STATEMENTS
OF THE
COMPARATIVE HEALTH
OF THE
BRITISH NAVY,
FROM THE
YEAR 1779 TO THE YEAR 1814,
WITH PROPOSALS FOR ITS FARTHER IMPROVEMENT.
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THE writer of this article proposes to lay before the Society, an account of the progress and causes of the improved state of health of the British navy, from the period at which France and Spain became parties in the war with the American Colonies, to the year of the general peace, which for a time closed the revolutionary war of France; and to submit certain proposals for the further improvement of the health of this valuable class of men.

Besides the means of information which occurred to him while he was physician to the fleet in the West Indies and North America, during the

four last years of the American war, and while he was commissioner of sick and wounded seamen, from the year 1795 to the year 1802, he has been furnished, by virtue of an application made in the name of the Society, with materials from the public offices of the navy, all of which most liberally supplied such extracts from their records as were necessary for his purpose.

Some of the most important results of these researches are thrown into the form of Tables, which are inserted at the end of this paper.

It appears from the inspection of the two first of these, that there has been a gradual and great diminution of sickness and mortality in the course of the above-mentioned series of years ; as is proved by the numbers received into the hospitals, which must be admitted as a satisfactory criterion of the degree in which sickness prevailed at different periods. But in order to obtain a knowledge of the whole amount of deaths, those which occur on board of ships, as well as those at hospitals, ought to be ascertained. There were no means of collecting them till five years ago, when an instruction under the authority of the Board of Admiralty was promulgated, for all commanders of ships of war to transmit every year, on the first day of January, to the secretary of that office, an account of all the deaths that had happened, of men on board of their respective ships in the course of the preceding

year. These accounts being deposited at the Admiralty, have formed the basis of the following statement*.

There were on board of ships of war in all parts of the world,

On the 1st of January, 1811,	138,581
1812,	136,778
1813,	138,324

Died of disease, killed, drowned, &c.

In 1810,	5183
1811,	4265
1812,	4211

From a calculation † founded on *data* furnished

* See more on this subject in the Quarterly Review of this year (1815) under the article of Mr. Colquhoun's Treatise on the Wealth, Power, and Resources of the British Empire, one of the greatest treasures of political and financial knowledge that has been offered to the public in these times.

† As the number of seamen and marines employed in 1813 was double of that in 1779 (see Table I.) the mortality would also have been double, had the intensity of the sickness been equal at these two periods. The deaths therefore in 1813 at the Naval hospitals in all parts of the world, would have been three thousand three hundred and thirteen: instead of nine hundred and seventy, their real number. There was no account taken of the mortality on board of ships in 1779, but it may safely be assumed to bear the same *ratio* to the deaths at hospitals as in 1813; and the deaths on board of ships being calculated on these elements, it will be found that in that year they would amount to three thousand and sixty-seven on the same number of men as

by this statement and the Tables above referred to, it is deducible that if the navy had been equally sickly in 1813 as it was in 1779, the whole number of deaths from disease in the former year would have exceeded the actual number by 6674; and this is perhaps underrating it, considering the present superior treatment of the sick on board of their ships. Under such an annual waste of life, the national stock of mariners must have been exhausted in the course of the prolonged warfare from which this country has just emerged.

It appears from Table II. that the most sickly years were those of 1779 and 1780. This will be accounted for by referring to Table III. and to the very intelligent and elaborate account of the sickness of these years in Illustration II.

in 1779. But as double* the number of men were employed in 1813, the number of deaths would likewise be double under the like intensity of sickness, and would therefore have amounted to six thousand one hundred and thirty-four: which, added to the deaths at hospitals, give a total of nine thousand four hundred and fifty; and subtracting from this the number that died at hospitals, and on board in 1813, there remain six thousand six hundred and seventy-four, as stated above, for the number of lives that may be said to have been saved this year, when compared to 1779. In making this calculation it has been assumed that the mortality of 1813 on board of ships, is equal to the average of the three preceding years; and only one half of the deaths on board of ships has been reckoned as referrible to disease, there being good reason to believe that the other half is composed of those who have been killed in battle, drowned, or who perished by other accidents.

* See subjoined Illustration I.

subjoined to this article, with which the author was favoured by Dr. Lind, (the worthy son and successor of the author of the Treatise on Sea Scurvy and other works of equal merit,) joint physician with his father at that time to Haslar hospital*. The decrease of sickness since that year has been gradual, with the exceptions of the years 1783, 1796, 1797, and 1804. (See Table II.) The smallness of the number of sick in 1783, was owing to the greater part of that year being a time of peace, for though the greater number of the ships were put out of commission before the end of the year, yet the number of seamen having been voted prospectively the year before on the presumption of hostilities continuing, it was as great† as for a year of war. In the year 1796, the sickness, instead of decreasing gradually, fell *per saltum* as it were (see Table II). This is satisfactorily accounted for by its being the first year in which the general supply‡ of lemon juice took place. The increase of sickness in 1797, (see Table II.) was owing to the irregularities connected with the alarming mutiny which

* This hospital stands on a point of land adjoining to Spithead, the roadstead near Portsmouth, and the principal rendezvous of the British navy.

† The number voted for 1783 was one hundred and eighteen thousand, but this measure was not carried into effect, peace having been concluded.

‡ This supply was not at first so general as it became afterwards, for it was afforded only to ships destined for foreign stations or for particular services. The war which broke out this year with Spain interrupted the trade in fruit. It was afterwards very plentifully supplied from Sicily.

broke out in the beginning of that year, and was not suppressed for several months. This serves as a proof how necessary subordination and discipline are to health. The increase of sickness and mortality in 1804 (see Table I.) was owing to the prevalence of the yellow fever in the West-Indies, that year in which the deaths at the hospitals at Jamaica and Antigua amounted to seven hundred and twenty-seven. It appears from Tables I. and II. that there was in that year a great decrease of sickness and mortality on the European stations, which was no doubt owing to the improved methods of preventing typhous fevers. (See Dr. Baird's letter in the subjoined Illustration III.)

The principal diseases which constitute sickness and cause mortality on board of ships in all climates, are scurvy and fevers. To these may be added dysentery, which prevails much in most tropical climates, and above all on the Indian stations. Since these disorders have been subdued in the European stations, pulmonic inflammation has been the most frequent and fatal disease. (See Table V.)

The scurvy*, a disorder incident chiefly to a sea life, but by no means peculiar to it, has been nearly eradicated by lemon juice, or more properly the citric acid; for the juice of limes, Seville oranges, unripe China oranges, and in short of all the species of the botanical *genus citrus*, or the natural

* See subjoined Illustration IV.

order of fruits called *Hesperidæi*, possess the same virtue. The second Table was constructed principally with a view to elucidate the beneficial effects of the general supply of lemon juice. This was known to be a remedy for the scurvy far superior to all others near two hundred years ago, as appears by the writings of Woodall*. It is singular that this important fact should have been hardly known for more than a hundred years† afterwards, when the late Dr. Lind, of Haslar Hospital, revived and diffused this valuable piece of knowledge by his writings. It was this author who first clearly‡ stated the singular powers of this remedy in the cure of scurvy, for Woodall only affirmed that its virtues were far superior to all other remedies. Notwithstanding this, the navy continued to suffer severely from this disease, till the order for a general supply of lemon juice, twenty years ago. This salutary measure was accomplished by a representation from the Medical Board of the navy in the year 1795, during the administration of Earl Spencer, from whose enlarged and benevolent mind every thing was to be expected. One of the most impres-

* His work is entitled "The Surgeon's Mate, or military and domestic Medicine, by John Woodall, master in surgery: London, 1636, p. 165." He concludes his praises of it by saying, "I dare not write how good a sauce it is at meat, lest the chief in the ship should waste it in the great cabin, to save vinegar." See a still earlier testimony in Purchas's Pilgrim, p. 158.

† See the subjoined Illustrations, No. V.

‡ Treatise on the Scurvy, p. 153 & 543. Third Edit. 1772.

sive parts of their argument, was built on the report of the effects of it in the *Suffolk* of 74 guns*. This ship sailed from England on the second of April 1794, and an experiment was made of supplying her with a quantity of lemon juice sufficient to serve out two-thirds of a liquid ounce every day, to every man on board. This was mixed with their grog, along with two ounces of sugar. She was twenty-three weeks and one day on the passage, without having any communication with the land, and arrived in Madras road, on the 11th of September, without losing a man, with only fifteen men on the sick list, all slight cases, and none of them affected with the scurvy. This disease appeared in a few men in the course of the voyage, but soon disappeared on an increased dose of lemon juice being administered. Let this fact be contrasted with the state of the Channel fleet in 1780 as described by Dr. Lind, (see the subjoined Illustration II.) which was overrun with scurvy and fever, and unable to keep the sea, after a cruise of ten weeks only: and let the state of this fleet be again contrasted with that of the Channel fleet in 1800, as described in the subjoined Illustration III. by Dr. Baird, which, by being duly supplied with lemon juice, kept the sea for four months without fresh provisions, and without being affected with scurvy.

* See more concerning the first general supply of lemon juice, in *Observations on the Diseases of Seamen*, p. 490. Ed. 3. by Gilbert Blane, M.D. Lond. 1799.

It appears from the inspection of Table II.* that during the nine years of war preceding the general supply of lemon juice, the annual average of sick sent to hospitals, was one in 3.9 of the whole men in the navy, but that in the nine succeeding years, the proportion was one in 8.4. Other causes, particularly the improved methods by which fevers were diminished, contributed greatly to this decrease of sickness, so that it may be difficult to assign precisely what is due to lemon juice. But what admits of no ambiguity, is that, ever since the year 1796, scurvy has almost disappeared from ships of war and naval hospitals. It will be seen from the subjoined copy of the printed form of returns, Table V. that scurvy is not even inserted there, as one of the heads of disease. One of the physicians of Haslar hospital has informed the author that he has seen but one case of it there, for the last seven years; and one of the physicians to Plymouth hospital reports, that only two cases have occurred to him the last four years. It will be seen, by comparing Table IV., with which the author was favoured by Dr. Wilson, one of the physicians to Plymouth hospital, with the like Table of Haslar hospital, at the interval of twenty-six years, what great changes there have been in that time in the number and quality of

* The author was furnished with this Table, by Dr. Harness, the medical commissioner of the Transport Board, who afforded every facility to the Society in the examination of the records of the medical branch of that office.

diseases, and particularly in the decrease of scurvy. It is found by the inspection of a great number of surgeons' journals, which the Society has been permitted to make, that ever since the supply of this article, the scurvy has either not appeared at all even on the longest voyages and cruises; or if ever it did in a slight degree, it was soon made to disappear by an additional dose of lemon juice. The daily regulated allowance for each man is now one fluid ounce, with an ounce and a half of sugar. It appears also from the same journals, to be favourable to health in other respects; for some of the surgeons have given it as their opinion, that it tends to diminish the number of fevers and ulcers. The latter are observed to be much connected with a scorbutic habit. It is true that there are instances of ulcers prevailing on board of ships, in their most aggravated state, since the introduction of lemon juice, but without any connection with scurvy, and it was confined to particular ships and hospitals in which they were infectious*. The increased attention to ventilation and cleanliness has since removed this evil, than which there was none more cruel to individuals, nor more embarrassing to the service.

Those only who have made themselves acquainted with the early part of the naval history of this country, or those who have perused the

* See Observations on the Diseases of Seamen, p. 503. 3d edition.

interesting, popular, and eloquent narrative of Commodore Anson's voyage, in which the distresses and calamities, the dreadful sufferings and mortality arising from the sea scurvy are depicted, can duly appreciate the value of this simple remedy. The power it possesses over this disease is peculiar and exclusive, when compared to all other alleged remedies. It is *sui generis*—*Nil simile nec secundum*. Its efficacy may also be stated as singular when compared to that of any other remedy in any other disease. It is a certain preventive as well as cure: no other remedy yet known can ward off this dreadful scourge of mariners for an indefinite length of time under the use of salt provisions; nor does it produce any bad effects on the constitution like some other specifics in certain other maladies. It may therefore be affirmed with truth that it performs not only what no other remedy will perform in this disease, but what no known remedy will effect in any known disease whatever*.

There are some other species of fruit and vegetable acids, also saccharine substances in every form, and fermenting beverages which have considerable power in retarding the progress of this disorder for a limited time, but will not cure it under the use of salt provisions. A vegetable substance called nopal, the stalk of the *cactus opuntia*,

* The author has never seen the scurvy resist the citric acid, and in the perusal of several hundreds of surgeons' journals, he has met with only two cases which seemed to resist it.

which keeps well at sea, has been lately discovered in India to be an extremely salutary article of diet, and to resist scurvy ; but the author read in the surgeon's journal of one of the East-India Company's ships, that in spite of the use of this, and of spruce beer at the same time, sixteen cases of scurvy arose, in one of which it was so severe as to prove fatal. All the mineral acids have been tried without effect. Had the peculiar virtue of citric acid been attended to when Commodore Anson fitted out the *Centurion*, and had a few gallons of it been sent on board of this ship in glass bottles, with a tenth part of spirits of wine to preserve it, all the misery which fills the reader of this narrative with so much commiseration and horror, and which was on the point of frustrating the object of the expedition, would have been prevented*.

* Anson's ship the *Centurion* left England with 400 men : there were 200 surviving on her arrival at Juan Fernandez, of whom only eight were capable of duty. In a very few days there would not have been strength remaining to carry the ship to her anchorage, and she would have been left adrift on the Pacific Ocean, in the same manner as the *Oriflamme*, a Spanish ship on her passage from Manilla to Acapulco, some time in the last century, in which the whole crew perished from disease, and in this state she was discovered with the dead bodies on board. This is a voyage of six months, being made against the trade winds. The ships employed in this service have of late years been perfectly healthy, by being abundantly supplied with the citric fruits. The author owes this information to Capt. Mendoza y Rios, to whom navigation is so deeply indebted for the incomparable Nautical Tables which he has constructed, and which he is still farther improving. Anson sailed from St. Catherine's the

The liberal supply of fresh provisions and vegetables, with which ships have been furnished while in port, during the late war, has also contributed much to counteract the scurvy, for formerly this disease was not confined to long voyages and cruises. It appears from Dr. Lind's statement, that one thousand four hundred and fifty-seven men ill of scurvy were sent to the hospital from the Channel fleet in 1780, and it has been known to arise in ships while at anchor under the daily use of small-beer. Nay, it has been known to arise among prisoners of war living entirely on fresh diet, and solely imputable therefore to confinement in bad air, a dull uniformity of life, depression of spirits, and indolent habits naturally belonging to a state of captivity. This happened at Portchester Castle and Norman Cross towards the beginning of the revolutionary war, before those arrangements were put in practice, which afterwards so effectually secured their health. The like happened about the same time in a prison ship adjoining to Portchester Castle, but it was remarked to break out sooner, and to a greater degree in the ship than in the castle*.

28th of January 1741, and arrived at Juan Fernandez the 10th of June following, so that he was one hundred and forty-three days from the last place of refreshment, whereas the Suffolk was one hundred and sixty-two days under the like circumstances without losing a man, and without having any man ill of scurvy, or any other dangerous disease on her arrival in India.

* See also a curious instance of scurvy arising at land under the use of fresh provisions, in an article by Sir James Macgrigor,
in

The year 1796 may therefore be considered as an era in the history of the health of the navy. But there appears* to have been another sudden decrease of sickness in the first years of this century. This is to be ascribed to the improvements in the method of promoting ventilation and cleanliness, and particularly to the strict discipline† adopted and enforced in the Channel fleet. Air contaminated by foul and stagnant exhalations, particularly those from the living human body, is the ascertained cause of typhous fever, known also by the name of the jail, hospital, and ship fever, which has been a more grievous and general source of sickness and mortality in the navy, than even the scurvy. The dysentery, which stands next in order in point of fatality, is also generated and propagated by the want of cleanliness and ventilation.

The infection of fever is generated by the breath and perspiration of men, crowded for a length of time in confined air, and without the means of personal cleanliness, particularly from the want of

in the *Med. and Surg. Journal of Edinburgh* for 1803, page 282; also in the *Trans. of the Coll. of Phys.* Vol. II. and IV. and *Trans. of this Society*, Vol. IV. page 141. It appears from Pliny, that this disease affected also the Roman armies in Germany. There is reason to believe that the Scurvy will not arise in any circumstances under the use of fresh animal food, provided fresh vegetables are used at the same time. Farinaceous food, though of a vegetable nature, will not have the same effect.

* See Tables I. and II.

† See the letter from Dr. Baird in the subjoined Illustration III.

shifts of linen. The methods which have of late been practised with such decided success, in combating these evils on board of ships have chiefly been :

First ; Regulations respecting personal cleanliness. A frequent inspection is made of men's clothing, to ascertain whether there is a sufficiency for the purpose of cleanliness, and of protection from cold : the regular washing of apparel is enforced, and two sets of hammocks are provided, in order that one may be scowered while the other is in use. It is greatly to be lamented that the want of a regular and adequate supply of soap is still a bar to these measures being carried into due effect, nor is it easy to account for the omission of a supply of such obvious and great utility, and of which the expense would be manifoldly compensated by the improved health of the men,

The chief source of infection used to arise from the method in which new raised men were treated, by being crowded on board of small tenders and receiving ships, for a length of time before they were distributed to their respective ships. The alarming state of sickness in the American war, induced the Navy Board, over which Lord Barham then presided, to institute, in 1781, what were called *slop ships* *, on board of which new raised men were conveyed, in order to be

* Slop is a trivial name for the various articles of seamen's clothing, such as jackets, shirts, and trowsers.

inspected, cleaned, and supplied with new clothing before being distributed, and to be conveyed to their ships not in small tenders as formerly, but in large men of war*. It was owing to the want of such regulations that the navy used to be most lamentably infested with fevers at the commencement of wars, from the manner in which impressed men were treated, and it is from a change of system in this respect that we are to account for the great difference in sickness in the year 1794, the first year of the revolutionary war, from that in 1779, in the great armaments on occasion of the war with France, Spain, and the Colonies. (See Table II.)

Secondly ; The improvements in the ventilation, cleanness, and dryness of ships. The want of cleanness will hardly produce disease, unless when combined with want of ventilation. What are called wind-sails, that is, wide tubes formed of canvas, and extended by hoops into the form of a cylinder, which pass from the external air into the lower parts of the ship, through the hatches, have been in use time out of mind, for freshening the spaces between decks. But these are very imperfect ventilators, for they cannot be let down in

* On the 13th of March 1787, the House of Commons called for an account of the impressed men who had died in the course of the American war, before being distributed to ships. The number returned was 180, as taken by the author from the original document deposited at the Journal-office of that House.

bad weather when the hatches must be shut, at which time they are most wanted. They also admit such large volumes of cold air, that they cannot with safety be introduced to those spaces where the men are asleep. In order to obviate these imperfections, it has been common for the last thirty years to put in practice a contrivance borrowed from a French frigate*, consisting of square wooden trunks, for which brass tubes have since been substituted, running from the hold or lower deck and terminating in the open air. Instead of air tubes in this situation, it has of late been judged more advisable to place a funnel vertically, near the middle line of the ship before the fore-mast, leading through the fore-castle deck. All ships are now fitted in this manner, and the great importance of it will be obvious, when it is recollected that in this deck there is neither hatchway nor ladder, and that the sleeping places are under it.—The removal of all offensive substances by sweeping and scraping, has been much more accurately attended to than formerly; but the washing of decks, particularly in cold and damp weather, has been much less practised. On the contrary, dryness, so essential to health and comfort, has been more studied, and rubbing with hot sand, scraping, and portable fires have been found much more salutary operations, than frequent washing. Though there seems little to fear with respect to health from

* See Diseases of Seamen, p. 266. Ed. 3.

the exhalations of pure water, whether salt or fresh, yet there can be no doubt of the bad effects of the diffusion of moisture in circumstances where it cannot be readily dried up, for it promotes mouldiness, putridity, or rust in the several perishable objects with which it comes in contact. Dryness therefore is deservedly held to be a matter of primary consideration in the economy of a ship, as well with a view to health and comfort, as to the preservation of all the valuable articles of victualling, clothing, utensils, and arms. It is essentially promoted by portable fires carried all over the ship, when most wanted, in iron stoves, which have been much in use for this purpose for some years. The use of iron, now so general in all the implements and machinery subservient to human life, is also employed for various uses on board of ships. It was about two and thirty years ago, that fireplaces of cast iron were first introduced in room of the brick-work, of which they were formerly constructed, and there is another application of iron, still more recent and important, which now falls to be mentioned.

One of the most prolific sources of foul air and bad smells in ships has been the putrescent matters absorbed and retained by gravel, sand, and other earthy substances, heretofore used for ballast. It is now found that these can be dispensed with, having been superseded by a recent invention, now coming into general use. Some part of the ballast

has at all times consisted of small masses or pigs of iron, but at present little else is used expressly for that purpose, what is farther required to give the requisite steadiness to the ship, being made up by the weight of the iron tanks now substituted for the lower tier of water-casks, and placed over the iron ballast. These vessels are cubes of four feet in dimensions, each of them capable of containing about two tons of water. This invention has in other respects a beneficial influence on health. Iron not being corruptible like wood, imparts no bad quality to the water, and by its durability ensures a more certain and ample supply; for the utmost distress has been known to arise from the decay of casks on long voyages and in remote parts of the world, where they cannot be replaced. The quantity that can be laid in at once in fitting out is also more abundant, than could be done by means of casks, a point of great importance to health on long voyages and cruises. A great deal of dangerous labour is also saved by this substitution; for these tanks are never removed, being filled and emptied by means of a forcing pump and a hose; whereas the hoisting up of casks from the hold at sea was one of the hardest and most dangerous duties of seamen, while it was also injurious to health, being performed in the midst of foul air. It has been truly remarked, that seamen are affected with ruptures* above the proportion of men

* The following account of the supply of trusses for the navy will convey an idea of this. During the last eight years, the
average

in general; and next to the violent pressure made on the abdomen, while seamen are lying on the yards, in the act of handing and reefing sails, such accidents may be chiefly imputed to the severe strains to which men are exposed in removing water casks from the hold for daily use at sea. The play of the machinery also employed in this operation has given occasion to severe and dangerous accidents.

Under the head of late improvements, conducive to the purity of air in ships, there falls to be mentioned another very recent and very important invention which has been adopted in their construction. This improvement was suggested and put in practice by Mr. Seppings, surveyor of the navy, and has been explained by him in the *Philosophical Transactions* for 1814. The purpose of the contrivance is to add to the strength, solidity, and durability of ships, and it is effected by the obliquity of the materials, and by filling up certain intervals and cavities with pieces of wood, caulked and pitched. It would be out of place here to enter into the merits of this plan, except in so far as relates to health, to which it is incidentally and collaterally condu-

average annual supply of trusses has been two thousand eight hundred and seventy-three single trusses, seven hundred and forty-three double trusses, and in the course of the last three years, ninety-eight bag trusses have been supplied to the navy. The trusses now preferred are those called *self-adjusting*, as they have been found to afford greater security than those formerly in use, to men employed in hard labour, who from their exertions and postures would be liable to a recurrence of the complaint.

cive in a variety of ways. First, By the obliteration of those cavities under the floor of the hold which used to be the receptacles of filth and of all manner of vermin dead and alive, proving perpetual reservoirs and sources of foul air and of offensive and noxious exhalations. Secondly, There is a circumstance in this form of construction still more favourable, if possible, to the purity and freshness of the air in the lower parts of the ship, so as in a great measure to supersede all other methods of ventilation. This consists of certain intervals left between the timbers of the frame which run up the sides of the ship, maintaining a constant communication of the open air with the hold and the spaces between decks. Thirdly, By virtue of this construction also a ship becomes less liable to leakage; so that by this and the new method of ballasting, all the unwholesomeness and offensiveness belonging to bilge water is done away: and it will appear hardly credible to succeeding generations, that the air in the well of a ship should become so contaminated, as in innumerable instances to produce instantaneous and irremediable suffocation. Two instances occurred to the author's own observation. Two ships of 74 guns, fitted in this manner, have lately returned from sea to be paid off; and it appears from their medical journals, that they have reaped every advantage with regard to health that could be wished or expected. The Albion in the course of eleven months, during three of which she was engaged in winter cruises on the coast of America, the most rough and

trying service in the world both for ships and men, had on an average no more than five on the sick list of a crew of 490 men; no infectious disorder arose; the only deaths from disease were one from pulmonic inflammation, which was by far the most prevailing complaint, and one from erysipelas; twelve were sent to the hospital, none of which were cases of fever, flux, or scurvy. Of this small number, the only serious cases were those of small-pox, consumption, and pulmonic inflammation. This ship was also fitted with iron tanks. The Tremendous, in the course of twenty-two months, employed chiefly in the North Sea, had no case of fever, flux, or scurvy, and only two deaths happened, one from pulmonic inflammation, and one from inflammation of the liver; nor did any infectious disorder arise, except the mumps* (*cynanche parotidea*), of which there were sixteen cases: the great majority of complaints were catarrhs: twelve were sent to hospitals, of which the only important cases were those of anasarca and pulmonic inflammation.

In reviewing the various ways in which these new methods of fitting ships of war affect health, it is truly pleasing to contemplate that admirable harmony by which every thing that is most perfect and excellent in subjects of art, as in the arrange-

* It is not uncommon for this complaint to spread in ships of war. See Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge, Vol. III. p. 431.

ments of nature, tend in all their bearings and influences to bring about the most salutary ends.

There is still another recent contrivance, which, though much less important, is in proof of the same principle, and is deserving of notice, as well from its having some influence on the purity of the air, as to demonstrate how much the human intellect is awakened and exercised in this age and country in all manner of useful inventions. What is alluded to, is the illuminators, or bull's eyes, as they are vulgarly called, consisting of thick portions of glass, in form of the segment of a sphere, inserted in the ports and decks for the admission of light in bad weather, when all the inlets of light and air are barred up. They afford great accommodation, particularly to small ships in the day-time, by superseding the use of candles, which are dangerous from the risk of fire, and tend to contaminate the air, already too close and foul.

There are some other points conducive to health in the present arrangements of the navy, which remain to be adverted to. The chief of these are the superior and excellent quality of all the articles of victualling; the plentiful supply of fresh meat and vegetables, while ships are in port, or within reach of it, as in the fleet stationed off Brest; the supply of as much wine as is equivalent to one half of the allowance of spirits; the use of cocoa for breakfast; and the general practice of vaccination.

The only head of improvement still remaining to be added to the enumeration in the present system of conducting the navy with regard to health, is the superior treatment of the sick. In the course of the last twenty years, the supply of medicines, and of the several articles of nourishment, has been greatly improved in quantity, quality, and selection: there has also since that time been appropriated to the sick a supply of bedding and other necessary articles conducive to cleanliness and comfort, and essential to their recovery. These arrangements began about twenty years ago, and have been gradually improved upon by the zeal, humanity, and good judgment of the officers, civil, military, and medical, attached to the sea-service. A great improvement has been made in the situation, fitting, and furniture of the *sick berth*, as it is called. The spot appropriated to the sick in ships of the line was formerly in the fore part of the lower gun-deck, a situation damp, ill-aired, and inconvenient. Its place is now under the fore-castle, furnished with all the requisites of an hospital, and with access to the head for necessary purposes. There are now therefore ample means of treating the diseases and wounds of men on board of their own ships, whether at sea or in harbour, which it was neither safe nor practicable to do in former times, when infection was rife; when the accommodations were unfavourable to recovery; when the supply of medicines and necessaries was inadequate;

and when there was a deficiency of medical and chirurgical skill.

It is from this that we can trace the late increased ratio of mortality at the hospitals, as appears in Table I. No slight cases are now sent to the hospitals as formerly, such cases being retained and cured on board : there are now no cases of scurvy, all of which, except such as were in the last extremities, or were complicated with other complaints, recovered at the hospital*. The sea service has also profited no doubt by the generally improved state of physic and surgery, and the encouragement so judiciously and liberally afforded to the medical service of the navy, under the administration of the late Lord Melville, by additional pay and the gratuitous supply of all the medicines†, which cannot fail to have attracted candidates of superior talents and education.

The causes of the improved state of health of the British navy appear therefore to consist in the ample and general supply of lemon juice, the su-

* It ought farther to be remarked, in justice to those who have the charge of these institutions, in order to account still more satisfactorily for this late increased proportion of mortality, that it has not been the practice for some years past, as formerly, to lodge the invalids in the hospitals on their arrival from abroad.

† Surgeons formerly found all their own medicines. A gratuitous supply of the principal medicines was directed in 1796, and an entire supply of them in 1804.

perior attention to cleanness, dryness, and ventilation, the improvement in victualling, vaccination, and superior medical treatment.

The moral effect of all these ought not to be overlooked. The encouragement administered to men's minds by kind treatment, and the anxious desire of officers to supply all their wants in sickness and in health, while they prove an inducement for good men to enter the service, cannot fail to add to that alacrity and spirit so favourable to health, and which have produced results in the course of the last twenty years, which will be proudly recorded in the annals of the country. And by a reverberated influence as it were, the contemplation of these great events, the fruits of successful valour, beget an elevation of mind still farther conducive to the sound state of the body, while it exalts and confirms those sentiments of patriotism and loyalty, which, backed by discipline and martial ardor, have so eminently distinguished our fleets and armies in the late contest. And we hope it will be admitted that the medical art has contributed its due share towards those resources by which this country has been saved, and Europe delivered, in the late war, a war unexampled in its duration, extent, and violence; and not less remarkable for the momentousness of the interests at stake, and the arduousness of the struggle, than it will be memorable for the final and complete success with which it has been crowned.

Much praise is due to the government of the country, and to the officers of the navy, for bringing about these salutary changes. It does not appear from the history of ancient times, nor of modern times till very lately, that the means of preserving the health of those engaged in war, whether by land or sea, was either studied or understood. We hear little or nothing of the medical establishments in war, among the polished * nations of antiquity, nor in the early history of Christendom; far less are they to be expected among barbarous nations, whether ancient or modern. It must however appear clear to every reflecting mind, that the care of the sick and wounded, is a matter equally of policy, humanity, and economy. Independently of men being sentient beings and fellow-creatures, they may also be considered as indispensable mechanical instruments. But in former times they had not the attention paid to them, which would have been due even to inanimate machines of equal utility; for there seem-

* Xenophon, Cæsar, and Polybius, who give the most minute details of war, make no mention of hospitals for the entertainment of the sick and wounded; nor does Vegetius, in his Treatise on the Art of War, ever touch upon this subject; but one of his commentators mentions, that each Roman legion (between three and four thousand men) had one medical officer attached to it, and that Augustus Cæsar, in compliment to the profession, and in gratitude to his physician Antonius Musa, under whose care he had recovered from a severe illness, decreed that these officers should in future be exempted from military duty. Vid. Vegetii de Re Militari, l. ii. Godescalci Stewechii Commentarius.

ed to be much more anxiety about preserving arms from rusting, and cordage from rotting, than about maintaining men in an effective state of health*. This cannot be asserted with regard to the sentiments and practices of the present officers of the navy, among whom there prevail enlightened and comprehensive conceptions of duty, arising out of a general diffusion of zeal, intelligence, and humanity; which, seconded by the like qualities in the civil authorities and the medical officers, has carried the health of the navy to a pitch, which the most sanguine well-wisher to the public welfare would not have ventured to predict five and thirty years ago.

The result of this has been not only to afford a great additional number of effective hands towards the accomplishment of those great ends for which navies are created and destined, namely, public defence, and the annoyance of the enemy, not to mention that naval renown of which as a nation we are so justly proud, but to promote economy to a degree which will appear incredible to those who have not paid close attention to this subject. It is computed that two ships of war are capable of more service by the present system, than three of the same rate in former times. Here is a saving of one third of the total amount of the national ex-

* There was no article in the public instructions issued to naval commanders, respecting ventilation and cleanliness, till the edition promulgated in 1806.

penditure, besides what is saved in the recruiting service, which has been officially calculated to amount to fifteen pounds for each man, and of hospital expenses which are estimated at five pounds for each man. This computation is exclusive of the higher bounties which would have been necessary under the reduced stock of seamen, which a high rate of mortality would have produced. Nay, it appears clear from what has been before stated, that if the mortality during the twenty years of the revolutionary war had been equal to what it was in 1779, the whole stock of seamen would have been exhausted; in which case men would not have been procurable by any bounties however exorbitant; for it has been stated that if the mortality of 1813 had been equal to that of 1779, there would have died annually six thousand, six hundred and seventy-four men more than have actually died; which in twenty years would have amounted to 135,480, a number very nearly equal to the whole* number of seamen and marines employed in the last years of the late war.

It must not be concealed, however, that the present rate of mortality of the navy, low as it is compared to what it was formerly, is very high when compared to that of subjects of the same age, in other situations of life. It will be found by calculations founded on the statement at page 492,

* See page 492, et seq.

that the average rate of mortality for the three last years of late war has been one in 30.25. This is a high rate for men of an age from twenty to forty years, of whom the great majority of seamen and marines consist. The Northampton Tables give a mortality of one in fifty-seven in this class of subjects, and these were constructed at a time when the general rate of mortality in England was greater than at present. From a computation founded on the experience of the last forty years, in the Equitable Assurance Office*, it appears that the mortality of persons at this age does not exceed one in one hundred and thirty. This calculation, however, is made on select cases, none but good lives being insured. From the best computation that can be made, the mortality in this class in the general population of England, is about one half the mortality of all ages, and this being one in forty-nine, according to the population returns of 1811, the mortality of subjects from twenty to forty ought to be one in ninety-eight; but as the decrease of mortality seems to be chiefly in infants (certainly so in the metropolis), and as consumptions have been observed to be more frequent of late among young adults, probably from a greater number of sickly children being saved, this rate of mortality is perhaps too low: it cannot be far wide of the truth, if we take it at one in eighty. But, be this as it may, one in

* Mr. Morgan, the very diligent and scientific actuary of this office, was so kind as to furnish the author with this information.

thirty is a very high rate of mortality; especially when it is considered that they are in some measure select cases, no sickly or unsound persons being admitted into the navy. In order, however, to make the comparison still more fair, a deduction of those who are killed in battle, or perish by drowning or other accidents inseparable from a life at sea, should be made from the naval deaths. There is good reason to believe that these violent deaths constitute one half of the mortality on board of ships of war. This will reduce the mortality from disease, to one half of what was stated. But on the other hand, in order to make a just calculation of the total rate of mortality, the deaths at hospitals ought to be included. In the year in question, 1813, the deaths at hospitals in all parts of the world amounted to nine hundred and seventy-seven. (See Table I.) These being added to the deaths on board from disease, and the number of men employed in that year being divided by the sum, the total mortality will appear to be one in forty-two, which is about double of that of subjects of the same age in civil life. It is greater than even that of prisoners* of war, which in 1813 was one in fifty-five; as appears by an account extracted from the public returns. It is also higher than that of the garrison of Gibraltar†, which is one in forty-nine, exclusive of the years in which the epidemic fever prevailed.

* See subjoined Illustration VI.

† See Vol. V. of these Transactions, p. 334.

It is a matter deserving of serious consideration, therefore, how far it is possible to improve still farther the health of seamen. The air at sea is more pure and salubrious than any where else. Nature therefore has done much, and as there is abundant proof of the power of art to controul the causes of disease, there is great encouragement in attempting something further in behalf of the health and lives of this most valuable class of subjects.

In order to effect this, it will be necessary to ascertain clearly what are the principal causes of disease, still existing in the navy.

From the examination of surgeons' journals, and hospital returns, it appears that the chief sources of mortality in the navy of late years have been pulmonic inflammation and fevers in temperate climates, and fevers and dysenteries in tropical climates. By the returns of the hospitals at home, a specimen of which is exhibited in Tables IV and V, it appears that pulmonic inflammation constitutes the largest head of mortality. This will farther appear very striking by comparing the proportion of pulmonic cases in the late returns of Haslar and Plymouth Hospitals, and Dr. Wilson's enumeration of diseases, with that in Dr. Lind's statement in 1780. These late cases are chiefly pulmonic consumptions, the *sequelæ* of pulmonic inflammation which had occurred at sea. The chief circumstance in a seaman's duty which exposes him to this inflammation, is his

being suddenly called from the too warm and close situation in which he sleeps, to take his watch in the night upon deck, or aloft. As this has always been the case, it may be asked how it happens that such complaints have been more frequent of late. The most rational answer to this seems to be, that, as the constitutions of seamen are now entirely free from scorbutic taint, and in a great measure from the debilitating influence of febrile poison, more sound and vigorous also from improved diet, cleanliness and ventilation, and at all times breathing a bracing atmosphere, are more prone to diseases of pure inflammation than formerly. In illustration of the superior purity of cool air being favourable to pulmonic inflammation, it may be alleged that the inhabitants of Swisserland, Savoy, and Sweden, are remarked to be more liable to these than the rest of Europe. If we were to reason farther upon it, an explanation might also be derived from that principle of the animal economy, by which it is found that the presence of one disease is in a great degree incompatible with the existence of another. Whatever the cause may be, the fact is undoubted. With regard to fevers, they are by no means subdued to the same degree that scurvy has been. In some of the last years of the late war, there occur in the surgeons' journals some examples of fever being generated and propagated in ships, to a great extent. In a 90 gun-ship, cruising in the channel in 1805, there occurred a hundred and seventeen cases of fever, five of which proved fatal. Intem-

perance also is occasionally unavoidable, particularly in port. In an 80 gun-ship which had been for some time at Plymouth in 1806, during which the men had indulged to excess in spirituous liquors, a fever broke out on her first going to sea, with which a hundred and six men were seized, of whom ten died. Such excesses are still more pernicious in tropical climates, and this, combined with other causes, has in the late war been productive of the most dreadful mortality. It appears, for example, from the first Table, that in the year 1804, while there was a high degree of health in the navy in Europe, there was an extraordinary loss of lives from disease in the West-Indies,

It remains to point out the means of counteracting these very serious evils. And first, with regard to pulmonic inflammation, which has been imputed to the too great heat and closeness of the places in which the men sleep, whereby they are generally in a state of perspiration when called into the open air, the utmost benefit would arise from rendering those spaces cooler. This should be done so as to avoid streams of cold air, which could easily be managed by the construction and due distribution of air-pipes, such as have been already described. But when Mr. Sepping's construction shall be universally carried into practice, no other provision for this purpose will be necessary. The extreme of cold ought equally to be avoided during sleep. Many pulmonic affections are caught by men fall-

ing asleep in the open air, on their watch. Proper clothing, particularly the wearing of flannel next the skin in cold climates and seasons, is an essential precaution against such inflammations, and it is almost unnecessary to mention that men should be induced, when practicable, to shift their clothes when wet, as one of the most material precautions against catarrhal affections, with which pulmonic inflammation generally commences.

Secondly. With regard to typhous fevers, it is plain that the well ascertained methods of preventing them, admit of a still higher degree of practical energy. It is also evident that no degree of discipline nor internal oeconomy can prevent or destroy morbid *effluvia*, and ensure the purity of air in a ship, till Mr. Sepping's improved construction and the new method of ballasting shall become general; nor till an ample and regular supply of soap shall be furnished. With regard to this last article, it is quite unaccountable how any thing so obvious should have been so long overlooked. The only conceivable objection is the expense that would be incurred. This could be obviated by its being supplied in the manner of slops and tobacco, that is, charged against the seamen's wages. But were it to be supplied at the expense of the state, it would be an inadequate statement and a narrow view of its benefits to say, that there would be a tenfold pecuniary saving in the tear and wear of men. Seamen are frequently not only censured but

punished for want of personal cleanliness, in circumstances in which they are without the means of practising it: for on foreign stations there is not every where a market, and if there were, seamen are generally in want of money to purchase it, no part of their wages being payable abroad. When this supply shall be granted, of which there can be no doubt in this humane and enlightened age, one half of it should consist of that sort of soap which is made with a double proportion of soda or barilla, as it answers remarkably well for scowering coarse articles with sea-water.

Thirdly. With regard to intemperance, naval officers are so fully persuaded of its baneful tendency, that no exhortation on this subject seems necessary. It is only to be wished that the possibility of abusing spirituous liquors were removed, this form of fermented liquors being more adverse to health than any other, and from the comparative smallness of their volume, their abuse is more easy, and their concealment less liable to detection. Much benefit is derivable from the late practice of substituting an equivalent in wine, for one half of the spirits; and still better effects have been experienced from an entire supply of wine*, to the exclusion of spirits. Intoxication not only renders men ineffective while under its influence, but ruins their constitutions, excites and predisposes to fevers, and gives occasion to various mechanical injuries of the most serious

* See a very striking example of an entire supply of wine, in Observations on the Diseases of Seamen, pages 51 and 83. 3d Edit.

nature and tendency. The great proportion of maniacs* among seamen is chiefly owing to injuries of the head, received in a state of intoxication, as might be naturally expected where the brain is already in a state of disturbance.

Tea is an article universally grateful to the British population, and has to a certain degree supplanted intoxicating liquors, in all ranks, to the great advantage of society. It would be wise therefore to encourage the farther use of it in the navy, there being no solid objection to the salubrity of it. To those who declaim against its supposed relaxing property, it may be answered by asking whether British courage and hardihood appear in the late exploits by sea and land less splendid than at Cressy or La Hogue, whether there is to be found in the results of the battles of Trafalgar and Waterloo, any proof of British nerves being unbraced by the habitual use of this beverage, and whether the physical and moral energies of our officers and men will not stand a comparison with those of their forefathers or of their enemies, neither of whom were drinkers of tea.

Fourthly. A great proportion of the mortality of the navy, is referable to the diseases peculiar to tropical climates, particularly in the West-Indies. Yet there are incontrovertible proofs, that fleets may serve on this station in a state of health, equal to that of any other part of the world. In the

* See subjoined Illustration VII.

month of April 1782, in a fleet of thirty-eight ships of the line and three frigates, manned with twenty-three thousand men, the deaths from disease were, of fevers, fifteen; of dysentery, seven; of scurvy, two; of small-pox, six; of mortification, one; of consumption, one; of general debility, one; in all thirty-three, and only ninety-seven were sent to hospitals. After the celebrated battle of the 12th of that month, the whole of this fleet rendezvoused at Port Royal, in Jamaica, and the greater part of it remained at anchor there during the following month of June. During this month, in thirty-two ships of the line and one frigate, there died of fever, an hundred and thirty-four; of dysentery, fifteen; of scurvy, none; of various other complaints, six; in all, an hundred and fifty-five. Not quite an hundred were sent to hospitals, and the majority of these were cases of fever. The mortality therefore, was more than four times greater than it was to windward, which was chiefly owing to the following causes:—first, The watering duty, on which the men caught the bilious remittent, or endemic fever of the climate; secondly, The clearing and fitting of the French prizes then in an extremely filthy state, from which they caught the yellow, or contagious fever (*typhus icteroides*). The writer finds, on consulting the notes which he then kept as physician to the fleet, that he first perceived the contagious nature of this fever, from observing, that those men who caught the fever, or were taken ill after returning to their own ships,

by having been exposed to the foul air of the French ships, communicated it to their medical and other attendants*: thirdly, The greater facility of procuring spirituous liquors, for intoxication, particularly with this species of fermented liquor, renders the body much more susceptible from all the causes of fever.

But the mortality of seamen in the West Indies during the American war was trifling, when compared with what it has been at different times in the course of the late revolutionary war. It appears by records kept at the Admiralty, that the naval force in the West-Indies in 1804, fluctuated from nine thousand to thirteen thousand in ships of all classes; whereas in 1782, in which there was a greater naval force under Lord Rodney than there had ever been before or has been since on any foreign station, the strength of this armament fluctuated from twenty-four to twenty-five thousand men. Yet on casting our eye on Table I. it appears that there died more in the hospitals of the West-Indies in 1804 than in 1782. This statement is still stronger, when it is considered, that those who died of wounds are included in the amount of deaths in 1782; whereas, in 1804, there was no action at sea. The mortality, therefore, was about

* This subject is well illustrated by Mr. Pym, Deputy Inspector of hospitals, in a work entitled *Observations on the Bilam Fever*. London, 1815.

three times greater in the latter than in the former period. It appears from the surgeons' journals on that station at that time, that there was a proportional mortality on board of ships. In one frigate, there were one hundred and seventy cases of fever, of which twenty-six proved fatal on board.

In order to recommend measures of future precaution, let us, if possible, detect the causes of this very great difference of sickness and mortality at different periods on the same station.

It is observable, that the mortality in fleets in the West-Indies, has been by far most severe in those wars in which there were great expeditions by land, as in that against Carthage in 1740, and those against Martinique and St. Domingo in the first years of the revolutionary war. There was no large army transported from England, nor any expedition of importance undertaken during the three years in which Lord Rodney commanded in the West-Indies. It is to this we trace the great difference in point of health at different periods. The vessels that used to be hired for transports, were for the most part very ill adapted to that service, generally over crowded; and during their long passages, in consequence of contrary winds and other obstacles, almost all of them arrived in the West-Indies in a sickly state, from stale provisions and scarcity of water; but above all from accumulated infection. When the typhous poison exists in a

slight degree, a warm climate dissipates it; but when in a concentrated state, it is exasperated by the heat of the atmosphere, and by the paludal exhalations which universally exist in the vicinity of West-India harbours: and it has been matter of observation that troops which were disembarked from the most crowded and infected of the transports, were those men who, though they had escaped illness on the passage, were attacked soonest and most malignantly by the fever of the climate. It ought also to be remarked, that the causes affecting the health of the troops in 1795 and 1796, were greatly aggravated by a fever then prevailing, generated in a ship which arrived in the islands in May 1793 under peculiar circumstances of long protracted crowding and foul air. And it may here be farther remarked, that malignant febrile infection has probably been kept up by being imported from time to time in slave ships, during those ages in which this traffic existed, the circumstances in the middle passage being such as were likely to generate contagion. The evils connected with the conveyance of troops have in a good measure been avoided by the attention of the Transport Board, in making better regulations; but more particularly by the employment of ships of war for transports*. This was eminently exemplified in the expedition to Egypt in 1798; for many of the troops, from various

* See a luminous exposition of the advantages of employing King's Ships in the transport service; in the speech of the late Lord Melville, in parliamentary debates for May, 1810.

causes of delay and change of destination, were six months on board of ships, yet disembarked at the Nile, in perfect health. The obvious remedy of the very serious evils from the old system of transports *, is the observance of those rules of ventilation and cleanness, which have been already amply described and dwelt upon.

The other principal cause of sickness in the West Indies, is the going on shore, whether for the purpose of wooding or watering, whereby they are at all times exposed to the endemial *miasmata*, or for any other purpose, whereby they may mix with the population, and inhale the morbid human effluvia, during those times in which epidemic fevers prevail. All such duties should be performed † by hired negroes, against which there can be no conceivable objection, but an economy demonstrably false, if there is any truth in the general scope of what has been said on this subject. It appears clearly from several incidents connected with the lamentable mortality in the West-Indies in the end of last century, and the beginning of this, that mortal diseases were contracted by seamen, not only by the wooding and watering duties, but simply by going on shore to the sea-port towns where infection existed: for ships have

* See subjoined Illustration VIII.

† The author has learnt since this went to press, that this has been practised for some years at Jamaica, with every advantage that could be wished.

been known to be exposed to the atmospheric heats of Africa, and other tropical regions, with impunity; but upon arriving at a port in the West-Indies, and some of the men going on shore, the most fatal epidemic immediately broke out*.

The only other remark that remains to be made on this subject is, that the abuse of spirituous liquors is vastly more pernicious in that climate than in cold and temperate climates. One main cause of the unexampled health of the fleet to windward in 1782, was the extraordinary vigilance exercised in precluding all access to this poisonous cordial. The admiral carried this so far as to send armed parties round that district of St. Lucia which lies adjacent to Gros-islet Bay, where the fleet lay at anchor, with orders to break all the stills that could be found, the island being then under martial law.

Fifthly. The last means to be proposed for farther promoting the health of seamen, is a more ample supply of articles of nourishment for the sick and convalescent. It is not enough that they be supplied with such small messes of refreshment as are fitting and necessary for a sick bed: the list of articles already provided is well selected, and sufficient for this purpose; but there are still wanting the materials of adequate and substantial diet,

* There are striking examples of this in the journals of the *Amelia* and the *Arab* frigates in the years 1804—1807.

adapted chiefly to convalescents. It may be answered that the portable soup answers this description; but this has never been a popular article of nourishment among seamen, nor is it sufficiently hearty, solid, or abundant for the purpose of recruiting strength. There is a new method of preserving fresh provisions not only in an uncorrupted state, but with their sound and natural flavour for several years, which has stood the most satisfactory test of experience, and is well known to many officers of the navy as an article of sea-store. This method* was invented and brought into use a few years ago by Mr. Appert. A quantity of provisions preserved in this manner sufficient for the sick and convalescent, might be furnished at a very moderate expense, and the form of preparation is so simple, that such a compendious and cheap method of managing it on a large scale, will probably be fallen upon, as to render it occasionally available to the whole of a ship's company.

The means proposed for the farther improve-

* The method is as follows: The meat is put into a pot, the bones being first removed, to be boiled in the ordinary way. When it is about three fourths boiled, it is taken out and put into jars, which are filled up with broth made from other portions of the same meat. The jars are then corked, luted, and put into bags; they are next placed in a boiler of cold water, heat is applied till the water boils, and the boiling temperature is kept up for an hour; the fire is then extinguished, the water drawn off from the boiler, and the bottles or jars taken out, which completes the process.

ment of the health of the navy, are therefore the taking of measures for the prevention of pulmonic inflammation, farther attention to ventilation, cleanliness, and temperance, the hindering of men from going on shore in the West-Indies, and the providing of a better diet for the sick and convalescent. Other minor particulars might be enumerated, such as the baking of soft bread on board of ships, which is quite practicable *, and besides the superior salubrity of it over biscuit, the more commodious stowage of flour is a great recommendation.

Whatever has been said with respect to the health of the navy, will apply to ships employed in commerce, but not in the same degree; for in order to man the guns on board of a ship of war, there are three times as many men including marines, as would be required merely for the purpose of navigating. Trading vessels therefore are not equally liable to the bad effects of crowding. Next to the Royal navy, the Marine of the East-India Company merits attention as a great public concern. The Directors of that Company very liberally permitted the members of this Society to examine their medical records. It appears that there was an allowance of lemon juice in the service, long before it was supplied to the King's ships, but the author was informed by the late Dr. John Hunter,

* See Diseases of Seamen. pp. 138 and 284. Third Ed.

physician to the East-India Company, that the supply was neither sufficiently ample nor good in quality. Since the practical proofs of its utility in the Royal Navy have become manifest, an adequate stock of good lemon juice has been supplied for the use of the mariners of the East-India ships, and of the troops conveyed in them, and with the same salutary effects. These ships not being so full of men as ships of war, fevers are not so apt to arise; and there being no crowded transports nor slave ships belonging to this service, it is from these circumstances that we can partly account for our Eastern Settlements not being subject to malignant fevers like the Western: I say partly, for with respect to endemial diseases, there are tendencies of particular spots and regions of the earth to particular disorders, which are quite inexplicable in our present state of knowledge. For instance, none of the ports of the Bay of Bengal are so subject to malignant fevers as the West-India harbours, though the creeks adjoining to the Delta of the Ganges are apparently similar. Batavia is the only port in that quarter of the world which can be compared to the Antilles in this respect. The swelled leg of Barbadoes and Cochin, and the *goitres* of certain mountainous districts, may serve as another example of the like local and unaccountable peculiarities. Dysentery and liver complaints, by a like peculiarity, are by far the most frequent and fatal disorders among seamen in India. The dysentery is probably owing to the

vitiated and acrimonious secretions of the liver ; this organ being much more liable to disease in India, at sea as well as at land, than on the Charibean stations. It is remarked in one of their surgeon's journals, that upon inspecting the body of some of those who had died of dysentery, he found abscesses in the livers of most of them. Early bleeding when the strength will bear it, a free use of calomel, and purging salts, and the discreet use of opium, were found the most efficacious remedies. It is a great advantage in this service, that the military forces are not conveyed in crowded transports, as on the expeditions to the West-Indies. The soldiers are very judiciously distributed in small detachments in the India ships, and it does not appear that on any occasion the deleterious poison of typhous fever has ever been generated in the aggravated degree in which it has appeared in other quarters of the world ; and this is no doubt one reason why the several presidencies of India have not been visited with the same dreadful scourge as our West-India settlements ; though the atmospheric heat is considerably more intense in the former, particularly in the presidency of Madras.

It is therefore highly satisfactory to contemplate the many proofs of substantial benefits that have accrued to the sea service in the last forty years, both in war and commerce, in all quarters of the world, from the zeal, humanity, and good judgment displayed in promoting the health of seamen. It has

been proved that it has added at least one third to the national force, and therefore subtracted in the same proportion from the national expenditure. It may be alleged by those who are disposed to question this position, that it is not by the improvement of health alone that ships are enabled to keep the sea at all seasons, and in all climates, for an indefinite length of time. This is certainly true, for the sheathing with copper, besides adding to the speed of ships, has proved of incalculable benefit by superseding the necessity of frequent repairs, whereby much time used to be wasted in harbours. In the year 1779 there were no ships of the line coppered except four, composing the squadron which Lord Rodney carried to the West-Indies, and the Bedford of 74 guns. In the year 1782, the whole British navy was coppered. It may farther be alleged, that by means of the recent discoveries in astronomy and mechanics, ships are enabled to keep the sea in prosecution of long cruises and voyages, whether for the purpose of war, commerce, or geographical science, without losing time and incurring danger by making land for the purpose of correcting longitude. All this is admitted. But these considerations are so far from disparaging the benefits of health, that they give it additional importance, for it is manifest that without the supply of lemon juice, and the other means of maintaining health for a sufficient length of time, the advantages of copper sheeting, the facilities in finding the longitude by chronometers, telescopes,

and astronomical tables, which do so much honour to the human intellect, particularly to the age and country in which we live, would be in a great measure frustrated. It would be of little avail that the depths of mathematical science, the elaborate researches of mechanical, optical, and chemical* philosophy, should be called to the aid of navigation, so as to co-operate so admirably in carrying it to its present exalted state of perfection, unless the means of preserving health were to keep pace with these mighty improvements. And on a review of this subject in all its extent and relations it will appear that there is not probably to be found in the whole range of human affairs, a finer illustration of the practical benefits of progressive knowledge in promoting the great interests of mankind; so that science, while it lends an aid, also sheds a grace and dignity over the useful arts; nor can there be a more striking proof of the maxim, that humanity, like every other moral virtue, is the best policy; nor could we light on a more happy example to elucidate that subsidiary influence and mutual dependence by which all the arts, sciences, and professions have a reciprocal bearing on each other, conspiring to bring about the greatest sum of human enjoyment, and affording a field of contemplation, in which cultivated, benevolent, and pious minds delight to expatiate.

* See subjoined Illustration IX.

TABLE I.

ABSTRACT of the Number of Seamen and Marines voted by Parliament for the Services of the Years 1779, 1782, 1794, 1804 and 1813 respectively, shewing the Numbers sent Sick to Hospitals, and Discharged therefrom, with the Numbers who Died therein in each respective Year, on the different Stations at Home and Abroad.

	Sent Sick.	Discharged.	Dead.	Run.
In 1779, 70,000 men voted.				
Home Station. { Haslar.	15141	11712	807	523
{ Plymouth.	6799	5736	174	96
{ Small Ports.	2286	4333	183	149
West Indies.....	3846	2425	467	221
East Indies				
Mediterranean	520	420	27	8
	28592	24676	1658	997
Proportion to the Number voted	1 in 2.45		1 in 42	
Proportion to the Sick.....			1 in 17	
In 1782, 100,000 men voted.				
Home Station. { Haslar.	9103	7054	513	122
{ Plymouth.	4784	3813	136	21
{ Small Ports.	9022	9974	447	483
West Indies.....	5104	3502	753	342
East Indies	2810	1251	337	21
Mediterranean	794	696	36	4
	31617	26290	2222	993
Proportion to the Number voted	1 in 3.2	.	1 in 45	
Proportion to the Sick.....			1 in 14.25	

	Sent Sick.	Discharged.	Dead.	Run.
In 1794, 85,000 Men voted.				
Home Station. { Haslar.	8949	7206	496	226
{ Plymouth.	4237	3790	164	17
{ Small Ports.	6062	7360	162	257
West Indies.....	733	525	58	32
East Indies.....	254	165	13	8
Mediterranean	1138	857	97	23
	21373	19903	990	563
Proportion to the Number voted	1 in 4		1 in 86	
Proportion to the Sick.....			1 in 21.6	
In 1804, 100,000 Men voted.				
Home Station. { Haslar.	1667	1251	140	2
{ Plymouth.	3888	3205	282	15
{ Small Ports.	2095	2187	203	28
West Indies	3215	2095	825	149
East Indies	932	592	105	17
Mediterranean	181	118	51	3
	11978	9448	1606	214
Proportion to the Number voted	1 in 8.33		1 in 62.25	
Proportion to the Sick.....			1 in 7.5	
In 1813, 140,000 Men voted.				
Home Station. { Haslar.	3592	3014	212	1
{ Plymouth.	3563	2948	231	3
{ Small Ports.	2578	1868	243	3
West Indies.....	2392	2212	179	6
East Indies	462	392	72	
Mediterranean	484	478	40	
	13071	10912	977	13
Proportion to the Number voted	1 in 10.75		1 in 143	
Proportion to the Sick.....			1 in 13.33	

TABLE II.

Shewing the number of Seamen, including Marines, annually voted by Parliament, for two distinct and equal Portions of War, with the Number annually sent sick on Shore, and to Hospital Ships on the Home Stations, during those Periods.

Years.	Number of Seamen.	
	Voted by Parliament.	Sent Sick.
1778	* 60,000	15,978
1779	70,000	24,226
1780	85,000	32,121
1781	90,000	23,812
1782	100,000	22,909
1783	110,000	13,577
1793	45,000	17,280
1794	85,000	19,248
1795	100,000	20,579
	745,000	189,730
1796	110,000	16,860
1797	120,000	20,544
1798	120,000	15,713
1799	120,000	14,608
1800	111,538	17,747
1801	131,538	15,082
1804	100,000	7,650
1805	120,000	8,083
1806	† 120,000	7,662
	1,053,076	123,949

* It may be remarked with regard to this and the preceding table, that the numbers voted being greater than the number actually employed, the inferences are not accurate. But these statements being comparative, the justness of the inferences will depend on the relative, and not the absolute number. Whoever wishes greater precision, may learn what abatement should be made from the number voted, by inspecting the statement in page 492, from which it appears that it is about one forty-seventh part.

† See Illustration I.

TABLE III.

Diseases admitted into the Royal Hospital at Haslar, in 1780.

Under the Physician's Care.	Under the Surgeon's Care.
Continued Fevers.....5539	Cutaneous Disorders 165
Intermittent Fevers 33	Venereal Disease 183
Small-pox 42	Ulcers, including Wounds and Abscesses 979
Measles 28	Fistula in Ano..... 8
Anginæ 3	Fistula in Perinæo 12
Pleurisy and Peripneumony 13	Burns 4
Asthma 61	Ruptures 3
Cough, Pain of Side, and Hæmoptoe 40	Disorders of the Testicles 16
Consumption 218	Contusions and Injuries of the Head..... 31
Rheumatism 327	Contusions of the Trunk and Limbs 102
Lumbago..... 4	Œdema of the Leg or Arm 4
Palsy 9	Luxations 8
Epilepsy 19	Fractures 60
Jaundice 1	Erysipelas 12
Dropsy 24	Ophthalmia and Disorders of the Eyes..... 17
Scurvy.....1457	Affections of the Urinary Organs..... 8
Scrophula 4	Amputations and Sundry Cases of Lameness 32
Mania 16	Total Surgical Cases1678
Headache and Vertigo..... 3	
Disorders of the Eyes 2	
———of the Ears 5	
———of the Abdomi- nal Viscera..... 3	
Cholic..... 1	
Flux 240	
Disorders of the Bladder... 16	
Gravel 32	In 1780 Physical Cases ...8140
Hæmorrhoids 2	——— Surgical Cases1678
Epistaxis..... 1	Total9818
Total Physical Cases8140	

Mem. In the above enumeration, out of the whole number of patients only 221 cases in making the collection have been omitted. The net number received into Haslar that year, was 10,839.

TABLE IV.

A Statement of the Diseases and Number of Patients admitted into the ROYAL NAVAL HOSPITAL at Plymouth, under the Care of one of the Physicians on that Establishment, in the Years 1806, 1807, 1808, and 1809; together with the Number of Deaths in each Year, during that Period.

DISEASE.	1806 No.		1807 No.		1808 No.		1809 No.	
	Rec ^d	Died.	Rec ^d	Died.	Rec ^d	Died.	Rec ^d	Died.
Fever	180	37	72	14	76	16	219	22
Pneumonia	39	15	73	14	76	46	58	5
Asthma	7		10	1	20	1	9	
Catarrh	33		12	1	5		12	
Phthisis	94	27	57	33	83	25	74	32
Rheumatism	59	2	39	1	50	1	47	1
Vertigo	2		1		2		2	
Epilepsy	15		3		13		3	
Mental Derangement	23		15		16		7	
Apoplexy	2	1	1				1	1
Phrenitis								1
Paralysis	5	2	2		7		10	
Diarrhœa	8	1	6	1	12	3	9	
Dysentery	15	4	12	2	13	4	43	11
Hepatitis	10	2	11	1	17		12	1
Icterus	2	1	4	1	1		3	
Enteritis	1		2		1			
Gastritis			1		1			
Cystitis			1		1			
Peritonitis			2		1		1	
Nephritis					1		1	
Dyspepsia	3		5		9		4	
Dropsy	9	2	8	3	9	4	15	3
Debility	34	3	19	1	34	6	20	4
Gout	4				1			
	545	97	356	73	449	106	550	83

DISEASE.	1806 No.		1807 No.		1808 No.		1809 No.	
	Rec ^d	Ded.	Rec ^d	Died.	Rec ^d	Died.	Rec ^d	Died.
Brought forward...	545	97	356	73	449	106	550	83
Hæmorrhoids.....	2		1		1		1	
Lepra.....	2		1		1		1	
Colica.....			2	2	1		1	1
Tympanitis.....	1		2		2		4	
Cynanche.....			2		2		4	
Scarlatina.....			3				3	
Erysipelas.....	1			1	2		1	
Constipatio	1				1	1		
Chorea			1					
Cholera			2		1		1	1
Diseased Stomach			1					
Incontinence of Urine	1		1		1		3	
Cephalalgia.....	1		1		1			
Scrofula	2		1		1			
Tetanus.....	1				1	1		
Hæmatemesis			2	1				
Scurvy	1		1					
Diseased Intestines....	1		2	1	1			
Hypochondria					1		1	
Gravel.....	1						1	
Worms.....					1		1	
Palpitatio Cordis	1		1		1		1	
	561	97	380	78	468	108	573	85

TABLE V.

ABSTRACT of MEDICAL REPORTS for the Months of January, May, and October, 1808, and January, May, and October, 1814.

MONTHS.	ROYAL HOSPITAL AT HASLAR.						ROYAL HOSPITAL AT PLYMOUTH.					
	Number now in the Hospital.	Received.	Discharged cured.	Died.	Harbour Duty.	Invalided. Unserviceable.	Number now in the Hospital.	Received.	Discharged cured.	Died.	Harbour Duty.	Invalided. Unserviceable.
<i>Fever.</i>	Jan. 1808	25	25	15	4		9	14	7	2	1	
	May	11	17	15	3		13	25	16	6		1
	October ..	3	4	4	2		5	9	3	2		
	Jan. 1814	32	24	15	2		15	15	18	1		
	May	43	51	22			70	74	19	3		
	October ..	17	13	14			7	10	14	1		
<i>Dysentery.</i>	Jan. 1808	9	10	13	2		4	2	1			
	May	4	6	1	1			1	1			
	October ..	26	40	23	4		1	2	2			
	Jan. 1814	13	11	7	2		3	4	2			
	May	4	5	2	2		2	2	1			
	October ..	13	12	22	2		3	4	2			
<i>Pulmonic Inflammation.</i>	Jan. 1808	38	37	14	5	4	36	34	5	6	4	5
	May	72	84	50	13	1	58	94	54	21		
	October ..	25	28	23	3	5	2	2	2	5		1
	Jan. 1814	111	83	36	7	4	11	10	23	1		
	May	83	77	68	7	8	17	21	8	2		
	October ..	51	35	49	10		18	22	11			

MONTHS.		ROYAL HOSPITAL AT HASLAR.						ROYAL HOSPITAL AT PLYMOUTH.					
		Number now in the Hospital.	Received.	Discharged cured.	Died.	Invalided.		Number now in the Hospital.	Received.	Discharged cured.	Died.	Invalided.	
						Harbour Duty.	Unserviceable.					Harbour Duty.	Unserviceable.
<i>Ulcers.</i>	Jan. 1808	124	44	32	1	2	6	41	23	4	1	1	1
	May.....	62	18	31			7	80	53	14			2
	October..	79	26	20	1	2	11	28	5	12		1	4
	Jan. 1814	68	29	18			5	51	19	17			
	May.....	36	14	17			6	29	15	17			9
	October..	60	26	24				51	35	11			10
<i>Wounds and Accidents.</i>	Jan. 1808	21	14	4		1	6	22	16	7	1		
	May.....	15	8	8	1	1	6	39	12	10		1	1
	October..	14	7	2			1	15	7	4			2
	Jan. 1814	29	11	6	2		7	56	21	7	1		7
	May.....	32	23	16			8	64	53	11	1		50
	October..	57	33	20	1		1	29	21	9	2		17
<i>Other Complaints.</i>	Jan. 1808	99	49	33	3	2	7	141	72	34	2	5	8
	May.....	81	62	27	6	3	15	163	116	49	7	1	24
	October..	92	60	24	5		6	99	59	52	3	9	16
	Jan. 1814	168	104	65	6	3	14	206	106	84	13	2	21
	May.....	102	87	82	8		10	260	217	102	7		74
	October..	141	76	56	3		7	216	120	101	9		24

TABLE VI.

Account of the Lunatic Officers, Seamen, and Marines, sent to Hoxton House, and variously disposed of for the last five years of the late war.

Year.	Received.	Discharged cured.	Discharged to their friends and otherwise.	Discharged to Bethlem.	Died.	Remaining on the 31st of December each year.
1809	76	10	3	43	9	112
1810	81	15	1	38	20	118
1811	85	4	3	53	16	128
1812	90	10		39	18	144
1813	93	17	7	55	13	140*
Total	425	56	14	228	76	

* Including the following officers, one captain, four lieutenants of the navy; three lieutenants of marines; one surgeon, one assistant surgeon, two carpenters, one gunner, one master's mate, one midshipman.

ILLUSTRATIONS.

I.

Page 493.

The gradual increase of the navy since the 16th century, may be learnt from historical records. It appears that in the reign of Queen Elizabeth, the navy, at the time of the Spanish armada, was manned by four thousand and eighty-eight mariners, six hundred and eighteen gunners, and one thousand five hundred and twenty-four soldiers, in all six thousand two hundred and thirty; not a twentieth part of the naval force at the end of the late war: that the number of seamen and marines in the year of the battle of La Hogue, 1692, was thirty thousand: that during the whole course of the first and second succession wars, (the former terminating in the peace of Utrecht, the latter in the peace of Aix-la-Chapelle,) it was forty thousand: that in the beginning of the seven years' war, it was fifty thousand, and rose to seventy thousand at the accession of his present Majesty; this increase having been made on occasion of the family compact of the House of Bourbon, and continued till the peace of 1763. The numbers in the American War, and the late war, have been stated in the preceding

tables. The great superiority of the late naval force will appear in a still stronger light, when it is considered that from the new methods of preserving the health of men, and of equipping ships, two ships are more than equivalent to three in point of efficient service.

II.

Page 493.

Extract of a letter from Dr. John Lind, late physician to Haslar Hospital.

The annexed state of Haslar Hospital in the year 1780, will shew the diseases to which the Royal Navy on the first equipment of fleets was then liable; and by comparing it with any statements you may obtain of it in the last war, will enable you to appreciate the effects of the improvements which have been since introduced into the navy, in correcting disease. On the 26th of October, 1778, the fleet under Admiral Keppel came into port, and before the end of December, sent three thousand six hundred sick to Haslar. This hospital contained one thousand eight hundred beds, of which one-fourth (four hundred and eighty) were in garret wards, suited only for convalescents, and restricted to about one-third the cubic space allowed for ventilation to beds in the

regular wards; to receive this number of patients three hundred additional beds were placed in the lobbies to the garret wards, and many other places not before destined for patients. From this you will be able to account for its appearing in your reports from the Transport Office, that the succeeding year 1779 commenced with two thousand two hundred and seventeen patients in the hospital. What, under the severe pressure of circumstances, was adopted as a temporary measure, was afterwards during the war acted upon as a permanent provision. In proportion as this receded from the regular establishment, the recoveries became fewer and more tedious. In 1779, on the return of the Channel Fleet, under Sir Charles Hardy, into port, it became sickly; two thousand five hundred were in the month of September received into hospitals from it, and above one thousand ill of fevers remained on board for want of room in the hospitals. On this occasion the prison hospital at Forton was added to the relief of Haslar, and accommodated more than two hundred patients; it continued in this employ till the succeeding autumn, when an influx of sick prisoners recalled it to its original destination. Within four months preceding the year, of whose diseases I am to state the account, six thousand and sixty-four sick had been sent to Haslar; and at the commencement of the year there were two thousand four hundred and forty-three patients in the hospitals. Early this year a convalescent ship,

the Mars, in which the patients, for the sake of holding a greater number, lay in hammocks instead of cradles, was added to the hospital establishment; and I may state, next year another convalescent ship, the Lioness, was joined to this, the former holding four hundred, the latter two hundred men. Some relief, though comparatively but a small one, had been obtained from private quarters throughout these difficulties.

The preceding account gives the cases of patients received into the hospital during the third year of the war. Strong infection had continued during the former years on board the receiving ships, which affected the ships fitting out, and generally the fleets on coming from sea into port; and a fleet of unusual magnitude, to which, in common with every department at the port, the hospital was disproportionate, from the strength of the enemy's combined fleets rendering it imprudent to divide, had remained collected at Spithead during a great part of the winter. The effect of this extended through the five first months of this year, and there was not afterwards experienced during the war any such fatal sickness.

Five thousand five hundred and thirty-nine cases of fever were admitted this year, of which three thousand seven hundred and fifty-five, or above two-thirds, were admitted in the first five months. The proportion of deaths to the general admissions

into the hospital, was during that period as one to eight; during the remaining seven months as one to nineteen. During the above five months also six hundred and ninety-seven died, being above two-thirds of the whole number of deaths (nine hundred and eighty-seven) which occurred that year in the hospital. Thirteen cases of pleurisy and peripneumony appear in the account; but during spring many others occurred combined with the prevailing fever.

One thousand four hundred and fifty-seven cases of scurvy are noted. This is the only instance that occurred of the channel fleet being in any considerable degree affected with this disease. In August after a ten weeks' cruise in the Bay of Biscay, when the beer and all fresh provisions had been exhausted, Admiral Geary's fleet returned to Portsmouth with two thousand four hundred men ill of the scurvy. Many of these were cured without being sent to the hospital, of whom some were landed and lodged in tents, others were allowed to walk in the fields through the day and return at night to their ships. Some had died on board, and two or three died in landing, otherwise this disorder proved fatal only in one or two exhausted cases.

Two hundred and forty fluxes were admitted. They were chiefly of a chronic nature, and in patients returned from abroad.

The proportion of fevers admitted this year was less than it had been during the two former years, and therefore the proportion of other diseases increased : it amounted this year to little more than two-thirds of all the other physical cases, and the proportion of physical cases was nearly five-sixths of all the patients admitted.

Of one thousand six hundred and seventy-eight surgical cases admitted, nine hundred and seventy-nine, or much above one-half had ulcers, including a few cases of wounds and abscess.

The gross number of admissions and deaths this year, as appearing by the agent's books, were admissions eleven thousand seven hundred and thirty-two, and deaths nine hundred and nine, being in the proportion of one death to thirteen admissions.

After this period the Channel fleet became more healthy, and Haslar was not so much exposed to fevers. The state of the war which had before always required it to winter in a body at Spit-head, then admitted of it being separated during winter, and divided between Portsmouth and Plymouth.

Besides the sick here enumerated, many scorbutics were sent on shore from ships, who were taken care of by their own people, and no account of them was taken at the hospital.

III.

Pages 495, 497, 503.

London, the 8th of July, 1815.

DEAR SIR,

I discover, by referring to the log-books of ships of the Channel fleet, under the command of the Earl of St. Vincent, that the fleet sailed from Torbay on the 27th of May, and returned to the same anchorage on the 26th of September, 1800, when out of 24 sail of the line, frigates, fire-ships, &c., composing the number returned to that roadstead, we had occasion to send only sixteen patients to an hospital.

During the above cruise the fleet had not one *fresh beef* dinner, and so strictly was the station off Brest preserved, that out of a hundred and twenty-one days, one only passed without communicating with the advanced post lying in the outer road of Brest Harbour, and the commander-in-chief ascertaining the enemy's force and position. This was a mode of cruising until then unknown, and utterly unpractised on that coast, but was then of vital importance to this country, as the French army, under the command of General Augereau, was embarked on board the French fleet, and waiting an opportunity of making their escape, the destination supposed to be Ireland, that country being then in a state of great commotion. At the very beginning of the

cruise, scurvy made its appearance, but by a timely supply of lemon juice was soon subdued. It was during this cruise that the commander-in-chief devoted himself most particularly to that system of improvement in the detail of the fleet, which has subsequently by its adoption diffused health through the British navy in all climates, viz. the establishment of a sick berth, the excellent arrangement in ships' store-rooms, by which ventilation is produced, cleanliness of men's persons, cleaning of decks remote from ventilation by dry rubbing, correcting damp and foul air by burning fires, introducing seamen's dress suitable to the climate, airing beds and bedding twice a week, when the weather would admit of it, &c. &c.; and of such consequence was the latter practice considered by the commander-in-chief, that he required a regular insertion of it in the ship's log, so that any deviation from this order in detached ships was liable to detection on rejoining the fleet. The introduction of these most salutary regulations so *entirely* belong to the Earl of St. Vincent, that hundreds of officers of the first character can attest, and the impartial historian record the same. No longer do we hear of ship fever laying up ships of the line, and their services lost to the country for many months at a time.

I am, dear Sir,

Very faithfully yours,

A. BAIRD.

IV.

Page 495.

The abuse of words has been truly stated by philosophers as one of the chief means of impeding the improvement and retarding the progress of useful knowledge. This cannot be better illustrated than by the perverted application of the term *scurvy*. Eugalenus, a German physician, in the beginning of the seventeenth century, laboured to prove that the scurvy, properly so called, almost all the forms of cutaneous complaints, hypochondria and various other maladies, ought to be considered as one disease, and treated accordingly. As he wrote in a confident and dogmatic tone, in bold and specious language, he was followed by most of the eminent writers of the seventeenth and beginning of the eighteenth century, particularly Boerhaave and Willis, whose works abound with the most puerile and absurd conceits on this subject. There would have been little harm in this folly, had they not built upon it a most incongruous and pernicious system of practice*. Kramer, who was physician to the im-

* The following sentiment of Dr. Lind on this subject is as well conceived as happily expressed. "There would indeed be some difficulty in conceiving how men of such wild fancies as were they who have been deemed the principal authors on the scurvy, and to whom we are indebted for this general name, should get into possession of that degree of fame which they have acquired, did we not perceive how much the world is disposed to admire whatever surprises; as if we were endowed with faculties

perial armies in Hungary from 1720 to 1730, relates that of four hundred men labouring under genuine scurvy, treated by one of the medical officers with mercury, so as to excite salivation, in conformity to the doctrines of his master Boerhaave, not one survived. This, though deeply mortifying to medical systems, is highly instructive, as an exhortation to study the rules of legitimate reasoning, the habit of discrimination, and the definite use of terms, while it ought to serve as a warning against the danger of idle speculations, gratuitous assumptions, and perverted language, so abhorrent to the simplicity and modesty of truth and nature. And has it not been chiefly owing to the attention being engrossed by scholastic sophistry and jargon, that the world was deprived for near two centuries of the practical benefits of the citric acid in scurvy? This discovery, the legitimate offspring of experience and observation, was overlaid as it were, and nearly stifled by that spurious mass of presumptuous error and systematic dulness, which constituted so large a proportion of what was miscalled Medical Science, in the 17th and great part of the 18th century.

to see through ordinary follies, while great absurdities strike us with an astonishment which overwhelms the powers of reason, and makes improbability even an additional motive to belief." It would appear that there are medical, as well as religious heresies and superstitions. This passage from Dr. Lind, relating to some of the fathers of modern physic, must remind every general reader of a parallel passage in one of the ancient fathers of the church.—*Credoq uia absurdum—Credo quia impossibile!*

V.

Page 496.

As a proof how much and how long this useful discovery was overlooked, it may be mentioned, that in the year 1753, a Fellow of the College of Physicians, and an eminent practitioner of that day, published a tract on the Sea Scurvy, in which he never adverts to the superior virtue of this medicine; and when the College was consulted on this subject by the government, they recommended chiefly vinegar, (see Mead's Works) which has been found by modern experience to possess but little power over this disease. Mead approves of this answer, and recommends also elixir of vitriol, which was supplied gratuitously to navy surgeons for many years. But though this mineral acid seems to palliate some of the symptoms, such as the hæmorrhages, it has been found of no real efficacy in effecting a cure. The same author quotes a striking instance of the efficacy of lemon juice, but evidently held it to be inferior to other acids. The very able and accomplished compiler of Anson's Voyage says, "The cure seems impossible by any remedy or by any management that can be employed." Dr. Gallesio of Savona, in an elaborate treatise on the *Genus Citrus*, published last year, takes no notice of this most interesting property of the citric acid: and it may be mentioned as a still farther proof of the neglect of this knowledge on the continent of

Europe, that Captain Flinders, in the * Narrative of his Voyage of Discovery, just published, relates, that when he arrived at one of the most remote points of his destination, his men were all in high health and strength, and with the fresh looks which they brought from Europe, by means of the ample supply of antiscorbutics, with which they were furnished when they left England in 1802; whereas the crew of a † French ship on the like service, was much affected with the scurvy. It is also matter of some wonder, that Captain Cooke's ship in the voyage of discovery to the southern hemisphere, in the years 1773 and 1774, was not furnished with this article; for the rob of lemons and oranges with which he was supplied, has not been found to possess the same virtue as the juice. The chief causes to which he ascribed the great health of his men in that voyage, and which are so eloquently commented on by Sir John Pringle (see Phil. Trans. 1776), were the use of malt, sour krout, and portable soup, together with extraordinary attention to cleanliness and ventilation. It may here be alleged that the scurvy was in this instance prevented without the use of this vaunted specific. But it appears from the narrative, that Captain Cooke was only fifteen weeks and three days on his longest cruise in search of a southern continent, which is not a sufficient time

* Vol. I. p. 226.

† The Geographe, Captain Baudin, Vol. I. p. 164. of this Voyage, drawn up by M. Peron, the naturalist.

to prove thoroughly the efficacy of his methods, and far short of the time for which ships have kept the sea exempt from this disease, by the virtue of lemon juice alone, under circumstances in which all other means had failed.

We have in the history of this remedy a striking example of the difficulties and delays which obstruct and retard the progress and adoption of practical truths*. In addition to what has been already stated, it may be mentioned that, in the year 1600, Commodore Lancaster sailed from England, on the 2d of April, with three other ships. They arrived in Saldanha Bay on the 1st of August; the Commodore's crew being in perfect

* Among other instances that might be quoted of the neglect and oblivion, and of the future revival, of useful medicines, one of the most striking in the history of physic is, that of the remedy for the gout, which within these few years has acquired considerable celebrity; and though it has been suspected of not answering to its original character, is now regaining the public confidence. Demetrius Papagomenos, a medical writer of Constantinople, in the thirteenth century, in a work *de Podagrâ* ascribes to the Hermodactyl the same virtues as belong to the secret medicine above alluded to, known by the name of *Eau medicinale de Husson*. It is sufficiently ascertained that the Hermodactyl is the root of the same plant as the *Colchicum Autumnale* of modern botanists; and it is also ascertained that it is to this last that the medicine in question owes its virtue.

The author is indebted to Sir Joseph Banks, P.R.S. for the knowledge of these particulars; and Sir Joseph allows him to say that he is satisfied with the accuracy of the preceding statement, and also that he has experienced in his own person, all the beneficial effects that have ever been ascribed to this medicine.

health, from the administration of three table-spoonfuls of lemon juice every morning to each of his men ; whereas the other ships were so sickly that they were unmanageable for want of hands, and the commander was obliged to send men on board to take in their sails, and hoist out their boats. Purchas's Pilgrim, Vol. I. p. 149.

VI.

Page 520.

No stronger proof of British humanity and attention to medical police can be adduced, than the state of health of the prisoners of war of late years. In former wars, fevers of the most malignant description used to break out in their places of confinement. Some complaints having been made of the pretended ill treatment and bad state of the prisoners of war at Dartmoor in the year 1811, an investigation was instituted by public authority, from which it appeared not only that these complaints were groundless, but that these unfortunate men were treated with the utmost care, and that of six thousand five hundred and seventy-two, the number of which they consisted, only thirty-six were in the hospital, and only one had died the preceding week. It appears farther by the weekly returns made to the Admiralty, that in the course of the year 1813, the average number of French prisoners in Great Britain was sixty-four

thousand six hundred and ninety-two. This was exclusive of Danish and American prisoners, and of those in foreign parts. The total number of deaths of French prisoners in all the *depôts* and hospital ships in Great Britain, amounted in the same year to one thousand one hundred and fifty-four, as appears by the same return, making one in fifty-five, as stated in the text. The following circumstances which are entirely unconnected with their treatment tended greatly to augment the mortality. 1st, The want of exercise and that depression of spirits which is inseparable from a state of captivity. 2ndly, The extreme profligacy of many of the prisoners, some of whom were so addicted to gaming, that they staked and lost their clothes, and even the articles of their subsistence. 3dly, The returns included the deaths of prisoners who had been reduced to the last extremity after a sea voyage, during which they laboured under sickness and wounds, particularly those from Spain, towards the end of this year, after the siege of St. Sebastian's and the battles of the Pyrennees. It is evident that these casualties belong to the calamities inseparable from war, and have no relation to the treatment of the resident prisoners. It is equally evident, that these owed their extraordinary degree of health, to the clean and airy habitations, the wholesome and abundant food, the comfortable clothing and good medical treatment with which they were supplied by the British government: and it is a matter of public expediency and of justice to the national

character, that these facts thus authenticated, should be proclaimed to the world as an answer to the calumnies that have been propagated on this subject, as an appeal to the candour of the enemy, and as a claim on his humanity and gratitude in the event of future wars.—This claim is farther enhanced by the remission in the late treaty of peace, of a large balance due by the French government for the maintenance of their prisoners.

VII.

Page 526.

While the author was a commissioner of sick and wounded seamen, ten recovered men were one day sent from Hoxton to be inspected. Upon questioning them it was found that in four of them the insanity had been occasioned by injuries of the head, of whom three had received these injuries while they were in a state of intoxication.

All the cases of lunacy which occur in the navy, are sent for cure and custody to an institution for the general reception of maniacs, situated at Hoxton, in the immediate vicinity of London. From thence such cases as are deemed likely to receive benefit from the treatment at Bethlem hospital, are removed thither, and if they do not recover in a year they are sent back, unless they are dangerous; in which case they are retained. Table VI.

presents a view of this branch of the service for the last five years of the late war, as extracted from the records of the Transport Office. By adding to the sum of the number recovered during that space of time, the number remaining on the 31st of December 1808, which appears to have been ninety-nine, and dividing the total by the number of deaths, the mortality is found to have been one in 6.8. By documents called for by a Committee of the House of Commons appointed to investigate the state of the madhouses throughout the kingdom, it appears, that the mortality calculated in like manner for Bethlem hospital, was one in eleven, and for St. Luke's, one in sixteen. This high rate of mortality at Hoxton, is an additional presumption in proof of that mismanagement in the institution, which was too apparent from the parliamentary investigation.

On comparing the number of lunatics entertained at Hoxton as stated in the Table, with the number of seamen and marines in Tables I. and II., and supposing the whole maniacs of the navy to be assembled there and at Bethlem, it would appear that more than one in a thousand is in that unfortunate situation; and considering the great length of the war, they may be considered as the whole number belonging to this portion of the community. There are no doubt some maniacs belonging to the ships of war on foreign stations, but their number must be inconsiderable, for they are as soon as possible

sent home as invalids, and lodged at Hoxton. This proportion favours the opinion stated in the text, that seamen are more liable to this malady, than the general population; for Dr. Powell*, on a gross computation, thinks, that the proportion of maniacs in the whole population of England, does not exceed one in seven thousand. It must be remarked, however, in abatement of what has been said of seamen, that they are of a timet of life by far the most liable to this malady; about one-third of the whole seizures being of persons from thirty to forty, and much more than one half is of persons from twenty to forty, the whole number admitted at Bethlem from the year 1784 to 1794 having been sixteen hundred and sixty-four, of whom five hundred and twenty-seven were aged between thirty and forty, and four hundred and eighty, from twenty to thirty. After making this allowance with respect to age, it will appear that the proportion among seamen is still greater than in civil life; the principal causes of which have been alleged to be, intemperance, and blows on the head. It appears from Mr. Haslam's work, that of sixteen hundred and sixty-four cases which were received at Bethlem in ten years, five hundred and seventy-four were discharged cured, and from

* Transactions of the College of Physicians, Vol. III. p. 140.

† See a work entitled, Observations on Madness and Melancholy, by John Haslam, apothecary to Bethlem Hospital; also a Treatise on Insanity, by M. Pinel, who makes the same remarks on the maniacs in France.

an account delivered to the Committee of the House of Commons it appears, that at St. Luke's there were admitted in the years 1811, 12, and 13, eight hundred and sixty, of whom three hundred and forty-eight were cured; and it appears from the preceding Table, that there were received in five years, four hundred and twenty-five seamen and marines, of whom fifty-six were discharged cured. It appears from all the statements, that there are little hopes of cure, unless it is effected in the first year after the first seizure. It has been judged advisable by the author to record these facts as matter of future comparison, also as the means and motives of future improvement, and this is the more necessary, as some of them are taken from unpublished documents.

VIII.

Page 531.

The beneficial effects of the ventilation of transports cannot be better evinced than by the following example. In consequence of the very great mortality of convicts on their passage to Botany Bay in hired transports, in which no attention had been paid to counteract the causes of infectious disorders, a large ship named the *Glatton*, about equal in tonnage to a sixty-four gun ship, originally intended for the East-India trade, which had

been purchased by government to serve as a ship of war, was, soon after the peace of Amiens, destined to transport the felons. While she was under repair, Lord Chichester, the Secretary of State for the Home Department, sent Count Rumford, Mr. Graham, a police magistrate, and the writer of this, to Chatham, in order to give directions for fitting up that ship, so as to ensure proper ventilation. The means recommended were the air-tubes already described, passing from the places where the convicts were to sleep, along the side of the ship to the open air; a narrow opening amidships, the whole length of the upper deck, protected by a covering in form of a pent-house a few inches above it to prevent rain or other things from falling into it, and scuttles in the side to open and shut according to the state of the weather. By the help of these contrivances, together with due attention to cleanliness and diet, and by not being over-crowded, the voyage was performed without either fever, flux, or scurvy arising, and without any loss of lives, except five male and two female convicts from chronic disorders. The convicts consisted of 269 males, and 131 females, besides 31 women and children. She sailed from Portsmouth on the 23d of September 1802, and passed the same port on the 22d September 1803, in proceeding up Channel to the Downs, having returned by Cape Horn, and having made the voyage of circumnavigation in three hundred and sixty-four days, of which she was only two hundred and se-

venty-seven at sea, having been at anchor six days at Madeira, fourteen at Rio Janeiro, and sixty-seven at Botany Bay. The longest time which she was at sea on the outward passage, was eighty-eight days, having sailed from Rio Janeiro on the 14th of December, and arrived at New South Wales on the 12th of March. She sailed from thence on the 22d of May, and touched at no port till she arrived in England ; so that she was seventeen weeks and five days at sea. The complement of men with which she sailed from England, was one hundred and seventy, not one of whom died on the whole voyage. Let this detail serve as a record of the perfection to which navigation as well as preventive medicine had attained in the beginning of the 19th century.

IX.

Page 538.

The chemical preparations more particularly alluded to here are the composition-metal as it is called, employed for hanging the rudder, and for fastening the sheets of copper to the ship, being adapted for these purposes by its peculiar property of not being corroded by this metal : the preparation of metals adapted by their different degrees of expansibility in different degrees of temperature,

to the delicate adjustments of chronometrical mechanism: also the different sorts of glass, which by their respective habitudes to transmitted light, correct the confusion and error produced by refraction in the lenses of telescopes. This is an improvement which Sir Isaac Newton at one time expressed a despair of ever being attained*. And we have seen a similar despair with regard to the cure of scurvy, expressed in a passage already† quoted from the Narrative of Anson's Voyage, reputed and believed to have been written by Mr. Robins, one of the ablest mathematicians and best writers of the last century. Mr. Robins, therefore, pronounces scurvy to be an *immedicable* disease. It would not perhaps have been thought too presumptuous if any one in like manner had predicted twenty years ago that the discovery of a safe, certain, easy, and speedy method of eradicating the small-pox, was beyond the reach of human sagacity, which has however been since realized. When we perceive therefore that certain useful and important

* See Newton's Optics, Book i. Part II. Prop. VII. and Vol. IV. Page 68 of Horsley's edition of his works. Yet Newton afterwards (as if it had been pre-ordained, that this individual should, in every point of science which he touched upon, maintain his superiority over all the rest of the human species), in a letter to Mr. Oldenburg in the year 1672, (Horsley's ed. Vol. IV. Page 322.) expresses some hopes of this object being attainable, and plainly hints at the principle upon which Dollond, about eighty years afterwards, (see Phil. Trans. for 1759 and 1765) founded his invention of the achromatic telescope.

† See p. 559.

discoveries and inventions have been made, some of them drawn from the deepest recesses of science, others found lurking under the very surface of nature, which the most profound and enlightened minds could beforehand hardly conceive, or believe to be possible, does it not afford a cheering and consolatory prospect, "amidst the thousand shocks that flesh is heir to," that there may still be in store for us, in the boundless progression and endless combinations of knowledge, other hidden means of advancing human happiness, of mitigating human misery, and of making accessions to the power of man over nature "which have not yet been dreamt of in our philosophy*"? .

* The Marine Barometer might have been enumerated as another instance of the application of modern science to useful purposes, being an instrument, which, though not directly subservient to health, is occasionally the means of saving life, by giving notice of the approach of danger, and therefore, the mention of it is not here altogether out of place. A very recent instance of this occurred in the hurricane of the 9th of August last, the most violent that has been known on the Atlantic Ocean for many years. A fleet of merchant ships from the West-Indies, under convoy of the Warrior of seventy-four guns, commanded by Captain Rodd, was exposed to its fury. In the course of a few hours before the gale came on, which it did with sudden violence, the quicksilver fell from 30.7 to 29.3 inches. The intelligent and vigilant commander knew well how to avail himself of this alarming prognostic, by taking in sails, striking top-masts, securing the guns, and making signal to the ships in company to do the same. His own ship, and many others, were probably saved from foundering by this early precaution; but such was the violence of the storm, that several ships were lost notwithstanding this warning.

X.

After this article of the Transactions was put to press, the author found in the Journal Office of the House of Commons, and in the records of the Admiralty, certain documents which promised to throw light on the mortality in the navy in former wars. In the end of the year 1762, the House of Commons issued a precept requiring an account of the number of seamen and marines raised and lost in the preceding seven years' war. The return to this was, that one hundred and eighty-four thousand eight hundred and ninety-nine had been raised, and one hundred and thirty-three thousand seven hundred and eight had been lost, besides one thousand five hundred and twelve, who had been killed. The number under the head of *lost* has been considered as the amount of the deaths from disease, and this construction of it has been given out to the world; but the author thinking this incredible, consulted the records of the Navy Office, and found that all those men who had been sent to hospitals and never returned to their ships, all those who had been discharged as unserviceable, also all deserters were included. This gave no information therefore as to the degree of sickness and mortality. But the House of Commons having required an account of the number of *deaths* in the American war, the Navy Board returned an account of the dead and killed only, as in the annexed

table. It appears from this interesting document, that the total deaths in 1779 was five thousand two hundred and seventy-seven. The deaths at hospitals that year were one thousand six hundred and fifty-eight*, which leaves only three thousand six hundred and nineteen for the deaths on board of ships. This does not accord with the statements in pages 492 and 493, but as there was not time for all the ships to have returned from foreign service, and as the war was not then at an end, a complete account could not be taken of the deaths, and hence the qualifying clause in the title of the annexed Table, *as far as the accounts can be made up.*

* See Table I.

Number of Seamen and Marines raised from the 29th of September, 1774, to the 29th of September, 1780, also the number who have died and who have been killed, from the 1st of January, 1776, to the 1st of January, 1781, as far as the accounts can be made up.

Dates.	Raised.	Dead.	Killed.	Total.
1774	345			
1775	4,735			
1776	21,565	1,679	105	1,784
1777	37,457	3,247	40	3,287
1778	41,847	4,801	254	5,055
1779	41,831	4,726	551	5,277
1780	28,210	4,092	293	4,385
Total	175,990	18,545	1,243	19,788