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31. With ink cover.

Thesis
on
Scurvy.

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Scurvy was endemic in all the Northern Countries of Europe two centuries ago, but gradually became less frequent as agriculture advanced. It is doubtful whether the Greeks or Romans knew any thing of this disease: and the description of that, which is supposed to be Scurvy, as described by Hippocrates, is so vague that much doubt is cast upon its really being Scurvy.

The earliest unmistakable description of this disease is to be found in the Narrative of the Campaign of the Christian army in Egypt under Louis IX about the year 1260.

It occured during Lent when the soldiers, on account of their religion, were denied meat, and had only one kind of fish — this along with bad air and scarcity of water is supposed to have caused the disease.

But Scurvy had existed long before this. Olaus Magnus, in a book published in 1555, when speaking of the diseases of Northern nations, describes Scurvy, and adds that it infested prisons and besieged cities. About the same time three physicians, Roussens, Bethius, and Wierus described Scurvy. In 1645 the Faculty of Medicine at Copenhagen published a "Consilium" which shews that at that time Scurvy was common among the Danes and the other Northern nations.

But it was during seasons of scarcity, that Scurvy caused the greatest havoc — following the March of Armies, and breaking out in besieged cities. In 1625 during the siege of Breda, in North Brabant, by the Spaniards, the inhabitants and garrison were afflicted with Scurvy:

during one part of the Siege it was reckoned that 1808 persons were suffering from it, and, as the Siege was prolonged, this number was increased. In 1703, during the Siege of Thorn 5000 of the garrison, besides a number of the inhabitants, died of this disease — the besiegers however were quite free of it. In 1795, Scurvy was general among the French soldiers of the Army of the Alps, and there were between 700 and 800 affected with it. During the Siege of Alexandria by the British in 1801, the French received into their hospitals 3500 scorbutic patients, and the siege only lasted from May to the end of August.

Scurvy has also occurred in Asylums and Prisons; in the Milbank Penitentiary in 1823, in 1838 in the County Gaol in Norwich 18 persons were affected by it, and so late as 1847 it occurred in Perth prison. But it has chiefly been in long sea voyages that Scurvy has caused its greatest ravages. One of the earliest accounts is that of Vasco de Gama in 1497, who, out of 160, lost about 100 men

In Lord Anson's voyage in 1740 and the 4 following years, we find that in the first two years only, a larger proportion than four in five of the original crew were lost. In 1780, the disease was very common in the Channel fleet as described by Trotter, of which we shall speak at greater length when we treat of its Causes and Prevention.

The symptoms of Scurvy are very numerous: among the first there is a longing desire for fresh vegetables, and the face of the patient is characterised by a peculiar sallowness. There is great listlessness evinced by the patient, with languor and despondency; the countenance appears as if it were bloated, and the eye is heavy and dull. The patient is readily fatigued, and he even feels wearied after sleep. This is accompanied by a tender, swollen, and ulcerated state of the gums, with loosening of the teeth impeding mastication. The lividity and sponginess are always limited to the gums, and cease abruptly at

the reflexion of the lips; the lips, contrasting greatly with the gums, are extremely pale, and present the same appearance which they have in Chlorosis. The skin over the whole body, but especially on the legs, feels dry; in many it is rough producing the cutis anserinus or goose-skin. Though the skin is generally dry and rough, yet over the swollen parts, as the calf of the leg, it is smooth and glazed. One of Dr. Budd's patients was troubled with profuse sweating for which nothing in his previous history could account, lemon juice appeared to increase the perspiration, which was followed in two days by sudamina all over his chest. Painful swellings arise in the joints - especially in the calf of the leg - with subcutaneous, intermuscular, or subperiostial ecchymosis: this is also seen on other parts of the body, least frequently of all is it noticed on the head and face. Some have no swelling on the calf of the

leg, but it becomes as hard as a stone; in others, again, there are hard swellings in different parts of the leg, which are very painful. These effusions according to Dr. Budd are chiefly of the fibrinous part of the blood; the skin covering these parts is thickened, and also attached to the cellular tissue below it, so that a fold of it cannot be raised up. Contraction and stiffness are not limited to the knee joint, but occur in others as in the elbow. In one case, which came under Dr. Budd's observation, there was neither contraction nor swelling in the calf, but the feet were extended, and the heels consequently drawn up, so that when the patient attempted to stand his toes only touched the ground. In certain cases the skin over the indurated parts preserve their natural color, owing (Dr. Budd says) to the effusion being beneath the fascia, nevertheless the skin is thickened and brawny, and at the

same time, adherent to the parts beneath. In some patients pain is present in all their bones, severest in their limbs, although very frequently pain is also confined to some part of the breast, which is aggravated on coughing. It is the effusions between the periosteum and bone that cause the pain from which scorbutics suffer. The effusions never suppurate, and, even when situated between bone and periosteum, do not lead to exfoliations of the bone. These node-like swellings occur most frequently on the tibiae, and also in a certain number on the parts of the jaw. The pains are more severe when the patients walk; and, in the advanced stage of the disease, the mere turning in bed, or attempting to move the painful limbs, renders the suffering all but intolerable. The bowels are generally loose, although we may have them regular or costive. Pulse varies — it is, however, usually slower and feebler than in health. Though the patient is generally

chilly, the pulse, especially when the disease is far advanced, may arise to 120 per minute, and frequently also the skin is hot. It is to an inflammatory action that this fever is referred. The spots in scurvy are flat, and on a level with the skin: we notice at times dry scurf and scales, as well as small eruptions of the dry miliary kind. These petechiae are generally small, and circular, and each has its centre at the point where a hair emerges from the skin. Bruised like spots also appear of various sizes, some as large as the palm of one's hand; they are not the result of a blow, or at least of one sufficiently severe to attract the patient's attention, and they are chiefly situated at the site of an old injury or ulcer. The urine is generally high coloured, it however varies.

In an advanced stage there are contractions of the tendons of the ham, and consequently the patient cannot use his limbs. After long confinement

they are so weak that they are apt to faint upon the least movement of their bodies. At this advanced stage of the disease the patients are liable to frequent and large bludings — from the lungs intestines or other parts of the body.

The gums besides being swollen and painful, have a bad smell; sometimes they are gangrenous. Even up to this stage the appetite of the scorbutic patient is good, and their senses are entire. Sir Gilbert Blane states that they sometimes suffer from a weakness in their eyes; which is so far corroborated by Dr Budd, that one of his patients complained of this, and said that everything appeared green to him: this took place a week before his death — we may add that this patient was not only highly scorbutic, but also dropsical from organic disease of the kidney.

The inspirations are generally quickened at an advanced stage of the disease; this quickness of the inspiration is pe-

-quently associated with quickness of the pulse. If a scorbutic individual has any ulcers or wounds they assume a peculiar aspect: at first the discharge from them is thin and sanious, it then coagulates and forms a crust over the ulcer, which can be removed — but with difficulty. If we do separate the crust, the ulcer may again bled, but the crust is very soon formed. The ulcer beneath is soft and spongy, and at its edges livid granulations sprout up. The slightest wounds and scratches are apt to degenerate into these ulcers, and all eruptions assume a livid aspect. The ulcers may continue long without affecting the bones, except in very severe cases: and ulcers formerly healed may break out afresh. Some sink from profuse evacuations of blood by stool or by urine; in some we have substernal pain, more frequently it is in one of the sides: in others re-

-spiration becomes laborious, and death often suddenly and unexpectedly closes the scene. The symptoms (it may be be added) have no mutual dependence on each other, and they are not confined to any certain order; if the patient has lately had a fever, or any tedious illness, the gums generally are first affected: or again if he has old ulcers on his legs – which is very common among seamen – the legs commonly are first attacked, and the ulcers put on the true scorbutic type.

Lind states that Scurvy has been ascribed to the action of sea salt on the system, also that the absence of fresh vegetables from the food for any length has caused it, and thirdly from something noxious in the confined air of a ship, and particularly the stagnation of the bilge water. He denies the existence of these as being causes of it: stating in regard to the first that he found no

difference in his patients to whom he gave no medicine from those to whom he gave salt water. But on the other hand he does not believe that salt flesh is equally innocuous; in the former case he says the salt escapes by the urine, but in the latter case even the act of digestion cannot separate the salt from the flesh and that consequently it is not so nourishing. In regard to the second supposed cause alone causing Scurvy, he shews that in vessels which had been to Sea for three months and in which the crews had not eaten vegetables, Scurvy did not break out, & in contrast to this he had seen Scurvy break out when he had been left time at Sea. Accordingly he says that tho' the want of fresh vegetables must be admitted as a strong predisposing Cause, yet there must be stronger Causes than this. The third Cause mentioned above is easily disproved; for, according to Lind, Carpenters and others most

exposed to its effects, do not suffer from them the most. Scurvy has broken out in a ship well ventilated and kept perfectly clean, and on the other hand we have examples of the perfect cure of Scurvy in the impure air of ill-ventilated vessels, e.g. in the attempt to conceal a number of sick on board the Guernsey from the visits of the Offices of health, the sick were confined in the Captain's store-room where there is probably worse air than in any other part of the vessel, and in spite of all this the men recovered without being landed. According to Lind the chief predisposing cause is the moisture of the atmosphere. He has observed Scurvy to occur during a continuance of cold, rainy, and thick weather; and again, he has noticed that Scorbutics are generally worse after they have experienced great rains or foggy weather, and that the symptoms were mitigated as the weather became dry and warm.

Cold is a second predisposing Cause, and the combined action of the two preceding are according to Lind the most powerful predisposing cause. In the northern parts of Russia, in Iceland, and in Greenland the hard winters, and the diet of the poor are the predisposing causes; while in the Low Countries it is owing to the damp and marshy nature of the soil; but even in the latter case Cold must have had its share in causing the disease, as we find that Venice has not suffered from it, though it is as damp as most places. Lind also states that when the situation in sea port towns is damp Scurvy breaks out, while in the neighbouring villages where the soil is dry Scurvy is unknown. Those who live in the top-flats of houses are not so subject to it, as those who live on ground floors. The state of the body affects a great deal the predisposition of individuals to this

disease; those weakened by fevers, and other debilitating diseases are prone to Scurvy, as well as those in whom some one of the secretions are suppressed, as that of menstruation in women.

A well-marked epidemic of Scurvy occurred in Perth prison in the year 1846: and the result of this has been an article from the pen of Dr. Christison, who, in conjunction with Dr. Maclagan, was sent to investigate its cause.

Prof. Christison's paper attempts to prove that the epidemic was owing to the deficiency of animal azotised food, and chiefly to the substitution of treacle for milk; we have also a second paper from the same writer on the Scurvy as it occurred among the citizens of Edinburgh, and among the labourers working at the several railways near and around Edinburgh, and which he also thinks bears out his theory.

The disease in Perth prevailed to a much larger extent among the males than

among the females, it attacked the adult in preference to the young, and the influence of previous length of confinement was a strong co-operating circumstance – this however acted mainly on their longer exposure to a dietetic cause, but at the same time he allows that long confinement is a strong predisposing cause. Constitutional infirmity favored the development of Scurvy: errors in diet will cause scurvy altho' the patient has been engaged in active employment, and breathing pure air.

The diet of the Perth prisoners was saccharo-farinaceous. The breakfast of the greatest number of males (highest rate) consisted of 8 ounces of oatmeal made into porridge with salt and water, and 15 fluid ounces of treacle water containing 1½ ounce of treacle. Supper consisted of 6 ounces of oatmeal made into porridge, and 10 fluid ounces of treacle water containing ¾ ounce of treacle. On four days of every week they had for dinner

12 ounces of wheat-bread, 2 pints of barley broth which contained 1 ounce of meat, 4 ounces of barley, 2½ ounces of turnips, carrots, cabbages, leeks and onions with a due proportion of salt. On one day of every week each prisoner instead of barley broth had 2 pints of pea soup, containing 4½ ounces of peas, 1 ounce of meat, 1¼ ounce of succulent fresh vegetables duly seasoned with salt and pepper. On another day dinner consisted of 12 ounces of bread, 2 pints of barley milk made with 4 ounces of barley, 10 fluid ounces of skimmed milk and a little salt. And on another day there was the same quantity of bread and 12 ounces of white fish. The food of the Scotch labouring classes consists of oatmeal, barley, potatoes, occasionally bread, with a moderate proportion of milk, and Prof. Christison naturally says that as this diet is simple all its constituents must be important and that none can be withdrawn without

the substitution of other food of similar composition. It seems that during the two years 1842 till 1844 treacle had been substituted for milk without any bad consequence. On the other hand in 1846 when treacle was again given for milk scurvy broke out, and one writer accounts for this by stating that in the latter case circumstances had arisen which rendered the treacle diet unsuitable, and as no other cause could be found he blames the substitution of the treacle for the milk. Fresh vegetables in the prison diet as above shewn, tho' not abundant, were not wanting, and the best proof was that when milk was given the disease was arrested and cured without the use of any other anti-scorbutic as lemon juice or oranges, or the addition of any more vegetables than they had hitherto received in their food: all the patients unequivocally stated that their symptoms decreased

within a very few days after the alteration of the diet. Prof. Christison accounts for the long time which elapsed between the change of diet and the appearance of Scurvy — a period of 14 months — by stating that as the food was not deficient in quantity a long time and concurring circumstances were necessary to produce the disease, and he says that scurvy might never have appeared had there not been some co-operating cause which he hints might have been the unhealthy epidemic constitution, which at that time prevailed throughout Scotland. Prof. Christison states that according to prison dietaries 20 to 25 ounces of dry nutriment combine economy with wholesomeness: that in that respect the Perth prison diet was not faulty, as it contained 24 ounces of nutriment. Again that the nitrogenous constituents in the several healthy dietaries vary from 4 3/4 to 6 ounces, and that even in this respect the general prison diet was not absolutely in error as it contained 4 3/4 ounces. But we find a difference in

the two dietaries when we compare the particular nitrogenous principles found in each. In the former animal casein, vegetable albumen and the Nitrogenous principle of muscular fibre - one or more - amounted from 1½ to 2⅓ ounces, while in the latter it amounted only to ⅔ of an ounce. And according to Christison this deficiency cannot be made healthy by the substitution of gluten which constituted 4 ounces of the nitrogenous nutriment in the prison diet previous to the appearance of Scurvy. This difference he adds, is not so little as might at first sight appear, for, if his theory be the correct one, the faulty diet contained less than one half of the lowest quantity and scarcely one third of the average contained in the healthy dietaries; and lastly that in all the epidemics of Scurvy in Britain, which have lately occurred, and which have been so minutely described as to allow an analysis of the diet, a similar de-

-ficiency has always occurred.

In Prof. Christison's second article we have the disease as it occurred in persons living in Edinburgh, as well as in its neighbourhood. The epidemic constitution previously mentioned was evidenced by a tendency to non-infectious acute diseases as diarrhoea on the one hand and pneumonia on the other: in addition to this the failure of the potato crop led to a change of diet among the poor. In February 1847 numerous cases of Scurvy sought for relief both at the Dispensary, and in the Hospital in Edinburgh, scattered cases however had been noticed in September and October of the previous year. The patients that Prof Christison saw between Sept^r & Dec^r 1846 had been living almost entirely on bread, meat, coffee & tea, but had neither fresh vegetables milk or malt liquors. Upto the 26^th April 1847, 18 cases were admitted into the Hospital — of these 2

were females; 6 of sedentary habits as tailor and shoemaker, three were ordinary labourers, and the others were respectively a barber, collier, tanner, refiner, blacksmith porter & traveller. Of these only a few had used a moderate quantity of meat at dinner, hardly any had used milk, and in the worst cases the diet was almost saccharo-farinaceous and at the same time deficient in quantity. The Nitrogenous part of the food was scanty, and what there was consisted almost entirely of gluten.

In regard to the railway labourers from 18th Feby to 26th April 108 cases were admitted into the Hospital, with three or four exceptions they were all Irish. The most of the Irish had come from Ireland during the previous summer to work at these railways. Their diet at home was potatoes oatmeal and milk: at first their diet here was not deteriorated, but owing to the failure of the potato crop, and the con-

-pegnent- dearness of provisions, potatoes were out of the question, very few even took milk, and of those who took meat few had more than 1½ lbs, many not more than one, and many none at all — of those who took Scurvy. The meat was rarely fresh, more generally it was salt pork, and occasionally salt beef. Fresh vegetables were not accessible. Their diet then consisted of bread, butter, sugar, infusion of coffee or tea, and of meat either a small allowance, or none at all. The quantity of food was sufficient, the kind of food was sac- -charine fatty & farinaceous, it abounded in unazotised principles chiefly starch, also in vegetable nitrogenous principle gluten, while it was very deficient in animal nitrogenous principles.

From the above and similar remarks Prof Christison arrives at the following conclusions: —

1st That a scorbutic diet contains comparatively a small proportion of

either vegetable albumen, animal Casein, or mixed nitrogenous constituents of muscular fibre.

2nd It sometimes contains a deficient amount of nitrogenous principle taken collectively.

3rd That it is sometimes little if at all defective in total nitrogenous constituents, but in this case the chief or sole principle of the kind present is gluten.

4th That sometimes this principle is superabundant, and yet the diet is scorbutic in tendency.

Therefore diet although it abounds in fatty, and saccharo-farinaceous constituents, and is sufficient in quantity, as well as containing the nitrogenous principle gluten is not sufficient to maintain life when the person is leading an active life. Prof. Christison allows that cases do occur which are not owing to the want of meat, or of milk, or of both combined, such cases

however are rarer than they seem, as patients (on account of pride) do not like to state how much they have been obliged to reduce their diet. Again want of fresh vegetables could not always be ascribed as the cause of the Scurvy, as in some cases which came under Dr Christisons notice, patients in account of Stomach complaints had been obliged to live on fresh vegetables for 2 or 3 years yet they were not affected with Scurvy till 1846 – although their diet was in no way changed in that year. Some other cause must co-operate with faulty diet, and the only one which Prof. Christison could find was the epidemic constitution. Owing then to some such concurring cause, Scurvy may originate in various faulty systems of diet, most obviously in a two family farinaceous, saccharo-farinaceous, or in a saccharo-farinaceous & fatty diet, or in a dry mixed diet (e.g. bread, fresh meat, tea coffee & butter), again in a more varied diet in which

the preceding have been combined with milk but in which the total nutriment was inadequate, once more (and very rarely) in which the same diet was taken in suf-ficient quantity - succulent vegetables alone being awanting. Therefore as various errors in diet may occasion scurvy so various dietitic remedies may cure it. Milk appears able to cure it when it is owing to a saccharo-farinaceous diet as seen in Perth prison, many cases may be cured by the sub-stitution of milk and fresh meat for part of the diet. Prof. Christison has never seen this fail but he allows that the addition of succulent vegetables, lemon juice, oranges and malt liquors may hasten the recovery; and in ad-dition to this he has been assured by some that meat & milk alone have failed to bring about a cure. He also allows that scurvy may be cured without meat & fresh milk. At the same time he says that it is quite possible

by giving food which contains large quantities of albumen without meat a cure may be effected, but when the Scurvy is owing to a too pure saccharo-farinaceous diet these will not be so useful singly, as when combined with some animal food — especially milk. He concludes by stating that milk is not an anticoubutic in all cases, and especially not so when the food abounds in too much animal nutriment.

Dr. Ritchie of Glasgow in regard to Scurvy states it as his opinion that in relation to the patients admitted into the Hospital in Glasgow the food failed both in variety and in the quantity of its animal constituents, and above all that the patients had been for months without fresh succulent vegetables. He states that the epidemic was owing to the failure of the potato crop, leading to dearness of vegetables, which to some were quite unattainable, milk also was increased in price, and consequently beyond the reach

of the poor, that persons in active employment require an increase of food for the production of animal heat, from which the scorbutics were debarred. Owing to this the chyle contained less of several of the nutritive constituents of every kind of food, that there was also the absence of the nitrogenous principles of fresh animal food, and the extinction of albumen, acids, and salts supplied by vegetables: and that the predisposing causes (already mentioned) as debility, exposure to inclement weather &c. were in full operation.

Dr. Andrew Anderson attempts to reconcile the two views we have already stated at full in regard to the cure of Scurvy — that of curing Scurvy by lemon juice, citric acid &c, and that of curing the disease by milk. He states that in addition to nitrogenous and non-nitrogenous food, a third element must be introduced by which these are assimilated, and that this third element is furnished by the

several juices contained in fruits and vegetables which are usually of an acid nature. If a person does not take this third element he may live long in health, though at the same time he is obnoxious to disease, and, if by any means, he becomes weakened and debilitated as through sickness, cold damp weather, confinement &c. Scurvy is very apt to ensue. These acids act then not by supplying nourishment, but by promoting assimilation. Milk, he adds, may act in this way through the lactic acid. If it was the casein that cured the disease, cheese should have the same effect also, a thing which, he says, he has never heard of. When as in Perth prison the food was not nitrogenous enough, milk might be the best antiscorbutic as it would supply first the deficient nitrogenous principle, and second the lactic acid which would promote assimilation.

Dr (now Prof.) W. T. Gairdner has I believe written a paper on Scurvy

I have unfortunately not been able to lay my hands on the paper, in his lectures to his class last year, however he stated shortly his views on the subject, and they appear to me to explain the appearance of Scurvy in Perth without looking for the cause in the substitution of treacle for milk.

In Dr Christison's paper the first thing that attracts one's attention is that for two years - from 1842-1844 - treacle was substituted for milk without any bad results following, and again that in 1846 it took a period of thirteen months after the change of diet for Scurvy to make its appearance. did the treacle and scurvy stand in relation to each other as cause & effect? I think not. Why did Scurvy not break out in 1842-1844, and why did it take a period of thirteen months to develop itself in 1847? The reasons given by Prof Christison do not seem to be sufficient. At the same time

that Scurvy appeared in Perth it appeared to a greater or less extent throughout Scotland generally, and I think we are therefore led to expect that there must have been some general dietetic cause. As far as I know there was no general appearance of Scurvy throughout Scotland in 1842-1844 and consequently the cause not then existing we found none in Perth prison by the substitution of treacle for milk. In 1846 things were quite different there was then a great change in the diet of the poorer & labouring classes: we had then the failure of the potato crop, and the consequent dearness of potatoes and of all vegetables, and although milk was at a discount in Perth prison in the cases of Scurvy which occurred throughout Scotland milk I do not think was so scarce. Though vegetables were said to have been given in their usual quantity in the prison before the outbreak of Scurvy it would have been a great step in the

settlement of this question if the broth and food generally could have been analysed now and then during a few months previous to the appearance of Scurvy, to see if vegetables were supplied in as large quantity as when they could be obtained at a cheaper rate; and I think that in all charity it may be stated that the vegetables would most likely be somewhat diminished in quantity. Milk however must have some antiscorbutic properties, and in some cases it alone may cure the disease. Still the mere withdrawal of it would not have caused Scurvy in Perth, nor do I think that the presence of milk will prevent Scurvy if the dietetic cause of the disease be present.

According to Dr Garrod the cause of Scurvy is owing to deficiency of potash in the food. His conclusions are:-

1. "In all scorbutic diets potash exists in much smaller quantity than in

those which are capable of maintaining health.

2. That all substances proved to be anti-scorbutic contain a large amount of potash.

3. In Scurvy the blood is deficient in potash, and the amount of that substance thrown out by the kidneys is less than that which occurs in health.

4. Scorbutic patients will recover when potash is added to their food, the other constituents remaining as before both in quantity and in quality, and without the use of succulent vegetables or milk.

5. That the theory which ascribes the cause of Scurvy to a deficiency of pot-ash in the food, is also capable of rationally explaining many symptoms of that disease."

The treatment of Scurvy therefore according to Garrod would be the administration of a few grains of some potash salt as the phosphate or the tartrate &c. either

by itself or mixed with the food.

According to Sir Gilbert Blane sea scurvy has been completely subdued by the discovery of citric acid as a cure and preventive. It was Lind that revived and diffused this knowledge, when he was physician to Haslar Hospital. Towards the end of last century the navy first received an order for the general supply of lemon juice. The Suffolk, a 74 gun vessel, sailed from England on the 2nd April 1794, and arrived in the Madras Roads on the 10th September, and not a case of scurvy appeared during the voyage. The Channel fleet in 1780 forms a marked contrast to this: after a cruise of only 10 weeks it was over-run with scurvy and fever. In 1800, again, the fleet remained out at sea for four months without receiving fresh provisions, but it was regularly supplied with lemon juice. Indeed since 1796 Scurvy has disappeared from naval hospitals and ships of war.

according to Blane nothing can equal the good effects of lemon juice – it is a certain preventive as well as cure. Trotter tried dilute sulphuric acid in one patient but it had no good effect, the patient however speedily recovered under the use of lemon juice. Concentrated acid of Tartar was also tried, and in like manner failed, but the vessel arriving at Dominica where fresh vegetables could be obtained, the disease speedily yielded to them. Trotter, while he speaks strongly in favor of the lemon juice, says that Scurvy can be prevented completely by a proper supply of fresh vegetables. His theory is that fresh vegetables impart a something to the body, which fortifies it against the disease, and that in proportion to the quantity of this something imparted, the disease will sooner or later disappear, making allowance at the same time for external causes which will counteract its effects on the constitution.

All fruits which are included in the order Aurantiaceae may be ranked among antiscorbutics. Rousseus in 1564 remarks that seamen can cure themselves of Scurvy by the use of oranges. Albertus in a treatise on Scurvy published in 1593 advises the juice of oranges, and of sour and austere plants. In 1726 our fleet in the Baltic under the command of Admiral Sir Charles Wager was very much affected with scurvy, and by the free use of oranges and lemons, of which he had a good supply, the Scurvy was cured, and the sailors arrived home in good health. While in 1780, 1457 cases of Scurvy were admitted into Stralsund Hospital, in 1840 one of the physicians of that Hospital had not seen a case of it for seven years. Most sour fruits also are in all probability antiscorbutic; as the French army of the Alps were much relieved of Scurvy by the use of sour grapes as related by Fodéré. Succulent vegetables as previously men

-tioned are antiscorbutic, but this property resides particularly in those plants which belong to the order Cruciferae as cabbage radish &c. Sorrel also is antiscorbutic and is used for that purpose by the Esquimaux, they however do not use scurvy grass. The Greenlanders use both sorrel and scurvy grass. Sir Edward Parry in the narrative of his first voyage speaks of the good effects of sorrel. The antiscorbutic virtue of vegetables seem to be greatest when they are eaten raw, dried herbs are of little or no value. Pickles have antiscorbutic properties, and also sour Kroute. — good effects from its use were noticed in the fleet in 1780. The fir tribe have also antiscorbutic properties; the abies rubra, or common fir obtained a great reputation among the Swedes when they were at war with the Muscovites: they used a simple decoction of the fir tops which was found equally efficacious as a preventive and as a remedy — this plant

was afterwards called Pinus Antiscorbutica. The mountain pine, the Pinus sylvestris is also highly antiscorbutic as is proved by the effect it had on two Squadrons fitted out by the Court of Russia. Both squadrons were afflicted with scurvy when they were wintering in Siberia, both by chance tried this plant, and both were thus freed from Scurvy. It may be added that in some this proved mildly laxative, in others its operation was so slight as scarcely to be felt. Infusion of malt is highly spoken of by Captain Cook. In 1780 our fleet in the West Indies were supplied with malt. Sir Gilbert Blane says that it proved beneficial, at the same time its antiscorbutic virtues were inconsiderable, and even some surgeons denied that it had any. Dr Budd reconciles these conflicting opinions by supposing that in the one case the properties of the infusion of malt were lessened by the process of extracting the essence, as

the antiscorbutic properties of lemon juice are impaired by the preparation of the syrup. Molasses also has proved antiscorbutic. It was first tried in the Foudroyant and was so beneficial that she was the only ship of the Squadron under Admiral Geary in 1780 that was free from Scurvy, which prevailed to such an extent in the other vessels that when they returned to Portsmouth 2400 were sent to the Hospital affected with it. Spruce beer and malt liquors are good antiscorbutics, and there is evidence that the same property is possessed by cyder. Wine ranks next to spruce beer and malt liquors, and it may be owing to its habitual use that the French fleet has generally been less afflicted with scurvy than our own. It was at first thought that vinegar would prove as serviceable as lemons, and other sour fruits, as the good effects of the latter were naturally attributed to their most striking quality — acidity. Experience has shown that this

idea is quite unfounded. From the preceding and similar remarks Dr Budd comes to the following general conclusions:-

1. "That antiscorbutic properties reside exclusively in substances of vegetable origin
2. That these properties are possessed in very different degrees by different families of plants: and that vegetables and fruits which are farinaceous possess them in the lowest degree, while all those which possess them in a very high degree are succulent.
3. That the antiscorbutic virtue resides in the juices of the plant, that it is in general considerably impaired by the action of strong heat, and by the process of vinous fermentation, and that it varies in some degree with the state of maturity of the plant from which it is derived.
4. That these properties of vegetables are not destroyed, but in some instances seem even to be developed

by the procss of acetous fermentation".

Having gone so minutely into the causes & prevention of Scurvy but little remains to be said of the treatment. Those vegetables noted for their antiscorbutic properties as oranges and lemons should be prefered. If the state of the gums prevent mastication the patient should be kept for a few days on milk diet, or soup along with antiscorbutics. As long as he continues feeble wine should be freely given, and this may be afterwards replaced by porter or ale. An opiate at night to produce sleep is often beneficial. The best dressing for ulcers consists in lint soaked in lemon juice. Bleeding should never be had recourse to. Blisters are apt to produce gangrene. Mercury should be avoided. The remainder of the treatment has been sufficiently indicated in the previous part of the thesis and repetition is useless.

The books from which the preceding thesis has been compiled are:-

Lind on Scurvy

Trotter's Medicina Nautica

Trotter's Medical & Chemical Essays.

Sir Gilbert Blane on diseases of Seamen.

Tweedie's Library of Medicine.

Edinr. & Lond. Monthly Journal 1847-1849 in which are the articles by Prof. Christison & by Dr. Ritchie, Andrew Anderson and Garrod.

I am not certain that I have stated Dr. Gairdner's views correctly, and therefore where I may have mistaken or mis-stated them I would say that they are what occurred to me in thinking over what Dr. Gairdner had stated in his lectures.

R.R.