u>199</u>	<u>9</u>

From this table it will be seen that the greatest sufferers are the small children of 1 to 3 years and the adult men. The small children are ~~shred~~<sup>hard</sup> hit by the limited diet as when they are weaned they are suddenly plunged into scorbutic conditions, and have no opportunity at all of fending for themselves. They are fed on maize porridge, maize water, maize itself and sometimes bread and tea (without milk). In this diet there is no anti-scorbutic element at all. The older the child the less it suffers from scurvy. In the class of children from 4-14 yrs. the majority of the cases and all the worst cases were aged 4, 5 and 6 yrs. while any over 8 yrs. were ~~very~~ rare. Only one was over 12 yrs. while no case at all was seen between the ages of 14 and 18 yrs. This is possibly due to survival of the fittest and possibly to the fact that the older children hunt around on their own for roots, berries and wild fruits, or perhaps because adolescent youth among these people seems to be extraordinarily tough (they suffer less on the whole from other diseases also than do adults and small children.)

Adult men are affected more than adult women to a very marked degree. Only about three of the women were so ill on admission that they could not walk, but for men to be carried in on stretchers is common. The main reason for this seems to be that the men contract the disease while away working at labour centres where the diet lacks anti-scorbutic elements. This may be due to the false economy of the employers who feed them or to the efforts of the men themselves to save their money and live as cheaply as possible or to the fact that anti-scorbutic food stuffs are simply not obtainable. The women, except those who go to service in the towns, stay at home and live on maize and beans, bread and tea. Any milk they can get from cows, goats or sheep is generally reserved for the children. The women, specially the heathen ones still adhere to their old custom of gathering herbs in the veldt and cooking and eating them. This probably helps to add to the anti-scorbutic value of their diet but in time of drought when the veldt is a uniform Khaki-colour even herbs are rare.

The fact that physical exertion precipitates scurvy probably has something to do with the excessive prevalence of the disease among men. The men are doing hard manual labour in mines, docks and on railways and haemorrhages into their leg muscles in particular are common and very marked. The women certainly work at home gathering fire-wood, carrying water great distances and building and thatching their huts but none of these activities are as arduous or long-

continued as the labour of the men. We have noticed however that the women come in greater numbers and with more marked scorbutic symptoms when rains have begun and they are doing heavy work hoeing in the fields. Cold and damp have nothing whatever to do with the causation of scurvy as some people have suggested as the people never work in the fields when it is actually raining and scurvy is not more frequent in cold weather than in hot.

Signs, Symptoms and Case examples of each Class.

(1) Adult men. A typical case is generally brought in an ox-wagon and has to be carried into the Out-patient department on a stretcher. The pain when his legs are moved is excruciating causing him to cry out whenever he is touched. The legs are extremely oedematous, twice their normal size in some cases, with here and there brawny hard areas specially in the calf muscles. Sometimes the whole leg is uniformly brawny and hard and swollen from hip to toes. The skin is shiny and tense and there are sometimes petechial haemorrhages in it and sometimes large discoloured areas from sub-cutaneous haemorrhages. In one or two cases there were haemorrhages into the gluteal muscles and into the muscles of the abdominal wall. The upper part of the trunk is not generally swollen. (cf. children) Swelling of the pinna of the ear or of the scalp has never been noted.

The gums are generally much swollen and fungating and of a typical purple hue. They bleed easily. The teeth are

loose and eating solid food is an impossibility. There is generally, but not always, a sero-purulent exudate from the tooth sockets. The breath is very offensive. The tongue is sometimes slightly swollen and often furred.

The eyes generally show marked xerosis of the conjunctiva but in none of these cases were there any subconjunctival haemorrhages. Impairment of vision is commonly complained of. There were no cases of epistaxis, haematuria, haemoptysis or haematemesis and bleeding from the bowel is very rare, except in children. (see Case 6). The heart is often affected in severe cases, being dilated, though without the production of murmurs. The pulse is rapid and small and attacks of syncope are not uncommon.

Dysenteric diarrhoea is rare in adults (see Case 6) constipation being more common. Secondary anaemia has been noted in some cases. The urine is generally free of albumin, though concentrated.

As the process of natural cure takes place the haemorrhages ~~es~~ into the muscles and round the joints are replaced by fibrous tissue. This results in stiffness of the muscles and fixation of the joints with great crippling, if not treated. Several patients have come to us, after the acute stage of the disease has passed off, with the entire musculature of their legs mainly replaced by fibrous tissue. They walk with difficulty or not at all and the joints are flexed and in some cases quite immobile. We find that the application of plain hot fomentations four-hourly while the

condition is in the acute stage tends to hasten absorption of clot and to prevent fibrous tissue formation. Also rubbing when the acute stage is past with Ung. Pot. Iod: is helpful. None of the patients so treated in the early stages have complained of any stiffness afterwards. The hot fomentations along with the rubbing and lemon juice and iodides internally have been our treatment for the late crippled stage and have been successful sooner or later in all the cases but one (see Case 22).

Case examples of Adult men: (a) typical cases.

Case (1). Enoch M- carpenter aged 70 yrs. On admission T. 99 P.104. Could not walk. Had a hard brawny swelling occupying the whole of the back of the left thigh, - very tender on pressure. Both legs below the knee were oedematous. The gums were fungating profusely, the teeth all loose and the mouth very foul. The bowels were constipated.

Treatment. Plain hot fomentations four-hourly to the legs. Boric and Alum mouth-wash 4 hourly. Gums swabbed with Hydrogen Peroxide three times a day. Tr.Opii for the pain and lemon juice half an ounce three times a day. Diet S.A.S. till teeth ~~were~~ firm then A.S. Results. After four days the pulse had settled to 80. The brawny swelling had disappeared in 10 days. The patient was allowed up in 14 days and could walk in 18. Left quite well after 25 days.

Case (2). Hlangani D- labourer aged 45. On admission T.100.8 P.120. Was newly back from work at a labour centre.

Could not even sit up, on admission. His body was oedematous up to the nipples and he had brawny swellings all through the muscles of both legs and even in the trunk muscles. The gums were fungating profusely and the teeth all loose. His heart was dilated, the apex impulse being felt in the 5th space one inch lateral to the nipple line. He was very breathless. His lungs were full of whistling rhonchi and coughing was painful to the trunk muscles. There was no albumin in his urine. Treatment. Foments to the legs and later rubbing. Tr. Opii for the pain. Lemon juice one ounce 4 hourly in one cup of water. Boric and Alum mouth-wash 4 hourly and Hydrogen Peroxide swabbing for the gums thrice daily. Diet S.A.S. and when the teeth were firm A.S. Ammon. Carb. cough mixture. Results. Improved rapidly. No dyspnoea after second day. Cough gone by the 4th day. Swelling of body and legs gone by the 10th day. Heart normal, apex impulse within the nipple line by the 13th day. Was allowed up. Walked home well on the 17-th day.

Case (3). Philip N- labourer aged 31. On admission T.98 P.98. Was just back from a labour centre. Unable to walk Both legs were swollen up to above the knee and the muscles were full of hard brawny masses, specially under the left knee. The gums were very swollen and bleeding and he could not chew. Treatment. Hot fomentations and later rubbing for legs. Tr. Opii for pain. Lemon juice half an ounce thrice daily. Diet S.A.S. and later A.S. Left well in 4 weeks time.

Case (4). Miselo M- office messenger, aged 60yrs. On admission T.98.2 P.80. Could walk but with great difficulty. Was past the acute stage. Legs had been very swollen, specially the left, but the swelling had disappeared. Gums also had been swollen and teeth loose but these symptoms were better. Muscles of left leg and to a less extent of the right, were tough and leathery and stiff, allowing of only the most limited movement. Attempted passive movement was very painful and also limited. Treatment. Hot fomentations 4 hourly to legs, followed twice daily by thorough massage with Ung. Pot. Iod. and passive and active movements. Lemon juice one ounce three times a day. Diet A.S. Results, Left well and walking freely after 32 days.

(b) Cases with complications:-

(1) Haematoma formation.

Case (5). James M- labourer, aged 46. On admission could hardly walk, legs swollen, gums swollen and bleeding, fluctuating swelling present over right scapula. This was explored and 100 c.c. of sanguineous fluid withdrawn. Treatment, Tr. Opii for pain. Lemon juice half an ounce three times a day. Diet S.A.S. and later A.S. Result. Left well in 17 days.

(2) Infected haematoma with marked anaemia and dysenteric diarrhoea.

Case (6). Cronje V- labourer aged 27. On admission T.100.8 P.96. Could walk. Large tender fluctuating swelling in epigastrium, aspirated and dark grumous pus withdrawn.

The swelling was then lanced and dark blood and pus evacuated. Streptococci found in pus. Patient had a marked secondary anaemia and a persistent dysenteric diarrhoea, passing a fair amount of dark blood in the stool. This would not yield to anti-dysenteric treatment but cleared up suddenly on lemon juice after about a fortnight's treatment. Treatment. Lemon juice half an ounce <sup>thrice</sup> daily and Ferri. Carb. Sacch.

Result. The abscess healed. The diarrhoea cleared up. The anaemia improved. The patient left hospital against advice but much improved, after 17 days.

### (3) Heart failure.

Case (7). James M- labourer aged 43 years. On admission T.97 P.124 R.48. Could hardly walk, extremely breathless and distressed: could not lie down. Feet and legs swollen and brawny <sup>but</sup> not definitely oedematous. Heart dilated, - apex impulse felt in the 6th space 2" lateral to nipple line. Oedema of both bases. Liver enlarged and tender. Gums swollen and bleeding. Treatment. Tr. Opii. Lemon juice half an ounce thrice daily. Digalen. Diet S.A.S. and later A.S. Result. Improved rapidly. Dyspnoea gone in 3 days. Swelling gone in 7 days. Allowed up in 10 days. Left against advice on the 14th day and walked home. Heart much improved. Apex impulse one inch lateral to nipple line and more in 5th than 6th space.

### (4) Tuberculosis of Lungs.

Case (8). Makehaste M- labourer aged 43. On admission T.100 P.112. Walked with difficulty, legs swollen, hard and



brawny below the knees. Gums swollen and bleeding. Was coughing and breathless and had pain in the chest. Right apex involved. Sputum T.B. +ve. Ran an irregular temperature up to 101° for 5 weeks, finally settled to normal with open air treatment. Treatment. Lemon guice half an ounce three times a day. Sedative cough mixtures. Diet A.S. open air treatment. Result. Left, scurvy cured, lung improved, after 6 weeks.

(4) Papular eruption simulating secondary syphilis (one case of this occurred among the men and one among the women).

Case (9). Clifford K- labourer aged 25. On admission temperature and pulse normal. Could walk with difficulty. Legs swollen and painful, arms painful. Pains said to be worse at night. Gums very swollen. He had a papular eruption uniformly distributed all over his body, also many petechial haemorrhages. Slight gland enlargement in left axilla and under the chin. Wassermann taken, result negative. Treatment. Lemon juice half an ounce three times a day. Hot foment to leg. Liq. Arsenicalis. Diet A.S. Result. Rapid improvement. Rash faded, pains improved. Left well on the 16th day.

As will be seen by the quick recovery of Case(2) where much larger amounts of lemon juice were given the response to treatment is instantaneous and almost miraculous in its rapidity. They all, without exception, respond to lemon juice.

(2) Signs, Symptoms and case examples in Adult women.

(a) Typical cases with fungating gumms and swollen legs are rare among the women. Most of them show only slightly swollen gums and marked xerosis of the conjunctiva. They complain of severe pains in the legs, back and shoulders. The two following are the most typical cases among the women.

Case(10). Lina B- housewife. <sup>aged 50</sup> On admission Temp. and pulse normal. Could walk but with great difficulty and much pain. Both legs swollen up to the knees. Calves of legs hard and brawny and very tender. Gums fungating badly, teeth loose, breath offensive. Bowels very constipated. Treatment. Ol. Ric. Lemon guice half an ounce three times a day. Hot fomentis to legs and later massage. Tr. Opii for pain Diet S.A.S. plus two oranges daily. Boric and Alum mouth-wash four hourly. From 16th day diet A.S. Result. Swelling all gone by 10th day, - up and walking on the 18th day. Left well on the 22nd day.

Case (11). Nosingile N- housewife aged 21 years. On admission could not walk. Both legs very painful but only ~~the~~ left leg swollen. Swelling extreme from hip to toes and very hard and brawny throughout, and excessively tender to touch. Gums slightly swollen. Pains in shoulders and small of back. ~~Is~~ Nursing a baby of 6 months which is quite well. Treatment. Hot fomentis to leg and later massage with Ung. Pot. Iod. Lemon juice half an ounce 4 hourly. Tr. Opii for pain. Result. Swelling gone on 19th day and rubbing commenced. Up On 24th day. Left well on 26th day.

The next shows the crippling that results from an untreated case :-

Case (12). Nonana P- Housewife, aged 38. Had been ill 3 months at home. The legs had been very swollen but the swelling had gone down. On admission patient was totally crippled. Both legs were stiff and contracted, the knees being flexed to a right angle. The muscles were wasted, tough and leathery and the joints almost immobile. Passive movement was limited and extremely painful, - active movement was ~~painful~~ impossible. There were aching pains in the legs even when lying still. Her gums were almost normal. She, unfortunately, would not drink milk even if she could get it.

Treatment. Diet A.S. Iodides and lemon juice half an ounce three times a day. The legs were fomented four hourly and massaged morning and evening with Ung. Pot. Iod. During the massage passive movements were attempted and the flexion gradually undone. At night the legs were firmly splinted in as extended a position as could be managed. Result.

After 2 weeks the muscles were softening and the legs could be almost completely straightened. After 25 days she could walk a little with sticks and after 39 days she walked home 12 miles without difficulty.

(b) Cases with complications:-

(1). Uterine. Complications in women are also rarer than in men. It is however noticeable that women with scurvy

even to a slight degree, have more pain at the menstrual periods than normal, though I have never known the menstrual flow to be excessive from that cause. Labour however is apt to be prolonged and more trying to the patient and post partum haemorrhage is very common, probably due to haemorrhage <sup>in 15</sup> ~~with~~ the uterine muscle preventing efficient contractions. Involution of the uterus is also delayed and there is tenderness of the fundus without any of the accompanying signs of sepsis.

Case (13). Maud M- (same family as case(1) ) aged 23. Housewife. Primipara. Brought into hospital on the 4th day of labour, very tired. Abdomen very tender, - could hardly bear palpation. Gums scorbutic, xerosis of the conjunctiva. No swelling of legs but pains in them. On vaginal examination the os was only  $2/6$  dilated and the presenting part (vertex R.O.A.) was high. The second stage was not reached till 2 days after admission, 6 days after labour pains started. Forceps were applied and the child delivered alive. The loss was considerable. Both did well except that the uterus involuted slowly and remained tender for nearly two weeks. Patient's temperature and pulse were slightly raised for 3 days but the lochia remained normal. Treatment. Lemon juice half an ounce thrice daily, A.S. diet. Result. Patient left well on the 21st day from admission.

(2) Heart failure

Case (14). Sophia M- aged 28. Housewife. On admission could not walk, legs very swollen and with brawny tender

areas. Gums swollen. Buttocks, back and hands oedematous. Ascites present. Heart dilated, apex impulse in the 7th space  $1\frac{1}{2}$ " lateral to nipple line. Liver enlarged and tender, 2" below costal margin. Very breathless. P.110 on admission. Ran a swinging temperature for over 2 weeks. Treatment. Tr. Opii and lemon juice one ounce thrice daily. Diet S.A.S. Orange juice one ounce 4 hourly. Digitalis and Nux Vomica. Result. Gradually improved. No dyspnoea, no swelling, and ~~xx~~ practically no ascites after 2 weeks. Pulse down to 76 after 4 weeks. Up and walking about after 5 weeks. Left well after 6 weeks. Heart, apex impulse in 6th space within the nipple line. Reported about 2 months after leaving hospital, no breathlessness even on exertion. Heart apparently normal.

(3) Papular eruption simulating Secondary syphilis.

Case (15). Louisa R- housewife aged 26. On admission unable to walk. Legs and feet very slightly swollen with a few brawny areas but stiff and weak. Gums fungating. papular eruption symmetrically distributed all over body. Wassermann taken - report negative. Treatment. Tr. Opii. Lemon juice half an ounce thrice daily. Result. Rash faded, pains subsided. Left well on 8th day.

Two cases of hemiplegia occurring during labour have come under my notice, but do not unfortunately come into this series. These were presumably from scorbutic haemorrhage but in the first, which was fatal, syphilis was also present. The other was treated in hospital during this

12 months, 3 months after haemiplegia occurred. She had almost recovered the use of the right side of the body and was improving rapidly. She only showed slight signs of scurvy when in hospital.

Signs, Symptoms and case examples in children.

Children have mainly the infantile type of scurvy identical with the description given by John Thomson. "Infantile scurvy is a state of perverted nutrition which affects all the tissues and organs more or less, arresting growth and leading to anaemia, local oedema and haemorrhage". The most striking feature of the disease among our cases was the extreme oedema. The children's legs were swollen to twice their normal size and more, the skin being tense and shiny and giving way in places. Their arms and hands were similarly swollen and their faces puffy and the eye-lids so oedematous that they could not open their eyes. The external genitals in male children are very distended and they frequently have difficulty in micturition. The swollen limbs are so excessively painful that the child ~~cries~~ cries on being touched and cannot move at all. It has to be turned over in bed at regular intervals to prevent one side from becoming much more oedematous than the other.

Haemorrhages are not so marked they chiefly take place in the loose tissue of the eye-lids and when the swelling subsides a little the child has two "black eyes". It is possible that haemorrhages occur beneath the periosteum but the general

oedema is so marked that it is difficult to make out definite areas. There is also haemorrhage by the bowel, just streaks of blood in the loose green slimy stools.

The skin is very typical in these cases. In some it is simply dry, shiny, tense and thinned out, with discoloured areas from sub-cutaneous haemorrhage. Lips dry and cracked and both lips and gums bleeding. In the more severe cases the epidermis actually peels off in large areas especially over pressure points, chiefly the buttocks back and legs and large raw areas, generally ~~septic~~, <sup>are</sup> and common. Presumably this is due to deficient nutrition of the skin stretched over extensive oedema.

The child is anaemic and breathless and there is a tendency to heart failure in the severe cases. The deaths have all been attributable ultimately to heart failure.

There is generally a rise of temperature, not always marked.

Neither epistaxis nor haematuria nor haemorrhage into the orbit causing proptosis, have been seen among these cases. In no case was albumen found in the urine.

The gums do not generally fungate in children, but are (~~generally~~) swollen and encroach on the teeth causing them to look short and not properly erupted. Before teeth have come there are no signs in the gums.

Dysenteric diarrhoea with frequent watery green stools, containing mucus and often streaks of blood, is an almost

universal feature of the condition.

Very frequent complications are bronchitis and broncho-pneumonia. These clear up rapidly along with the other signs and symptoms on lemon juice treatment.

Most children recover without the least sign of crippling from fibrosis, but in two cases, both girls of 7, severe crippling resulted from haemorrhages in and around the knee joints. One small boy aged 7 limped from stiffness of the muscles of one leg for some time after his scorbutic symptoms had died down, and was brought to hospital for that.

(3) Children 4 - 14; Case examples.

In this group three things are noticeable (1) that the majority were under 6 years (2) that there were more girls than boys and the girls were much worse. (3) The severe cases were all amongst the younger children of 4 - 6 years. The only death in this group was a girl aged 5. Case (16). Violet R- aged 5. On admission T.100. P.128. Ill for 2 months at home. No milk for many months. Whole body much swollen. Could not move. Could not open her eyes for oedema. Skin peeling off in patches on thighs and buttocks. Gums swollen and bleeding. Lips cracked. Breathless on being moved. Could scarcely be got to swallow either food or medicine. Frequent watery green diarrhoea. Incontinence of both urine and faeces. Tongue furred. Heart slightly dilated. Treatment. Brandy. Orange juice lemon juice, Bengers, rectal salines (not retained.)



Result. Died on the 4th day from admission.

Case (17). Lillian M- aged 5. On admission T.98. P.124.

Ill 2 months at home. No milk for long. Whole body swollen: face very puffy : eye-lids too swollen to open. Large raw areas over buttocks, thighs and back and round ankles. Could not move her legs at all or sit up alone. Could move her arms. Haemorrhages into eye-lids very marked. Frequent dysenteric diarrhoea. Treatment. Lemon juice one drachm three times a day. S.A.S. diet. Zinc ointment to sores.

Result. Recovery rapid. Could sit up on the 3rd day. Swelling quite gone on the 8th day. Could walk feebly when removed on the 13th day.

Case (18). Lizzie B- aged 4. On admission T.99. P.96.

Face, hands and legs swollen. Ill for one month at home. No milk for long. Frequent diarrhoea, stools green with mucus. Gums swollen. Skin tense and shiny.

Treatment. Lemon juice one drachm three times a day. Diet

S.A.S. Result. Good recovery. Swelling gone in 5 days.

Left well on the 18th day.

Case (19). Nontombi M- (girl) aged 7. On admission T.96.6

P.104. Whole body swollen specially face and feet. Ill for 6 weeks at home. No milk for long. Mouth very sore.; gums swollen and ulcerating and offensive. Watery diarrhoea, stools green shiny and unhealthy. Had bronchitis as well.

Treatment. Lemon juice one drachm thrice daily. Cod liver

oil Emulsion one drachm thrice daily. Mist. Am. Carb.

Diet S.A.S. Result. Swelling went down rapidly - gone by the 7th day. Patient remained weak for a long time however.

The sores in the mouth did not clear up for 2 weeks (on Hydrogen Peroxide and Glycerine and Borax). Left well at the end of 4th week.

Case (20). Stapleton N- (boy) aged 4 years. On admission T.99.8 P.118. Ill for one month at home. No milk. Legs and arms swollen. Lips cracked and bleeding ; gums swollen. Copious diarrhoea, green, with blood and mucus and undigested food. Very ill on admission, developed meningismus, had 2 epileptiform fits. Treatment. Lemon juice one drachm four-hourly. Orange juice two drachms 4 hourly. Diet, first Bengers then S.A.S. Saline bowel wash-outs.

Result. Swelling gone after 7 days. Stools normal after 14 days. Temperature normal after some variations on the 19th day. Left well on the 38th day.

The next two cases are the girls of 7 with crippling as a sequela.

Case (21). Florence M- aged 7. Ill three weeks at home. No milk for long. Both legs swollen below the knees.

Marked effusion into the right knee-joint which was very swollen and acutely tender. There was also some swelling of the left knee joint. Gums very red and swollen and bleeding.

Treatment. Hot Mag. Sulph. fomenta to knees. (As this was the only thing that relieved the pain they had to be continued for 4 weeks.) Lemon juice two drachms thrice daily.

Iodides and massage after the acute stage was past.

Result. Swelling of legs gone in 7 days. Swelling of knees persisted for 3 weeks and pain in them for 4. The knees both were stiff after the swelling had gone down and it took another 4 weeks of massage with active and passive movements to bring them back to normal. Left well 8 weeks after admission.

Case (22). Nondilili M- (girl) aged 7 yrs. Ill 3 months at home. Legs had been much swollen at home, especially the knees. On admission the swelling had almost gone, but the knees were excessively tender and stiff. The muscles of the calf too were leathery and stiff. The pain in the knees was severe even without moving, and attempted passive movement could not be borne. Gums were very swollen.

Treatment. Orange juice two drachms 4 hourly. Lemon juice one drachm thrice daily. Iodides. Fomenta and massage with Ung. Pot. Iod. Splinting in extended position (as far as it could be attained) at night. No improvement in position but pain slightly less. Put up in double extension for 8 weeks, <sup>with</sup> and daily massage, to try to straighten knees: very little improvement in position but pain quite relieved. Finally knees were straightened by forcible moulding under general

anaesthesia and put up in Plaster of Paris for 3 weeks. Then massage and active and passive movements were recommenced and patient gradually recovered the power of walking. She could run 6 months after admission.

(4) Small children 1 - 3 yrs. Case examples.

These were much the worst sufferers both as regards number and mortality. There were 77 cases and 8 deaths and most of the cases were severe. Without exception they had recently been weaned and the shock of the change of diet from breast milk to maize brings on the symptoms suddenly and acutely after 3 or 4 months of the new régime. For obvious reasons the native women nurse their babies for as long a period as possible - in some cases only weaning them at the end of the second year. Though the anti-scorbutic (~~Mother's~~ ~~must, of necessity, be very low~~) quality of the breast milk in a scorbutic mother must, of necessity, be very low it seems to be enough to keep the children free from symptoms in almost every case.

The type of scurvy from which these tiny children suffer is the usual infantile type, described for the previous group. In no case however has crippling resulted. Deaths are apparently due to utter exhaustion and heart failure. The chief complications were bronchitis and broncho-pneumonia. The out-patient records of the hospital show whooping cough to be a serious complication of scurvy, very trying to the

child and dangerous to life.

Case (23). Alice L- aged 2 years. On admission T.99.6  
P.128. Weaned three months ago, no milk at home. Whole body  
very swollen; eyes could not be opened for oedema of lids.

Epidermis coming off in patches over buttocks and legs.

Gums swollen. Could not move either arms or legs. Constipa-  
ted; stools however green with mucus and streaks of blood.

Treatment. Lemon juice one drachm thrice daily and orange  
juice one drachm 4 hourly. Diet S.A.S. Result. Pulse was  
very feeble for 2 or 3 days and swollen limbs very cold.

However improvement once started was rapid. In a week she  
could sit up and the swelling was quite gone in 10 days.

She went home, able to walk, on the 21st day. News of her  
came 2 months after her discharge and she was said to be  
very swollen again.

Case (24). Caroline K- aged 18 months. On admission T.99.6

P.100. Weaned 5 months ago, no milk at home. Legs swollen  
and painful, arms not so bad. Skin coming off legs arms and  
ears in large patches leaving pink raw surfaces. Mouth very  
sore; gums red and swollen; small ulcers all over tongue

gums and buccal mucous membrane. Was teething. Dysenteric  
diarrhoea, - loose green stools. Treatment. Ol. Ric. Lemon  
juice one drachm thrice daily. Zinc ointment to sores.

Diet Bengers and later S.A.S. Glycerine and Borax for mouth  
and swabbing with diluted Hydrogen Peroxide.

Results. Temperature remained up for first 3 days. Recovery was slow. Could not sit up till end of 2nd week. Swelling however was all gone in 10 days. Could walk feebly after 4 weeks in hospital. Left well after 5 weeks.

Case (25). Ndoda S- (boy) aged 18 months. On admission T.96. P.126. R.40. Weaned 6 weeks:whole body swollen. Face puffy, could hardly open eyes. Cried on being touched. Had acute conjunctivitis and acute pharyngitis. Gums swollen and bleeding, lips cracked. Vomiting. Stools loose and green with mucus. External genitals very oedematous : difficulty in micturition. Pulse very feeble. Could not sit up or move limbs. Skin coming off in patches on buttocks, arms and ears. Treatment. Orange juice two drachms 4 hourly. Lemon juice one drachm thrice daily. Brandy, Strychnine hypodermically and Digitalis. Diet, Bengers and milk.

Result. Patient got rapidly weaker and died on 4th day after admission.

Case (26). Lennox M- (boy) aged 2 years. On admission T. 101.2 P.138. R.46. Weaned 4 months. Whole body swollen and painful. Lips cracked, gums swollen. Coughing from broncho-pneumonia. Diarrhoea - watery yellow stools with mucus. Epidermis peeling off over buttocks : pressure sore on scalp, right side at back. Treatment. Lemon juice one drachm thrice daily, cough mixture etc. Diet S.A.S.

Result. Temperature fell to normal on 13th day from admission

and chest cleared. Swelling disappeared gradually - gone by 14th day. Was very weak for some time but could walk by the time he was discharged 6½ weeks after admission.

Infants under a year. Case examples.

In this class are only two, as native babies are always breast fed unless the mother dies, in which case the baby seldom survives long. One of these was hand-fed and the other breast-fed. The latter case is almost unique, an infant of 5 months on the breast developing typical signs of scurvy. The mother was in very poor condition - thin and anaemic though with only mild symptoms of scurvy, gums swollen and pains in legs and shoulders but no swelling of body. Her milk however was very scanty.

Case (27). Lina S- aged 5 months. On admission T. 97 P.100. On breast, but mother's milk very scanty. Has been given supplementary feeds of Maizena made with water. Body very swollen, especially legs and arms to a less extent. Face puffy. Cries when touched. Does not move its limbs easily. No diarrhoea. Treatment Breast milk increased by feeding up mother on A.S. diet; extra milk and lemon juice. (~~ONE drachm thrice daily~~) The baby itself got orange juice one drachm thrice daily, and lemon juice with Cod Liver Oil Emulsion two drachms thrice daily. Result. Baby gained <sup>1.0</sup> 1/1b. 12/oz. in 4 weeks. Swelling disappeared in 5 days. Both left well after 5 weeks in hospital. Reported 8 months

later. Lina was a fine big child, fat and firm. A cow had calved at her home while the patient was in hospital so she had been able to remain free from scurvy on her return.

Case (28). Nokupila G- (girl) aged 10 months. On admission T.97.8 P.100. Hand-fed from birth mainly on maize water and porridge and a little milk for the first few months -none latterly. Has had swollen limbs for 5 months. Swelling less on admission than it had been. Gums were very swollen - but she was teething. Cried constantly. Diarrhoea - loose green stools with mucus. Treatment. Ol. Ric. Lemon juice and Dill water equal <sup>a</sup>parts, one drachm 4 hourly. Diet milk and Potato-cream. Result. Removed against advice 6 days after admission much improved. Swelling gone.

#### Conclusions.

- (1) That the normal diet of the natives of this area is so poor in Anti-scorbutic elements that they live in a state of mild latent scurvy. This tends to make them less physically and mentally fit than they would otherwise be. It also lessens their resistance to other diseases, Tuberculosis, Enteric Fever etc.
- (2) Drought deprives them of practically all the Anti-scorbutic factor that exists in that diet, viz:- milk and green food-stuffs.
- (3) The greatest sufferers are (1) the adult men, who, most of them, are at work in labour centres and (2) the newly



weaned children (1 - 3 yrs) who undergo a sudden change from a mildly Anti-scorbutic diet (breast milk) to an absolutely scorbutic one.

(4) The deaths that occurred were all among children and all save one in the class 1 - 3 yrs. Heart failure was the ultimate cause of death in every case.

(5) There was a conspicuous absence of cases amongst adolescents; no cases at all occurring between the ages of 14 and 18, and only 2 between 12 and 20 years.

(6) Physical exertion precipitates the symptoms. A man may be apparently well and pains and swelling come on as soon as he starts heavy work.

(7) Some points that I have not found mentioned in text-books are as follows:-

- (a) In untreated cases among adults and older children fibrosis of the muscles and around joints takes place after haemorrhages by the natural process of healing. This causes crippling.
- (b) In parturient women scurvy tends to cause prolongation of labour and post-partum haemorrhage.
- (c) In small children with marked oedema the destruction of large areas of epidermis (in some as large as the palm of the hand) is common, raw septic surfaces being produced.
- (d) In small male children the extreme oedema of the external genitals is of fairly frequent occurrence.

The prepuce is so swollen that difficulty of micturition results and even absolute retention in some cases.

(8) That lemon juice half an ounce three times a day will cure any adult case in the course of 2 to 4 weeks. But the larger the amount of lemon juice given the more rapid the cure.

(9) Hot fomentations applied to the haemorrhagic swellings in adult cases and rubbing with Ung. Pot. Iod. after the swelling has gone down, prevents fibrosis and the resultant crippling.

