

Treatment: Flavonoids, 300 mg. every four hours for 48 hours. Total dose: 3.2 gm.

Results: Epistaxis arrested after five hours. Profuse perspiration took place 18 hours after the therapy was initiated with rapid drop of temperature to normal. Nasal discharge stopped. Nasal mucous membrane normal after 24 hours. Cough subsided after 48 hours.

COMMENT

In both these cases of virus A influenza, the infection responded promptly to flavonoid therapy. Epistaxis was arrested within five to six hours.

SUMMARY

The capillary syndrome is present in many viral infections and is involved in the inflammatory processes.

Citrus flavonoids, otherwise known as vitamin 'P' or capillary permeability factor, minimize the injury to the capillary wall induced by viral infections.

Five cases of virus influenza were treated with citrus flavonoids (C.V.P.) with encouraging results.

The therapeutic effect of flavonoids in viral infections might be interpreted as the result of improved functioning of the capillary system.

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SCURVY IN NEBRASKA: I. THE EPIDEMIC OF SCURVY AT CANTONMENT MISSOURI (FORT ATKINSON), NEBRASKA, 1819-1820

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LAST YEAR marked the bicentennial of the publication of James Lind's famous book in 1753 entitled "Treatise of the Scurvy." It was Lind's experiments upon twelve sailors afflicted with scurvy and described in this book which put final conviction to

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the fact that scurvy is a nutritional disease easily prevented and easily cured. In spite of the fact that the cause, the cure, and the prevention of scurvy were known even long before the time of Lind, this disease continued to be the cause of thousands of preventable deaths. Scurvy continued to be the sailor's calamity, the soldier's calamity (1), the explorer's calamity, the settler's calamity, the baby's calamity,

and the calamity of individuals, such as bachelors and widowers, who tried to subsist by reason of lack of knowledge or lack of funds on a restricted diet destined to develop scurvy.

Scurvy was by no means an unknown disease in the medical history of the United States Army. In the early days of the republic scurvy oft made its appearance among our soldiers stationed along the frontiers of our expanding territory. This disease may be accounted for by the fact that the rations of the soldier at that time were not as nutritionally adequate as they are at present. Although our early army surgeons well knew that the rations had to be supplemented with fresh food, including fruits and vegetables, to prevent scurvy, these foods were at times unavailable. The military status of the army surgeon at that time did not help the nutritional situation. His advice and suggestions as to hygiene, sanitation, and nutrition went frequently unheeded by the line officer. The necessity of including an antiscorbutic in the United States Army received very late recognition. During our own Civil War or War Between the States, there occurred during the five and one-sixth years covered by statistics, 30,714 cases of scurvy and 383 deaths from this disease (2). Indeed it was as late as thirty years after the Civil War that army regulations made provision for the inclusion of antiscorbutics in the ration (3).

The Louisiana Purchase made in 1803 added to our young country a vast area mostly unexplored. When this large area came into our possession, traders from the fur companies of St. Louis and of New Orleans, the latter then a Spanish possession, had already penetrated the great plains to do business with the Indian tribes. Trade relations with the Ponca Indians along the Niobrara River in what is now northeastern Nebraska had already been established by Morier in 1790. In 1796 white agents of the Commercial Company had made contacts with the Mandan nation. In due time English traders from Canada came into the newly acquired territory and had made contact with the Indians living at the headwaters of the Mississippi River (3a).

The intrusion of the British fur traders into regions belonging to the United States aroused the Federal Government to a decision to enforce the laws protecting the American fur trade. It was in accordance with this decision that Secretary of War Calhoun, on March 18, 1819, ordered the Sixth United States Infantry Regiment stationed at Plattsburg, New York, and commanded by Colonel H. Atkinson, to proceed to establish a military post at Council Bluffs* on the upper Missouri River, a site recommended years previously by Captain Meriwether Lewis and Lieutenant

*The Council Bluffs where the army post was established was located in Washington County, Nebraska, some sixteen miles up the Missouri River northwest of Omaha. The site of the post now adjoins the present town of Fort Calhoun. Council Bluffs received its former name from a bluff overlooking the Missouri River. Near this bluff Lewis and Clark held two councils with the Otoe and Missouri Indians August 3, 1804, and with the Omaha Indians a little farther up August 19, 1804. The correct name is Council Bluff not Council Bluffs. The relentless Missouri long ago in changing its channel wiped out the spots where Lewis and Clark held their councils with the Indians.

William Clark as suitable for an encampment. The encampment established there towards the end of 1819 was successively called Camp Missouri, Cantonment Missouri, and Fort Atkinson, after the officer who at one time had command of the Sixth Infantry Regiment.

The Sixth Regiment of Infantry previous to taking up its march westward had been garrisoned for nearly three years at Plattsburg, New York. There it had experienced none of the hardships and privations of military life, but only its relaxations and gaieties. Many of the enlisted men were better fitted for the ordinary duties of garrison life, but were not well fitted to undergo the difficulties that awaited them on their arduous trip.

The regiment left Plattsburg March 20, 1819. It arrived in Pittsburg May the first of that year. There they remained one week to embark on board transports for St. Louis. During the passage down the Ohio River on their way to St. Louis, the confinement on board the boats and the use of the extremely turbid river water added to the sick list. Arriving at St. Louis June the eighth, in a feeble condition, the regiment went into camp at Belle Fontaine. The excessively hot weather prevailing at that time did not restore their vigor, but on the contrary added to their enfeeblement. According to Surgeon Mower, the soldiers seemed to experience the same languor felt by men living in northern areas on passing to tropical climes. At St. Louis the Sixth Infantry Regiment was joined by the New Hampshire Rifle Regiment.

On July 4, 1819, in accordance with the orders of Colonel Atkinson, the regiment embarked on the steamboat "Thomas Jefferson" and four keel boats or barges for their final destination which was Council Bluffs on the Missouri River. The steamboat developed mechanical trouble after having sailed for three hundred miles. The failure of the "Thomas Jefferson" necessitated the transfer of the troops and the cargo to the keel boats or barges which were propelled by sails.

According to Surgeon Mower, "without the experience of watermen, the troops had to contend with a torrent, which, in point of rapidity and natural obstructions, was perhaps without parallel. The struggles against the current often compelled the men to plunge into the water to free the boats from snags and sand bars. Most of the flour and corn was damaged by frequent wetting. The narrow channel of the Missouri at low stages of water, the frequent and sudden bends made useless the sails. The barges had to be propelled by the cordelle and setting poles. This arduous way of ascending the river required severe exertion. After these severe exertions the several companies composing the regiment reached the place of destination between the third of October and the fourth of November."

The Department Order issued November 2, 1819, gave official recognition to the establishment of the new military outpost.

Headquarters, 9th Mil. Dep.
Camp Missouri 2nd Nov. 1819

Dept. Orders:

A military post is established at this place and is to be called and officially known, as soon as the barracks are

erected, by the name of Cantonment Missouri. The command of the fort is conferred upon Lt. Col. Morgan, who will call on the Commandant of the Department for special instruction, relative to the duties of his Command (4).

(Signed) T. F. Smith,
Act. Asst. Ajt. Gen'l.

Camp Missouri
October 13, 1819

It was not, however, until December 20, 1819, that the principal barrack buildings and hospital had been completed as well as the shops, the armory, and the barracks.

The weather that year was unfortunately bad. The temperatures during October, November, and December of 1819 varied from 88° to 10° F. below zero. A killing frost occurred September the twenty-fifth. The latter part of December and the whole of January were excessively cold. The mean temperature for January was 8 degrees 62 minutes. The temporary shelters and even the permanent barracks thrown up from green material of the woods, proved but a feeble barrier to the inclement weather.

The history of medicine in Nebraska, just as the history of medicine in California, begins with an epidemic of scurvy. The first physicians who came to Nebraska were involved in this epidemic. They were Army physicians, Surgeon John Gale of the New Hampshire Rifle Regiment, and Surgeon Thomas G. Mower of the Sixth Regiment of Infantry. Still another name connected with the epidemic was one Surgeon's Mate Nicoll of the Sixth Regiment of Infantry and Surgeon's Mate Malone of the New Hampshire Rifle Regiment. Another physician connected with the troops was Dr. Presley W. Craig, but his name does not figure in the military records in relation to this disease.

The food even at an early date became a problem for the commander of the post. On August 26th, 1819, the following order was issued:

Detacht. Order:

The board of Survey having inspected the Beef and Pork pursuant to Detachment Order of this date are condemned. Eight hundred and ninety-seven pounds of pork and two hundred and fifty-four pounds of beef which on account of its remote situation from the market cannot be disposed of at any price (5).

(Signed) J. Bliss, Cap., 6 Inf. Comdg. Detacht.

Fresh beef, issued to the troops since their arrival in the usual proportion, was in the latter part of January restricted to the use of hospital patients. Unfortunately the surrounding country did not abound in game, a good source of antiscorbutic food. Furthermore, the regiment had no expert hunters. The beans, peas, and vinegar gave out. The rations thereafter consisted of salted pork and beef, bacon, flour, and Indian corn. Most of the meat was putrescent, evil of smell and taste, and was unfit for issue. The flour had become musty. The corn furnished in proportion of two pints to every six rations was usually thrown aside. There were no vegetables. The food of the soldier was nutritionally deficient in many respects. It was certainly deficient in the antiscorbutic factor. It was unpalatable and unwholesome. On such diet deficiency disease was bound to make its appearance.

As early as October of 1819 the length of the sick call brought anxiety to the commandant, and the surgeons were urged to take solicitous care of the sick.

Regimental Orders:

In the future the Surgeon will exhibit every morning to the Commandant of Companies a statement showing the names of the men on the sick report in quarters who require issue of fresh beef and it will in the future be the duty of the commandants respectively to note in the margin of their Provisions return the quantity of fresh beef required.

The Commissary on receiving their reports will have them consolidated and issue the quantity required, conformably to the requisition to the Quarter Master Corporal of Companies. The increase of the sick report renders it imperiously incumbent on the Surgeon to visit the sick frequently during the day, to attend to their wants, and report immediately any necessary which can be procured for their comfort or convenience in which it is confidently expected that the commandants of Companies will not decline any assistance which may be deemed requisite on their part (6).

(By Order) Chas. Pentland, Ajt. R. R.

In the garrison orders dated January 23, 1820, the Commander set down instructions to the officers and men. The tone of the order indicated that the Commander was alarmed at the spread of the disease.

Cantonment Missouri
23 Jany 1820

Garrison Orders:

The Commandant had hoped when the troops had got in Quarters they would soon have been restored to health, but he observes with concern the sick list daily augment. At the present moment the sick must claim the first and chief attention of the Commandants of Corps and yet it has not already been done, ample and comfortable Quarters must without delay be provided for their reception.

A Captain will be detailed weekly as officer of the Police. He will be responsible that the parade and the environs of the Cantonment will be kept free from filth of every description.

He will visit the Quarters daily and occasionally during meal times. He will report when relieved in writing which will be spread upon the records of the garrison and published in orders. The officer of the day is confined to his ordinary duties. The practice of throwing slops and filth near the gate ways, or near the Cantonment is forbidden for the future. These things must be carried a considerable distance from the Cantonment (7).

(Signed) T. F. Smith
Act. Asst. Ajt. Gen'l

On January 26, 1820, another order was issued concerning the distribution of food.

Cantonment Missouri
Jany 26, 1820

Garrison Order:

The issue of fresh beef hereafter will be confined to the sick. It will be issued in equal quantities to the two corps at this place and will be distributed among the sick in such manner as the Surgeons of Corps may direct (8).

(Signed) W. Morgan, Lt. Col. R.R. Cmdg.

Surgeon Mower's report to Joseph Lovell, Surgeon General, U. S. Army, indicated the seriousness of the epidemic of scurvy. To quote from the report: "Early in this month (January) a scorbutic taint was perceptible in some of our patients who were laboring under other diseases. At first the cases were mild and appeared to yield, in some measure, to treatment. During the whole of this month it was noticed that the recovery of our patients was peculiarly slow and precarious. In many cases, after the acuteness of the disease has been subdued, the sufferer continued to languish and decline. Early in February the progress of

scurvy had become alarming; its baneful influence was rapidly extending to every form of disease. The situation of the command had assumed a serious aspect. Most of the exciting causes still existed, while the means of relief were beyond our reach" (9).

The Commandant of the post, having been apprised from time to time of the nature and extent of the prevailing malady, and of the best means calculated to arrest its progress, organized parties under the direction of officers, and dispatched them up the river in pursuit of buffalo and other game. Unfortunately the success attending these exertions was very inconsiderable.

On February 5, 1820 a garrison order was issued to the effect that the Commissary will issue the vinegar at this post provided the Surgeons should deem it beneficial to the sick (10).

It is apparent that the belief persisted for centuries that antiscorbutic properties resided in anything that was sour. Lind had proved by his experiments of 1747 on sailors that dilute sulfuric acid or dilute vinegar had no antiscorbutic properties, but that the citrus fruits, lemons and oranges, only possessed the power to cure scurvy. Indeed as early as 1348 a document was published in which it was asserted that "one should use in all foods much vinegar, sorrel, juice of oranges and of lemons and of other acid things which are most beneficial" and of "fruits to combat pestilential maladies those are better that are rather acid, such as red berries and pomegranates" (11).

On February 6, 1820 Surgeons Mower and Gale sent the following report to Colonel W. Morgan:

Cantonment Missouri
6th Feb. 1820

Sir:

In compliance with your order we have the honor to remark that the Scorbutic habit has assumed a distinguished rank among the numerous diseases that afflict our camp. Independent of its own bale influence on the human system, it aggravates and renders more inveterate all the other diseases to which its unhappy victim is liable. It should therefore be guarded against with the utmost precaution that art can suggest or experience dictate should be used to put a period to its prevalence and its influence.

It is a Disease Occurring after subsisting on Putrescent salted animal food with a deficiency of vegetable matter. Excessive fatigue, indolence, cold and moisture, and personal uncleanness may also be enumerated among its many exciting causes.

It is necessary that the men be compelled to air their bedding frequently and change their flannel, often washing their hands, face, feet, and even their whole bodies previous to retiring, to bathe frequently in tepid water. Wiping dry with a course cloth will be very serviceable. Rooms should be kept perfectly clean with a free admission of air guarding against cold moisture with sufficient fires.

Salted provisions should be issued seldom as possible but fresh meat and such Farinaceous substances as can be procured, be substituted.

Vinegar the invaluable part of the ration has from necessity been withheld, . . .

The salted meat lately issued has been very putrescent and under present circumstances highly deleterious. By divesting it of internal impurities, boiling it in changes of water with the addition of Charcoal it becomes much more palatable and

wholesome. We have the Honor Sir to be your Most Obt. Servt. (12).

(Signed) T. G. Mower
Surgeon 6 Infy.
Jno Gale Surgeon
Rifle Regt.

To Col. W. Morgan, Commanding Brigade.

Due to the fact that scurvy was becoming more serious, an order was issued for parties to go on hunting trips to secure fresh food. Game, however, proved to be very scarce.

Cantonment Missouri
15th Feb. 1820

The Surgeons having reported that fresh provisions are absolutely necessary for the health of the troops, and there being no other means of procuring it except by hunting, the commandants of corps will send out such parties as they shall deem necessary for this purpose. These parties may go beyond the limits prescribed by the Department Orders but in such case they must be accompanied by a Commissioned Officer, and they must take the utmost care not to involve themselves in difficulties with the Indians. The Commandant must at the same time observe that nothing but absolute necessity would induce him to dispense with the orders of the Commandant of the Department, but the necessity of the case is so urgent that he feels no doubt but that the Commandant of the Department will approve the course he has accepted under the existing circumstances (13).

(Signed) W. Morgan, Lt. Col. R. R. Comdg.

The commanding officer, alarmed at the extent and severity of scurvy among his soldiers, decided to send the men who were most seriously ill down river to Fort Osage, situated near the present-day Kansas City, in the hope that they may secure there better food and receive better care. Accordingly the following order was issued:

Cantonment Missouri
6th March 1820

Garrison Order:

Major Ketchum with a party of men has been detached for the purpose of bringing the boats to this place, in order to transport the sick to Fort Osage. It is hoped that these boats will arrive in a day or two, and that the weather will become sufficiently moderate to permit the sick to embark. The Commandant is alive to the situation of the sick. He has done all in his power to render the situation as comfortable as practicable. It is hoped that at Fort Osage they will be provided with everything necessary to restore their health.

The Commandant has determined to send the sick below, without waiting for the orders of the Commanders of the Department. The troops will see that the Commandant is not indifferent to their situation. There is no reason for despondence. In a few days we may expect warm weather and in a very short time we will be able to procure early vegetables. In the mean time the Commandant will confine their fatigue to indispensable objects. The gates will be immediately erected and the guard reduced to the smallest possible number. The Commandant will see that all the soldiers unemployed will constantly be upon hunting excursions. The vigilance and activity of officers is indispensably necessary (14).

(Signed) W. Morgan, Lt. Col.

On the 25th of March, 70 patients afflicted with scurvy belonging to the 6th Regiment were embarked on board keel boats destined for Fort Osage. Surgeon Mate Nicoll of the 6th Infantry and Surgeon Mate Malone were ordered to transport the invalids to Fort Osage (15).

In order to bolster up the morale of the sick, card playing, hitherto forbidden, was allowed, and the musicians in the band were sent to the various companies

to amuse the soldiers. The regimental order concerning the musicians was issued the eleventh of March, 1820 (16).

The sick soldiers sent down to Fort Osage had fared well, for on April 6, 1820 the following order was issued.

Cantonment Missouri
April 6th 1820

Garrison Order:

The Commandant has the satisfaction to announce to the command the progress of the sick sent to Fort Osage; they were on the 28th Ultimo 90 miles below this place, and had only lost three men, two from the Rifle Regiment, and one from the 6th Infy. The others were partly recovering and were in high spirits (17).

By order of the Lieut. Colonel Commanding
(Signed) C. Pentland, Lt. R. Regt.

After removal of the seventy men to Fort Osage, there remained nearly a hundred patients afflicted with scurvy. During the first week in April under favorable weather a large proportion of the sick were removed from the cantonment and located under tents about a distance of three miles. This new camp was called "Camp Recovery." Not a single death occurred at this place, although several patients were removed to this camp in a very moribund condition. Some of the patients had lost every tooth from its socket, and some had large portions of the lips sloughed off. No disease is more amenable than scurvy to treatment both as regards to prevention and to cure.

The recovery from scurvy was due to the fact that at the time Camp Recovery was established, wild vegetables began to shoot up among the vegetable products first discovered, and most valuable as an antiscorbutic was a very diminutive bulbous root, a wild onion no larger than a nutmeg. An old legend told to the late Dr. C. W. M. Poynter, formerly Dean of the University of Nebraska Medical College, stated that an Indian was the first to point out the wild onion (allium), which grew along the river bank, as a remedy for scurvy.

That the American Indians suffered from scurvy and were fully acquainted with a remedy for this disease may be gleaned from the experience of Jacques Cartier, the French navigator and explorer. Cartier's crew of 110 suffered from scurvy in 1536 while wintering in Canada. Twenty-five of his men died of this affliction. Those still alive were saved by the use of a concoction of the bark and leaves of an evergreen tree. This concoction an Indian had told Cartier would cure his men of scurvy.

To cite an original source: "Our Captayne considering our estate one daye went for the walking, when he saw a troupe of those countrymen coming from Stradagona among which was Doagaia who not passing tenne or twelve dayes before had been very sick with that disease. Our Capitayne seeing him whole and sound was therat marvellous glad. He asked Domagaia how he had done to heal himselfe. He answered that he had taken the juice and sappe of the leaves of a certayne tree and therewith had healed himself. Our Capitayne asked him if any were to be had thereabout desiring him to show it to him. Domagaia straight sent two women to fetch some of it

whyche brought tenne or twelve branches of it and therewith showed us the way how to use it and that is thus: to take the barke and leaves of the said tree and boil it together, then to drink the saide concoction one daye and the other not, and the dregge of it to be upon his legges that is sick. The tree is in their language called Amida. Our Capitayne presently caused some of that drinke to be made, but there was non durst taste of it except one or two who ventured the drinking of it only to taste and prove it, the others seeing that did the like and presently recovered their health and were delivered of their sickness" (18).

The garrison order of March 22, 1820 issued by Lt. Col. W. Morgan is of great interest. It expresses regret at the great loss of life and portrays the hope that the coming of warm weather will improve conditions. The coming of warm weather implied abundance of fresh meat, fresh fruit, and fresh vegetables.

Cantonment Missouri
March 22, 1820

Garrison Order:

The sudden and unexpected appearance of a disease at this place which had swept away so many valuable soldiers, could not fail to excite in the bosom of the Commandant the most anxious sollicitude, the most poignant grief. The troops saw that every exertion was made by their officers to prevent the expansion of the disease and to alleviate the suffering of those who have fallen under its influence. They therefore bore their suffering with a fortitude that reflects honour on the American Soldiery, and which demands the thanks and respect of the commandant of the Post. Indeed it is difficult situations which test the character not only of the soldiery but the spirit and firmness of the Officers and their devotion to the service.

The Commandant firmly believes that the present mild weather which we have reason to believe will continue will quickly stop the progress of the prevalent disease. The mild weather will no doubt soon bring forth the early wild vegetable which cannot fail to have the most salutary influence in preserving the health of the troops. It is confidently hoped that the hunters will soon find us a supply of fresh Buffalo meat, and sometime next month the commandant expects a drove of cattle at this place.

The Commandant therefore hopes the troops will not suffer themselves to be cast down; we could not guard against the disease with which we have been attacked because it was altogether unlooked for; henceforth we know our enemy and know therefore how to provide against him. Let none suppose because we have suffered the first winter after our arrival, we shall suffer in the same way in the ensuing winter. We shall hereafter be amply supplied with fresh provisions; we shall be able during the summer to cut a sufficient quantity of hay to subsist all the cattle we shall require during the winter, or if we cannot do this the cattle can be killed early in the winter, which slightly salted, answers all the purposes of fresh provision. There are soldiers at this Post who have subsisted chiefly on beef put up in this way at stations on the Mississippi in higher latitudes than that which we at present occupy, who have enjoyed perfect health and perhaps have not heard of the complaint which unfortunately exists at this place.

With respect to those troops who will probably ascend higher, they will be in a buffalo country. They will in all likelihood be furnished with horses and will be able to supply themselves amply with the meat of that animal. The past ought not to alarm us, because by making proper use of the experience we have acquired, we may easily avoid for the future the evils under which we at present suffer. Let none therefore be too soon disgusted with the service in which they are engaged. If the life of a soldier was always smooth and even, he could acquire no reputation. It is difficulties and dangers that set him in a proper point of view and display his character to the best advantage.

A portion of the sick will be sent down the river as soon as the boats can be prepared, for those who remain we have every thing to hope (19).

(Signed) W. Morgan, Lt. Col. R. R. Cmdg.

On April 4, 1820 Lt. Colonel Morgan issued the information that the Commandant had been apprised by a communication from the headquarters of the department that a drove of cattle had been purchased and would probably reach the post by the 20th of the present month, if not sooner. Boats laden with vegetables were also on the way and would probably arrive about the same time (20).

The coming of spring, the wild onions, and the arrival of fresh provisions completely arrested the onset of scurvy. No new cases of scurvy thereafter appeared. The hospitals at the cantonment and at Camp Recovery were emptied of invalids. As new troops arrived and the camp enlarged, the epidemic of scurvy was forgotten in the routine of military life. Scurvy was averted by better nutrition. Several hundred acres were farmed for food.

Fort Atkinson in its heyday was a post with several hundred soldiers, a stockade, a parade ground, barracks and stables. The post was planned as one of a string of western forts, but when Congress dropped the schemes it became the farthest outpost in our expanding country. During the seven years of the existence of this post, it served to protect the fur trade and to discourage the British from attempts at fur trapping or colonizing. It also served to impress the Indians. By 1827 Fort Atkinson had fulfilled its usefulness, since American interests were firmly established in that area. When the fort was abandoned the troops were sent down the river to Fort Leavenworth, Kansas. The camp site soon became the wilderness it was, and the fickle Missouri River has since changed its channels some miles to the east.

Of the 788 soldiers stationed at Fort Atkinson in January 1820 nearly 500 soldiers fell ill of scurvy. Of these 157 died. They lie buried beneath the sod of the abandoned post.* This outbreak of scurvy took the heaviest toll of life of any other outbreak of scurvy among our soldiers. The morbidity rate was 63.5 per cent, and the mortality rate 31.4 per cent. In the year 1820 scurvy occurred in other army cantonments. On the first of January 1820 the military strength at cantonment Missouri was 588 and at Fort Snelling, then known as St. Peter's situated at the confluence of St. Peter's and the Mississippi River, the military strength was 228, an aggregate in both posts of 1016 (21). The total number of cases of all diseases ending March 31st at both posts was 895. Of these 503 were of scorbutic character. The number of deaths was 168, of which 157 occurred at Cantonment Missouri. From the "Statistical Report on the Sickness and Mortality in the Army of the United States," published in 1840 by Thomas Lawson, Surgeon General of the United States Army, the total number of

*The writer visited in May, 1954, Fort Calhoun the present village, which once formed the site of Fort Atkinson. Nothing remains of the military buildings, and there are no traces of an army post cemetery and no tombstones or any other designations of the presence of graves. The site of the fort is indicated by an insignificant marker.

cases of scurvy for the year 1820 was given as 734 and the number of deaths as 190.

To quote again from Surgeon Mower's report: "Nearly all seemed to be reduced by protracted sickness and long continued labor. The sutler's supplies were exhausted, the fresh provisions were nearly all issued and the Hospital stores were inadequate for an emergency. In this situation, when the most nutritive diet was requisite to restore our exhausted energy, the men were compelled to subsist on salted or smoke-dried meats, without vegetables or groceries of any description. To add to our list of suffering the weather in January became excessively severe, the mercury at different periods, for several days in succession did not rise above zero and once fell to 22 degrees below that point. Under these circumstances about the 20th of January the scurvy made its appearance to which all other diseases soon yielded precedence; but it proved fatal in a few cases since February when nearly the whole regiment sank beneath its influence."

"That debility, induced by long continued sickness, was favorable to its development is manifested from the fact that those who were most debilitated from previous indisposition were first seized and numbered among its earliest victims. It may also be reasonably inferred that excessive labor and fatigue and the severity of the weather had an agency in the production of the disease, for the officers and non-commissioned officers, who experienced less of the former, and were less exposed to the latter, were exempt from the effects. One officer, who had been long confined by indisposition, formed an exception. This was the only case in which there was the least degree of convalescence observable prior to the appearance of vegetables, and this was probably affected by our being enabled to subsist him on eggs, chicken and milk—presumptive evidence that a nutritive diet produces a cure."

The anti-scurvy factor in this dietary regimen was derived from fresh chicken and unpasteurized milk.

That inclement weather and exposure *per se* do not lead to scurvy is well illustrated in this soldier's epidemic. Some of the military personnel were detailed as hunters for the purpose of procuring fresh meat. The officer, Lieutenant Durand, who commanded the detachment that wintered in a half-faced camp, some distance below the main post, subsisted his men entirely on fresh provisions from the woods. Not a single individual in this detachment of hunters experienced sickness of any description. Unfortunately game was scarce, and there was not a sufficient number of wild animals killed to supply the main camp to bring about the abatement of scurvy.

At this point it is interesting to comment that emphasis laid solely on citrus fruits as antiscorbutics had led to many a death from scurvy. It has been stated that "gold is where you find it." This traditional statement may be paraphrased: "the antiscorbutic factor is where you find it." In one place it may be found in citrus fruits; in a second place it may be found in pine needles; in a third place in wild berries; in a fourth place in green leaves and even in grass; in a fifth place, as in most of Europe, in the lowly potato; in a sixth place it may be found in fresh meat.

Polar explorers there were who lost their lives dying of the scurvy because they lacked the traditional anti-scorbutics, not realizing that all around them there were plenty of antiscorbutic foods in the profuse animal life typical of the polar regions, particularly of the Arctic regions.

The epidemic of scurvy among our soldiers in 1819-1820 illustrates very important facts in human nutrition. The foods that were available among the afflicted troops were deficient in dietary factors other than the anti-scurvy vitamin. Yet in a state of multiple vitamin deficiencies the symptoms that first became clinically recognizable were those of scurvy. It is therefore evident that scorbutic symptoms may be the first and most prominent ones to be recognized clinically in multiple deficiency states, when one of these total deficiencies happens to be vitamin C or ascorbic acid. Nevertheless when both thiamin and ascorbic acid are entirely absent, clinical beriberi and scurvy may develop simultaneously. The "ship-beriberi" of former days was no doubt a combination of beriberi and scurvy. When these two diseases run a concomitant course, the symptoms of beriberi appear some months before scurvy. The latter deficiency disease may take longer to develop its clinical manifestations. Darling (22) noted the pathologic affinities of beriberi and scurvy. Convoy (23) described an epidemic in which both beriberi and scurvy developed in the same individuals.

That more than one avitaminosis other than scurvy and beriberi may be present in an individual is confirmed by many investigators. Kellock (24), Majdalen (25), and Kahle (25) reported in infants cases of scurvy complicated with rickets.

Night-blindness, a symptom of vitamin A deficiency, as a complication in scurvy was first mentioned in American medical literature by Dr. Edward Coale, U. S. Navy (27), in his account of the epidemic of scurvy, which ravaged the crew of the frigate Columbia in her cruise around the world during 1838 to 1840. The vessel carried a complement of 450 men. So many men lost their ability to see after sundown that the

deck-work could not be carried on without their assistance. Hicks (28) reported the prevalence of night-blindness in the Confederate Army of Northern Virginia, particularly at the occupation of Fredericksburg. The soldiers could see very well during the day, but experienced visual difficulties as darkness developed. Hays (29) likewise observed night-blindness during the Civil War of the War between the States in scorbutic soldiers in the Northern or Union troops. O'Shea (30) found in troops engaged in World War I many cases of scurvy with night-blindness as a complication.

Surgeon Mower's report of the epidemic among the soldiers cites indolence, fatigue, despondence and previous illness, salted meat, and lack of fresh food as etiologic factors in scurvy. These alleged factors together with bad air and bad water were held for several centuries responsible for an outbreak of scurvy. Today we know that neither indolence nor fatigue, nor despondence, nor previous illness, nor salted meat, nor bad air, nor bad water will cause scurvy, if the diet is richly supplied with vitamin C. Old ideas though wrong do not seem to be graciously and quickly discarded. Old ideas, no matter how erroneous they may be, die hard indeed!

The fact that the epidemic reached its peak in winter is not to be construed that scurvy is a seasonal disease. Winter in those days was a period of the year during which antiscorbutic foods became unavailable. When a deficiency of antiscorbutic foods in a diet exists scurvy is bound to arise regardless of season. Scurvy occurred in a most aggravated form on board a large portion of the American squadron blockading the coast of Mexico during the summer of 1846, and for some months disabled several of the largest and most efficient ships at a time during the Mexican War when their services were required to operate against the enemy (31).

In our own Civil War or the War Between the States scurvy prevailed to the greatest extent during the winter months; in the Crimean War, however, the greatest frequency of scurvy occurred during the

Diagram showing the Prevalence of Scurvy among the White and Colored Troops of the United States during the War of the Rebellion, and in the English and French Armies during the Crimean War

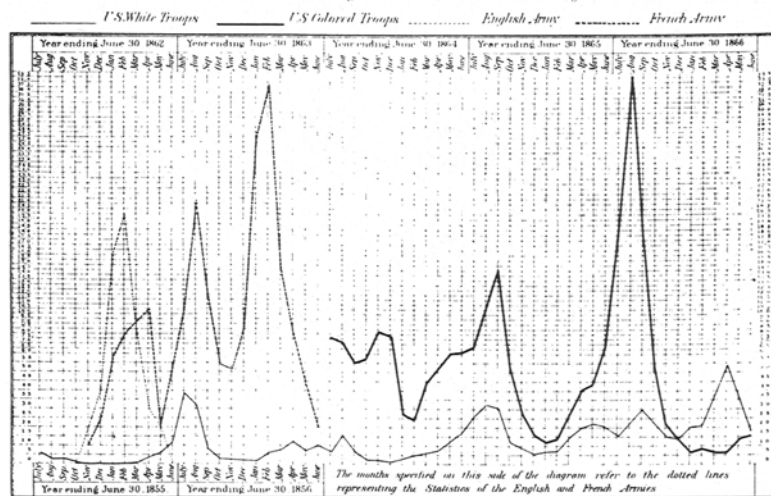


Figure I

summer months. The accompanying graph illustrates the lack of influence of season on the occurrence of scurvy during these two wars (32). At the siege of Thorn in Germany in 1703, scurvy ravaged most severely the besieged army during the months of July and August, which proved to be the hottest months. In the cases of infantile scurvy reported, season played but a slight role. To quote from Hess: "As might be expected, it (scurvy) has been particularly prevalent in the North where vegetation is scanty—in Greenland, Alaska, Russia, and the Baltic states. It has likewise prevailed in the tropics when the crops have failed. India has been conspicuous for its large number of epidemics" (33).

In the years 1836, 1837, and 1838, 235 cases of scurvy and five deaths from this disease were reported among our soldiers. Of this number 159 cases and one death occurred in 1838. Nearly all the patients reported in that year were stationed in Florida or were soldiers that were sent into that area in campaigns against the Indians. To quote from Surgeon General Lawson's book (34): "The rations of our soldiers regarded in all its component parts no doubt disposes the system to scurvy in warm countries, and in these campaigns whenever it proved deficient in any respect, it was always to be so in reference to the vegetable portion."

That fatigue and exposure to unfavorable weather lead to a more rapid onset of scurvy when the diet is deficient in the antiscorbutic factor may be gleaned from the report of Surgeon Gale to the Surgeon General written at Council Bluffs and dated October 1, 1820: "It will not surprise you to learn that the fatigue endured in transporting loaded boats such a distance in a peculiarly laborious manner of navigating the Missouri, exposure to the medium sun, the dews of the evening and the chill of the night, were productive of diseases. Nearly every man suffered from sickness, and many experienced relapses before arriving at our point of destination; nor did we then cease to suffer from dysentery, catarrh and rheumatism."

That a bacterial invasion will convert a latent scurvy into florid scurvy with severe hemorrhagic tendencies has been noted in World War I on the eastern front in connection with typhus fever. The effect of infection upon a condition of latent scurvy has been emphasized during the Crimean War (35), and during our own Civil War or War between the States (36). Wherry in 1909 reporting experiments with guinea pigs and the plague bacillus observed that the animals fed a cereal diet developed far more hemorrhages than those receiving cabbage with their cereal diet (37).

In scurvy death may result from cardiac failure, excessive hemorrhage, or infection. There is usually present in scurvy pulmonary congestion, which may be complicated by pulmonary edema and terminal pneumonia. Baudens, writing in 1858 on the occurrence of scurvy in the Crimean War, stated that scorbutus prevailed in an epidemic form and was rarely witnessed without being associated with diarrhea, intermittent and remittent fever, bronchitis, pneumonia, and other infections. These complications proved to be the most direct cause of the mortality which scurvy

produced (35). Lind as early as 1753 reported the presence of swollen and purulent axillary and mesenteric glands (38). An early writer stated that "there's few diseases at sea but what scurvy requires a share in. Preservation from this would free them (the sailors) from the danger of most diseases." Indeed an outbreak of scurvy may be overlooked in its entirety, and the diagnosis made wholly on terms of the prevailing infectious diseases, which may constitute but secondary manifestations.

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THE CAUSES AND PREVENTION OF RECURRENCES IN PEPTIC ULCER DISEASE

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IT IS commonly accepted that 46 to 93 percent of patients with peptic ulcer have a recurrence of symptoms within five years after healing (1-5). The ten-

dency to recurrence is so pronounced that insurance underwriters place a high rating on victims of the disease. Most treatises on ulcer disease discuss the problems encountered, but as applied to actual cases the recommendations are rather nebulous (6, 7).

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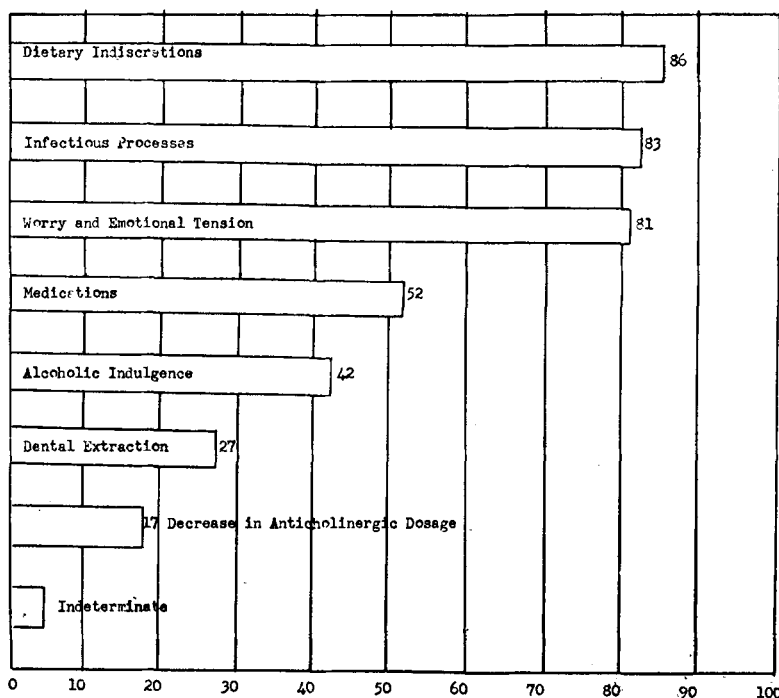


Fig. 1: Possible precipitating factors in 109 peptic ulcer recurrences. Number of times occurring.