

[Alexandro Malaspina](#) to Señor Don Josef Salvaresa, Chief Medical Examiner of the Real Armada in Cádiz

December 23, 1788

To my great satisfaction, His Majesty (whom God preserve) has authorised me to consult your Excellency about the most appropriate antiscorbutics to be used during the extended voyage which has been entrusted to me: please do not be upset, your Excellency, that I write at some length on a point of such importance. The preservation of Man is the worthiest object of his fellows.

To proceed in the best possible order for discussing this matter, I shall divide it into three parts, which will be the subjects of as many letters: we shall investigate in the first part the best method for keeping our seamen healthy; thus, this letter will cover the contents of the food ration and its governing regulations, both in port and at sea. The second letter will deal with mariners who are already sick. The third, finally, will be focused specifically on those items which are better included in the officers' food than in that of the seamen.

Let us first note some preliminary points that will serve as the basis for the reasoning which follows; we shall assume 1) that it will be frequently possible to obtain all the water we need, and to keep it fresh in the hold; 2) that the crew of seamen and number the naval officers will be from the northern provinces of Spain, that is, from Asturias, Galicia and the mountains; 3) that these people must be, like the senior officers, free of all chronic illness, and therefore endowed with the strength and endurance that are so prominent among Spanish sailors.

The method, which I believe most useful for the preservation of Spanish seamen is not so much mindless discipline, which is easy to maintain as a form of rational constraint in those from the North and varies according to the occasion, adapted principally to the lively passions of the men as well as the reasoning that flows from these. The attached extract of my reflections on the latest voyage of the *Astrea*, undertaken on behalf of the Royal Company of the Philippines, will lay out for your Excellency, with the greatest specificity, the character of Spanish seamen; and although in giving preference to those from the northern provinces I have tried, as much as possible, to avoid those who manifest excessive sensibility, I believe we would agree that this trait is characteristic of them, albeit not to so great an extent as with Andalusians.

Between-decks will of course be spacious, and each sailor will have his hammock, so that the miasmas emanating from the one who has just risen, and particularly from his clothes, will not be passed on to the one who immediately takes his place to rest. There is also a fire on the same deck as the seamen, and the smoke and flames will naturally remove much of the infected air; furthermore, from time to time, a more intense fire, suitably placed, will be used to cleanse the wood of the ceilings. As for laundering clothes; protection against sun and water; hooded jackets for the cold; usually having three watches instead of two; washing clothes in fresh rather than salt water; and, finally, taking care of the cleaning of the vessel and all its contents, you can rest assured, your Excellency, that our diligence will far surpass anything the officers of the Real Armada have displayed so far.

Two things only I would like to ask your Excellency before passing to the second subject, and they are 1) if your Excellency considers it preferable to use fire or vinegar, whether sprayed or as a vapour, to render the air below decks less infectious; 2) if, during rapid transitions from great cold to heat, it is better to expose the seamen to long periods of frightful cold or (in defiance of their usual devil-may-care attitude) to load them with an excessive amount of warm clothing.

Let us now move on to food and drink. These can be divided into four main categories: bread, legumes, salted beef and bacon; to which later, by way of condiments, we should add oil, vinegar and wine.

Concerning bread, one of our main foods, I think it will be much better if we have it made from a robust wheat rather than one of less substance, in which case Andalusian and Castilian will of course be preferred to Sicilian, Sardinian or Berber. It should also not be very spongy bread, because it seems to me that the less it is baked, the less will be the loss of those constituents which make this, and other vegetables, so healthy. It is true that it then acquires a certain leathery flavour and texture which make it unpalatable, and perhaps also difficult to digest. I should like to ask your Excellency for your opinion on this balance of the opposing advantages and corresponding disadvantages of baking bread either a little or a lot, so that I may manage the production this important element accordingly. It is opportune at the same time, to enquire whether it is useful to alternate bread made from wheat with that made from corn and rye; if so, then we could take on board cakes of one or the other seed, which would serve for variety and be at the same time healthier. It will be useful, at least, if your Excellency could kindly give us the benefit of your experience: it will serve as a starting-point for those who will in future light upon this interesting question.

Legumes are themselves endowed with antiscorbutic properties; and since, I am glad to say, there are many abundant species in both this continent and America, they are naturally to be considered of great utility as food for sea voyages. In the voyage I have just completed, I was only able to look into the second of the two properties that have to be investigated for all their kinds, which are 1) their relative wholesomeness, and 2) the relative ease with which they can be preserved during extended campaigns, particularly in the awful climates of the tropics. Your Excellency will be pleased to hear that I have analysed some of these foodstuffs: rice is the vegetable which I have found least subject to degradation, both on board and on land, at least in the tropics; this is followed by the garbanzo bean, to be preferred even to the garbanza, and finally the lentil; white beans, such as the cocacho, the chickpea and the fava, here known under the name of "tarragonas," are other such species that even with equal or greater care have not fully resisted the heat and moisture with which, in the tropics, is associated such a high degree of spoilage.

However, since preservation is not the only issue, or perhaps we should say not the principal issue, in this branch of provision, we should also investigate whether their relative wholesomeness might make other seeds preferable, the more so because in our expeditions campaigns of long duration are not always required, and because the greater part of our missions will take place in cold rather than hot climes. This subject, related more to chemical analysis than to maritime experience, will be of particular interest to Your Excellency, and whatever recommendations you are able to make will be of a great utility for maximising our success in the delicate choice of the necessities of life.

With respect to salted beef and bacon I will say plainly and simply that it is almost an axiom in the navy that the second is to be preferred to the first, and that in my view reason itself strongly endorses this idea; the more so if in the salting of bacon (particularly in the tropics) all those precautions are taken which were so well thought up by Messrs. Cook and La Pérouse, by whose methods I had bacon salted lately in Manila.

Of course, because of the abundance of blood vessels and other nutritive tissues impossible to remove, beef is of necessity more prone to putrefaction than bacon; and although the greater porosity of the latter makes it naturally liable to absorb more salt, it also makes it easier to extract the salt with two successive batches of water, in which it is immersed for a long period before being cooked. It follows from this, therefore, that bacon will surely last longer; and probably less prone to spoilage than salted beef, unless in the difference of properties between pork and beef there is perhaps sufficient compensation, of which I am unaware, for the disadvantages already indicated. M. de La Pérouse used vinegar for salting, keeping the bacon for three days in a solution of moderate concentration; when taken aboard it was not immersed in brine, but simply covered with a layer of mineral salt. This method is very expensive,

not to mention the observation that the vinegars of our American colonies do not have the properties necessary for this operation. Nevertheless, I believe it will be preferable to any other; if the seamen are not inclined, despite our example, to prefer salted beef to fresh foods of whatever kind, even if poor in taste, they will need to resort more frequently to bacon.

As far as oil is concerned, I am rather afraid that your Excellency will find that its use will not be as common as on the *Astrea*: it is no longer a matter of nourishing an Andalusian crew, but one from the northern coasts, where oil is hardly known, it not being there a product of Nature. I would like your Excellency to advise me about the prudent limits on its use, particularly in soups, whether at lunch or dinner; and to indicate to me some signs by which one may come to know when the unhealthy effects of its fat content, and the difficulty of determining this oneself, outweigh its value as a nourishing food with a pleasant taste.

It would be an omission here not to mention gazpacho: will its effects be as valuable for seamen from these provinces? And should we insist on its almost constant use, even if the crew are somewhat disgusted by it?

Finally, as to wine, I find it necessary to use it almost constantly; and by repeated experience I am convinced that the vintage of San Lucar is preferable to any other in Spain. I have only two doubts that your Excellency could resolve for me: 1) whether the amount of half a pint is sufficient to produce a healthy effect, particularly after, during a long voyage, the wine has acquired new strength; and 2) if appropriate, whether this digestive and antiscorbutic is best provided in the morning, in the middle of the day, or at night.

The total exclusion of hard liquor and of salty fish (including cod) are two things on which I believe we will not disagree: as to cheese, which is also commonly included in our navy ration, I find it difficult to work out its value, but it may be appropriate on the occasion of a tempest, when it obviates the need for a fire; and this will be the only case in which we shall use it.

I end this letter by reminding your Excellency how important it is to the humanity and fatherly love of His Majesty that this issue of the preservation of crews be examined with all diligence, and how much I shall appreciate the opinion of your Excellency. Your most affectionate and grateful friend, who kisses your hands. Cádiz, December 23, 1788.

Text courtesy of the Museo Naval, Madrid. Translation by John Black.

[Spanish Original](#)