THE SCALE OF MEDICINES

WELLS

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WITH WHICH

MERCHANT VESSELS ARE TO BE FURNISHED.

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MERCHANT VESSELS ARE TO BE FURNISHED,

BY COMMAND OF THE PRIVY COUNCIL FOR TRADE;

WITH

OBSERVATIONS ON THE MEANS OF

PRESERVING THE HEALTH OF SEAMEN;

DIRECTIONS FOR THE USE OF THE MEDICINES, AND FOR THE TREATMENT OF VARIOUS ACCIDENTS AND DISEASES.

BY

T. SPENCER WELLS, F.R.C.S.,

FORMERLY SURGEON, ROYAL NAVY; CHIEF SURGEON TO THE BRITISH HOSPITALS AT SMYRNA AND RENKIOI, DURING THE RUSSIAN WAR.

SECOND EDITION.—SEVENTH THOUSAND.

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DEDICATION

TO

SIR WILLIAM BURNETT, K.C.B., K.C.H., F.R.S.,

DIRECTOR-GENERAL OF THE MEDICAL DEPARTMENT OF THE NAVY, ETC.

SIR,

You have done so much to improve the condition, increase the comforts, and thereby add to the efficiency of the Seamen of the Royal Navy, that a work in which the principles you have advocated so long and so successfully are adapted to the use of Merchant Seamen could be dedicated to no one with so much propriety as to yourself. Allow me, therefore, thus to secure, by your permission and approval, an authority my little work could not otherwise possess, and at the same time to express the gratitude I, in common with the whole body of Medical Officers of the Navy, feel for the exertions you have made so perseveringly to raise the character and position of the Department of which you are Chief.

I have the honour to be, Sir,

Your faithful and obliged servant,

T. SPENCER WELLS.

London, January 1, 1851.

PREFACE TO THE SECOND EDITION.

Six thousand copies of the first edition of this work having been disposed of, and the demand since it has been out of print having been continuous, it has been determined to bring out a second edition. No alteration of importance has been made in arrangement, but each page has been carefully revised. The author has aimed at brevity, simplicity, and utility; and trusts that the second edition of his little work may be as well received by those for whom it is written as the first. The latest alterations made in the "Scale of Medicines," as well as the clauses of the 'Registration Act,' 'Merchant Shipping Act, 1854,' and the 'Passengers' Act, 1855,' relating to the health of seamen, have been added to the present edition.

Upper Grosvenor Street, London;
December, 1860.

PREFACE TO THE FIRST EDITION.

In 1844 the Scale of Medicines with which every merchant-vessel, not carrying a surgeon, was to be furnished, in pursuance of Act 7 and 8 Vic., cap. 112, by command of the Lords of the Admiralty, was drawn up under the direction and superintendence of Sir William Burnett, Director-General of the Medical Department of the Navy, by the late Dr. M'Arthur.

Dr. M'Arthur wrote a number of observations upon some of the accidents and diseases to which seamen are more peculiarly liable, with directions calculated to preserve the health and promote the comfort of this important class of our countrymen. These observations and directions were published with the "Scale of Medicines," and the little book so formed passed through five large editions in four years; a most certain proof that such a work was required, and found to be useful.

During the late Parliamentary session Mr. Labouchere's Mercantile Marine Act was passed, and the duty of issuing the "Scale of Medicines" for merchant-vessels was transferred from the Lords of the Admiralty to the Board of

Trade. Accordingly a new scale has just been issued, and the publishers of Dr. M'Arthur's book have obtained the work now offered to the public from Mr. Spencer Wells, framed upon a similar plan, and with the same objects as that of Dr. M'Arthur.

The extensive circulation of the former work has been the best possible test of what was exactly required by merchant-seamen in the way of medical advice and sanitary instruction, and of the kind of information best adapted to their wants and capacities. It is hoped that the present work will be found an improvement upon its predecessor, many additions having been made which past experience appeared to render necessary. It is submitted to the public with the sincere hope that it may prove useful in preserving the health of seamen, may add to their comforts, and thereby increase the efficiency of our mercantile marine. Extreme simplicity has been studied, and a familiar mode of address adopted, in order to render the advice and directions of the author easily comprehended and executed. Wood-cuts have been added for the same purpose. The principal objects have been:—

I. To avoid all technical phrases, and to inform men of average intelligence how they may preserve health and avoid disease, by following certain simple rules.

II. When disease arises, how they may place the patient under the most favorable circumstances for recovery, and DO NO HARM by the improper use of medicines; and,

III. If accidents occur, either on board where the medicine-chest is at hand, or on shore far from all assistance, what is to be done to avoid immediate danger, and prevent, as far as possible, future ill-consequences.

A medical man would do many things when treating some of the accidents and diseases mentioned in the following pages, which it would be most dangerous for any one not medically educated to attempt. Such things will not be alluded to, but simple means alone described and recommended, which any man of common sense can easily understand and safely adopt.

As many of the accidents and diseases to which seamen are liable are also common on shore, in our seaports, colonies, and in many rural districts where medical aid cannot be obtained readily—and as the principles to be observed for the preservation of health, as well as for the prevention and cure of disease, and the treatment of accidents, are the same, whether ships or houses be inhabited—it is hoped that this little work will prove useful to persons living in the country far from a medical man, to clergymen, missionaries, and colonists, and to the numerous class of yachtsmen and travellers.

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ACTS OF PARLIAMENT,

7 AND 8 VICTORIÆ, CAP. 112;' THE 'MERCANTILE MARINE ACT, 1850;' THE 'ACT FOR REGISTERING BIRTHS, DEATHS, AND MARRIAGES;' THE 'MERCHANT SHIPPING ACT, 1854,' AND THE 'PASSENGERS' ACT, 1855.'

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18. "And be it enacted, that every ship navigating between the United Kingdom and any place out of the same shall have, and keep constantly on board, a sufficient supply of medicines and medicaments suitable to accidents and diseases arising on sea voyages, in accordance with the scale which shall, from time to time, or at any time, be issued by the Lord High Admiral, or by the Commissioners for executing the office of Lord High Admiral,* and published in the London Gazette; and every ship (except those bound to European ports, or to ports in the Mediterranean Sea) shall also have on board a sufficient quantity of lime or lemon juice, sugar, and vinegar, to be served out to the crew

* Now transferred to the 'Board of Trade;' see Clause 63 of the Mercantile Marine Act.

whenever they shall have been consuming salt provisions for ten days: the lime or lemon juice and sugar daily, after the rate of half an ounce each per day; and the vinegar weekly, at the rate of half a pint per week to each person, so long as the consumption of salt provisions be continued. And in case any default shall be made in providing and keeping such medicines, medicaments, and lime or lemon juice, sugar, and vinegar, the owner of the ship shall incur a penalty of £20 for each and every default; and in case of default of serving out such lime or lemon juice, sugar, or vinegar, as aforesaid, the master shall incur a penalty of £5 for each and every default; and in case the master or any seaman shall receive any hurt or injury in the service of the ship, the expense of providing the necessary surgical and medical advice, with attendance and medicines, and for his subsistence until he shall have been cured, or shall have been brought back to some port of the United Kingdom, shall, together with the costs of his conveyance to the United Kingdom, be defrayed by the said owner of the ship, without any deduction whatever on that account from the wages of such master or seamen; and, if paid by any officer or other person on behalf of Her Majesty, the amount, with full costs of suit, shall be recovered as a debt due to Her Majesty; and every ship having one hundred persons or upwards on board, and every ship, the voyage of which shall be deemed under the provisions of the Act passed in the sixth year of the reign of Her present Majesty, intituled 'An Act for Regulating the Carriage of Passengers in Merchant Vessels, to exceed twelve weeks, having fifty persons or upwards on board,' shall have on board, as one of her complement, some person duly authorised by law to practise

in this kingdom as a physician, surgeon, or apothecary; and in case of every default the owner shall incur a penalty not exceeding £100."

'*Mercantile Marine Act*, 1850.'

Clause 62. "And be it enacted, that every place in any 'ship' occupied by 'seamen' or apprentices, and appropriated to their use, shall have, for every person, a space of not less than nine superficial feet for every adult, measured on the deck or floor of such place, which shall be kept free from stores or goods of any kind not being their personal property in use during the voyage; and every such place shall be securely and properly constructed and well ventilated.

63. "And be it enacted, that the duty of issuing a scale of medicines and medicaments, which is by the 'General Merchant Seamen's Act' imposed on the Lord High Admiral, or the Commissioners for executing his office, shall be transferred to the 'Board of Trade.'

64. "And be it enacted, that in the case of 'ships' bound to any ports in 'Her Majesty's dominions' in North America, the 'Board of Trade' may, by general regulations, dispense with the observance of so much of the 'General Merchant Seaman's Act' as relates to lime or lemon juice, sugar, and vinegar, and may limit such dispensation to any class of such 'ships,' and impose any conditions it may think fit, and may revoke any such dispensation.

65. "And be it enacted, that the 'Board of Trade' and the Local Marine Boards may appoint proper medical inspectors to inspect the medicines, medicaments, lime or lemon juice, sugar, and vinegar required by the 'General Merchant Seamen's Act,' and may, subject to the sanction of

the 'Board of Trade,' fix the remuneration of such persons; and such medical inspectors shall, for the purposes of such inspection, have the same powers as the special inspectors hereinafter mentioned; and whenever any such medical inspector reports to the collector or comptroller of customs in any port, and at the same time to the master, owner, or consignee of any 'ship' lying therein, which is required to carry such articles, that in such 'ship' the said articles, or any of them, are deficient in quantity or quality, or are placed in improper vessels, the master of such 'ship,' before proceeding to sea, shall produce to such collector or comptroller a certificate under the hand of such medical inspector, or of some other medical inspector, to the effect that such deficiency has been supplied or remedied, or that such improper vessels have been replaced by proper vessels, as the case may be; and if such 'ship' proceeds to sea without the production of such certificate, the owner, master, or consignee thereof shall be liable to a penalty not exceeding twenty pounds: Provided that every such inspector, if required by timely notice in writing from the master, owner, or consignee, shall make his inspection three days at least before the 'ship' proceeds to sea, and if the result of the inspection is satisfactory shall not again make inspection before the commencement of the voyage, unless he has reason to suspect that some of the articles inspected have been subsequently removed, injured, or destroyed.

66. "And be it enacted, that any person who sells or supplies any medicines, medicaments, lime or lemon juice, of bad quality, for the use of any ship, shall for each offence be liable to a penalty not exceeding twenty pounds.

67. "And be it enacted, that every master shall keep on board proper weights and measures, for the purpose of

determining the quantities of the several provisions and articles served out, and shall allow the same to be used at the time of serving out in the presence of a witness, whenever any dispute arises about such quantities.

68. "And be it enacted, that if any place in any 'ship' occupied by 'seamen' or apprentices, and appropriated to their use, is not in the whole sufficiently large to give such space as hereinbefore required, or if any such place is not securely and properly constructed and well ventilated, the owner shall, for every offence, be liable to a penalty not exceeding £20; and if any such space as aforesaid is not kept free from goods and stores as aforesaid, or if proper weights and measures are not kept or allowed to be used as hereinbefore directed, the master shall, for every offence, be liable to a penalty not exceeding £10."

NOTICE TO ALL CAPTAINS AND COMMANDING OFFICERS OF BRITISH VESSELS RESPECTING REGISTRY OF BIRTHS AND DEATHS AT SEA.

The Registrar-General of Births, Deaths, and Marriages in England hereby directs the attention of all captains or commanding officers of British vessels to the following Provisions of the Act of the 6th and 7th of William IV, cap. 86, entitled '*An Act for Registering Births, Deaths, and Marriages in England*,' namely:

In the 21st Section it is enacted, "That if any child of an English parent shall be born at sea, on board of a British

vessel, the captain or commanding officer of the vessel on board of which the said child shall have been born shall forthwith make a minute of the several particulars hereinbefore required to be inserted in the Register, touching the birth of such child, so far as the same may be known, and the name of the vessel wherein the birth took place, and shall, on the arrival of the vessel in any port of the United Kingdom, or by any other sooner opportunity, send a certificate of the said minute, through the Post-office, to the Registrar-General."

In the 26th Section of the same Act, it is enacted, "That if any of His Majesty's English subjects shall die at sea, on board of a British vessel, the captain or commanding officer of the vessel on board of which such death shall have happened shall forthwith make a minute of the several particulars hereinbefore required to be inserted in the Register, touching such death, so far as the same may be known, and the name of the vessel wherein the death took place, and shall, on the arrival of such vessel in any port of the United Kingdom, or by any other sooner opportunity, send a certificate of the said minute, through the Post-office, to the Registrar-General."

The following are the Schedules containing the particulars required to be inserted in the Register, so far as the same may be known :—

185 .—BIRTH of a Child at Sea, on Board of [*here name the Vessel*].

When Born.	Name, if any.	Sex.	Name and Surname of Father.	Name and Maiden Surname of Mother.	Rank or Profession of Father.	Signature of Master of the Ship.

185 .—DEATH at Sea, on Board of [*here name the Vessel*].

When Died.	Name and Surname.	Sex.	Age.	Rank or Profession.	Cause of Death.	Signature of Master of the Ship.

The minute should be made in the Ship's Log, and a copy of the minute certified in the following manner, or to the like effect, must be sent through the Post-office, by the first opportunity, addressed to the Registrar-General of Births, Deaths, and Marriages, *General Register Office, Somerset House, London.*

"I hereby certify that this is a true copy of the minute made in the Log of on the day of 18

"Witness my hand this day of 18

(SIGNED)

"*Captain (or Commanding Officer) of*

[Here state the name of the vessel].

Note.—The word "English" includes only natives of England and Wales. The word "British" includes vessels belonging to all parts of the British Empire.

ACCOMMODATION FOR SEAMEN ON BOARD MERCHANT SHIPS.

Attention is called to the following provision of the 'Merchant Shipping Act, 1854,' sect. 231.

The following Rules shall be observed with respect to accommodation on board (that is to say):

1. Every place in any ship occupied by seamen or apprentices, and appropriated to their use, shall have for every such seaman or apprentice, if they sleep in hammocks, a space of not less than 9 superficial feet, and if they do not sleep in hammocks, a space of not less than 12 superficial feet, measured on the deck or floor of such place.

2. Every such place shall either be 6 feet in height from deck to deck, or shall have for every seaman and apprentice, if they sleep in hammocks, a space of not less than 54 cubic feet, and if they do not sleep in hammocks, a space of not less than 72 cubic feet.
3. Every such place shall be kept free from stores or goods of any kind, not being the personal property of the crew, in use during the voyage.
4. Every such place shall be properly caulked, and in all other respects securely and properly constructed and well ventilated.

And if any such place in any ship is not in the whole sufficiently large to give such space for each seaman and apprentice as hereinbefore required, or is not properly caulked, and in all other respects securely and properly constructed and well ventilated, the owner shall for every such failure to comply with the provisions of this section incur a penalty not exceeding £20; and if any such space as aforesaid is not kept free from goods and stores as aforesaid, the master shall for every such failure to comply with the provisions of this section incur a penalty not exceeding £10.

ON THE

PRESERVATION OF HEALTH, AND PREVENTION OF DISEASE.

A LARGE proportion of the diseases which affect seamen may be prevented. The causes upon which the diseases depend may be removed or avoided. The official reports of the Registrar-General of Births and Deaths afford the most abundant and conclusive proof that disease is far more prevalent in crowded, dirty dwellings than in cleaner and larger houses. A ship is a floating dwelling; and just as the health of people ashore varies with the state of their houses, so the health of seamen varies with the state of their ships. In large, well-disciplined ships, the average health of seamen and passengers is above that of people of the same ages ashore; but in crowded, dirty, ill-ventilated vessels, diseases become as prevalent and as fatal as in the narrowest alleys and most filthy cellars on land. There can be little doubt, also, that if the ill effects of crowding, filth, and defective ventilation were not resisted by robust men at the most vigorous period of life, who, when on deck, are breathing pure air, disease and mortality would be even greater than they are, and that seamen would suffer as much as passengers who are confined below.

A register of all seamen who die on board merchant ships, or in hospitals or foreign ports, is kept in ac-

cordance with the Merchant Seamen's Act. From this register, of about 3000 deaths annually, it appears that in the eleven years from 1838 to 1848 inclusive, the average proportion of deaths from diseases produced or aggravated by impure states of the air breathed by the sick was fifty-five per cent. In the year in which it was the lowest it was thirty-six per cent., and in the year in which it was the highest seventy-three per cent. The deaths from this class of diseases in London, in proportion to the total deaths, is but twenty-seven per cent., so that the proportion of seamen who die of diseases induced or aggravated by preventable causes is more than double that of people ashore. In 1847, when such diseases were exceedingly fatal in London, the proportion of deaths to the total deaths was only thirteen per cent., while among seamen it was sixty per cent.

By diseases produced or aggravated by impure air, I mean not only contagious diseases such as small-pox, measles, or scarlatina, or the fevers acquired by seamen when on shore in tropical climates, but those ship fevers which are sure to spring up at sea whenever many people are crowded together in a dirty, ill-ventilated ship. The latter are nearly as fatal as all other classes of these diseases together, being in the proportion of forty-three per cent.

It would appear, further, from an abstract of the returns of the Registrar-General of the causes of death in seamen who have died ashore in the ports of London, Liverpool, Bristol, and Hull, in the years 1845, 1846, and 1848, that the proportion of deaths from these

diseases is double among seamen at sea than when on land; and from other returns, that the proportion in colliers and coasting vessels is higher than in other classes of ships.

It is fully proved in the navy, and in the Government emigrant and convict ships, that these diseases, so far from being more prevalent than on shore, are far less so; that the proportion of deaths is not so great as among people of the same ages on land, and that the proportion of diseases aggravated by preventable causes is also less. It is very plain, therefore, that a large, clean, well-ordered ship is a most healthy abode; and that an ill-ventilated, dirty, and crowded vessel is more unwholesome and dangerous than any court or alley in London. A few facts will suffice to prove how proper care will improve the condition of people at sea, preserve their health, and prevent or moderate disease. In 1740 Anson set sail from England in the "Centaurion" with 400 men, accompanied by the "Gloucester" with 300 men, the "Pearl" with 250 men, the "Wager" with 160 men, the "Tryal" with 100 men, and two vitualling sloops. They left England in September, had a long run to Madeira, and arrived on the coast of Brazil in December. By this time the crews were very sickly, great numbers were in hammock, and many had died. Twenty-eight died very soon after anchoring, and ninety-six were landed sick. After a three months' voyage round Cape Horn scurvy carried off forty-three men in April and double that number in May. By the 9th of June, 200 were dead of the "Centaurion" 's crew of 400, and only two

quartermasters and six foremast men were fit for duty besides the officers. The crews of the whole squadron had amounted to upwards of 1200. Within one year after leaving England only 335 remained alive.

A Spanish squadron sailed nearly at the same time. The "Esperanza" lost 392 out of a crew of 450, and other ships nearly in the same proportion.

To show that this fearful mortality was no supernatural infliction, but that it depended upon removable causes, we may compare this voyage with that of Cook in 1772. He sailed with the "Resolution," carrying a crew of 112, and the "Adventure" with a crew of 81. He kept his ships clean and dry; took good stores of wholesome provisions and proper clothing; kept the hammocks, bedding, and clothes of the men as dry as possible; got fresh water, vegetables, and provisions at every opportunity; and the result was, that, on arrival at the Cape, only one man was on the sick list. After leaving the Cape, they were 117 days at sea before reaching New Zealand; and when they arrived there was only one bad case of scurvy on board. After a voyage of three years, in all varieties of climate, only one man died of disease out of the crew of 112 carried in the "Resolution." In Cook's last voyage he was away four years, and not a single man of his crew died from disease. Surely nothing can more strongly exemplify the fact that proper care will prevent disease, than a comparison of these voyages of Cook and Anson. We now seldom hear of such mortality as that of Anson's crew, or of that of Admiral Hosier, who buried his ship's company twice in 1726.

It has been generally prevented by care and foresight. From 1795 to 1802, the proportion of transported convicts who died on the passage to Australia was 1 in 10. Since 1801 it has only been 1 in 46, and now it only amounts to 1 in 70. The diseases of which the convicts died have been prevented, by removing or avoiding the causes upon which the diseases depend. The sickness and mortality among the emigrants to Canada in 1841, however, reminds one of the days of Anson and Hosier. The following is the official return of the number that arrived at Quebec and Montreal in 1847 up to the 10th of November:

Embarked from	Steerage.	Infants.	Cabin.	1847. Total.
Scotland . . .	3,462	174	116	3,752
England . . .	29,833	2,305	190	32,328
Ireland . . .	51,129	2,835	365	54,329
Germany . . .	7,458	226	13	7,697
TOTAL . .	91,882	5,540	684	98,106

Number that died on the passage . . .	5,293
Admitted into Grosse Isle Quarantine Hospital, 8,563, of whom died	3,452
Died in Quebec Marine and Emigrant Hospital, and in the city of Quebec, up to 9th October . .	1,041
Died in Montreal Emigrant Hospital, and in the city of Montreal, up to 1st November . . .	3,579
Total deaths	13,365

(Signed) A. C. BUCHANAN, *Chief Agent.*

Thus, about 1 in 18 emigrants died at sea in 1847, during the short passage between England and Canada.

A few years before, only 1 in 200 had died. In some vessels one third, in others, three fifths, of the passengers died; and others were landed so ill that, of 1959 sent to Kingston hospital, 707 died; and of 3300 to Toronto, 757 died. This was only up to October, large numbers still remaining in hospital. The cause of death in these cases was fever from overcrowding, defective ventilation, and dirt; and dysentery from bad food, or food badly cooked. In some cases the fever was taken on board by infected persons. In others it was generated on board by the causes just enumerated. All this sickness and mortality might have been prevented; and considering that it occurred after the proofs of the good effects of proper regulation afforded by Cook, and by all more modern experience, it must be considered as most disgraceful. The lesson has not been lost, however, for in the seven years that have elapsed since the 1st of January, 1853, the mortality in 524 emigrant ships sent out by the Emigration Commissioners, carrying 172,233 souls, has amounted to only 2226—equal to 1·31 per cent. But the necessity for constant vigilance is still urgent, for it is only a few months since the "Great Tasmania" arrived at Liverpool from Calcutta, having lost, out of 937 soldiers, between 60 and 70 who died on the voyage, and with more than 300 suffering on arrival in England with scurvy or dysentery, the only cause having been the bad quality of provisions and a want of good lime-juice. The ship during the passage had been a floating hospital; the doctor, with 400 or 500 sick men, being of course almost helpless.

CAUSES OF DISEASE.

The causes of disease at sea which may be removed relate, first, to the SHIP; and, secondly, to the MEN. Those which relate to the SHIP are impure air, want of space in mess-places and sleeping-berths, dirt, and wet. The means of prevention are ventilation, improved construction, cleanliness, and dryness. Those which relate to the men are unwholesome food and water, intemperance, dirt, improper clothing, exposure to cold and wet, and imperfect discipline, shown in a want of proper regulations of the amount of sleep and labour and of amusements for the crew. The means of prevention are a sufficient supply of wholesome food and pure water, temperance, cleanliness, warm, porous clothing, and improved discipline. Upon each of these subjects a few observations will be made, commencing with the means of preventing those causes of disease which relate directly to the SHIP.

VENTILATION THE MEANS OF PREVENTING DISEASES WHICH DEPEND UPON BREATHING IMPURE AIR.

ON the 2d of December 1840, the "City of Londonderry" steamer, on her passage from Ireland to Liverpool, encountered bad weather. The captain battened down the steerage passengers in the fore part of the ship, and suffocated seventy-three of his fellow-creatures. In 1846 the "Maria Somes," transport ship, was overtaken by a heavy gale, and it was thought necessary for the safety of the troops, their wives, and children, to order them below, and batten down the

hatches. Many of them were suffocated. In 1833 two young men on board the "Magnus Troil," in Leith harbour, went to bed in the cabin as usual, and shut the door so closely, on account of the cold, that one was found dead in the morning, and the other dying from suffocation. In 1840 two other strong young men were killed under precisely the same circumstances in the cabin of the "Mary Hardie," lying at Greenock. In 1852 a ship carrying coolie emigrants to the Mauritius was obliged to batten down the hatches in a severe hurricane, and this caused the deaths of fifty out of 204 from suffocation. In the 'Daily News' of April 24th, 1852, a surgeon-superintendent of Government emigration writes that he was in charge of coolie emigrants from East to West Indies in 1847; that the hatches were battened down off the Cape for twelve hours, when he, at the risk of being swamped, was obliged to have an opening made through the fore hatchway, and "thus saved many from suffocation, but the deaths the next fortnight were fearful."

We hear a great deal of 146 Englishmen having been confined in the Black Hole of Calcutta in 1756—a prison eighteen feet square—and only twenty-three being found alive in the morning; but when, in 1846 and 1848, passengers are suffocated by scores on board English ships, we find official reports containing statements that it is the opinion of "competent naval authorities," that the "loss of life, through the adoption of measures had recourse to for adequately providing for the general safety, was *unavoidable under the circumstances*." Such statements prove the most profound

ignorance on the subject of ventilation. This ignorance is so far from being uncommon, that some explanation of the general principles of that subject appears to be called for.

All living human beings are constantly throwing off poison from their lungs. Many know that if charcoal be set on fire in a closed room, people confined in that room will be suffocated or poisoned by carbonic acid gas; but they appear not to know that this same gas is poured forth from their lungs continually, and in large quantities, and that if a room or cabin were perfectly air-tight, a person breathing in it would as certainly and inevitably poison himself with his own breath as if charcoal were burnt in the place. The only difference would be in point of time. Candles or lamps burning in a room poison the air just as a man or animal does by breathing, and one candle requires about as much pure air to burn as a man does to live. If a candle be placed in a closed vessel—under a common tumbler, for instance—it will soon poison the air in the glass and go out. If a healthy person fill a lamp glass with the same poison by breathing into it, and put this glass over a lighted candle, the candle goes out directly the gas in the glass surrounds the wick. If the air in a glass jar be poisoned by burning a candle in it, or by filling it with the breath from the human body, a bird or mouse placed in that jar almost immediately dies.

So much for the effects of the poison when unmixed. But it is very seldom that man is exposed to the undiluted poison he himself forms. It is only in such cases as the Black Hole of Calcutta, or the "City of

Londonderry" steamer, the "Maria Somes," or the cases just related in the "Magnus Troil," and "Mary Hardie," and the suffocation of the coolies, or accidents in mines, where people are confined in air-tight chambers, that the extremity of the evil—*sudden death*—is produced. Our rooms, however badly constructed, are not absolutely air-tight. It is difficult to make a cabin so; and the laws of nature in the diffusion of gases, and their varying consumption by animals and vegetables, secure safety and a certain degree of health when man's ignorance does not contribute to his own ruin.

But though *sudden* or absolute poisoning is not often produced by want of air to dilute or remove the poisonous gas evolved in respiration, slow poisoning is so to a fearful extent. A healthy man requires four cubic feet per minute of pure air to ensure the changes which should take place in his blood during respiration, and to remove and sufficiently dilute the poisonous gas he exhales. The poison of the breath issues warm from the body, and, being warm, is specifically lighter than air, and rises just as a balloon filled with light gas does. It rises to the ceiling or deck, but finds no way of escape, no opening higher than the fire-place; so that, unless a current of air pass through the open door, all the upper part of the room or cabin becomes filled with poisonous gas. Currents of pure air come in through crevices of doorways, carrying with them only a small portion of the impure air, and the air above the level of the opening is very little affected. Just as a bottle of oil inverted in a stream of water remains full, because the oil is lighter than the water, so the part of the room

above the level of the chimney-opening, or the upper part of a cabin, remains full of a poisonous gas, because it is lighter than the current of pure air which passed from the door to the fire-place. Now, it is in this upper part of rooms that adults breathe. Their heads are above the level of the pure air; they are breathing a varying amount of poison. If a bird be suspended in a cage from the top of a four-post bedstead in which two persons are sleeping, and the curtains are drawn rather closely together, the bird will certainly be found dead in the morning, poisoned by the breath of the sleepers, who, if they were at the same level with the bird, would as certainly poison themselves. Small rooms are quite as dangerous as a large, curtained bedstead, and the close cabin of a ship resembles it as nearly as possible. When the bed-place is high up in the cabin, near the deck, and there is no opening for the warm air to escape, the sleeper is exactly in the position of the bird hung up at the top of the bedstead.

Not very long ago, a new house was erected under the direction of an eminent architect to accommodate the monkeys in the Zoological Gardens of the Regent's Park, and this dwelling was to resemble as near as possible an English gentleman's drawing-room. Two ordinary drawing-room grates were put in, with low chimney openings as close to the floor as possible, and the windows and other openings above were made perfectly close. Some warm air was also admitted through openings in the floor. All the openings for winter ventilation were made close to the floor, under

the erroneous belief that the gas produced by the respiration of the animals, being heavier than the other air of the room, would fall and escape below. The architect forgot that it issued *warm*, and therefore *light* from the animals, and that when cold it would become diffused and mix with the other air. Sixty healthy monkeys that had been several years in England were put into this room. In one month fifty of them were dead, and the other ten dying. The animals were all poisoned by their own breath. They were living in an extinguisher. All the hot breath and impure exhalations of the monkeys were collected in the upper part of the room, could not escape, and poisoned them. As soon as some openings in the upper part of the room, which were intended only for summer ventilation —as if the monkeys could live without pure air in winter— were unclosed, the room became perfectly habitable, the ten sick monkeys recovered, and those since placed in it have remained perfectly healthy. It is curious that all the monkeys that died are said to have died with tubercles in the lungs—true consumption—the most prevalent disease of this climate, which is developed, I am persuaded, in numberless instances in our population in the same manner, but less suddenly, as among these monkeys. Our schools and nurseries are not quite so close as this monkey-house, but in many there is no very great difference. The windows are not opened for fear of draughts of cold air; there is only one door, and that is seldom opened; and the chimney opening is not more than three or four feet from the floor. Even that is often closed. The effects

are bad enough in large rooms inhabited by few people; but when rooms are small or crowded, the magnitude of the evil can scarcely be appreciated. In a ship, when the ports and hatches are closed, the people are exactly in the same situation as the monkeys. They poison themselves with their own breath, and generally much quicker than the monkeys did, because they are more crowded, and the pure air is more effectually excluded. It has been ascertained that nearly 10,000 emigrants have lately been poisoned by their own breath in emigrant ships. They died from ship fever, produced by want of ventilation. A few years ago, 700 children, in a charity school at Norwood, fell into ill health, and many died, it was supposed, from want of food, but it was proved to be from imperfect ventilation.

Dr. Arnott, in his evidence before the Health of Towns Commission, gave his opinion that nearly half the illness not resulting from old age that occurs among the lower classes might be prevented by a proper public system of ventilation; and Mr. Toynbee proved that scrofula, both in animals and men, was clearly developed by inhabiting crowded, close rooms, and sleeping in confined cots surrounded by curtains, and that by a simple system of ventilation adopted by a Samaritan Fund in connexion with the St. George's and St. James's Dispensary, the cases of sickness in the district were diminished one half, and those which did occur were cured in half the time.

This is sufficient to show the universal deficiency of ventilation, and the evils produced by breathing air.

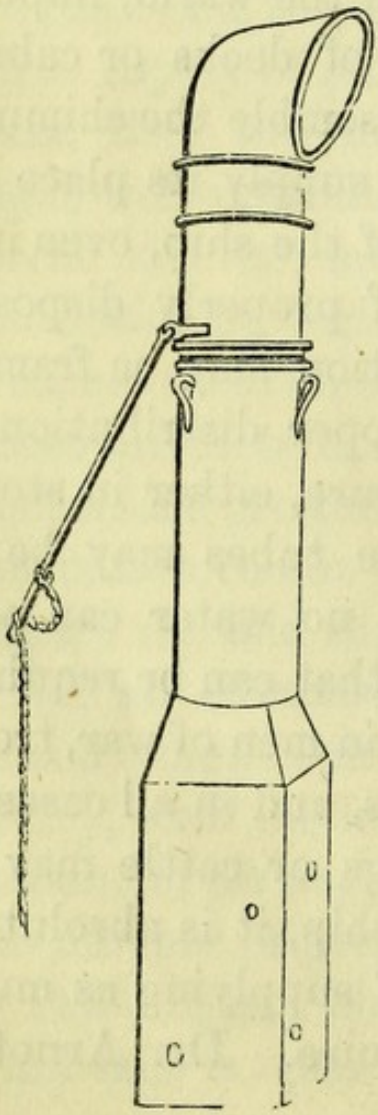
rendered impure by the breath of healthy persons. The effects are still more evident when these persons are diseased, especially with diseases which are propagated from one person to another. The breath then is not only a simple poison, but it also contains the germs or gases which convey special disease—smallpox or typhus, for instance—and if these gases are collected in large quantities, and not carried off by a current of air, or diluted by mixture with pure air, they produce smallpox, typhus, or some other disease, according to the nature of the disease in the first person affected. When one such person is confined in a small room, or several in a large room, and perfect ventilation is not practised, the disease inevitably spreads; but when a free supply of pure air dilutes the poisonous emanations, they are innoxious. Fever patients scattered about well-ventilated hospital wards do not cause the spread of fever; but if they are crowded together, or if ventilation be neglected, they poison every one who approaches them who is not protected by a previous attack. These are facts upon which the principles of ship ventilation are grounded. It is evident that no plan of ventilation can be effectual which does not remove the impure air, and supply a sufficient amount of pure air, under all circumstances in which the ship may be placed, whether in a storm or a calm, in wet weather or dry, with the hatches opened or battened down, the amount of air supplied being regulated according to the number of persons consuming it.

The ordinary plan of ventilation by means of canvass wind sails is open to many objections. They are al-

most useless in a calm, and in a strong breeze they are blown down, or they send powerful draughts of cold air in certain directions only. They either supply too much air or too little. They are not adapted for rainy weather. They cause rheumatism or cold in the persons exposed to their direct action, so that these persons often tie them up and thus cut off all supply of fresh air to the deck during a whole watch. It is clear, therefore, that some other plan must be substituted.

When there is a fresh breeze, or when a vessel is going fast through the water, an abundant supply of fresh air may be most easily obtained, and it may be distributed to every part of the ship by a series of tubes properly disposed. Again, if the warm, impure air is drawn from the upper part of decks or cabins into a tube heated by a lamp to resemble the chimney of a house, cold air will pass in to supply its place by any openings in the deck or side of the ship, even in a perfect calm. Thus, by means of properly disposed tubes, a self-acting plan of ventilation may be framed which will secure a supply and proper distribution of pure air, with removal of the impure, either in storm or calm; and the openings of the tubes may be so protected from rain or spray that no water can pass down them. These tubes are all that can be required in ordinary merchant vessels, but in men of war, troop ships, convict and emigrant vessels, and in all cases in which a number of human beings or cattle may be crowded between the decks of a ship, it is absolutely necessary to possess the means of supplying as much air as the body of breathers require. Dr. Arnott's

air-pump fulfils this object most simply, beautifully, and effectually, with so little expenditure of power that the labour of one man is sufficient to supply as much air as a thousand persons require for breathing. Two boys can work one easily for two hours with so little fatigue that they are fit for any other duty at the close of this labour, and in steamers half-horse power from the engine would be amply sufficient. Any ship carpenter, or ordinary carpenter, could make such a pump out of materials found in every ship at the expense of a few shillings. They are used in cases of necessary confinement of the people below; but, under ordinary circumstances, it is not necessary to work the pump, as tubes properly disposed secure perfect ventilation.

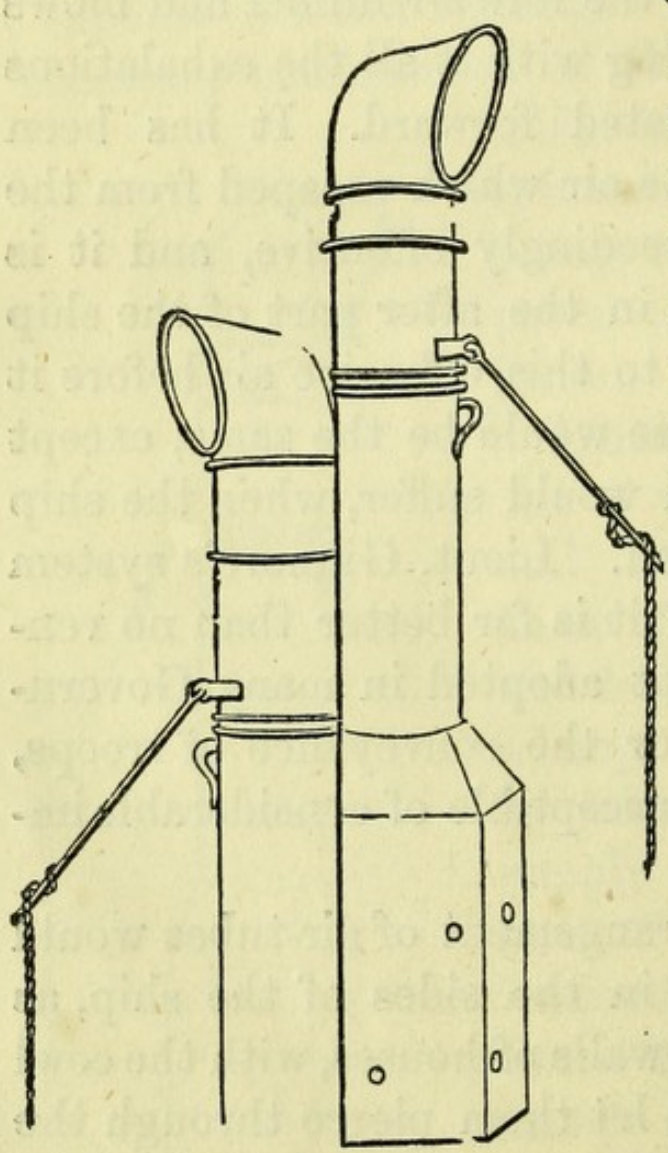


Lieut. Gilmore has taken out a patent for air-funnels, and the top or cowl of these funnels is just what should be adopted as the top of any series of air-tubes, for by trimming the cowl of the supply tube to windward and that of the discharge tube to leeward, the fresh air blows down the supply tube and the escape of impure air is facilitated. This cut shows Lieut. Gilmore's movable cowl and

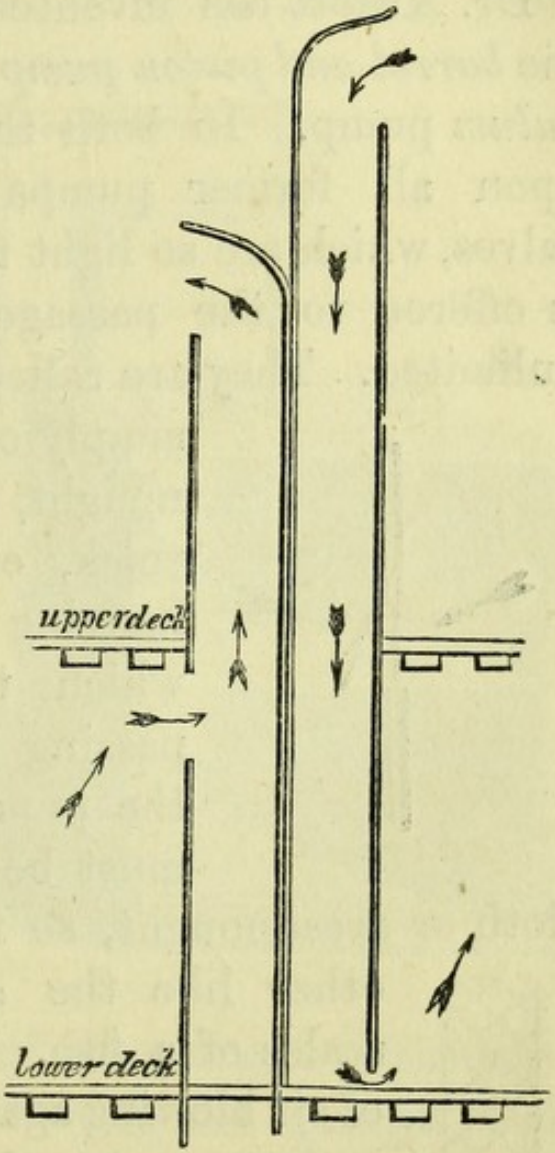
base, with handle for turning to windward and lanyard for lashing. There are eye-bolts for stays, and holes for screw-bolts in the square base. The height under the cowl varies from six to nine feet, according to height of bulwarks. The objection to Lieut. Gilmore's arrangement of his funnels is, that persons in one part or other of the ship must suffer from the impure air of another part being driven towards them. For instance, in a steamer going against a head wind, or a ship beating to windward—the hatches in either case being closed—the pure air comes down the fore air-funnel and blows towards the stern, carrying with it all the exhalations of the persons congregated forward. It has been found in practice that the air which escaped from the discharge tube was exceedingly offensive, and it is plain that many persons in the after part of the ship must have been exposed to this offensive air before it was discharged. The case would be the same, except that the persons forward would suffer, when the ship was going before the wind. Lieut. Gilmore's system is doubtless very useful; it is far better than no ventilation. It is at present adopted in many Government vessels taken up for the conveyance of troops, convicts, &c.; but it is susceptible of considerable improvement.

The most complete arrangement of air-tubes would be, either to place them in the sides of the ship, as chimney-flues are in the walls of houses, with the cowl upon the bulwarks, or to let them pierce through the deck in some convenient situation near the hatchways or masts; in either case one tube carrying fresh air

along the bottom or floor of the deck, the other removing the impure air from above—a pair of tubes acting upon each compartment of the ship. For instance, in small merchant vessels there should be a pair for the steerage and a pair for the after part of the ship. In steamers an additional pair for the engine-room. In passenger ships a pair should communicate with each compartment, the top and bottom of every sleeping berth communicating by blinds or perforations with the ventilated compartment. In men of war a pair should act upon each deck. It is a matter of no importance if the tubes are separate, or if a single tube be divided into two channels by a partition, one channel opening in the lower, the other in the upper part of each compartment of the ship. The latter is a more convenient form, occupying less space, but if it be adopted one cowl must be higher than the other as in the annexed cut, in order that their relative movements to windward and leeward be not interfered with; or a double cowl might be made by

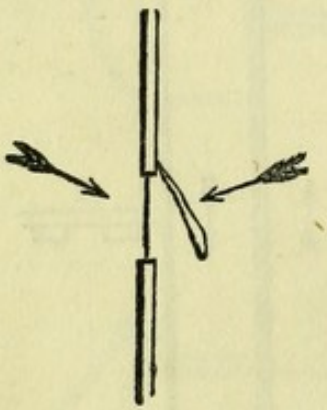


making each channel a complete tube at the top, and a vane might be placed so as to make the cowls vary with the direction of the wind. A lamp placed in the discharge tube, a short distance above the opening from the deck, will considerably increase the draught along the tube, which then exactly resembles a chimney with a fire in the grate. When hatches or ports are open this would be quite sufficient to effect removal of impure and secure entrance of pure air. The arrows in the accompanying sketch show the direction of the currents of air. The size of the tubes should vary according to the number of men supplied with air. If two tubes be used for a steerage inhabited by ten men, the diameter of each should be about three inches. If one tube be divided by a partition into two channels for the supply of the same number of men, the joint diameter should be between four and five inches. The circumference of the tube would thus be about double that of one of the separate tubes. The rule



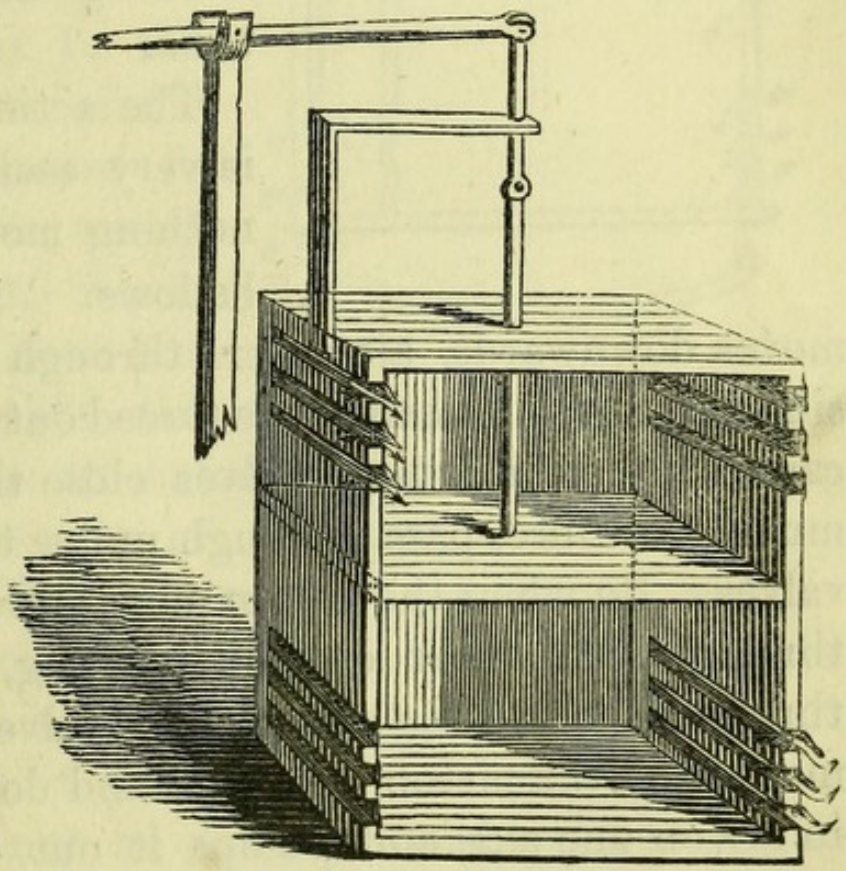
should be to make the tubes about the size of the united windpipes of the men to be supplied with air, and three inches may be taken as about the size for ten men; but in calculating the rate of increased size for additional number of men, it must be remembered that a tube six inches in diameter will convey nearly four times as much air as one of three inches. Two three-inch could be put within a six-inch tube, and large side spaces would be left free.

Dr. Arnott has invented two forms of air-pump—the *barrel and piston pump*, and the *swing-flap* or *pendulum* pump. In both the very great improvement upon all former pumps is in the nature of the valves, which are so light that no valvular obstruction is offered to the passage of air, and their size is unlimited. They are called curtain valves, and consist simply of pieces of oiled silk, dreadnought, painted canvass not too thick, or cloth of a close texture, hanging across an opening, through which they are prevented from passing by wire-lattice work. If the pump be very large, the valve must be formed of several pieces of cloth or dreadnought, so fastened as to overlap each other like the slates of a house, or the scales of a fish. It is plain that a draught of air blowing against a piece of cloth fixed as in the accompanying figure would blow it open, while a draught in the opposite direction would close it. If the opening were grated with wire

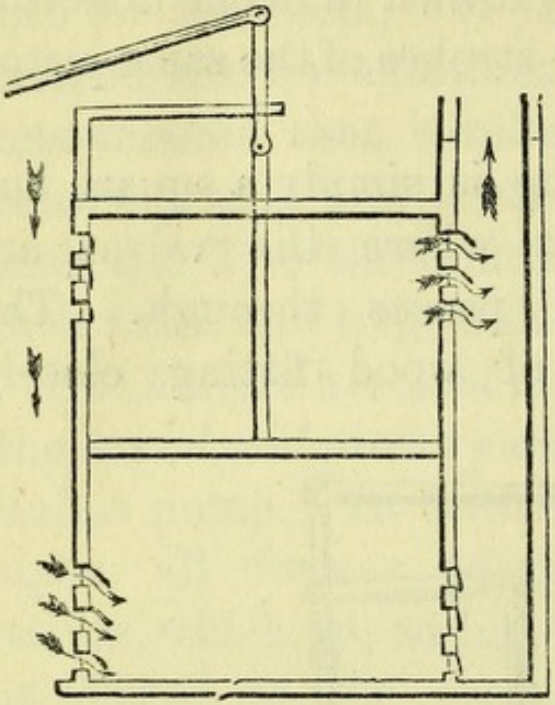


thus, the cloth could not be blown through it, and the air, therefore, could not escape. Thus, by nailing these curtain valves within or without the upper part of openings in a box, air may be drawn in in one direction and forced out in another by strokes of the same piston or flap.

The *barrel and piston* pump is simply a square box closed on all sides, except where the valves are and where the piston-rod passes through. The piston is merely a piece of wood fitting closely to the sides of the box, but still loose enough to move up and down in the box, with but little friction. It is made so that it can only move in the part of the box between the upper and lower valvular openings, so that it may not interfere with the action of the valves. One side of the box must communicate with the open air, either directly or by means of a tube; and the other side with the tube which is to distribute the air throughout the ship. It is thus made a supply-pump of fresh air;



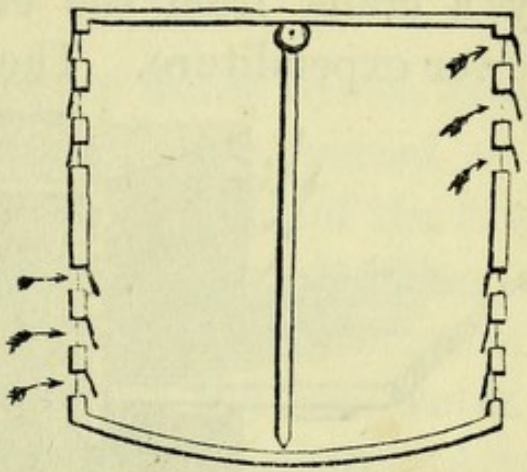
but, by reversing the action, it may be made a discharge-pump of impure air. It is not necessary, however, to keep two pumps in action, for if a tube communicate with the upper part of each compartment, the impure air will escape, without pumping, when fresh air is freely supplied, especially if a lamp be kept burning in the discharge tube.



The action of this pump is very easily seen. It is nothing more than a square bellows. As the piston moves downwards, air enters through the upper outside opening. It cannot be forced outwards again, because the lower outside valves close the opening. It must, therefore, pass through under the lower inside valves. So when the piston moves upwards, air enters through the lower outside opening, and is forced through beneath the upper inside valves. Thus, every motion of the piston upwards and downwards draws in air on one side and pumps it out on the other, as will be seen by comparing the two cuts. It may be worked by a lever, handle, and sling, like a common pump, or by a crank and fly-wheel, or a rope and pulley. A pump of this kind, with the space in which the piston works three feet square, allowing a three-feet stroke of the piston, will easily distribute 1000

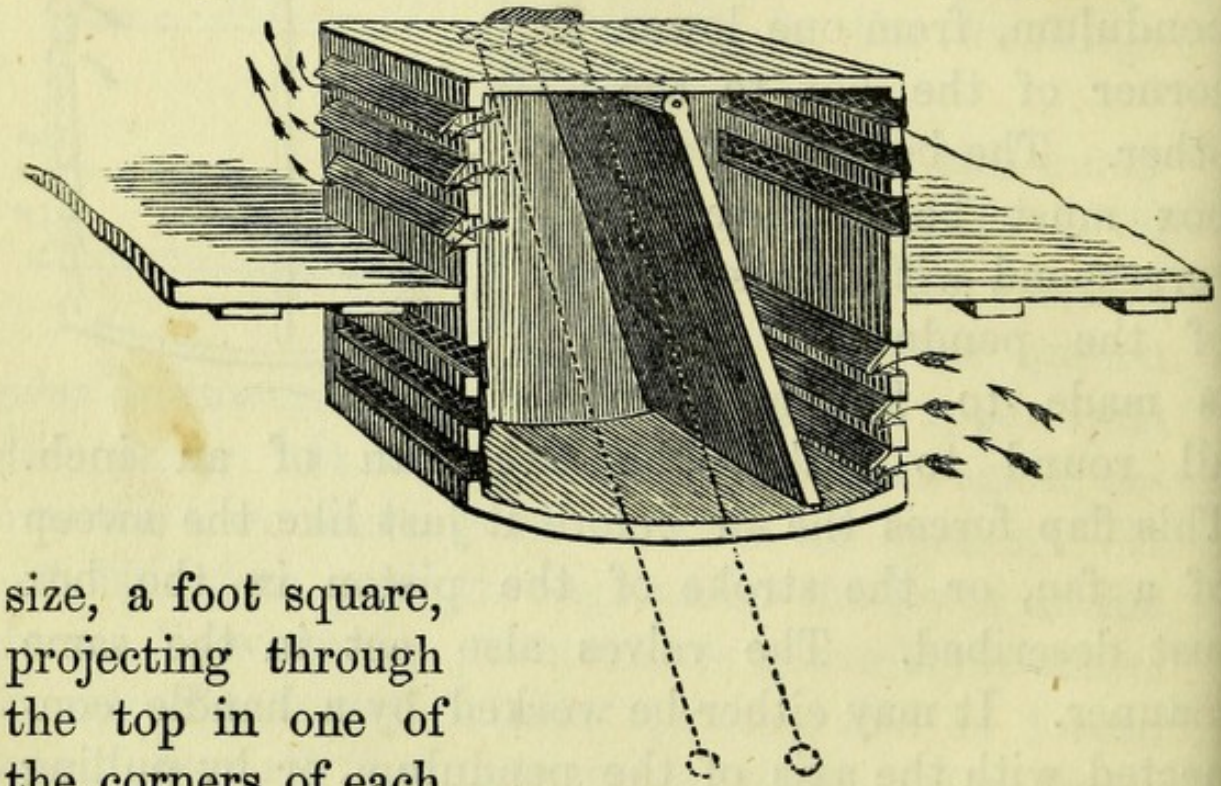
cubic feet of air per minute. This is an allowance of four cubic feet per minute for every person in a crew of 250, a quantity quite sufficient to afford pure air for breathing, as well as for the dilution and removal of all impure exhalations.

The *swing-flap* or *pendulum* pump is also a cubical box, divided into two equal parts by a hanging flap or partition. The flap is hung so that it may swing backwards and forwards, like a pendulum, from one lower corner of the box to the other. The bottom of the box must be concave to correspond with the sweep of the pendulum, which is made to fit the box all round to within the twentieth of an inch. This flap forces the air before it just like the sweep of a fan, or the stroke of the piston in the box just described. The valves also act in the same manner. It may either be worked by a handle connected with the axis of the pendulum, or by pulling ropes acting upon it just as in the act of tolling a bell. It should not be worked more quickly than the usual rate of a clock pendulum, unless springs were fixed inside near each lower corner, to assist recoil and prevent injury to the apparatus from hard striking.



This pump, like the other, is both a forcing and drawing pump, and acts either as one or the other, ac-

cording to the arrangement of the valves and air-channels. What renders it peculiarly adapted for ship ventilation is the facility with which it may be fixed in any part of a ship, and the certainty with which it would serve the double purpose, at the same time, of supplying pure and removing impure air. For instance, one might be fixed in every cabin of a large steamer, and the whole kept constantly working, night and day, by a crank from the engine at less than half-horse power expenditure. The lower half of a pump of this



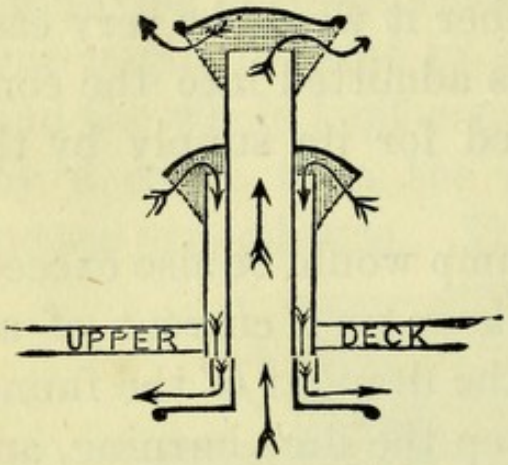
size, a foot square, projecting through the top in one of the corners of each cabin, would not occupy useful space. The upper half would communicate with air admitted by openings in the deck or bulwarks, or would open into an air-tube. Nothing would be easier than to carry a double tube all round the ship between the timbers. Into the one compartment of this tube the pump would discharge the impure air from the top of the cabins, while the other compartment would sup-

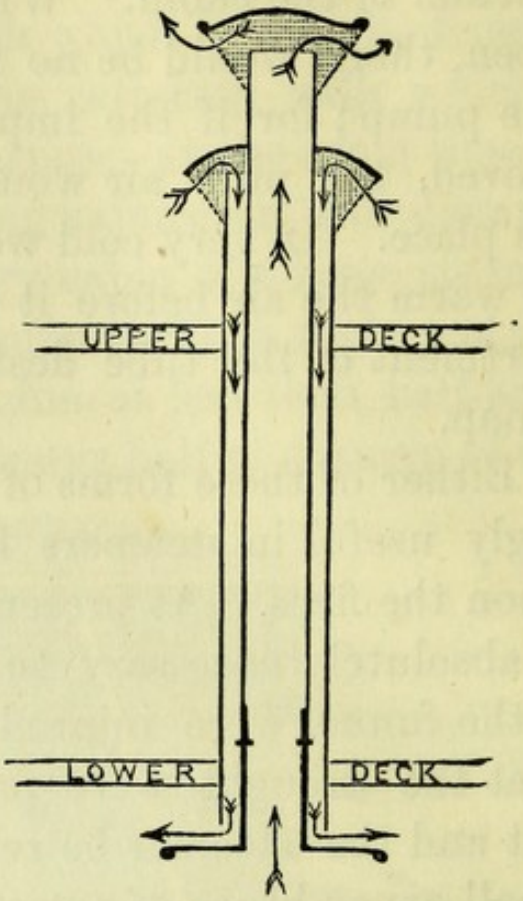
ply pure air to be distributed by the pump round the bottom of the cabin. When hatches or ports remain open, there would be no necessity for the supply by the pump; for if the impure air were effectually removed, the pure air would find its way in to supply its place. In very cold weather it would be very easy to warm the air before it was admitted into the compartment of the tube destined for its supply by the pump.

Either of these forms of pump would be also exceedingly useful in steamers to keep up a current of air upon the fires. At present the draught of the funnel is absolutely necessary to keep the fires burning, and if the funnel were injured by a shot or otherwise, so that the draught were prevented, the fires would go out and the steamer be rendered powerless. A very small expenditure of power from the engine, employed upon one of these pumps, would ensure a constant draught under all circumstances, and render combustion of the smoke a matter of the greatest possible ease. Great economy of fuel might thus be ensured, with increased efficiency of the vessel, particularly when it is desirable to avoid observation, and much less liability to serious injury in action.

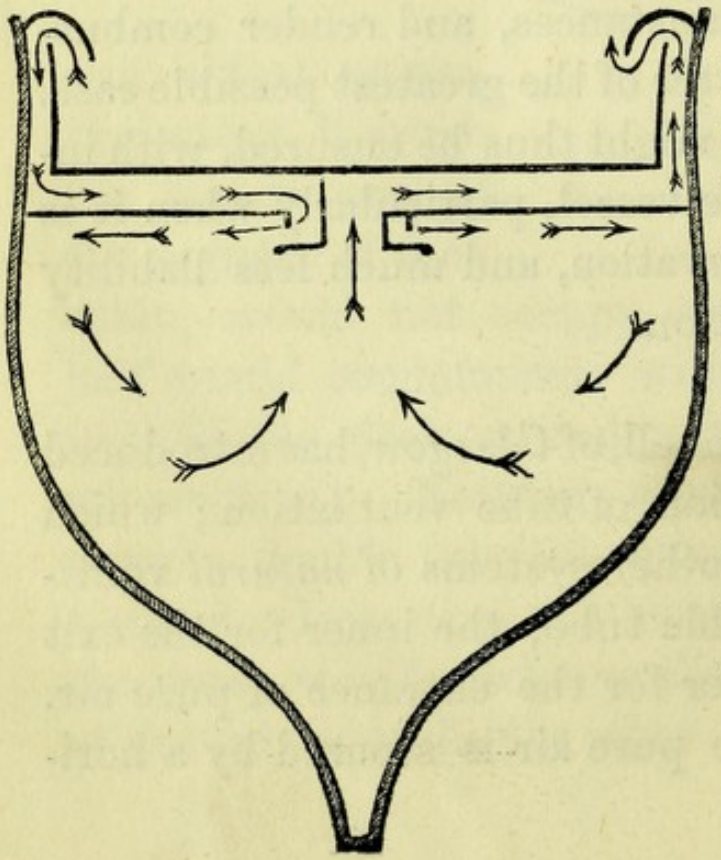
Recently, Mr. McKinnell, of Glasgow, has introduced a very useful modification of tube ventilation; which bids fair to replace all other systems of *natural* ventilation. He uses a double tube; the inner for the exit of impure air, the outer for the entrance of pure air. The distribution of the pure air is secured by a hori-

zontal flange, which will be understood by referring to





the two annexed diagrams; one showing a ventilator to supply and remove air between decks; the other for the ventilation of cargo, or the lower deck of a man-of-war. If it be an objection to have tubes projecting through the decks, their openings may be made in the bulwarks as shown in the accompanying section.



Captains of vessels in which this system has been adopted speak very favorably of it. One says there is "never any smell of bilge, and not a bit of mould in her hold." Another says, "This voyage our cargo homeward consisted of sugar and molasses; and the ventilators acted well in carrying off the steam, and so causing less drainage from cargo." A third adds, "On discharging the outward cargo, the hold and timbers were found to be perfectly free from damp or mould. Our homeward cargo was rice, which was delivered in Liverpool in excellent condition. On the voyage I found the ventilators of very great service in keeping the cargo cool. They had also the effect of drawing the weevils almost entirely out of the cargo. We were never troubled during the whole voyage with the least smell of bilge water."

This is the system of ship ventilation which I feel most disposed to recommend to ship builders and owners. It will probably be many years, however, before anything so necessary is generally adopted, and captains may find themselves obliged in an emergency to adopt some ready method. A little consideration of the principle and plans just alluded to will enable them to meet the requirements of any case that can possibly arise.

CROWDING.

Crowding and defective ventilation are so generally combined that it is only necessary to observe, that the greater the number of people confined in a limited space, the greater is the necessity for an adequate supply of pure air. In the Merchant Sea-

men's Act, the 62d clause is inserted to the effect that every place occupied by seamen and apprentices, and appropriated to their use, shall have, for every person, a space not less than nine superficial feet for every adult, measured on the deck or floor of such place, which is to be kept free from stores or goods of any kind, not being their personal property in use during the voyage. This clause has doubtless had a most beneficial effect, as it is also directed that the ship shall be "securely and properly constructed and well ventilated." Thus, besides IMPROVED CONSTRUCTION as far as regards ventilation of ships, a greater space must be devoted to the use of the seamen.

CLEANLINESS OF THE SHIP is most important for the welfare of the crew. No dirty ship can be a healthy one. The gas from bilge water, which is so offensive to the nose, is most injurious to the health. Other gases also form when the limbers are not kept thoroughly clean. Dirt of all kinds is apt to collect around the keelson and in the holds. It is, of course, moist or wet. It becomes putrid. The wood of the ship itself decays more or less, and when all this goes on in a hot climate, and perfect ventilation is not practised, no one can wonder that low fevers arise on board ship. The holds and limbers are as pestilential as a sewer or small marsh ashore. Even in the navy dirt is some times allowed to collect for months in the bottom of ships. The vessels for the last Niger expedition were fitted out with peculiar care, and unusual precautions were taken to provide for the health and comfort of the crew. Yet, when they arrived at Madeira, quan-

tities of shavings, pitch, and filth were found in the limbers. Some years ago, I inspected a small steamer in Malta harbour, on account of some suspicious cases of disease having arisen on board. The officers represented her as perfectly clean below, and it did really appear that unusual care was taken, by pumping water in and out under the engine room, to keep her clean. Still, tarnishing of the bright parts of the engine, and the lace of the officers' dress, with a disagreeable odour whenever the vessel was in motion, showed that something was wrong. I therefore procured a plan and section of the lower compartments, and found that a space, immediately in front of the engine room and beneath the steerage, was below the level at which the pumps acted. After a good deal of trouble the covering of this space was removed, and many bucketsful of the most filthy mixture of coal-dust, sawdust, oakum, and the sediment of bilge water, were taken from it. The ship afterwards became perfectly sweet and healthy.

A vessel with her bottom full of foul bilge water is little better than a floating cesspool. In harbour she is still, and no very evident stench is produced; but directly she gets to sea, the motion keeps the fetid bilge water in a state of agitation, and the air between decks becomes horribly offensive—silver blackens, and the machinery of steam-vessels can scarcely be kept bright. The most distressing headache and nausea is produced in those unaccustomed to breathe this gas, even if not subject to sea-sickness. To prevent the accumulation of bilge water, every ship should be

so constructed that the pump-well or *cesspool* is at the lowest level in the ship, and that all the bilges run freely into it. A pipe should be so fixed that fresh water can be freely admitted to wash out all these *drains*, and a pump should be fitted up which might be worked either by hand or by the engines of steamers. The bilge water should be diluted and pumped out *every day*, as it very soon becomes foul. When this is done regularly, the bilge water becomes perfectly inoffensive, and the vessel free from unpleasant smell. The use of the solution of chloride of zinc is of great importance in connection with this process. It appears to saturate and harden the ship's timbers, prevents decomposition of the woody fibre, and thus removes one source of the impurity of the bilge water, at the same time that it destroys all the foul odours produced by other causes. In steam-vessels its use is of the greatest importance. When I served in the Locust attention to pumping and cleaning all the bilges never effectually checked the formation of foul gas until the chloride of zinc was used. But, after its use, no odour could be detected, and the engineer reported to me that his engine was kept clean with a fourth of the labour that was necessary before. He said that one man could keep the engine cleaner more easily than four could before the chloride was employed. Thus its use would lead to a considerable saving of expense in our merchant steamers.

The best way of using the solution, in a large ship, is to mix forty pounds in a hundred gallons of water, pour part of it into the bilges, and pump out; then

pour down the remainder, and pump again after leaving the solution for twenty-four or forty-eight hours. In a small vessel a fourth part of this quantity may be sufficient.

Cleanliness of the hammocks and bedding should also be strictly enforced. Regular days should be appointed for washing hammocks and airing bedding—the mattresses and blankets should be hung separately on the clothes-line. All cooking utensils should undergo inspection at short intervals, and be kept perfectly clean. The same attention should be paid to the water kids and mess traps—the head and water-closets.

Whitewashing the holds, store-rooms, steerage, &c., is to be strongly recommended. Lime is much cheaper than paint, and it assists in decomposing organic matter which would otherwise attach itself to the wood-work. The lime should be scraped off, and replaced, from time to time. It is also a good plan, before long voyages, to whitewash the casks in the hold, when it can be done without inconvenience. The hold should be thoroughly cleaned before it is stowed, and care taken that no perishable substances of any kind fall between the casks, &c., as they could only be found and removed afterwards with great difficulty.

Dryness is almost as important as cleanliness. Ventilation is the great means of securing dryness. The atmosphere, where many persons are confined together, is necessarily damp, and free evaporation cannot go on unless a free current of air is admitted

between decks. Iron pots, or hanging stoves, containing burning cinders, and swung between decks, are very useful to hasten the drying process. They may be used, with proper care, in the well, holds, and store-rooms, or any part of the ship where they can be placed with safety.

Ships are often kept wet and unwholesome by the careless use of water in washing decks, and by neglecting to pump and clean the bilges. Washing the upper deck is, no doubt, the best way of cleaning it, because nothing checks evaporation, and it soon dries. But in the covered decks, dry cleaning is far preferable to washing; scraping, or dry holy-stoning will keep a ship perfectly clean without wetting the decks, and render her a far more comfortable and healthy abode than one cleaned by washing or wet holy-stoning. In winter nothing can be more uncomfortable than a ship wet below, and it requires several hours to dry her thoroughly; while in summer or tropical climates, the effluvia which rise during the rapid evaporation of the wet decks are most unwholesome. In either case the men sit and lie about the wet decks, and become subject to catarrhs and rheumatism. I served successively in two line-of-battle ships. In one the ship below was cleansed by dry holy-stoning; in the other, by wetting. The numbers of the crew were nearly the same in the two ships, and they were employed together on the same stations; yet, in the washed ship the number of men on the sick list, in one year, with colds alone, equalled the number of the whole sick list of the dried ship. All

the colds, other diseases, and accidents in the dry ship were not more than the colds alone in the wetted one. In the latter the proportion of affections of the lungs and rheumatism was also greater.

When men cannot be spared to dry holy-stone lower decks, and in passenger ships, it is a good plan to cover all mess-places, cabins, cockpit, &c., below with painted canvass or oil-cloth. This can be easily washed and kept clean without wetting the decks, and is dried as soon as cleaned. This is found the greatest possible comfort in the sick berths, gun-rooms, and cockpits of men of war, when allowed by the captains. It saves labour, and is conducive to the health of the crew, and might be generally adopted in all ships and steamers carrying passengers, as in emigrant and convict vessels.

The causes of disease at sea, relating directly to the MEN, have now to be considered; and first, in importance, stand unwholesome FOOD AND WATER.

Man has been formed for a mixed diet of animal and vegetable food. The structure of his body is wasted and removed by daily use, and is repaired by a supply of nutritious food. This food must contain the elements which compose the structures of which the body consists. If it does not contain them, the body is imperfectly nourished. The food must also contain them in the proportion necessary to supply the varying wants of the system; otherwise an accumulation of useless matter takes place in the blood, or the body is not regularly nourished. Over-supply of some substances must be got rid of unnaturally. Deficient

supply of others leads to disorder, and the whole body becomes diseased. All seamen are familiar with the fact that when biscuit and salt provisions were their chief food, scurvy was often prevalent and fatal. It disappeared as soon as fresh meat and vegetables were procured, and has been prevented by supplying lemon-juice, when fresh vegetables could not be obtained in long voyages. It is perfectly well known that when the biscuit and salt meat are of good quality, a proper supply of lemon-juice will keep off scurvy in the longest voyages. This shows that a mixture of animal and vegetable substances is necessary to prevent absolute disease; and it is also known that a certain variety in these substances is necessary to secure perfect health. This has led to the formation of scales of diet by the Government for the seamen of the Navy, and for emigrant ships sailing under Government superintendence. The naval scale is not very perfectly adapted for merchant seamen. It is not sufficiently varied to ensure a healthy condition of the men. The scale, therefore, which I should recommend for merchant seamen should be founded upon that of the emigration ships sailing under Government, and those of John Marshall & Co. The following are copies of these two scales:

DIET SCALE FOR GOVERNMENT EMIGRATION SHIPS TO AUSTRALIA.

For each Person of 12 years of age and upwards. Children between 1 and 12 years of age receive one half of such rations.

	ANIMAL FOOD.					BREAD STUFFS.					PRESERVED VEGETABLES.			GROCERIES.					
	Beef.	Pork.	Preserved Meat.	Suet.	Butter.	Biscuit.	Flour.	Oatmeal.	Peas.	Rice.	Potatoes.	Carrots, Turnips, Onions, Celery, Mint.	Cabbage.	Raisins.	Tea.	Coffee, weight when roasted.	Sugar.	Treacle.	Water.
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	pint.	oz.	oz.	portn.	prtn	oz.	oz.	oz.	oz.	oz.	qts.
SUNDAY	—	8	—	2	—	6	8	—	¼	—	—	1	—	3	¼	—	—	2	3
MONDAY . . .	—	—	8	2	2	6	8	4	—	—	—	—	—	—	—	½	4	2	3
TUESDAY .	6	—	—	—	—	6	8	—	—	4	4	—	1	—	¼	—	—	—	3
WEDNESDAY	—	8	—	2	—	6	8	4	¼	—	—	—	—	3	—	½	4	2	3
THURSDAY	8	—	—	—	2	6	8	—	—	—	4	—	1	—	¼	—	—	—	3
FRIDAY	—	—	8	2	—	6	8	8	—	—	—	—	—	—	—	1	4	2	3
SATURDAY . . .	6	—	—	—	—	6	8	—	¼	4	—	—	—	—	¼	—	—	—	3
WEEKLY TOTALS .	20	16	16	8	4	42	56	16	¾	8	8	1	2	6	1	2	12	8	21

WEEKLY.—Mixed Pickles, 1 gill; Mustard, half an ounce; Lime Juice, 6 ounces; Salt, 2 ounces; Pepper, half an ounce.

Children between one and four years of age are to receive preserved meat instead of salt meat every day, also a quarter of a pint of preserved milk, and every alternate day one egg. Children under one year old are to be allowed 3 pints of water daily; and if above four months old, a quarter of a pint of milk daily; also 3 oz. of preserved soup, and an egg every alternate day, and 12 oz. of biscuit, 4 oz. of oatmeal, 8 oz. of flour, 4 oz. of rice, and 10 oz. of sugar weekly. To Infants under four months old the Surgeon may issue such nutriment as he may, in any case, think necessary. The Surgeon may draw an additional quart of water daily for the use of each person sick in the Hospital.

While in any port in the United Kingdom, or in any port into which the vessel may put before completing the voyage, and, if practicable, for one or two days after sailing, two thirds of a pound of fresh meat, one pound and a half of soft bread, and one pound of potatoes, per Statute adult, are to be issued daily, with a suitable supply of vegetables, in lieu of all the other Rations, except tea, coffee, sugar, and butter.

	2d Cabin Bread.	Beef.	Pork.	Preserved Meat.	Rice.	Flour.	Potatoes.	Split Peas.	Sugar.	Tea.	Suet.	Oatmeal.	Vinegar.	Water.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	pint.	oz.	oz.	oz.	pint.	pint.	qts.
SUNDAY . .	½	—	—	½	—	½	1	—	1	¼	1	1 Weekly.	½ Weekly.	3
MONDAY . .	½	—	½	—	—	¼	1	¼	1	¼	½			3
TUESDAY . .	½	½	—	—	—	½	1	—	1	¼	1			3
WEDNESDAY	½	—	—	½	—	½	1	—	1	¼	1			3
THURSDAY .	½	—	½	—	—	¼	1	¼	1	¼	½			3
FRIDAY . .	½	—	—	—	1	½	1	—	2	½	1			3
SATURDAY .	½	½	—	—	—	½	1	—	1	¼	1			3
	3½	1	1	1	1	3	7	½	8	1¾	6	1	½	21

For each Child, male and female, from 1 to 14 years of age, one-half the above allowance. Children under 1 year old go free, and have no rations. If the Potatoes are expended, ¼ lb. Rice in addition to be issued to each Adult daily in lieu thereof. When fresh Beef is issued, 1 lb. to each Adult per day will be allowed; there will be no Flour, Rice, Peas, Suet, Oatmeal, or Vinegar, during the issue of fresh Beef.

The above is the scale of the Messrs. Marshall. The chief difference between this and the Government emigration scale is, that on one day in the week a pound of rice is allowed instead of meat. Less flour is used than in the Government scale, and bread is used instead of biscuit. Fresh potatoes can also be given, —as the voyage to Canada, for which this scale is proposed, is shorter than that to Australia. The raisins in the Government scale are not given in that of Marshall, and the quantity of peas is less. Eight ounces of sugar are allowed weekly in Marshall's scale, 12 in that of Government: that of Government also allows butter, which the other does not, and gives tea and coffee instead of tea alone. The oatmeal in Marshall's scale is now allowed by the Emigration Commissioners; and the mustard, pickles, and salt, properly issued by Government, are omitted by the Messrs. Marshall. The regulations as to children's diet are very good in the Commissioners' scale.

A very good scale has been issued by the Company who sail regular packets for emigrants to Australia from the East India Docks:

	Biscuits.	Preserved Meat.	Soup with Beef in it.	Beef.	Pork.	Flour.	Raisins.	Suet.	Peas.	Rice.	Preserved Potatoes.	Water.	Rum.	Tea.	Coffee.	Sugar.	Butter.	Vinegar.	Mustard.	Salt.
	lb.	lb.	lb.	lb.	lb.	lb.	oz.	oz.	pint	lb.	lb.	qts.	gills	WEEKLY.						
SUNDAY . . .	⅔	½	—	—	—	¼	2	1½	—	—	½	3	½	Two Ounces	Three Ounces	Fourteen Ounces	Six Ounces	Half a Pint	Half an Ounce	Two Ounces
MONDAY . . .	do.	—	—	—	½	¼	—	—	⅓	—	—	3	½							
TUESDAY . .	do.	—	½	½	—	¼	2	1½	—	½	—	3	½							
WEDNESDAY .	do.	—	—	—	½	¼	—	—	⅓	—	—	3	½							
THURSDAY . .	do.	½ Salmon	—	—	—	¼	2	1½	—	—	¼	3	½							
FRIDAY . . .	do.	½	—	—	½	¼	—	—	⅓	—	—	3	½							
SATURDAY . .	do.	—	½	½	—	¼	2	1½	—	½	—	3	½							

PROVISIONS WILL BE COOKED FOR THE PASSENGERS.

It will be in the discretion of the Surgeon Superintendent to issue three times a-week, to children under seven, four ounces of Rice, or three ounces of Sago, in lieu of Salt Meat. Rum will not be issued to children under fourteen years of age.

MEDICAL COMFORTS.

A supply of Medical comforts will be put on board in the following proportions to 100 statute adults:

1 Cwt. of Oatmeal.
28 lbs. of West India Arrow-root.
56 lbs. of Scotch Barley.
150 lbs. of Sago.
30 lbs. of preserved boiled Beef, in 1 lb. tins.
20 lbs. of preserved boiled Mutton, in 4 lb. tins.
400 Pints of Lemon-juice, in wickered stone bottles, of 5 gallons each.
300 lbs. of Sugar.
24 Bottles of Port Wine.
12 Bottles of Sherry Wine.
100 Gallons of Stout.
10 Gallons of Brandy.
10 Gallons of Rum.
10 Gallons of Vinegar.
8 Dozen Pints preserved Milk.
5 Galls. of Sir William Burnett's Chloride of Zinc, in quart bottles.
1 Cwt. of Marine Soap.

The above Medical comforts to be issued at the discretion of the Surgeon, whether for the sick, or to preserve health.

Women who may be nursing may have a pint of Stout each day, if ordered by the Surgeon, who is also to make a liberal use of the Preserved Milk, for keeping the younger children in health. Proper Medicines, &c., will also be provided.

This differs but little from the Government scale, except in the admission of rum—a decided mistake; but the increased amount of preserved vegetables in the former scale is certainly an improvement.

Before framing what I would recommend as a perfect and economical scale of diet for merchant seamen, it will be necessary to examine into the relative merits of the method of preserving meat by salting, and by the new process of the simple exclusion of air.

When meat is sufficiently salted to keep for a long time in different climates, a large proportion of its nutritious elements is removed in the brine. The saline solution, in which the meat is soaked, dissolves a great deal of the nutritious matter of the flesh, which is thus purely wasted. The salt also enters into combination, more or less perfect, with the animal fibre, and alters its remaining properties; the change increasing with time. When the meat is used, it is again soaked to remove superfluous salt. Further loss is thus incurred; so that a pound of fresh meat, preserved by salting, is not only chemically altered, but it has given up a large proportion of its nutritive matter in the first process of salting, and again in preparation for cooking. It can be no matter of surprise, therefore, that persons fed on salted meat for any length of time are imperfectly nourished, and soon become diseased.

Fresh meat and vegetables may be preserved without any salt, by simply placing them in tin canisters and expelling atmospheric air. The canisters are filled. They are then nearly closed and placed in a solution which boils at a very high temperature, and

the steam which escapes from the boiling meat or vegetables carries all the air they contain with it. When all the air is expelled, the case is completely closed with a soldering iron, and the process is complete. Thus no nutritive matter in the meat can be lost. It is cut up as it comes from the butcher's—the bone only being removed—and placed within the canisters. It merely undergoes a simple process of boiling in the canister itself, so that none of the juices of the meat can possibly escape. If the cases are not injured, the meat remains perfectly good for an indefinite period, and cannot be distinguished from fresh, stewed meat. I have tasted carrots and turnips so preserved, which appeared as fresh as if just taken from the ground.

The benefits which would arise from the general adoption of this method of preserving meat instead of salting it are manifold. 1. The meat so preserved, retaining all its nutritive matter, is far more nourishing food than salted meat; and its chemical characters not being altered by saline combination, it is far more wholesome. 2. The men prefer it very much. At the Mauritius, when it was supplied to our troops instead of *fresh* provisions, on account of the high price of cattle, all preferred it to salted meat, and many to the fresh meat of the island. 3. By removing the necessity for taking live stock to sea, a great source of dirt and discomfort is avoided. 4. The method is more economical than that of salting. It is true that salted meat of good quality can be obtained in a quantity at about 5d. per pound, and good

preserved fresh meat cannot yet be obtained at less than 6d. But the salt meat contains a varying quantity of bone; the fresh meat none whatever; and three quarters of a pound of the fresh meat contain more nutritive matter than a pound of salted. The navy were supplied with preserved fresh provisions in very large quantity at 5½d. per pound; and I found that the prime cost of salt meat purchased then in very large quantity by public tender was, for salt beef about £6 per tierce, and for salt pork, £8 6s. on an average, or about 4¾d. for beef, and 6½d. for pork per pound. It is plain, therefore, that good salt meat could not be sold for less than the fresh preserved meat, to afford a fair profit to the preparer and owner. Fresh carrots and turnips were supplied at 4½d. per pound, and the soup and bouilli for the emigrant ships at 5d. This latter is the very worst kind of provisions that could be selected, as the consumer cannot determine the amount of meat and vegetables he is purchasing, and the captain does not know how much meat he is supplying to his men or passengers when he gives out soup and bouilli. It would be far better to take the meat and vegetables separately.

With the present system of stowage there is some little objection to preserved fresh meats; as a tierce, which contains 300 lbs. of salt beef, will only contain 240 lbs. of the canisters of preserved beef; but the greater nourishment in the 240 lbs. of the one than in the 300 lbs. of the other is a sufficient answer to this objection. I am supposing, of course, that really good and thoroughly well-preserved food is supplied.

Good salted meat is far better than the insipid fibrous material often supplied under the name of preserved meat.

There can be no doubt that if the new system were generally adopted by shipowners, much greater economy would follow from the support of large colonial meat-preserving establishments. I have little doubt that meat might be thus supplied from Australia at 3d. per pound, giving a fair profit to dealers, and enormously increasing the value of land in that colony. At present, however, a large regular supply could not be depended on, and in framing a scale of diet, it is necessary for the present to admit a certain proportion of salted meat, not because it is so good as well preserved fresh meat, but because an adequate supply of the latter could not be depended on.

In the French navy the men are supplied with bread baked on board; and there can be no doubt that this is much more wholesome than the biscuit almost universally used in our navy and mercantile marine, even when this biscuit is fresh and good. When biscuit is attacked by weevil there can be no doubt of its unwholesomeness. Biscuit so damaged is largely supplied to merchant ships, and is the cause of much disease among the men. The objections to baking on board ship are, the chance of injury to the flour—the quantity of water required to mix it, and the fuel required in baking increasing the necessity for stowage room—other occupation of the cook, or the necessity of carrying a baker—and the sour taste of leavened bread. The former objections are for the

consideration of nautical men, the latter may be obviated by using soda instead of yeast or leaven. Bread may be made perfectly light in this way, and a pound of flour will make a heavier loaf than when the flour has been fermented, because, in the one case, the gas which passes through the dough and lightens it is supplied from the soda; in the other, it is formed by the destruction of a portion of the flour. The following is one mode of making unfermented bread:—Thoroughly mix one drachm of carbonate of soda with a pound of flour, add 70 minims of muriatic acid to half a pint of water, mix it up with the flour and put the dough into the oven *immediately*—the bread will be heavy if not baked as soon as the dough is made. The acid and soda when mixed together only form common salt, so that the bread is simple flour, water, and salt. If it is not salt enough, a teaspoonful of salt may be dissolved in water before adding the acid. Such bread is much more palatable than leavened bread; it keeps longer and is far more wholesome than biscuit. It is left to the consideration of seamen how far its use may be generally or partially adopted.

Other kinds of vegetable food which may be taken to sea are vegetables, preserved fresh or by drying; peas, rice, oatmeal, &c., and dried fruits. Carrots and turnips preserved by the exclusion of air, or by a process of simple drying, are the vegetables best adapted for seamen in point of usefulness and economy. Potatoes are also preserved by removing the rind, breaking up the potato, drying, and grinding to a coarse

powder. In this state it is very portable, and will keep good for years. Raisins and currants are most useful fruits at sea. Other fruit preserved by boiling can only be taken as a luxury, or as diet for the sick. Lemon-juice must be taken and served out in accordance with the Act of Parliament, but citric acid will probably be supplied in its place when the amended Act comes into operation.

The principles to be observed in forming a scale of diet are to give as much food as is necessary to support health and strength—to regulate the quantities of animal and vegetable food by the wants of the system—to vary the nature of the food as far as practicable—and to adopt those means of preserving food which alter it in the smallest degree from its natural condition. A healthy man, taking active exercise, should not be allowed less than three quarters of a pound of animal food, and a pound and a quarter of solid vegetable food, daily—three quarters of a pound of the vegetable food to consist of bread or biscuit, and the meat to be weighed without bone and after cooking. For the present, half the meat taken to sea might be salted and half preserved fresh. It might consist of beef, pork, and mutton, and the fresh and salt meat of each kind be served on alternate days. Every day a quarter of a pound of carrots or turnips, or of preserved potatoes, might be served alternately. Three quarters of a pound of bread, and a quarter of a pound of rice, peas, or oatmeal on certain days, and on other days two ounces of raisins or currants, with a quarter of a pound of flour,

would complete the vegetable diet. Tea, coffee, sugar, butter, vinegar, mustard, and salt, might be allowed on the scale to emigrants under Government superintendence, or cocoa might be advantageously substituted for coffee. Flour, bread, rice, &c., keep much better in tin cases or iron tanks than in casks.

DRINK.

Water.—It is of the greatest importance that the water should be pure. It is preserved infinitely better in iron tanks than in casks. It is to be hoped, however, that, for the future, large ships at least, and steamers in general, will not find it necessary to take water to sea, as very simple means can be adopted for procuring pure distilled water from the sea water. In some of our sailing men of war from eighty to three hundred gallons of distilled water are procured during the hours of cooking with no extra expenditure of fuel, and in steamers any necessary quantity might be obtained. Such an apparatus might be easily adapted to vessels of any size, and the subject is well worthy of the attention of practical men. It would never pay to carry fuel for the purpose of distilling water alone, but the coals used in cooking may heat a still at the same time and thus afford a supply of pure water, which by agitation with air loses the insipid taste of distilled water, and is not only preferable to water from casks or tanks, but to the unwholesome water frequently taken in from rivers in warm climates.

Very frequently the water in merchant vessels is not kept either in iron tanks or in charred casks, and soon becomes putrid. When this is the case, it should never be drunk until after exposure to the air. Water which appears quite putrid when first the bung is taken out of the cask, becomes sweetened by exposure to the air for a few days or even hours. Still more perfect purification may be effected by mixing with powdered charcoal and passing through a filter. A filter, on the ascension principle, was fitted up in a half-ton tank, which supplied the whole ship's company of a frigate for two years. A filter of proportionate size might be employed in every ship with the greatest possible advantage.

The gutta percha piping is the cleanest and best material to be used when water is pumped from the tanks to the decks. Gutta percha would be very advantageously substituted for wood in making water casks, tubs, or pails for ships, and it might even be preferable, on many accounts, to iron tanks.

Spirits.—The use of rum and other spirituous liquors is the cause of much disease at sea. No fermented liquors are necessary for the preservation of health. On the contrary, they are generally injurious in proportion to the quantity taken. A very large proportion of crime, punishment, and serious accidents take place in the navy when the men are under the influence of drink, and it cannot be doubted that in the merchant service, where the restraint is less, the evils are greater.

It is a great error to suppose that spirits feed or

nourish the body. They do no such thing. They do not contain the elements of which the structures of the body consist, or from which they can be prepared. They do not even assist in maintaining the heat of the body to anything like the degree commonly believed; and they check the process of purification of the blood which goes on during respiration, causing impure matters to be retained in the blood and circulated to the brain in common with all other parts of the body. A moderate habitual use of fermented liquors does no good, but more or less harm; and, as it is apt to lead to the immoderate abuse, with all the fearful consequences of that abuse, every means should be taken to discourage the men from taking any spirits whatever. Upon these subjects I may quote the following extracts from an admirable tract by my friend Dr. Carpenter. After proving the extreme evil and danger produced by the use of fermented liquors in warm climates, he says:

"The testimony of those who are exposed to *vicissitudes* of climate is perhaps even more valuable than that of those who have to sustain continued or severe cold; and under this aspect we regard the evidence of intelligent seamen as of peculiar importance, in addition to the force it derives from the well-known attachment of their class to spirituous liquors. That such regard the total abstinence principle as at any rate a *safe* one, may be inferred from the circumstance that it is now carried into practice in a very considerable part of the merchant service in this country, and in a still larger proportion of American vessels; and that the adoption of this plan is not known to occasion any difficulty in obtaining crews for the 'temperance ships,' when a fair compensation is made in the superior quality

of the provisions and allowances, or in the rate of wages, as an equivalent for the 'stoppage of the grog;' in fact, such ships are often in positive request. And it is not a little worthy of note that lower rates of assurance are frequently taken upon 'temperance ships,' than upon those in which the usual allowance of spirits is continued; it being well known that a large proportion of losses at sea are due to the intemperance of officers and men. We consider that an immense improvement was made in the victualling of the navy when the allowance of grog was diminished, and coffee, cocoa, &c., were substituted; and we trust that the day is not far distant when the total abstinence principle may be recognised as worthy of Government support in the army and navy, instead of being (as at present) checked or discouraged by the strong temptations to indulgence which are placed so completely in the way of the men, as to require great moral courage on their parts to resist them habitually. That the moral condition of sailors is more likely to be raised by the universal extension of the abstinence system amongst them, than by any other single measure of improvement, is unhesitatingly declared by all who have had experience of the superior conduct of the sailors on board the 'temperance ships;' and we feel assured that the 'cat' may be discarded when the grog is thrown overboard,—at least two thirds of the offences now punished by flogging having their origin directly, or indirectly, in alcoholic excitement.

"That there are peculiar difficulties attending the complete withdrawal of the allowance of spirits in the naval service, we freely admit; and it is well that these difficulties should be openly stated, in order that they may be fairly met, and, so far as possible, counteracted. We have requested a distinguished medical officer attached to the late Antarctic expedition to place us in possession of his opinions on this point; and we are sure that those who are acquainted with the scientific reputation of Dr. Joseph Dalton Hooker will consider the declared results of his experience under such trying circumstances as highly important. In reply to our question, whether the habitual use of

fermented liquors may be *safely* dispensed with on board ship, he thus writes:

"'*Allowing the water to be palatable*, I have no hesitation in saying that the habitual use of the spirits may be *beneficially dispensed with*, as far as the health of the crew is concerned.'

"In reply to our second query, whether the abstinence in cold climates is attended with positive benefits, Dr. Hooker writes:

"'I do think that the use of spirits in cold weather is generally prejudicial. I speak from my own experience. *It is very pleasant.* The glass of grog warms the mouth, the throat, and the abdomen; and this, when one is wet and cold, with no fire, and just before turning into damp blankets, is very enticing; but it never did me one atom of good: the extremities are not warmed by it; and when a continuance of exertion or endurance is called for, the spirit does harm, for then you are colder and more fatigued a quarter or half of an hour after it than you would have been without it. Several of the men on board our ship, and amongst them some of the best, never touched grog during one or more of the Antarctic cruises. They were not one whit the worse of their abstinence, but enjoyed the same perfect health that all the crew did throughout the four years' voyage. Many of our men laid in large stocks of coffee, and, when practicable, had it made for them after the watch on deck. These men, I believe, would willingly have given up their spirits in exchange for coffee; but we could not ensure them the latter on the requisite occasions. To the southward of the Antarctic circle, or of lat. 50°, you may say, it blew a gale three days out of five; there was always a heavy swell running; the whole ship and bedding were damp from condensation, where not so from shipping seas; the atmosphere of the lower deck (with hatches battered down) such that you could not see from one mess-table to another; and this for days together. There is neither standing, sitting, nor lying in comfort. All hands, officers and men, up and ready; the one watch on deck, the two others on the *qui*

vive for any emergency. In cruising amongst the ice, the ship is perhaps put about every half hour; and we have been for sixteen hours in this state. Every time we go on deck we are drenched with cold salt water, which sometimes freezes as it falls; and when you go below, there is really nothing to do but 'lick your paws,' as the men say. Nothing hot can be got.'

"Certainly a more uncomfortable situation, short of positive danger, can scarcely be imagined. Let us see what Dr. Hooker says of the use of spirits on these occasions, in answer to our third query—Whether there exist *any* circumstances which in his opinion render the *occasional* use of alcoholic liquors beneficial.

"'This is perhaps as extreme an instance as I could bring forward of the demand for spirits. Now I do not believe that to 'splice the main-brace' half a dozen times, or even more, in this sixteen hours would do any good in the way of giving strength; but to refuse the men some grog would be a great hardship. I have seen grog given—half a gill at a time—thrice (I think) under such circumstances, with no perceptible harm; but I do not suppose it did any good; and more would, I am sure, have done mischief. The fact of giving it did good in one way;—it made the men joyful, not from excitation, but as we all rejoice on cutting the Christmas pudding; and I quite believe that under that continued exertion the bad effects were dissipated. But this is a very different thing from doing any real physical good. I can well suppose the effect to have been, though inappreciably, the contrary. Of one thing I am sure, and that is, that no one was more ready for a repetition of the exertion from taking the stimulus; the intervening time was more pleasantly and comfortably passed. It may be a question whether, granting the spirits to have done some good towards exhilarating, when no modern appliances could be available, it would be desirable to withdraw it on such occasions. It is a choice of evils perhaps.

"'I know of only one occasion on which the spirits appeared indispensable; and that was, when a little more exertion at the

crowning of a mighty and long-continued effort was demanded. Thus the ship, when sailing in the pack-ice, is sometimes beset, or falls to leeward into the lee-ice. This takes two or three minutes; but if there is much wind, it takes many hours to get her out. Not being in command, the sails are of no use; and the ice prevents her moving in any way but with it to leeward. Under these circumstances, the only way to get her out is by fastening ropes from the ship to the larger masses of ice, and warping her out by main force against the wind. Now I have seen every officer and man in the ship straining at the capstan for hours together, through snow and sleet, with the perspiration running down our faces and bodies like water. Towards the end of such a struggle, at the mighty crowning effort, I have seen a little grog work wonders. I could not have drunk hot coffee without stopping to cool; nor, if I had, do I think it would have supplied the temporary amount of strength which was called for *on the spot* under circumstances like this.—These, however, are extreme cases, which do not affect the sailor in his ordinary condition, and which any ship might be well prepared for.'

"Fully agreeing with Dr. Hooker that we know of nothing which, under such trying circumstances, could be advantageously substituted for the alcoholic stimulus, we may add the remark that, where the habitual use of it is relinquished, a much smaller amount of it will suffice to produce the required stimulation than where a large allowance is daily imbibed. Every medical practitioner must be aware of the necessity of regulating the quantity he administers, for any particular object, by the usual habits of his patient; a single glass of wine doing that with one which an entire bottle would scarcely effect with another more seasoned vessel. We must not omit Dr. Hooker's conclusion:

"'The great practical difficulty on board ship is, that you have no available substitute for bad water but good grog, as the sailor is at present situated. I cannot, however, but think that, with more attention to the comforts of the sailor, his own love

of liquor would diminish; and that he might be weaned from it by the officers, though the depriving him of it by the Government would be a dangerous experiment.' "

I have seen so much crime and disease clearly produced in the navy by the rum allowed to the men by Government, that I am desirous of checking the evil by every means in my power. I would therefore recommend that, in framing scales of diet, no rum, wine, or other spirituous or fermented liquor should be taken to sea as an ordinary allowance to the men. A small quantity might be taken for use in cases of emergency, or in some few instances of disease. But the men should be encouraged, by higher wages, to abstain from such drinks, and instructed that they are very seldom necessary, and generally injurious. Above all, they should be supplied with good water, and sufficient tea and coffee.

CLEANLINESS OF THE PERSONS AND CLOTHING OF THE MEN

should be strictly enjoined by daily muster and inspection, and by periodically washing and airing the clothes. The serge frocks and blue trousers saturated with perspiration and salt water become so hard, greasy, and irritating, that diseases of the skin of an obstinate nature are often caused by wearing them. The men should be encouraged to wash the whole of the body every morning, and to bathe daily in warm weather. A cask fixed to the ship's side makes a capital bath, and may be so slung as to be instantly emptied and refilled. In steamers, warm water might

be supplied in abundance—and in large ships enough for a weekly bath for each man might be taken from the coppers. Any clothing worn next to the skin should be frequently inspected and washed. It is absolutely necessary to perfect health that all dried perspiration should be cleaned from the skin every day. The pores must be kept clean; and this can only be done by daily washing and wearing clean underclothing.

The CLOTHING must be warm, light, and porous. It must also be adapted to the climate and weather; but in all climates flannel should be worn next the skin, at all times, except when in bed. It absorbs the perspiration, and, being a bad conductor of heat, prevents chills and all danger of checked perspiration. Frocks and trousers made of blanket flannel are very useful for night wear during heavy dews, and in tropical climates in rainy seasons. Flannel dries very soon when hung up in the rigging. On passing from a warmer to a colder climate extra clothing should always be worn, and in all changeable seasons the men should be encouraged to keep their feet and necks warm by comforters and woollen stockings. Sailors are very obstinate on this point; but I have often seen those who wore comforters round their necks at night escape colds from which those who neglected the precaution almost universally suffered. Colds and rheumatism are more prevalent in warm climates than in England. Sudden changes from heat to cold, heavy dews at night, fresh breezes chilling the body when heated by a hot sun, or cold, damp evenings after a hot day,

common in many warm climates, explain this, the body being less protected by clothing than is usual in England. Flannel worn next the skin preserves the body from these effects of climate. If it irritate the skin, wove cotton may be substituted; but this is not so useful as flannel.

Exposure to wet and cold should never be allowed unnecessarily. The men should not be allowed to lie about the decks during the night watches. They should be particularly cautioned against sleeping in wet clothes, and also from exposing themselves to the sun in hot climates. When sleeping ashore at night in hot climates, near rivers or marshes, if in the open air, a fire should be made, and if in a house, the upper room should be selected. If one is obliged to sleep on a ground floor, the windows should be kept shut, as the malaria remains near the ground at night.

DISCIPLINE.

The hours of labour, rest, and sleep should be defined, and the order only disturbed in cases of necessity. Excessive labour, imperative under some circumstances, should be followed by lengthened repose. Regular hours for meals, sleep, and labour, are of the greatest importance at sea. A well-ordered, strictly disciplined ship, under a just officer, is always comfortable; while nothing can be more miserable than a ship in a lax state of discipline. Singing, dancing, various games and amusements, should be encouraged at certain times, such as single-stick, sling the monkey,

and ship billiards. A habit of reading should be encouraged by every possible means. A few shillings spent in such useful publications as those of the Messrs. Chambers, or in some illustrated paper, would be always well laid out by the master of a ship before a long voyage. Nothing leads so soon to discontent and disorderly conduct as the want of something to interest the mind; and sailors will generally seize with avidity any book thrown in their way. I have seen twenty or thirty sitting together frequently to hear some shipmate read an old newspaper, and appear perfectly delighted by the loan of some simple interesting book. When the mind is interested and employed, the sailor is cheerful, active, and obedient; but if no mental recreation be provided, he falls, at times when active bodily exertion is not required, into a querulous, discontented condition, becoming slothful, unruly, and quarrelsome. A considerate master, who attends to the comfort of his crew, will always find his reward in their activity in moments of danger, and he will observe that during calms or idle moments the loan of a few books will often be received more gratefully, and repaid by more willing service, than so slight a mark of kind feeling could appear to deserve.

In concluding this part of the subject it is necessary to observe that, owing to want of medical superintendence at some shipping ports, men are often entered who are labouring under symptoms of various diseases, particularly chronic dysentery, old ulcers, scurvy, and diseases of the chest, or the first commencement of eruptive fevers. This should be pre-

vented by the appointment of proper medical officers at our ports, whose duty it would be to examine every man before he signs his articles. This plan has proved most useful at Liverpool. It is impossible to have a healthy crew if men leave port in a state of disease. It would be necessary also to require that each man should furnish himself with a sufficient supply of clothing for purposes of warmth and cleanliness, and the bedding should be clean before it is taken on board.

PART II.

OBSERVATIONS

UPON THE ACCIDENTS AND DISEASES TO WHICH SEAMEN ARE MOST LIABLE, WITH DIRECTIONS FOR BLOODLETTING, VACCINATION, &c.

ARRANGED ALPHABETICALLY.

ABSCESS, or *gathering*, as it is commonly called by seamen, may appear in almost any part of the body; but the groin, neck, or armpits, are the most frequent situations. Some redness and pain of the part are first observed, then hardness and swelling. The swelling gradually increases until the skin is raised and a red lump is seen, which feels soft to the touch. It is very tender, and the pain is of a beating or throbbing kind. At last, the skin gives way, and matter is discharged for some days. The quantity gradually diminishes, the opening closes, the hardness and redness disappear, and all is well.

An abscess will often appear without any obvious cause. Sometimes it follows a blow, or strain; at others a decayed tooth will cause an abscess below the jaw; or venereal disease will produce a bubo or

abscess in the groin.—See BUBO. Abscesses between the buttocks are also often connected with piles.—See PILES. There is no dead flesh in an abscess. In this respect it differs from a boil.—See BOIL.

In the treatment of an abscess, the principal thing is to keep the part quiet, warm, moist, and free from pressure. Warmth and moisture may be secured either by a wet bandage or by poultices. The *wet bandage* is simply a piece of soft linen—a pocket-handkerchief, for instance—folded four or five times and thoroughly wetted with cold water. This is wrapped round the part and covered by another wrapper—either a towel or a double piece of flannel. The cold water very soon becomes warm, and is felt to be very comfortable. The bandage should be wetted again when it becomes dry or uncomfortably warm. It acts quite as well as a poultice, is cleaner and more readily obtained on board ship. A *poultice* may be made of bread and water, linseed-meal, or oatmeal. To make the first, soft bread must be crumbled, put into a basin, covered with boiling water, then covered over and left for a few minutes. The water is then drained off, the softened bread beat up into a pulp with a spoon, and spread, about half an inch thick, upon a piece of linen. It should be applied warm, and as it becomes dry the linen may be moistened by sponging a little warm water upon it. The linseed-meal, and the oatmeal poultice may be made by putting a little of the powder into a basin, stirring it up with a little boiling water, gradually adding more water, and stirring until a soft paste, free from lumps is formed.

This is to be spread on linen, not quite so thickly as the bread poultice, and a little oil or lard placed on the surface to keep it soft and moist. There is no great difference in the action of these poultices, and in most cases the wet bandage is far preferable.

When an abscess is very painful, the skin evidently thin, and the matter is felt distinctly by the finger, the skin may be pricked by a lancet or sharp penknife. Time is thus saved and much pain spared, for the matter is often a long time in forcing its way through a tough skin. It is necessary to be cautious and not cut deeper than is required to let out the matter, for fear of wounding some important part.

AGUE.—See FEVER, *Intermittent.*

APOPLEXY is not of frequent occurrence among seamen; but occasionally an idle captain, supercargo, or other person on board, who eats freely, sleeps long, and takes but little exercise, becomes fat, and subject to fits of drowsiness. His face becomes flushed on stooping, or on the slightest exertion, and the breathing is short and hurried. When such a person commits an excess in eating or drinking, is obliged to exert himself in any unusual manner, is excited by anger or any violent emotion, he is very likely to have a fit of apoplexy. Persons affected with diseases of the heart or lungs, are also likely to have similar attacks. The person suddenly falls down senseless and powerless. The face is flushed and swollen, the skin is hot, the temples and vessels in the neck are

seen and felt to beat violently. The breathing is very heavy, often almost like snoring. The eyes are shut, and on opening the lids, the white part appears blood-shot. Convulsive motions of some of the limbs are not uncommon. The pulse is slow, full, and hard.

There is another kind of apoplexy, to which very old men and feeble persons are subject, and those who suffer from dropsy and disease of the kindeys. There is the same loss of sense and power, with heavy breathing; but the face is pale, the skin cool, and the pulse feeble. It is important to remember this, because the two kinds of apoplexy must be treated in a different manner.

In both cases it is well to take off the neckcloth, and any part of the dress which can produce the least pressure on the neck, and to admit pure air freely to the place where the person is lying; but in all other respects the treatment differs.

In the kind first described, the head of the person should be raised without bending the neck, and a bucket of cold water poured over it; then, from a pint to a pint and a half of blood should be taken from the arm.—See BLOODLETTING. This is almost the only case in which a person not medically educated, should venture to bleed another. No hartshorn, or any other stimulant, should be applied to the nose; and on no account should an emetic be given, as some have advised. The person must be kept as quiet as possible after the bleeding, and ten grains of calomel put upon his tongue. A little cold water is to be given occasionally with a spoon as soon as he can

swallow. If he begin to recover, he must be kept on low diet for a long time; the bowels kept open by purgatives; and no wine or spirits of any kind allowed. Quiet and pure air, with frequent sponging of the skin, are of great importance.

In the second kind of apoplexy, bleeding would, in all probability, very soon kill the patient. It must be carefully avoided. The head should not be raised. All that can be done is, to put a large blister behind the neck, to keep the feet warm, and to give ten grains of calomel if the bowels have been confined. If they have been opened on the day of the attack, this will be unnecessary. Should recovery take place, a more nourishing diet will be necessary than in the first kind of apoplexy; but stimulants must be given very sparingly, or not at all. Extreme quiet is necessary during convalescence.

ASTHMA is difficulty in breathing, which comes on in a kind of spasm, and passes away, leaving the sufferer breathing as freely, or almost as freely, as before the attack. It generally comes on at night, with a feeling of suffocation and great noise in the chest, and the patient is obliged to sit up to help him to breathe. Some persons only suffer from asthma in certain places or seasons, at other times being quite free from any chest affection. In others it depends upon some disease of the lungs or heart. This can only be known by consulting a medical man.

The treatment during the fit consists in the administration of some hot drink in considerable quantity.

Hot strong coffee generally affords great relief. If this cannot be obtained, hot wine and water, very weak, or hot tea, may be given. A mustard poultice, or flannel wrung out of hot water, may be also placed on the chest. If this does not afford relief, an emetic should be given. I have lately found that a few drops of chloroform thrown upon a handkerchief, held before the nose and mouth, afford great and immediate relief during the fit.

The best means of preventing a return of the fits, are temperance in food and drink, and avoidance of such places and habits as have been found by former experience to induce an attack.

BITES OF MAD DOGS, AND BITES OR STINGS OF VENOMOUS REPTILES AND INSECTS.—The bite of a healthy animal is a simple torn or bruised wound, and must be treated in the manner described under the head WOUND; but a poisoned bite, or sting, requires certain special precautions. Whether bite or sting, the wounded person is inoculated with an animal poison; and this poison must be removed, rendered harmless by some antidote, or the injured part must be taken off or destroyed.

The *Bite of a Mad Dog* is likely to produce a terrible and fatal disease in the bitten person, called hydrophobia, which may not appear for weeks or months after the bite. The majority of persons bitten by mad dogs escape without any further ill consequences than the mere wound. Again, many dogs are supposed to be what is called *mad*, who are not so;

but the safe rule is, when there is any room for doubt on the subject, to treat the wound as if the dog were really mad, and as if the fatal disease would certainly ensue if the poison were not thoroughly removed. No means have yet been found of *curing* hydrophobia; the object, therefore, is to *prevent* it by removing the poison, or the poisoned part.

If no assistance be at hand when a person is bitten, he should instantly suck the wounded part for several minutes, spitting away the blood from time to time. Then, if the bite be on a limb, a handkerchief or string should be tied tightly round it, between the wound and the body. This supposes that the person has no knife with him. If he have, and can summon up courage, he had better instantly cut out the bitten piece, by carrying the knife around all the parts penetrated by the teeth of the dog; or a nail or fork may be made red hot, if a fire be near, and the part entirely destroyed by the application of the hot iron. If a finger or toe be bitten, and there is no doubt of the disease of the dog, the safest plan would be to chop it off instantly with a chisel, or large knife, and a hammer or mallet. The loss of the finger would be well repaid by the security afforded against a fatal disease.

If the bite happen on board, or where caustic or vitriol can be obtained, after the bitten part has been cut out, the caustic should be applied, or the wound may be filled with gunpowder, and a light applied. The part is thus instantly cauterized.

If a person is bitten by a dog, and the wound heals

before it is known that the dog was diseased, as soon as this fact is discovered, the scar should be completely cut out, and caustic applied to the wound.

If a bitten person become affected with hydrophobia, which is known by horror of swallowing fluid or solid substances, convulsions, difficult breathing, and the collection of thick slime about the lips, no medical treatment has yet been discovered of the least use, except the production of insensibility by chloroform. All sorts of remedies have been tried and have entirely failed, so that if no chloroform can be procured, the patient had better be made as comfortable as possible, and not tormented by medical treatment. If chloroform is to be had, the patient may be made insensible by covering his mouth with a handkerchief, moistened by a few drops of the remedy, and this should be repeated as often as the pain or spasms return. This, if of no other use, will at least relieve what would otherwise be most horrible suffering, both bodily and mental.

Bites of reptiles are more sudden in their poisonous effects than those of mad dogs. The bitten person almost immediately begins to feel the distressing effects of the poison with which he has been inoculated. After the bite of the *adder* or *viper* the person very soon becomes faint and sick; there is very great pain in the bitten part, extending up the limb or body, and swelling very soon comes on. Olive or sweet oil is considered to be an antidote to the poison of the adder, and as soon as it can be procured it should be well rubbed into the wound. Brandy or wine

should also be given in sufficient quantity, with hot water, to remove the faintness and depression of the patient. Some persons recommend that a wine-glassful of olive oil should be swallowed, and the popular belief is, that the fat of the reptile is as efficacious as the oil. Thus it is the common practice to kill the adder to rub some of the fat into the bitten part. But it must be remembered that the great object in all cases of poisoned wounds is to remove the poison or the poisoned part, and therefore the treatment just recommended, when a person has been bitten by a mad dog, should be followed when a *viper*, *rattlesnake*, or any of the East Indian serpents, as the *cobra di capella*, has inoculated the poison. In addition, however, brandy or some stimulant must be given freely. After the bite of the rattlesnake, the part bitten, and sometimes the whole body, swells and mortifies. In either case, keeping the part warm by hot poultices, and giving quinine in doses of five grains every two hours, with plenty of wine or brandy, will be the best treatment. The *Tanjore pills*, which consist of arsenic and mercury, with some vegetable substances, are said to be very useful after the bite of the *cobra di capella*.

It should be remembered that if the lips be cracked, it would not be safe to suck any poisoned wound, as the crack might also become poisoned. In this case a large quill, or any hollow tube, if at hand, may be placed between the mouth and the wound. But most likely no such thing can be found at the moment, and in that case the wound should be sucked, as the dan-

ger to the lip is by no means so great as that of allowing the poison to remain in the bitten part. In the one case it is pure, in the other diluted with saliva.

It is well to know that the adder or viper is small, reddish black, and has a dark lozenge-shaped streak along the back. Harmless snakes have two rows of teeth in the upper jaw. Poisonous snakes have but one. In poisonous snakes the scales are smallest near the head, and gradually increase in size towards the tail. In harmless snakes, on the contrary, the largest scales are near the head, the smallest at the tail.

Insects may either bite or sting—some both bite and burrow under the skin. The *harvest bug* in England, the *tick* in North America, the *chigoe* of the West Indies, the *guinea worm*, and other insects, bury themselves beneath the skin, produce violent itching, and if the insect be not thoroughly removed, very obstinate sores follow. The chigoe generally attacks the toes or the soles of the feet, and lays its eggs, enclosed in a small sac, beneath the skin. The eggs, and every part of this sac, must be completely removed with the point of a needle or knife, or the most violent inflammation follows, and sometimes parts of the feet have been lost by mortification. The guinea worm attacks any part of the surface of the body, and lies like a fine fiddle-string beneath the skin. Sometimes it attains several feet in length. It is supposed to be contagious, as it has affected nearly the whole of large ships' companies. It may remain many months unnoticed. At last pain, inflammation, and

small boils form, and the head of the animal protrudes. It must be extracted very carefully, in order to remove it entire. The protruded part should be wrapped in a long strip of sticking plaster, and rolled up, a fresh turn or two being given to the roll every day very gently, not stretching the animal tightly enough to tear it in two.

Mosquitoes, bugs, fleas, and many other insects which bite, also poison the wound by the inoculation of a fluid, which renders the blood thinner, and more fit for suction. In warm climates the bite of the mosquitoe is often followed by severe inflammation; and, if the skin be scratched, most troublesome sores often result. The pain and itching produced by these bites is greatly relieved by rubbing a little liquid ammonia over them, either pure or mixed with an equal proportion of olive oil. On the western coast of Africa, where the varieties of these biting and sucking insects are numerous, and many of them exceedingly venomous, the natives draw out the poison by a sort of cupping-glass, made of a small gourd, open at both ends, one opening being but small. The larger opening is placed over the bite, and a piece of lighted paper or wood is inserted by the smaller opening, which is then closed by the thumb. This is a very simple and useful method of producing the action of suction upon a wound, and it may be kept up for a considerable time.

Insects which sting, as wasps, horse-flies, hornets, or bees, not only insert a poison into the person stung, but also frequently leave the sting itself, or

part of it, in the wound. In this case, the sting should be carefully drawn out with a pair of tweezers, or the skin may be opened with a needle, and a little squeezing will then generally force out the sting. A little oil and laudanum mixed together in equal parts may then be applied, and the part covered by a wet bandage or poultice. Pain and swelling often last many hours. Sometimes stinging insects are swallowed in fruit, and the inside of the throat is stung; so much swelling following that persons thus injured have died of suffocation. Hot fomentations to the throat, and gargles of hot water, are the only means a person ignorant of anatomy could safely employ in such cases.

BLEEDING.—Under this head will be found remarks upon accidental bleeding, and the means of stopping it. The method of bleeding from the arm will be found described at page 85, under the head BLOOD-LETTING. The articles DYSENTERY and PILES may also be referred to.

Blood is often spit or coughed up from the lungs, and occasionally is vomited from the stomach. In the one case it is generally mixed with phlegm, in the other with food. Blood from the lungs is generally streaked in the phlegm. It is frothy in small quantity; in larger quantity it is of a bright red colour. Blood from the stomach is generally in considerable quantity and dark coloured. In either case the patient must be laid on his bed or hammock, kept as quiet and cool as possible, and cold or iced drinks

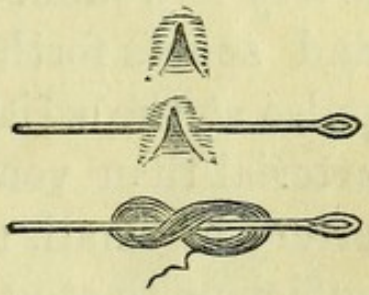
given. The drinks may be made sour by vinegar or some other acid. In the absence of a medical man these means alone must be trusted to, for bleeding and lowering measures on the one hand, astringents, or stimulants on the other, would be more likely to do harm than good in the hands of those who cannot properly appreciate the cause upon which the bleeding depends.

Bleeding from the nose is not unfrequent at sea, especially in warm climates. When the quantity of blood lost is not great the effect is often salutary; but sometimes so much blood is lost that it becomes necessary to stop the bleeding. To do this, let the person sit upright, and hold the arms straight upwards above the head. This position maintained for three or four minutes will often alone suffice to stop the bleeding. If, however, it should continue, a drachm of alum must be dissolved in six ounces of cold water, and some of the solution be thrown with a syringe into the nostril on the side which bleeds. The bleeding is almost always from one nostril only; if from both, the alum solution should be thrown up on both sides. A piece of linen or lint moistened with the same solution, or with spirits of turpentine, if the alum solution do not prove effectual, may also be passed into the nostril and allowed to remain there for some hours. A piece of silk or string should be previously tied round the linen, so that it may be easily removed when requisite. A surgeon would plug the nostrils in a different way, but the plan just described, with the erect posture, quiet, cool air, and

cold acid drinks, will always be sufficient to stop almost any bleeding from the nose. To prevent a return, the bowels must be kept open, and a temperate diet insisted upon.

Bleeding from the ear is scarcely ever seen except in cases of wounds, or fracture of the skull. Should it occur under other circumstances, lint wetted with alum solution may be pressed into the ear, held there until the bleeding ceases, and left for a few hours.

Bleeding from leech bites is seldom excessive, except in very young children. A little powdered alum, or a few drops of spirit of turpentine, sprinkled over the bites, will almost always stop the bleeding. If this does not succeed, a fine needle should be passed through the edges of the bite, and a piece of silk or twine twisted round the needle, in the form of the figure of 8, will instantly stop the bleeding. The drawing shows—first the bite, then a needle passed through the edges of the wound, and lastly the manner of tying the string around the needle so as to press the sides of the wound together. When tied, the string would be tighter than it appears in the drawing.

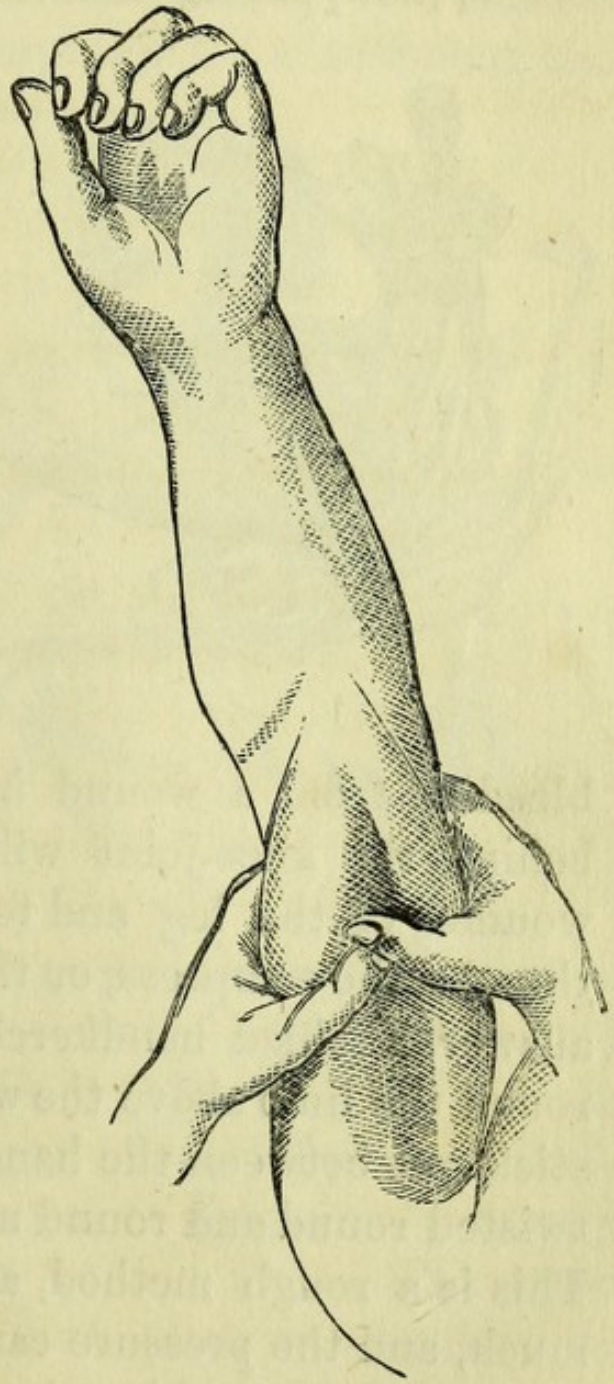


Bleeding from wounds may be merely an oozing of blood from the surface of the wound, no large blood-vessel having been injured; or an artery or large vein may have been injured. The application of a sponge wetted with cold water, or cold solution of alum, or a piece of lint steeped in spirit of turpentine, and the

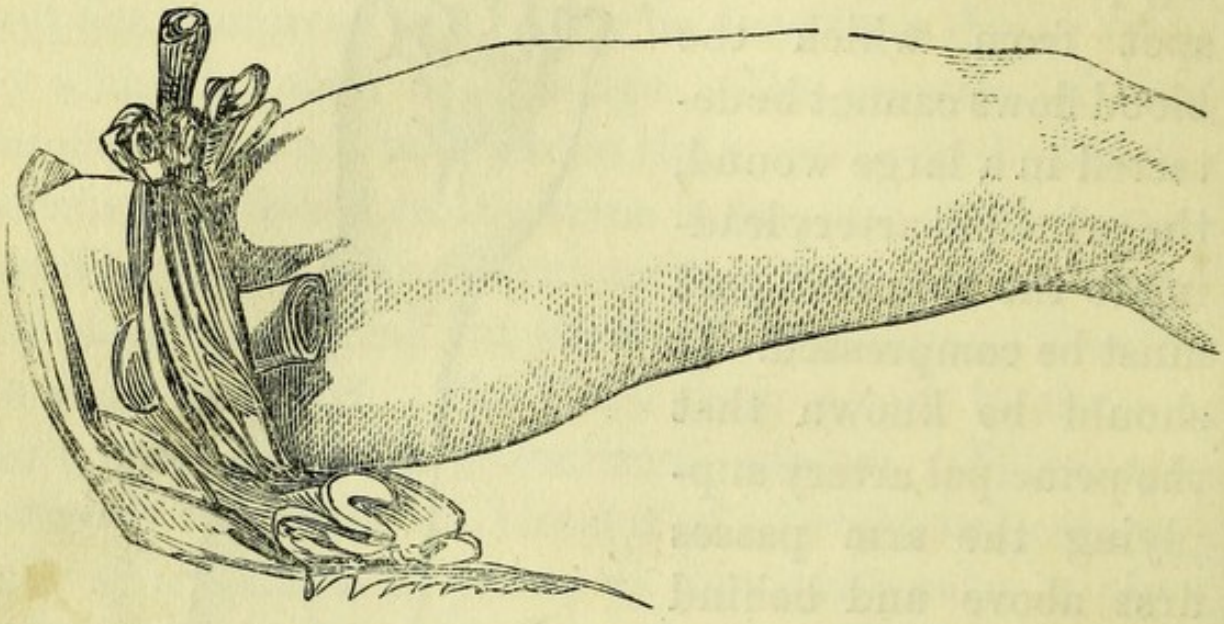
pressure of a bandage, will always stop a simple oozing. When a *large vein* is wounded, or when a swollen vein in the leg bursts, a small piece of cork or wood should be wraped up in lint, folded three or four times round it, and pressed upon the spot from whence the blood issues. The pressure of the finger upon this compress will always be sufficient to stop bleeding from a vein, and the compress may easily be fixed for a day or two by a handkerchief or bandage. The pressure of the bandage must not be between the wound and the heart, because the blood in the veins is running towards the heart, and any impediment to its course might cause the bleeding to break out afresh, if the compress should be at all loosened. The blood from a vein is always dark, and flows in a continual stream. When an *artery* it wounded, the blood is of a bright red colour, and spurts forth in jerks, at the same rate as the pulse at the wrist. It is much more difficult to stop arterial than venous bleeding; still, if the wounded artery be small, the pressure of the compress will be sufficient to stop it, as in the case of a wounded vein. But as the course of the blood in the arteries is *from* the heart, pressure must be applied upon the bleeding point, and also above it, or between the wound and the heart. The blood is thus prevented from arriving at the wound.

If an artery of some size be wounded, a very considerable quantity of blood may be lost in a very short time. The person soon faints, and this state of fainting favours the formation of clots of blood in the wounded vessel which assist in plugging it up.

Unless, therefore, fainting continue so long that death is threatened, no attempts must be made to rouse the person from it by stimulants. When the fainting goes off, the bleeding may or may not return. If it should do so, firm pressure must be made with the thumbs upon the bleeding point. If the exact spot from which the blood flows cannot be detected in a large wound, the principal artery leading to the wounded part must be compressed. It should be known that the principal artery supplying the arm passes first above and behind the collar-bone, then from the middle of the armpit along the inside of the arm, to the middle of the bend of the elbow. Pressure downwards behind the collar-bone with the handle of a key, will stop any bleeding from a wound about the armpit; and pressure with the thumbs upon the artery against the bone of the arm, will also stop bleeding about the elbow, forearm, or hand.

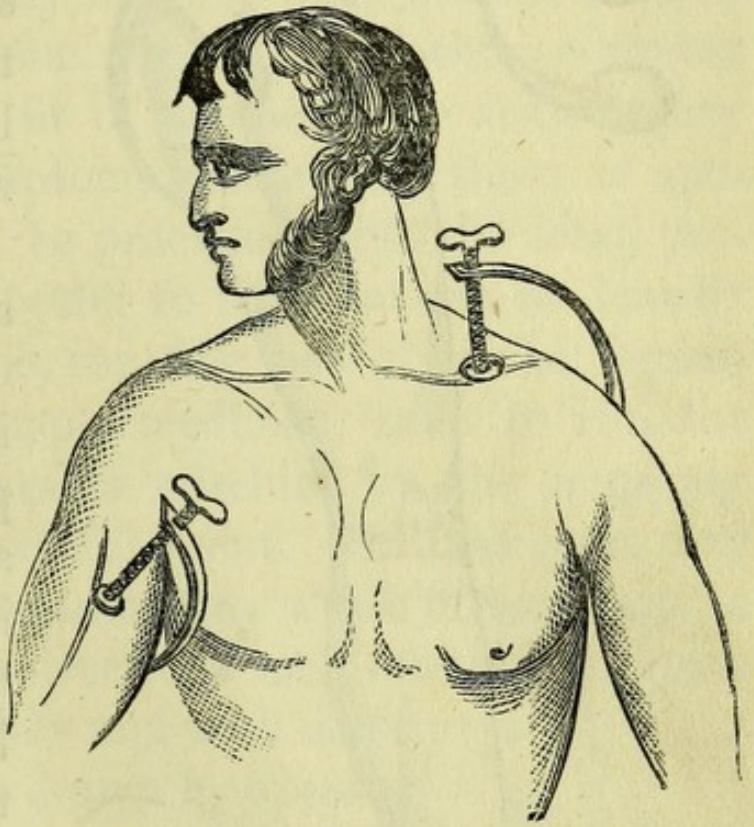


The principal artery of the thigh and leg, passes from the centre of the groin along the inside of the thigh for about half its length, then turns backwards, and runs along behind the middle of the knee just between the hamstrings. Pressure upon this artery, in the upper part of the thigh, will stop almost any

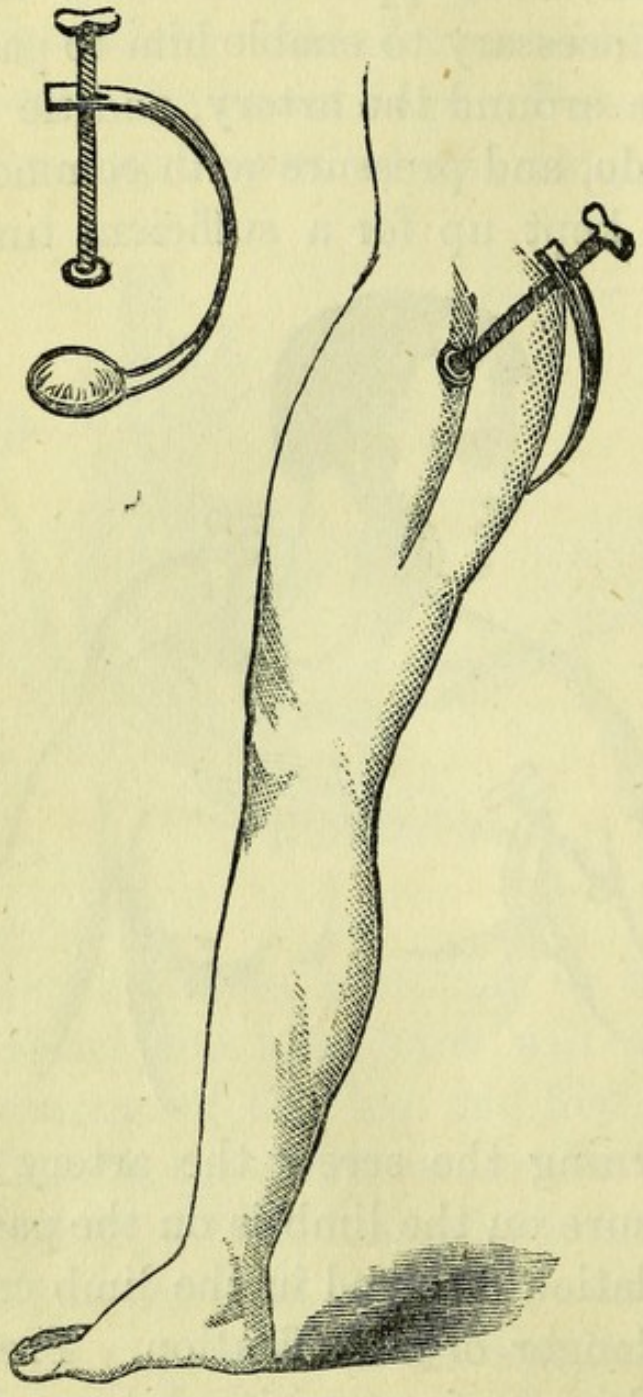


bleeding from a wound in the thigh, and pressure behind the knee-joint will also stop bleeding from wounds of the leg and foot. If pressure with the thumbs, the compress, or the handle of a key, does not answer, a folded handkerchief should be tied tightly round the limb above the wound, and a piece of strong stick put between the handkerchief and the skin, and twisted round and round until the bleeding is stopped. This is a rough method, as it bruises the limb very much, and the pressure cannot be kept up very long without danger of causing mortification of the limb. If the common screw tourniquet with a pad be used, the pad must be placed upon the artery,—the situ-

ation of which should be remembered. But this, like the last, cannot be long applied. Accordingly, as a merchant-captain cannot be supposed to have the anatomical knowledge necessary to enable him to pass a piece of silk or twine around the artery, and tie it up as a surgeon would do, and pressure with common tourniquets cannot be kept up for a sufficient time with safety, the tourniquet to be supplied for the future to merchant vessels consists of an arc of steel, armed at one end with a pad, and pierced at the other by a padded screw. One pad is placed over the artery, the other on the opposite side of the limb, and by simply turning the screw the artery is compressed. The pressure on the limb is on the pads only; so that the circulation of blood in the limb can go on, and there is no danger of mortification. Pressure can be kept up as long as is requisite, by merely altering the position of the pads a little. The screw should not be tightened more than is necessary to stop the bleeding. In the drawings this tourniquet is seen applied upon the arteries of the thigh and arm, and above the collar-bone. A wound of the largest



arteries might require the pressure to be kept up for a fortnight or three weeks, before it would be safe to remove the tourniquet; but two or three days would suffice for smaller vessels. The instrument just described may be obtained for a few shillings of any surgical instrument maker.

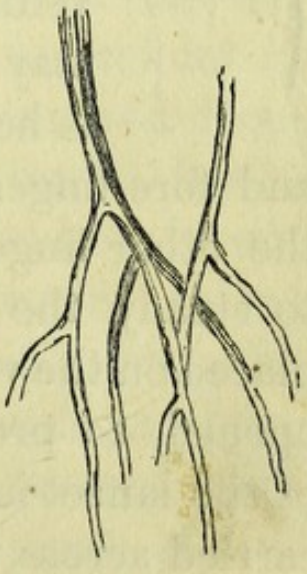


When an artery about the temple or other part of the head is wounded, pressure properly applied will always stop the bleeding, as the bone affords a firm resisting body, against which the artery may be pressed. The compress just described, held for an hour or more by the hand, and afterwards fixed by a handkerchief or bandage, is all that need be done.

When a great deal of blood has been lost, great care is necessary during the recovery of the patient. Extreme quiet, free ventilation, confinement to bed, and a diet very gradually and cautiously increased—

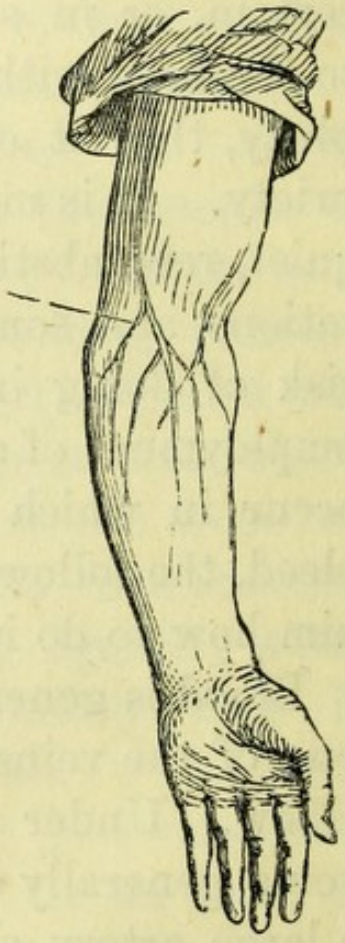
as nutritious as possible—but with very little stimulants, must be insisted upon.

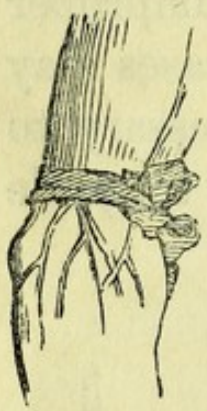
BLOODLETTING.—It is very seldom indeed that a person who has not received a medical education can be justified in bleeding another. So much harm may be done by bleeding in a case when it is not absolutely required, that it is only in some very violent attacks of internal inflammation, the nature of which is almost certain, or in some fit of apoplexy, or some injury to the head with symptoms resembling those of apoplexy, that it could be practised with the least propriety. It is much better to try what can be done by quiet, rest, abstinence, the free use of drinks, fomentations, and some simple medicine, than to run the risk of doing irreparable mischief by the improper employment of a powerful agent. Still, as cases may occur in which a captain may think it necessary to bleed, the following directions are intended to guide him how to do it safely and with certainty.



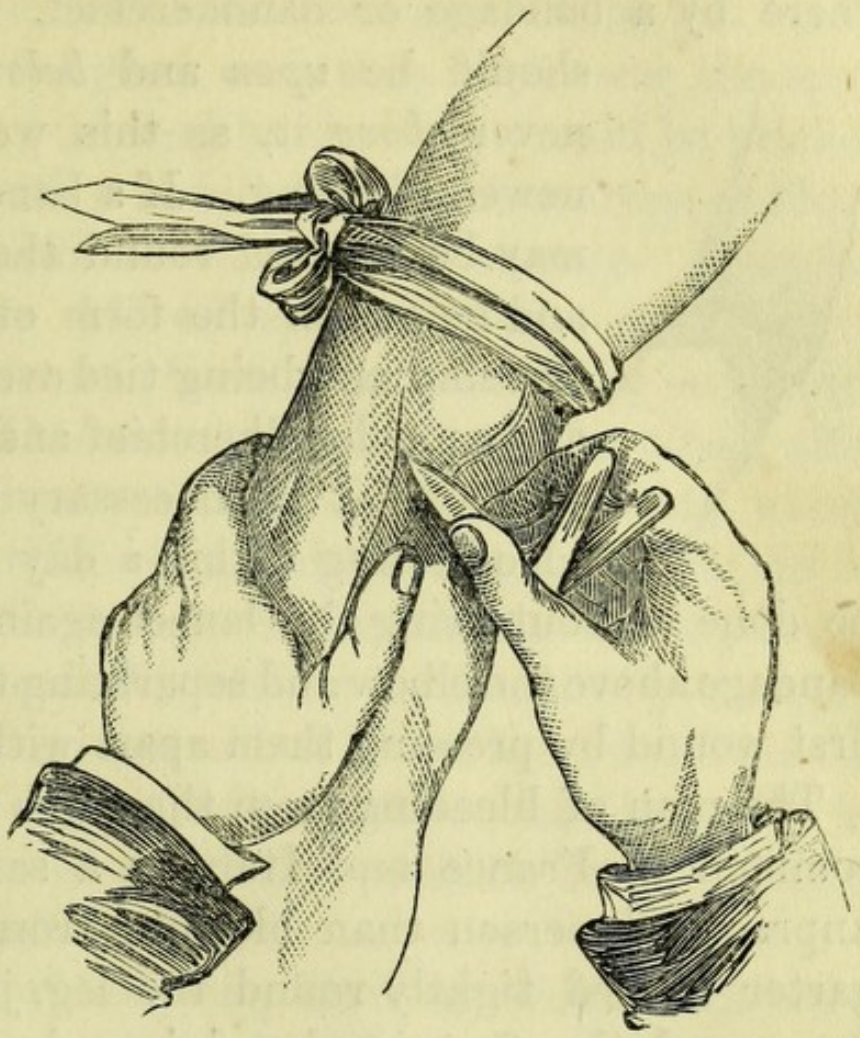
Blood is generally drawn by opening one of the veins about the bend of the elbow. Under the inner of the three veins generally seen in this situation, a large artery almost always runs, as seen in the woodcut, the darker vessel being the artery, dividing into two in front of the elbow-joint. This vein, therefore, must be avoided, as a wound of the artery would be a most dangerous accident. Sometimes an artery may run beneath

one of the other veins, and in that case, the vein so situated should also be avoided. The artery may easily be felt beating like the pulse at the wrist. Before opening any vein, therefore, the operator should feel carefully if he can detect any pulsation or beating beneath the vein he thinks of bleeding from. If he can do so, another vein must be selected, and, as a general rule, he had better avoid the large vein which gives off the branch to which a line is drawn in the annexed cut. Having found a vein which is not over an artery, by thus determining that no pulsatory vessel is behind it, a bandage or handkerchief should be tied round the arm, not very tightly, above the bend of the elbow, *thus:*—The patient should then grasp a stick, or the back of a chair, and when the vein is seen to swell it may be opened. The lancet is held between the thumb and fore-finger of the right hand, the other fingers resting on the arm to steady the hand. The thumb of the left hand is placed on the vein just below the spot where it is to be opened, to prevent the vein from rolling. The point of the lancet is then put into the vein on one side and carried across to the other, thus cutting through the front half of the vein and the skin over it. It is not to





be pushed into the vein until a large opening is made and then withdrawn, as this would make a deep and probably dangerous wound, nor is it to be pushed perpendicularly into the vein, but directed across the arm and vein from side to side, in the manner here represented. If no blood flows,



probably the skin only has been divided, and the blue vein may be seen between the divided edges of the skin. If so, it must be opened by a second cut in the same direction. The thumb is removed from below, and the blood allowed to flow into a basin. It is seldom that more than a pint should be drawn, and it is a good rule, if a patient is sensible, to set him upright, and, as soon as he feels faint to stop the bleeding. This is easily done. The bandage above the elbow is taken away, the thumb pressed upon the wound, the arm washed, and a piece of lint folded four or five times to make a pad about an

inch square is then placed upon the opening and tied there by a bandage or handkerchief. The pressure should be *upon* and *below* the wound, never *above* it, as this would cause renewed bleeding. If a bandage be used it may be twisted round the elbow, above and below, in the form of the figure 8, crossing and being tied over the pad; but a simple handkerchief answers nearly as well. If it be necessary to repeat the bloodletting within a day or two it may be done without using the lancet again by tying the bandage above the elbow and separating the edges of the first wound by pressing them apart with the fingers.

The plan of bleeding from the veins of the foot, so common in France and Italy, is a safer one for an unpractised person than bleeding from the arm. A garter is tied tightly round the leg, just below the knee, and the foot is placed in a large pan of hot water. One of the veins on the back of the foot is then opened in the same way as in bleeding by the arm. When enough blood has flowed, the foot is removed from the water, the garter taken off, and the wound covered by a pad of lint, fastened by a piece of adhesive plaster.

Surgeons occasionally bleed from a large vein in the neck, or from an artery in the temples, but no unprofessional person should attempt to do so.

Bloodletting by leeches is not common at sea, but it is the safest mode, and is to be preferred when leeches can be obtained. The part to which the

leeches are to be applied must be washed perfectly clean and dried. The leeches may then be put into a tumbler or wine-glass, and thus kept over the spot. If they do not bite readily, the skin should be pricked or scratched with a needle, until a few drops of blood issue, upon which the animals bite at once. They are left until they fall off spontaneously, and if it is desirable to preserve them a little salt may be thrown over them. This causes vomiting of the blood, after which the animals should be kept in clean water. The part to which they have been applied should be covered with a sponge or folded linen, wetted with warm water, and this should be frequently changed, until the required amount of blood has been lost. If oozing for a long time is required, the bites may be covered by a bread-and-water poultice, or by a flannel wrung out of hot water.

The means of stopping bleeding from leech-bites, when too long continued, will be found at page 79, *art.* BLEEDING.

BLOODLETTING by CUPPING is performed by surgeons with glasses expressly adapted for the purpose, and a scarificator. But any glass with well-rounded edges, which cannot injure the skin, will answer equally well, and a few strokes may be made with a sharp knife or lancet as well as, although less quickly than, with the ordinary scarificator. The object is to exhaust the air from the cup or tumbler which is used, and an unpractised person will do this most effectually by fastening a small piece of paper to the bottom of the inside of the cup with sealing-wax. A few drops of spirits of wine or strong brandy are

then dropped upon the paper, until it is thoroughly moistened. A light is applied, and the edges of the cup are pressed firmly upon the part from which the blood is to be drawn. If the edges press regularly upon the skin all round, so that no air can enter the cup, this is firmly fixed upon the skin by the time the spirit has burnt out, and the skin may be seen to rise within the cup, if this be made of glass. It is removed by pressing down the skin on one side with the finger so as to allow air to enter, the glass being held to prevent breakage by a fall. As soon as it is removed, and before the skin has had time to subside and recover from the state of numbness caused by the compression, a sharp knife or lancet is to be drawn across the raised portion of skin. Four or five cuts should be made from side to side, only just deep enough to cut through the skin, and the glass should then be reapplied as before. It will soon become partly filled with blood. When the bleeding appears to cease, and enough blood has not been drawn, the glass may be removed and emptied, the cuts cleaned with a hot, moist sponge, and the glass reapplied. Three or four cups may be applied, if necessary, near each other. When enough blood has been drawn, the cups are to be removed, the cuts cleaned, and covered by a piece of adhesive plaster. The bleeding ceases spontaneously, unless some small artery has been wounded, in which case the pressure must be applied in the manner described under BLEEDING.

The cups may be applied much more quickly by a spirit-lamp, but some little dexterity is required to do this well. A very simple lamp may be made by

passing a cotton wick through a large quill. The cotton is wetted with spirit and lighted—the glass held with one edge upon the skin, the other raised to allow the lamp to be placed within the glass. It is allowed to burn there for a few seconds, and is quickly removed, the edge of the glass being instantly pressed upon the skin as the lamp is taken away.

Cupping is a safer way of taking blood than blood-letting from the arm—the exact quantity of blood drawn can be easily regulated—and it may be very easily done by a new kind of cupping-glass, to which an india-rubber exhausting bottle is attached.

Blister.—See the directions upon the bottle of blistering fluid.

Boils are very common at sea, and are often exceedingly painful, obstinate, and troublesome. They are generally produced either by taking too much animal food and spirits, too long a continuance of salted food and want of vegetables, or they follow recovery from some fever. Very frequently several appear at the same time in different parts of the body, and sometimes follow each other in succession, one appearing as another gets well.

The treatment consists in avoiding the causes: vegetable food should be procured if possible; if not, very little animal food should be taken for some days; rice, biscuit, oatmeal, &c., forming the chief articles of diet. Some opening medicine should also be given, and spirits avoided. Two grains of quinine may be taken twice a day, when the patient is out of health, and when one boil follows another.

A boil differs from a common abscess, as it contains what seamen call a *core*—a portion of dead texture beneath the skin, which must come away before the boil can heal. Basilicon ointment, spread on linen, should be applied for a day or two, and when a small pimple or blister forms upon the most prominent part of the boil, two cuts should be made through it rather deeply, crossing each other at the centre of the boil. Some matter will then escape, and a yellowish-brown substance will be seen at the bottom of the wound. Some of this may probably be squeezed out, and fresh ointment should be applied. When no more can be squeezed away, and all is removed, a piece of lint and adhesive plaster are to be placed on the opening, and nothing more will be required. In dressing boils, each should be covered separately, as the matter is apt to irritate the skin, and cause other boils around the first.

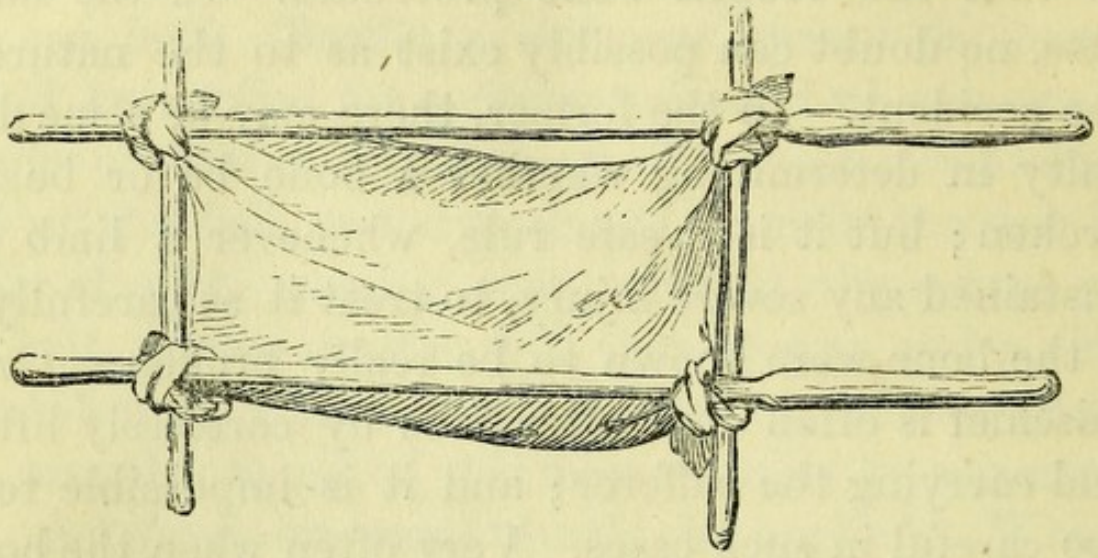
The boils called *sand boils*, which form on the front of the knee, are generally produced by small particles of sand being rubbed beneath the skin when the men are kneeling to holystone the decks. Very troublesome sores are thus produced. Great care should, therefore, be taken never to kneel with the bare knees upon a sanded deck. In treating a sand boil, all particles of sand must be removed, wet compresses applied for a day or two, the leg kept at rest, dry lint and adhesive plaster being afterwards used.

Bones, *broken or dislocated.*—Bones are often broken at sea by falls from aloft, or from deck through the hatchways, or by blows. They may be broken

without any wound of the skin, or the skin and soft parts between the skin and bone may be also injured, so that the broken bone protrudes. In the latter case, no doubt can possibly exist as to the nature of the accident. In the former, there may be some difficulty in determining whether a bone be or be not broken; but it is a safe rule, whenever a limb has sustained any severe injury, to treat it as carefully as if the bone were known to be really broken. Great mischief is often done after falls by carelessly lifting and carrying the sufferer; and it is impossible to be too careful in such cases. Very often when the bones of the leg or arm are broken, there is some distortion or bending of the limb, which shows at once that the bone cannot be in its natural direction, and the patient loses the power of moving the limb.

When a bone is broken on board ship, a cot should be at once got ready, the patient laid in it, the limb placed in the position the patient finds most easy, supported so by pillows, and the cot slung in the least disturbed part of the vessel, in a situation where it cannot reach the side during rolling or pitching. If the accident happen on shore, and it is necessary to carry the person to some hospital, or to bring him on board, supposing the leg or thigh to be broken, a sort of cot should be made by tying a blanket or piece of canvass on a couple of oars, or stout pieces of wood. Two shorter cross pieces near each end of the oars will give additional firmness to the cot, and by tying the corners of the blanket round the turn where they cross the oars, a firm and easy conveyance is

formed. Upon this the patient should be cautiously laid, disturbing the injured limb as little as possible,



and laying it as nearly as can be done without pain by the side, and in the same direction as its uninjured fellow. They may be also steadied by tying them together with handkerchiefs.

The *principles of the treatment* of broken bones are few and simple—namely, to place the bone as nearly in its natural position as possible, the uninjured limb being the guide to follow, and to maintain it quietly in that position for a month or six weeks.

For the first three or four days after the injury the limb should merely be laid on pillows, until swelling has subsided, cloths wet with cold or tepid water being laid on it according to the sensations of the patient. When swelling has nearly disappeared, the limb may be farther fixed and steadied by pillows, folded sheets, pads of straw, tow wrapped in linen or splints, or the plaster of Paris bandage. The manner of applying them will be described for each limb.

Broken skull is chiefly dangerous from the injury to the brain.—See HEAD, INJURIES of the.

The *bones of the nose* are sometimes broken by blows, and the fragments are driven inwards towards the nostrils. The little finger, or some round smooth piece of wood or bone may be passed into the nostril, and the pieces of bone raised to their natural position. If they remain nothing more need be done, but if they fall inwards the nostrils must be stuffed by small pieces of lint to support them. A piece of quill may be inserted to secure free passage of air.

The *lower jaw-bone* may be broken in several situations. The deformity is at once evident if the fragments are much displaced, but sometimes irregularity in the teeth is the only sign of fracture. The teeth are the best guides in setting the bone. The displaced part must be so pushed as to bring the teeth to a level with those which retain their natural position. It is very difficult to maintain the replaced part, but it may be done by soaking a piece of gutta percha in hot water, or cutting a piece of pasteboard, and notching the edges so that after soaking in water it may be applied closely all round the chin and jaw on both sides. This must be supported by two handkerchiefs, one being passed under the chin, and tied on the top of the head, the other passing round the jaw, and being tied behind the head. Or a square piece of linen may be split down the middle from each end, to within two or three inches of the centre. The unsplit portion is placed under the chin, two of the tails are pinned over the head to the front part of the night-

cap, and the two others to the cap behind. No food which requires mastication must be given until the broken bone has united, soup, arrowroot, milk, &c., being placed between the teeth by a small spoon.

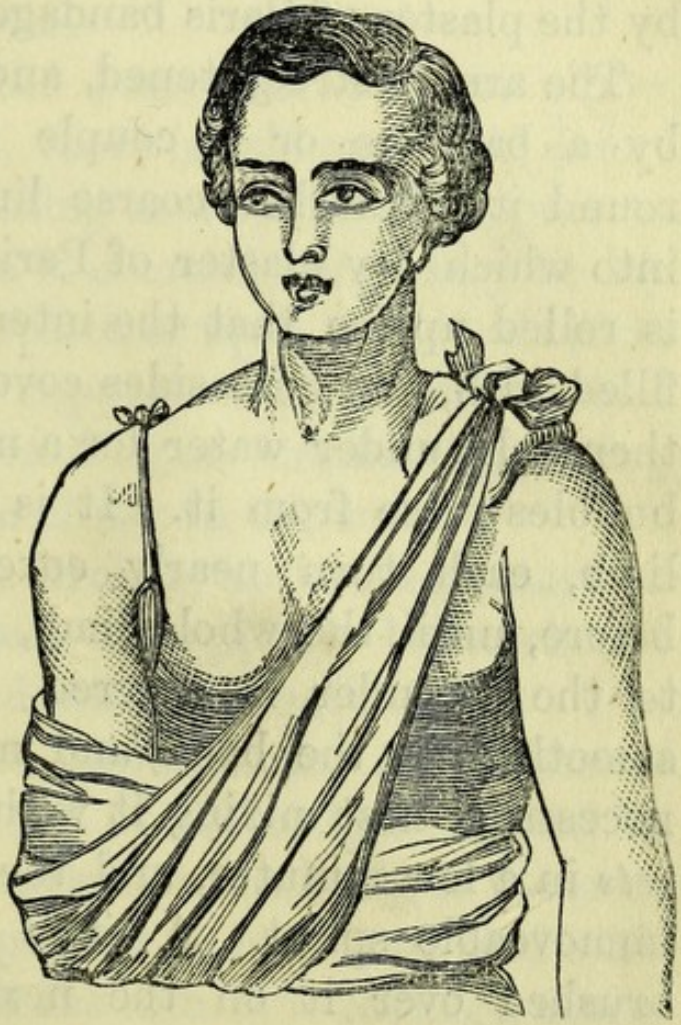
The *bones of the spine* may be broken in the neck, the back, or the loins. These accidents are almost always fatal, and the more rapidly so the higher the seat of the injury. Nothing can be done to replace the broken bones. Extreme quiet, abstinence, and occasional aperients, if necessary, are to be recommended. The most easy position is to be maintained. Should the urine be retained, the catheter must be used.—See STRICTURE.

The *breast-bone* and the *ribs* are often broken, the latter much more frequently than the former. The finger may not detect the fracture, but it may be presumed to have taken place, if, after a blow or fall upon the chest, a person feels pain in one spot on drawing each breath. The danger in these cases is from injury to the lungs, or the occurrence of inflammation in the chest. Therefore, if feverishness, cough, and pain, come on, the person must be treated for inflammation of the lungs.—See INFLAMMATION. If no such symptoms be observed, and only one side be injured, a flannel roller, six yards long, and four or five inches broad, should be bandaged tightly round the chest, so as to prevent the ribs from moving very much in breathing. The person should be placed in a sitting position in the bed or cot, supported by pillows. If both sides be injured, or if the breast-bone be broken, a bandage would be dangerous, and extreme quietude must be

trusted to; any inflammation within the chest being carefully treated. Long strips of adhesive plaster are sometimes passed round the chest instead of the bandage.

The *collar-bone* is often broken by falls from aloft or by blows, and most frequently near the middle. There may be very little displacement, or one broken end of bone may pass above, before, or behind the other, causing very considerable deformity. The hand cannot be raised to the forehead, and the shoulder falls lower than natural.

A pad, made by rolling up a part of a sheet until it is about eight or ten inches long, and as thick as the fist of a man with a large hand, is pressed under the arm-pit, and fixed there by a piece of ribbon tied over the shoulder. A handkerchief is then tied round the arm and chest, one end being pressed before, the other behind, so as to fix the arm to the side. A sling for the elbow, and the whole of the forearm, as far as the hand, is then to be made by another handkerchief, which is tied over



the opposite shoulder with sufficient tightness to raise the injured shoulder. These handkerchiefs must be replaced from time to time, and worn from a month to six weeks.

Surgeons often treat this accident in a different manner; but the above plan is the best for a non-professional man to follow.

The *bones of the arm* may be broken above or below the elbow. There is but one bone between the shoulder and elbow; two between the elbow and hand, one or both of which may be broken. When the bone above the elbow is broken, it is supported best by the plaster-of-Paris bandage.

The arm is straightened, and the skin is protected by a bandage or a couple of handkerchiefs tied round it. Another coarse linen or calico bandage, into which dry plaster of Paris has been rubbed as it is rolled up (so that the interstices of the fabric are filled with, and both sides covered by, the powder), is then held under water for a minute or more until no bubbles arise from it. It is then rolled round the limb, each turn nearly covering that made just before, until the whole limb, from below the elbow, to the shoulder is covered. The moist plaster is smoothed by the hand, and more may be applied, if necessary, first mixing it with water in a basin. It *sets* in a few minutes, and the limb is cased in a firm, immoveable splint. A little common paste may be brushed over it on the next day, to prevent the outer crust from falling off in powder. When it is necessary to remove the bandage it can easily be

done by wetting it, as the plaster absorbs water very readily and becomes quite soft. The hand and wrist are supported by a sling, the elbow being allowed to fall, and thus draw down the lower end of the broken bone. The plaster bandage should be worn for four or five weeks, and need not be touched until it becomes loose.

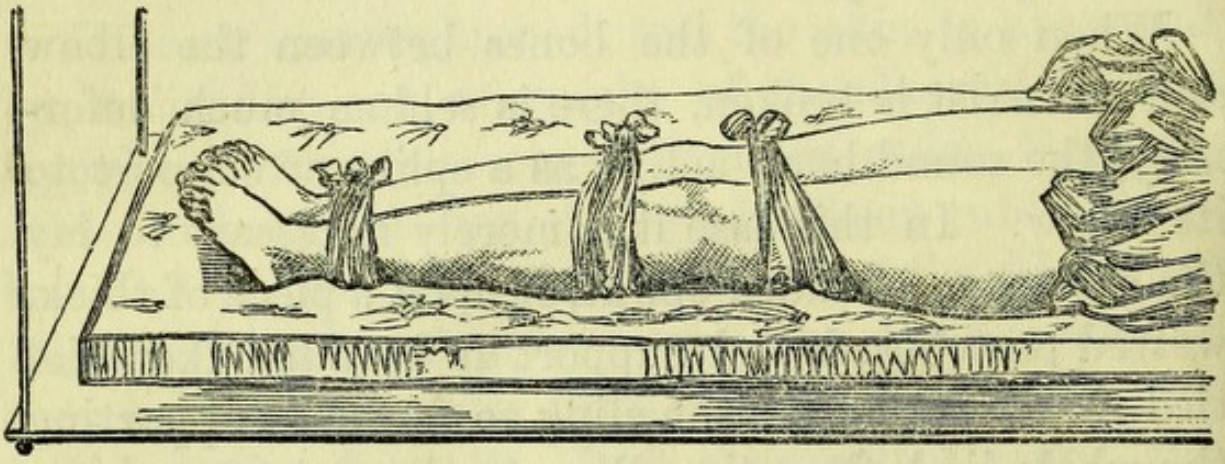
If plaster cannot be obtained, thick pasteboard wetted, or the covers of bound books, or folds of linen covered with a mixture of white of egg and flour, or soaked in thick starch, may be substituted—the limb being laid upon a pillow until the application has become quite dry and stiff.

When only one of the bones between the elbow and the wrist is broken, there is seldom much deformity, the sound bone acting as a splint or support to its fellow. In this case it is merely necessary to lay the arm upon a padded splint, or upon a piece of thick, wetted pasteboard, and support it by a handkerchief tied round the neck; the sling so formed supporting the whole limb from the elbow to the wrist.

When both bones are broken, no bandage must be rolled round the limb, lest the opposite bones should be pressed together and unite to each other. The effect of this would be to prevent many of the movements of the hand. A pad of folded linen should be laid on the front, and another on the back, of the arm. Upon each of them a splint is to be placed, and both are to be fixed tightly to the arm by a bandage, tapes, or handkerchief, tied round them. The arm, resting on the back splint, is then supported in a sling for about a month.

Broken fingers are best treated by wrapping narrow plaster-of-Paris bandages, or wet pasteboard, or softened gutta percha, round each injured finger, and fixing it with a bandage. The hand should be kept in a sling for a month.

When the *thigh-bone* is broken, the limb between the hip and knee is sure to be deformed, and the patient cannot lift it below the broken part. Surgeons treat this accident by means of straight splints or the double inclined plane; but on board ship it is better to make the sound limb the splint on which the injured one is supported. A cot-frame may be slung,

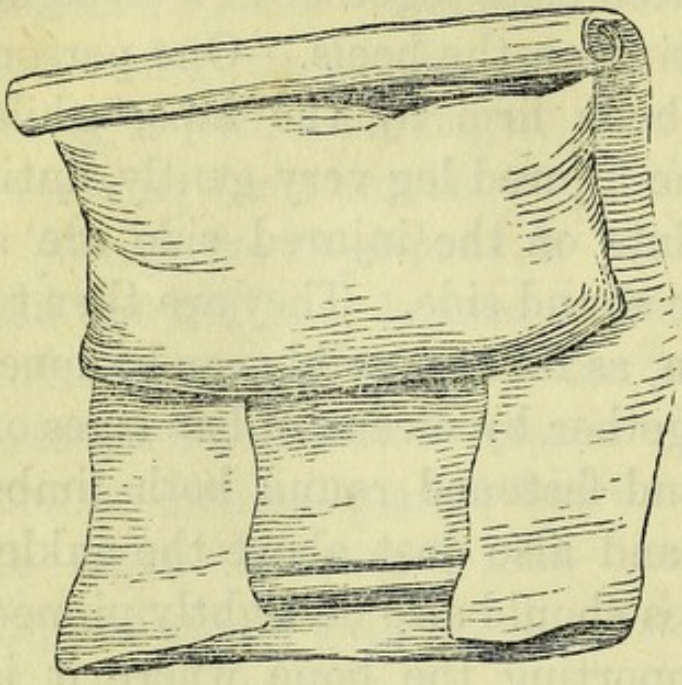


and the sacking covered with boards, so that the bottom cannot yield to the weight of the body. Or, a frame of boards fastened together so as to make a sort of shutter, six feet and a half long and three feet broad, may be slung like a cot. Upon this a firm, smooth, hair bed should be placed, and the patient laid upon it on his back. Two large pads of folded linen—towels, or parts of sheets rolled up—must then be placed between the knees and ankles of the two limbs, by tying the ends round the sound limb, so as to fill up the hollow spaces between the two limbs. The

calves of the legs should lie flat upon the mattress, and the limbs should be placed close together in a straight line with the body, resting on the heels. One person must then hold the body firm by the hips, while another draws down the injured leg very gently, until the knee and ankle joints on the injured side are a little lower than on the sound side. They are then to be fixed in this position, as far as possibly can be done, by binding the legs together by means of bandages or handkerchiefs passed and fastened round both limbs just below the knee, and also just above the ankle. A towel folded four times should also be tightly pinned round both thighs, supporting the bone where it is broken. A pad should be made of soft tow for the heel, hollowed in the centre, to receive the most depending part of the heel, as the long-continued pressure on this part is apt to produce very troublesome sores. The feet should be supported by a pillow, so that they cannot fall to either side.

When the bone is broken, and the limb is not shorter than the other, it may be treated successfully in a still more simple manner. The cot and bed are prepared as before. Pillows are laid to support the ankle and under part of the knee. Over these, three or four pieces of ribbon or broad tape, or strips of canvass, are placed, and a sheet is folded until it forms a bandage about as broad as the distance from the hip to the knee. The centre of this folded sheet is placed upon the bed and pillows just where it will be convenient to lay the thigh. Sometimes it may be well to place a long pillow within the sheet, as shown

in the drawing, but this is seldom required. The patient is then carefully lifted into bed, the thigh is placed upon the sheet, and this is rolled up from each end towards the limb, until a long pad or roll of sheet can be tightly pressed against the thigh on each side. The tapes are then tied and the affair is completed, as will be seen at page 105, where a broken leg is thus secured. Greater steadiness may be obtained by folding thin pieces of deal, about three inches wide, in each end of the sheet, or a small bundle of straw laid together lengthwise.

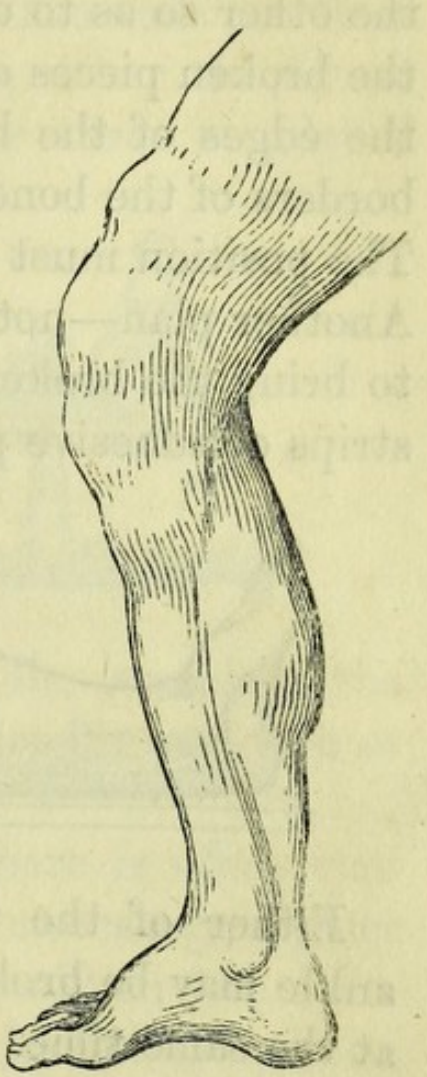


Surgeons always bandage a broken thigh before applying the other apparatus; but this had better not be done by an unpractised person, as the limb might be considerably shaken or disturbed, and more harm than good would be done if perfectly uniform pressure were not obtained.

As long as the limb retains the proper length, and is easy and steady, it had better be left alone. If swelling come on, cloths wetted with cold or warm water, according to the sensations of the patient, may be applied. If any undue pressure is

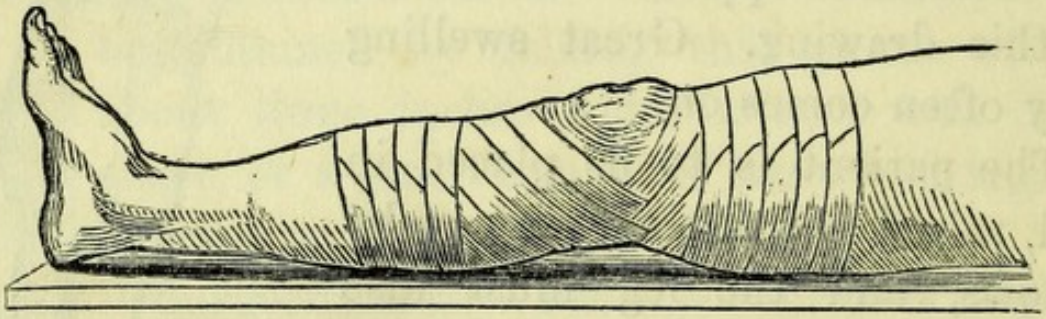
made by any bandage, or the knot of a handkerchief, this must be diminished. Perfect rest for five or six weeks must also be insisted upon.

Broken knee-cap is generally the result of a blow, or of some violent effort made to avoid falling. The person loses power over the leg, yet all the joints can be moved freely by another person, who can also feel that the bones of the thigh and leg are not broken. In place of the projecting knee-cap, he can place his finger in a deep depression on the front of the knee, and feel the broken pieces of bone above and below the knee. The appearance is shown in this drawing. Great swelling very often comes on.



The patient is to be placed in bed, raised to a sitting posture by pillows, and the leg must also be raised considerably by pillows, so that the body and leg of the patient are arched almost into the form of the letter V, the angle being formed by the hip. Wet cloths may be applied to the knee until the swelling subsides. If gutta percha can be had, a large piece should be warmed and fixed round the sound limb while it is held in the position described until the gutta percha cools. The hole for the knee-cap is then cut out, and when this is applied on the broken

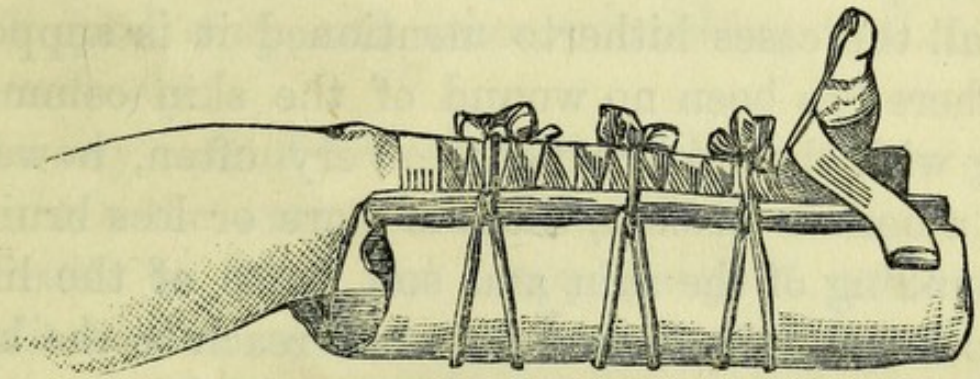
knee-cap, it assists very much in keeping it in place. When no gutta percha can be had, a handkerchief is to be passed twice round the thigh, just above the knee, and tied or stitched tightly. Another is fastened in the same manner close below the knee. Tapes are then passed from the one handkerchief to the other so as to draw them together, and with them the broken pieces of bone. Care must be taken that the edges of the handkerchief do not slip over the borders of the bone, or the whole would prove useless. The position must be maintained for about five weeks. Another plan—not so easily practised by a sailor—is to bring the broken pieces of bone together by long strips of adhesive plaster, as shown in the drawing.



Either of the two bones between the knee and ankle may be broken singly, or both may be broken at the same time. The injury of the large shin-bone is at once evident to the eye and touch; but the small bone is covered by flesh, and it is very difficult to determine if it be broken or not, except very near the ankle, when the bone comes near the surface.

When the small bone alone is broken, it is merely necessary to lay the leg on a pillow and keep it quiet for three or four weeks. But if plaster of Paris can

be had, it will be well to use it as before directed for the arm. Even when the large bone alone is injured, the small one becomes so great a support, that little more is necessary. A sheet is to be folded to a length reaching from the knee to the sole of the foot, and a pillow laid upon the centre, as in the drawing at page 102. On this the limb is placed. The ends are then rolled up to each side of the limb, either simply or upon pieces of thin deal. Two or three couple of



handkerchiefs, tied round the whole, complete the support. The leg must be kept quiet for a month or five weeks.

When both bones are broken, there is often considerable deformity, and it becomes necessary to place the limb in a position as nearly resembling the uninjured leg as possible. This is done by fixing the knee, and drawing the foot gently but steadily downwards, and holding it until the folded sheet and deal splints just recommended are applied. The leg may be laid upon the outer side, or upon the heel, whichever is most agreeable to the patient. The ankle-bone or heel must be protected from undue pressure by pads of cotton or of tow and linen, hollowed out at the

centre, and the foot should be steadied by a pillow or bandage.

When the bones of the *toes* are broken, the foot must be kept at rest, but no particular treatment is required, except for the great toe, which had better be surrounded by wetted pasteboard, or gutta percha, or the plaster-of-Paris bandage. The boards of any bound book will always supply pasteboard for these purposes, if, as is possible, no other is to be found on board ship.

In all the cases hitherto mentioned it is supposed that there has been no wound of the skin communicating with the broken bone. Very often, however, when a bone is broken, there is more or less bruising or wounding of the skin and soft parts of the limb; but so long as the wound does not reach to the bone, and has no communication with the broken part, the additional injury is of no further importance than that it wants dressing, and care that the bandages and splints do not press irregularly upon the wound. When the bone projects through the skin, or when a wound leads directly to the broken part, the case is always a serious one. The great object is to heal the wound as soon as possible. It should, therefore, be covered carefully with dry lint. This becomes soaked with the blood, and should be left to dry upon the wound. A sort of natural plaster is thus produced, which excludes the air, and often does not come off until the wound is healed. Should much swelling and heat come on, cloths wetted with cold water should be covered over the limb, and wetted as often

as they become warm. The limb is kept perfectly quiet on pillows, and the bedclothes must not be allowed to press upon it. If the wound does not heal, the patient becomes feverish. He has shivering and hot fits, with headache, and a great deal of matter is discharged from the wound. In these cases extreme quiet and cleanliness must be trusted to until medical assistance can be obtained. At first the patient must be kept on low diet, but when he is becoming weakened by excessive discharge, some arrowroot and wine, with good soup, and other nourishing food, must be given freely.

In any case of broken bone without wound, or one in which the wound has healed, if it should be found difficult to keep the supports just recommended applied, other means may be adopted by which the limb may be immoveably fixed. A sort of trough or square box may be made, just large enough to hold the limb, which is placed in the trough and covered with wet plaster of Paris. This hardens, and the limb may be left in the mould until it has united. Or if the plaster-of-Paris bandage before described cannot be obtained, the skin may be covered with a piece of linen, and the limb then surrounded by other pieces saturated with thick starch, which, when dry, forms a hard, firm covering, and gives great support. Instead of starch, a paste made by mixing white of egg with flour, or powdered chalk with strong solution of gum arabic, may be used. Perhaps of these the mixture of egg and flour is to be preferred, if it can be obtained, but a sheet of gutta percha, softened by

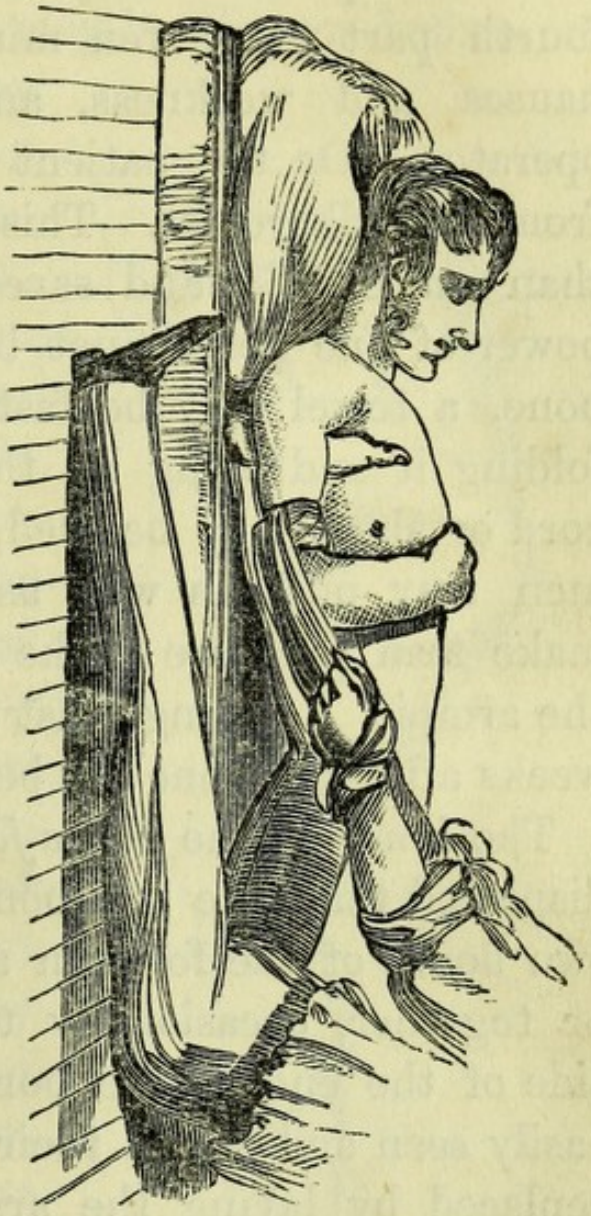
soaking in hot water, then fastened on the limb, and allowed to cool and harden, is the best and most convenient. I knew a merchant captain who sustained a bad compound fracture of the leg at sea. He immediately sat in an arm-chair, put his leg into a barrel of flour, and slung both chair and barrel. The flour and blood made a perfectly firm support for the limb, and the old sailor sat, smoked, ate, and slept in his arm-chair, until the limb was perfectly sound.

BONES OUT OF JOINT, OR DISLOCATED.—The following are the only dislocations which an unpractised person could be expected to recognise or treat with safety.

The lower jaw-bone is sometimes dislocated when a person gapes widely, or laughs very heartily. The mouth is suddenly fixed wide open, the person cannot speak, and makes strange grimaces whilst endeavouring to do so. The bone is easily returned to its place by pressing the back teeth downwards, and the chin upwards. A couple of corks, or two pieces of wood, may be pushed, one on each side, between the back grinding teeth, and the chin then pressed upwards by the hand; or, what is better, the thumbs well guarded by linen wrapped round them, should be placed on the back lower grinding teeth, one on each side, and press the teeth and jaw down while the chin is forced upwards by the fingers, or by an assistant.

The *bone* of the *arm* is sometimes thrown out of the shoulder joint into the armpit. The person feels great pain, he cannot bring the elbow close to the

side, nor raise it as high as the shoulder. All the motions of the bone are impeded, and the head of the bone may be felt moving in the armpit when the arm is turned. It is not difficult to replace the bone when the attempt is made soon after the accident. The patient is laid upon deck, or on the ground, or a mattress placed on the ground. The person who attempts to return the bone sits down close to the feet of the patient on the ground or deck, and on the side of the injury. Some soft linen is put into the armpit, and the operator, having taken off his shoe, presses his foot upon this linen, takes hold of the arm firmly, and draws it steadily to himself, at the same time keeping the shoulder firm by the pressure of his foot. At the time of making the greatest extension of the limb the patient's attention should be diverted by telling him to move his legs upwards, or by asking him some question about the accident, and then the bone gene-



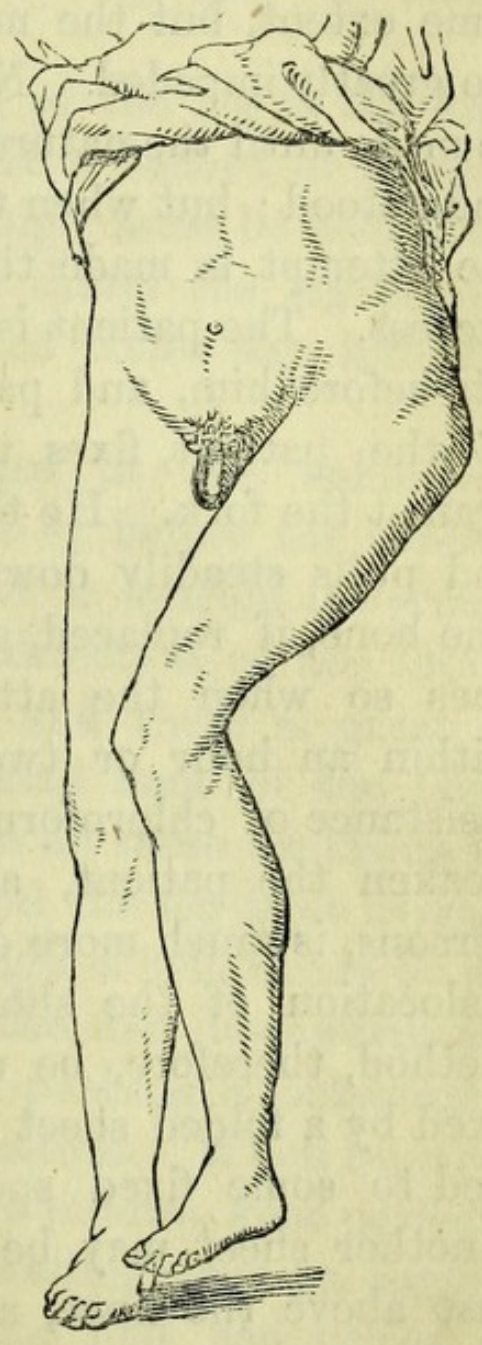
rally slips into its place with an audible snap. If difficulty arise, and the patient is very strong, one of the emetic powders may be given in divided doses, a fourth part every ten minutes. This will produce nausea and weakness, and materially assist the operator. Or the patient may breathe chloroform from a handkerchief. This relaxes the muscles more than an emetic, and saves from pain. Should the power of one person not be sufficient to return the bone, a towel may be fastened above the elbow by folding it and tying by the *clove hitch.* To this a cord or sheet may be tied, upon which one or two men may pull, as well as the operator, who must make firm pressure at the same time with his foot in the armpit. A sling must be worn for two or three weeks after the bone has been replaced.

The *bones* of the *elbow-joint* are much more rarely displaced than the arm-bone at the shoulder. The two bones of the forearm are, however, either singly or together, occasionally thrown behind, or to one side of the end of the bone of the arm. They are easily seen and felt in their new situation. They are replaced by laying the arm upon the knee of the operator, and forcibly bending the forearm, at the same time pulling the hand downwards.

At the *wrist-joint* the bones of the back of the hand are sometimes thrown before and sometimes behind the bones of the forearm, forming a large projection. The hand is to be grasped by the operator, and the arm being fixed, the hand is then drawn in a direction away from the arm, and turned either

backwards or forwards, according to the direction of the dislocation, in order to make the displaced bones glide back to their natural position.

The *bones* of the *fingers* may be thrown before or behind each other. They are replaced by bending them in the direction contrary to that of displacement. The thumb is reduced when dislocated in the same manner by bending backwards or forwards. Pulling, with the idea of lengthening or extending it in the natural direction of the thumb or fingers, is seldom of any use.



The *thigh-bone* may be thrown out of the hip-joint in various directions, but the only dislocation likely to be detected or treated successfully by a seaman, is that in which the bone is thrown upwards and outwards, with the effect of shortening the whole limb, and throwing the knee and foot forwards, and towards the opposite side. When the thigh is moved, the bone may be felt to turn just below the principal projection of the hip. Some similar effects

might be produced by a fracture of the thigh-bone very near the joint, but in this case the limb is easily restored to its natural position, and all the motions of the foot are free. In case of dislocation the foot and leg can be moved backwards and forwards to some extent, but the motions outwards and inwards are greatly impeded. No attempt at reduction should be made until the nature of the accident is thoroughly understood; but when this is ascertained, the sooner the attempt is made the greater are the chances of success. The patient is laid on his back, the operator sits before him, and passing his leg between those of the patient, fixes the hip by pressing his foot against the fork. He then grasps the foot and ankle, and pulls steadily downwards with his whole force. The bone, if replaced, goes in with a snap, and often does so when the attempt to replace it is made within an hour or two of the accident. But the assistance of chloroform, or of the emetic powders to weaken the patient, and of the power of several persons, is much more often required than in cases of dislocation of the shoulder-joint. Should the first method, therefore, be unsuccessful, the hip may be fixed by a folded sheet passing between the legs and tied to some fixed spot near the patient's head. Another sheet may be fastened by the clove hitch just above the knee, and upon this or upon a cord tied to it several persons may pull steadily, or the rope may be passed through a pulley, and managed by the operator alone.

The *knee-cap* may be displaced in various directions,

and is easily felt in its new situation. The patient sits upright; the foot and leg are then raised so as to bring the knee as near to the body of the patient as possible. The bone can then very easily be pushed into its place. The leg must be kept quiet for several days afterwards.

When one or both bones of the leg at the *knee-joint* are thrown either behind or before, or to either side of the thigh-bone, the thigh must be held firmly by one person while another draws the leg steadily downwards until the displaced bones slip into their place.

The *foot* may be dislocated at the ankle-joint, passing to either side, behind or before the bones of the leg. The sole of the foot is twisted inwards or outwards, according to the direction of the injury. The foot cannot be moved, and there is great deformity. Very often the small bone of the leg is broken at the same time. In all these accidents the patient is laid on his side, and the leg bent at right angles to the thigh. The thigh is held firmly by one person, while another draws the foot downwards in a line with the leg, afterwards pushing it outwards or inwards towards its proper position. When replaced, the foot must be supported by pillows, kept perfectly quiet, and if much pain and swelling come on, some of the veins on the back of the foot had better be opened by the lancet, and the bleeding encouraged by keeping it in warm water.

The treatment directed in the above cases has been upon the supposition that no wound of the skin and

soft parts communicates with the injured joint. Should this additional misfortune happen, the case is always a very serious one. As to the treatment, that recommended with regard to broken bones communicating with the skin should be followed.

Bruises are best treated by keeping the part quiet, covering it with linen wetted with cold water, and laying over this a flannel wrapper. If the part becomes hot and uncomfortable, the linen should be repeatedly wetted with cold water and left uncovered; but generally it is better to cover it, as the water becomes warm and forms a very soothing kind of fomentation. There is no use in adding any medicine to the water. If the skin be broken, it should be covered with soft lint and simple ointment.

Bubo is a swelled gland in the groin, and is generally the result of venereal disease. It may, however, be produced by strains, or by sores about the feet. It is best treated by keeping the person quiet, and applying cold lotions at first. One part of spirit and six parts of water answers very well. It is applied by a thin piece of linen, which is wetted as soon as it becomes dry. Should this fail to reduce the swelling and pain, and redness come on, wet compresses or hot poultices must be used, and the bubo treated as an abscess. (See Abscess.) When the swelling is hard and remains stationary, neither diminishing nor forming matter, a small blister should be applied over it.

BUNION is a painful swelling upon the inside of the joint of the great toe with the foot. The shoe should be cut away over it, or made very large; the foot kept at rest when the bunion is inflamed, and cold lotion or compresses applied. A piece of thick leather, upon which adhesive plaster has been spread, with a hole cut in the middle of the leather to receive the most prominent part of the bunion, may be worn with advantage. The pressure of the shoe is thus made to fall on the leather, while the bunion remains protected in the central hole. A surgeon should be consulted if the toe be very much deformed.

BURNS AND SCALDS may injure the body in very different degrees. The skin may be simply blistered, or it may be completely charred and destroyed with the parts beneath it down to the bones. Between these two extremes of slight and severe injury there may also be many intermediate degrees. Again, nearly the whole body may be injured, or only a small portion; the danger, of course, varying with the extent and degree of the injury.

The first thing to do is to put out any clothes which may be still burning. This is best done by rolling up the person in a blanket, sail, or anything else which will exclude the air. The clothes should then be removed, to examine the amount of injury. This must be done carefully, in order not to tear away any blistered skin, or open any blisters which may have risen. If the person is shivering and feels faint, some hot wine and water should be given, and bottles of

hot water applied to the feet. If in great pain, twenty or thirty drops of laudanum may also be given.

Whether the burn be large or small, the best application is cotton-wool, or wadding. It must be laid smoothly over the whole injured surface, about an inch thick, and kept on by handkerchiefs or bandages. It should be left undisturbed for some days, unless it becomes saturated with moisture, in which case lint wetted with tepid water may be applied and covered by oiled silk. Should there be no cotton on board, the part should be dusted all over with flour, until a layer about half an inch thick covers the burned part. The whole should then be covered by thin linen or a handkerchief.

A blister should never be pricked or opened at first, and when one has opened accidentally, the thin, bluish skin left upon the burn should never be disturbed or removed. It is the softest and best covering to the injured part. In a day or two, however, there may be dragging pain near the blister, and inflammation around its edges. Then it is better to let out the fluid by large needle punctures, or by two or three snips of a pair of scissors. The cotton or flour may then be applied after the fluid has been all discharged. When it is desirable to remove either cotton or flour, it is best done by fomentations of hot water. The flour generally cracks, to allow any matter which may form under it to escape. If it should not do so, a crack or two may be carefully made in the sort of crust it forms with the fluid discharged from the burn.

When parts have been completely destroyed by burning, the separation of the dead portion is favoured by applying lint wet with spirits of turpentine, and over this hot poultices. The strength must be supported by nourishing diet, wine or beer; and if much pain is present, twenty or thirty drops of laudanum may be given three or four times a day. The dose should be gradually decreased as the pain abates.

When parts are deeply burned about the neck or joints, deformity is likely to be produced by contraction of the parts during and after the healing process. This must be guarded against as far as possible by keeping the head erect, and any joint extended near which the skin has been destroyed.

CARBUNCLE is a very large boil. It generally forms on the back, or the back of the neck. The dead flesh often extends several inches under the skin. Two cuts must be made completely across the swelling at right angles to each other, and about half an inch into the sound parts on each side. The two cuts cross each other in the middle of the swelling. Any brownish or yellowish, loose substance which may be observed must be removed. If there is much bleeding, lint wetted with spirits of turpentine must be applied to the wound, and it is also a good plan to apply the turpentine under a poultice until all the dead flesh has come away. When this has taken place, the sore may be dressed as a simple wound. As carbuncle generally occurs in old or very weak persons, it

is well to allow wine or beer and a nourishing diet.

CHOPPED HANDS are often very troublesome at sea. The cracks must be cleaned thoroughly, a piece of lint put over them, and this fixed by a strip of plaster.

CHILBLAINS, if the skin is not broken, should be well rubbed night and morning with equal parts of olive oil and spirits of turpentine, or a mixture of a tablespoonful of mustard with a quarter of a pint of water. After the skin has broken, cotton wool is the best application. It should be laid on an inch thick, and fixed by a strap of adhesive plaster. Worsted stockings or woollen gloves should be worn.

CHOKING is occasionally produced by swallowing hastily large pieces of food, which press upon the windpipe and stop the passage of air into the lungs. At other times, when a person swallows and inhales at the same moment, a morsel of food, or anything which may happen to be in the mouth, is drawn into the windpipe itself. In either case the accident is a very serious one, and unless prompt assistance be afforded, sudden death from suffocation may probably ensue.

When any such accident occurs, two fingers should be carried to the back of the mouth as far as possible, and in many cases, any large lump of meat or other food may be easily removed when it is lying just at

the top of the throat, or entrance of the gullet. If it have passed further down, several large draughts of water should be swallowed in succession, and the person must use every effort to swallow. Should this not succeed in dislodging the substance, a piece of soft sponge, about an inch square, may be securely fastened on to a piece of thin cane, whalebone, or flexible wire, about eighteen inches long, and by pushing the sponge to the back of the mouth, and then down the throat, the foreign body is pushed into the stomach, and the sponge withdrawn. This only to be done when large pieces of food are in the gullet. It would be most dangerous to use such measures when fish-bones, pins, or anything which might be thrust through the lining membrane of the passage, have caused the distress. It is better to leave these sharp bodies alone, unless they can be reached and removed by the finger. They are vomited, or pass into the stomach, and some little soreness for a few days afterwards is the extent of the mischief in most cases. If a bone be distinctly felt in some part of the gullet, a large piece of bread or potato should be swallowed, and some large draughts of water should be taken immediately afterwards.

When anything solid has passed into the windpipe, the sensation of choking, violent cough, and general spasms, immediately follow. Perhaps the cough may expel the offending substance. If not, the symptoms may either continue until death, or subside and recur again and again after intervals of varying duration. Surgeons remove such bodies by opening the wind-

pipe; but all that those not medically educated can do is to feel with the finger at the back of the throat and remove any foreign substance they can feel there. If it be certain that any moveable body is in the windpipe, the patient may be held with his head downward, with his feet in the air. Some smart blows may then be given on the back, and the chest shaken, when the foreign body may perhaps be coughed up. A bullet has been expelled from the windpipe in this manner, and the position considerably assisted in the removal of a half-sovereign from the same situation.

CHOLERA is not a disease likely to be mistaken. People always know when and where it is prevalent. At such places and seasons any purging is suspicious; but when it is accompanied by vomiting, when the matters vomited and purged are whitish and abundant, when the skin is cold, the thirst great, and cramps seize upon the legs and body, the patient assuredly has cholera.

When first the disease commences, if it be in a mild form, it should be treated as a simple diarrhœa. (See DIARRHŒA.) If the other symptoms follow, the rules to be borne in mind are—1. To allow the patient to drink as much as he pleases; he should be supplied plentifully with cold milk-and-water, barley-water, toast-and-water, or what he will probably prefer—simple cold water. 2. To arrange his bedclothes according to his own sensations. If he feel chilly, he should be covered warmly, and bottles of hot water applied to the feet and between the legs. If heat

prove unpleasant, as it often does, coverings should be light, and no artificial heat should be employed. 3. If cramps come on, the legs should be diligently rubbed by the hands of two or three persons at the same time, if possible.

Many patients would recover if no other means were used than these. Great harm has been done by the employment of calomel, opium, brandy, and many other drugs; while the benefit derived from their use is very questionable. The only medicine I have ever believed to have been of real use was quinine, given in doses of five grains every two hours. It may be dissolved in five drops of diluted sulphuric acid, or one drop of the oil of vitriol, with a wineglassful of water.

Sometimes, after cholera has ceased, a fever comes on, which lasts several days. In this disease five grains of quinine should be given every night, and two grains morning, noon, and afternoon. The diet should consist of eggs, milk, and rice, if they can be procured; and if not, of the most similar substances within reach. Meat appears to be injurious for a long time, in any form, even as a broth.

The following official instructions to captains of ships, issued by the General Board of Health, are to be read with advantage, although I think the advice as to opium or laudanum is a mistake.

"Captains of ships are hereby warned—

"I. WHAT TO AVOID.

"*Overcrowding.*—The amount of breathing-space for

the men which may suffice in ordinary times is insufficient in an epidemic season. Increase space as much as practicable. Permit no sails, large trunks, or any part of the cargo, to occupy the forecastle. If sufficient additional space cannot be otherwise obtained, erect a temporary tent on deck by awning, sails, &c., for the men at night, taking care that they keep warm and dry. Ventilate the forecastle and every part of the ship with fresh air as freely as possible. Pure air is the first essential requisite to safety.

"*Dampness.*—To lessen the danger from dampness let the boards be dry-rubbed. Let the men change their wet clothes whenever practicable, and never allow the wet clothes to remain below an instant. A thick flannel belt or bandage around the stomach or loins would be a great defence for sailors. Flannels or Guernsey frocks should be worn next the skin. Sudden and violent attacks of cholera often follow a chill.

"*Filth.*—Let every part of the ship be kept as clean and sweet as possible, and enjoin personal cleanliness on the men. Vessels affected by bilge water should be pumped out frequently, especially steamers.

"*Unwholesome food.*—Articles of food which may be taken with little inconvenience in ordinary times may be dangerous in an epidemic season. The best articles of food are meat, good biscuits, rice, oatmeal, and good potatoes. Solid food is better than fluids, and therefore at this time it would be desirable to give the crew beef and mutton instead of soup. Care

should be taken to avoid all tainted meat and decayed vegetables. Special attention should be paid to having a supply of pure water. All *river water near towns should be avoided.*

"*Excess.*—Great moderation both in food and drink is absolutely essential to safety. A single act of indiscretion has been followed by a severe attack; intemperance at such a time is fraught with extreme danger. An epidemic atmosphere commonly produces great depression, both of body and mind, and a desire for stimulants. If for the relief of this feeling recourse be had to gin or brandy, the result may be fatal.

"*Purgative medicines.*—No purgative medicines of any kind should be taken at this season, unless under medical direction. Glauber's salts and Epsom salts are especially dangerous. Owners and masters should provide themselves with the necessary medicines immediately.

"II. WHAT TO DO.

"Cholera is commonly not so sudden in its attack as is supposed. It usually gives warning of its approach for some hours, and often for a day or two, by some degree of looseness of the bowels. This may be slight, and it is almost always without pain; but let no one be put off his guard by this circumstance. The master should, by observation and inquiry, take notice of the health of the crew; and for his guidance, until such time as he may be able to obtain medical assistance, the following recommendations are subjoined:

"If any man should be attacked with any degree of looseness in the bowels, the following medicine should be given to him at once—fifteen or twenty grains of opiate confection, mixed with two tablespoonfuls of peppermint water, or with a little weak brandy and water warm. This should be repeated every three or four hours, or oftener if the attack is severe. If this medicine is not at hand, eight or ten drops of laudanum may be substituted for the opiate confection.

"If the purging is severe, and especially if attended with vomiting or coldness, the man should go to bed immediately, and be kept warm. Bottles of hot water, or bags filled with salt or bran, should be applied to the stomach and feet and along the spine.

"A large poultice of mustard and vinegar should be put over the stomach, and kept on fifteen or twenty minutes. The above medicines should be continued every hour, or every two or three hours, according to the emergency of the case, until a doctor can be got. Rest and warmth in bed are essential until medical assistance arrives, but not a moment should be lost in seeking medical aid."

COLD produces very injurious effects upon those long exposed to its influence, especially when the person is wet at the same time. In very cold climates, or seasons, persons often die from simple exposure to cold, when without adequate protection from clothing. The effects upon the whole body are shown by sensations of numbness, depression, aud sleepiness. Captain Cook has described the passage of Dr. Solander

and a party over the hills of Terra del Fuego. He cautioned his people against the tendency to fatigue and sleep, and told them, "Whoever sits down will sleep, and whoever sleeps will wake no more." The doctor himself was the first to suffer, and begged his companions to allow him to lie down. But they, by means of entreaty and force, kept him moving for some time. At last they were becoming exhausted themselves, and the doctor was left behind with two black servants, who had also become drowsy. The party fortunately succeeded in making a fire before the doctor had been asleep five minutes, and yet he was roused with the greatest difficulty, and for a time lost almost all power over his limbs. The black servants both died. The rules should be followed therefore—1. To avoid all unnecessary exposure to severe cold. 2. When on shore, or locked in by ice, and surrounded by snow, to obtain protection from the wind by matting, blankets, and an outer covering of snow. A snow cottage is said to be by no means an uncomfortable dwelling. 3. When the ill effects of severe cold are appearing, to endeavour to keep up active motion; and above all, not to give way to the desire of sleeping. Of course, the first opportunity of kindling a fire, and procuring warm drink and protection from the weather, must be seized; but when a person is nearly dead from cold, he must not be suddenly exposed to heat. The temperature of the body must be raised very gradually, by rubbing him with flannels, at first wet with tepid water, and afterwards dry. Liquid ammonia should be applied to the nostrils,

if at hand, or they and the throat may be tickled by a feather or any soft substance. As the person recovers, warm drinks may be given. Fatty, oily, and sweet food enables the body to withstand cold longer than bread and meat.

Sometimes a particular part of the body only suffers from the effects of cold. It is then said to be frost-bitten. In Russia the nose and ears, the fingers and toes, are sometimes frozen to death and destroyed in winter. The part is first painful, blue, and a little swollen, then it assumes the livid whiteness of a corpse. Pain and sensibility both disappear, and if the cold continue, mortification comes on, and the part is lost. Great care is required in the treatment of such cases. The heat must be restored very gradually to the part. It is to be first well rubbed with snow, or very cold water, until the circulation returns. This is known by returning colour and warmth. The rubbing may then be continued for a time by the hand alone, and the part covered with flannel or cotton wool. Should it mortify, the only thing to be done is to cover it thickly with cotton wool until it separates, then to use water dressing until the sore is healed.

A *cold in the head*, as it is called when it is slight, will generally go off in two or three days, if the person keep comfortably warm, and leave off spirits and animal food. A warm foot-bath and some hot gruel at bedtime often assist in hastening the recovery. Many persons are subject to what they call a "sniveling cold." When this is felt to be coming on, it may very often be stopped at once, "cured in one night,"

as the phrase goes, by taking a tumbler of hot wine and water at bedtime, containing twenty drops of laudanum, or a teaspoonful of paregoric. Should a cold become severe, it is always attended by cough, which then becomes the most important symptom. (See COUGH.)

COLIC is severe pain or cramp in the belly, generally the effect of improper food, confinement of the bowels, or distension of the stomach or bowels by flatulence. The pain generally comes on suddenly, and the person finds relief by bending forwards and pressing the belly firmly with the hands.

Flannels wrung out of hot water should be at once applied to the belly, and a cup of hot tea or coffee taken. Perhaps this alone will relieve the pain, and then a dose of castor oil may be given, either alone or with twenty drops of laudanum, if the pain continue. If the pain is very severe, twenty drops of laudanum should be given at once before the castor oil, and the oil given as soon as the pain ceases. If the bowels are confined, two or three of the purgative pills may be given at bedtime, or five grains of calomel at bedtime, and a dose of castor oil in the morning. If there be much flatulence, half a teaspoonful of the carbonate of soda, with a few drops of essence of peppermint, or half a teaspoonful of powdered ginger in hot weak wine and water, will often be found very useful. Hot flannel should be kept to the belly until all pain has ceased.

CONSUMPTION is a disease of the lungs, accompanied by cough, expectoration, pains in the chest, principally near the collar-bone and top of the shoulder, quick pulse, perspirations at night, loss of flesh, and great weakness. All these symptoms, however, may depend upon affections of the lungs very different from true consumption. A medical man must be consulted, to determine what is the nature of the disease; but it is a safe rule whenever such an assemblage of symptoms is observed, to lead a very regular life; to abstain from wine, spirits, and beer; to take light, nourishing food, as eggs, milk, and meat but once cooked; to avoid all violent exercises, great fatigue, or strong emotions; to sponge the whole body every morning with tepid water, and rub it thoroughly dry with a rough towel; to avoid cold, damp, and draughts of air; to apply a small blister occasionally under the collar-bone; to take some simple remedy if cough or diarrhœa are troublesome (see COUGH, DIARRHŒA), and at the first port to obtain a supply of cod-liver oil, which should be taken in doses of one or two teaspoonfuls three times a day. It is said not to be very unpleasant when taken simply floating on the top of a wineglassful of water, coffee, or orange wine.

CORNS.—When hard and on the outside of the toes, the feet should be soaked in warm water for a quarter of an hour, then all the softened skin of the corn should be scraped or rubbed off. The shoes should be enlarged where tight. A piece of thick

soft leather, with a hole in the centre, may be worn around it. The leather is made more adhesive by means of plaster. Soft corns between the toes may also be removed by soaking and scraping, and cured by rubbing the root with a piece of caustic for a few seconds. This causes a hard black skin to form, which should be pulled off, and the caustic again applied. Two or three applications will be sufficient.

COSTIVENESS, or a generally confined state of the bowels, is a very common complaint among seamen. It arises in a great measure from the nature of the food, and should be prevented as far as possible by obtaining fresh vegetables wherever they can be had, substituting preserved for salt provisions, and improving the quality of the bread. It is a bad plan to take purgative medicines habitually; but when the bowels have not been open as usual, and when the motions are hard, two of the purgative pills should be taken at bedtime, or one of the powders in the morning; or half an ounce of Epsom salts, or an ounce of castor oil, may be taken. The effect of the salts or oil may be increased if necessary by giving from three to five grains of calomel the night before. All this must be regarded merely as temporary means of relief. The real cure is in the avoidance of the causes upon which constipation depends.

COUGH attends many diseases of a totally different nature, and is a mere symptom of these diseases. The remedies, therefore, should be simple, as those proper

for one disease might be injurious in another; but it is a good rule, in all cases, to abstain from stimulants, to live sparingly, to keep the bowels open, to avoid cold and damp, and to cover the chest with flannel. Whenever the cough is accompanied by pain in any part of the chest, to apply a large bran poultice as warm as can be borne, a mustard poultice, or a blister over the painful part. When the cough accompanies a common cold, ten grains of Dover's powder may be given at bedtime. Should it continue, and the patient appear feverish, one of the emetic powders should be mixed in half a pint of water, and an ounce of the mixture taken every four hours. When the cough is very dry, two or three teaspoonfuls of laudanum may be put into a jug of boiling water, and the patient should inhale the steam rising from the mixture, holding his mouth over the top of the jug, and covering his head with a towel. When, on the other hand, there is very great expectoration, as in old people who can scarcely spit up the quantities of phlegm which forms in the chest, twenty drops of the liquid ammonia may be given three or four times a day in a glass of water, and a blister applied to the chest. The balsam of copaiba is also useful in such cases, in doses of twenty or thirty drops three times a day. It is sometimes necessary to clear the chest of the phlegm by an emetic. Some temporary relief will be afforded in most varieties of cough by anything which moistens the throat, as liquorice, acidulated drops, a mixture of honey or treacle with vinegar, or a gargle of warm vinegar and water.

CRAMP.—The cramp which seizes upon the muscles of the limbs when bathing, and occasionally at other times when making unusual movement or exertion, is relieved at the time by perfect rest of the affected part, and rubbing it sharply with the hands. When it comes on in the water, the bather should lie perfectly still on his back until the spasm goes off. When it affects the calves of the legs of a person in bed, he should endeavour to stand firmly; pain may be increased at first, but the spasm is soon over. It generally arises in men from confinement of the bowels, and indicates the necessity for some opening medicine.

CRAMP IN THE STOMACH.—(See COLIC.)

DEAFNESS may arise from such various conditions of the ear that a medical man should be consulted as soon as possible. It will always be safe, however, to clear the ear thoroughly of any wax which may have collected by means of a syringe and warm water, and to protect the internal ear from cold by cotton wool. The wool may be moistened with olive oil if the outer ear be dry. A blister behind the ear is of service in many cases.

DIARRHŒA, or purging, generally arises from overloading the stomach, or from taking improper food, unripe fruit, unwholesome fish, &c. Occasionally, it will depend upon perspiration being suppressed by a sudden chill, by wet feet, or by drinking cold water

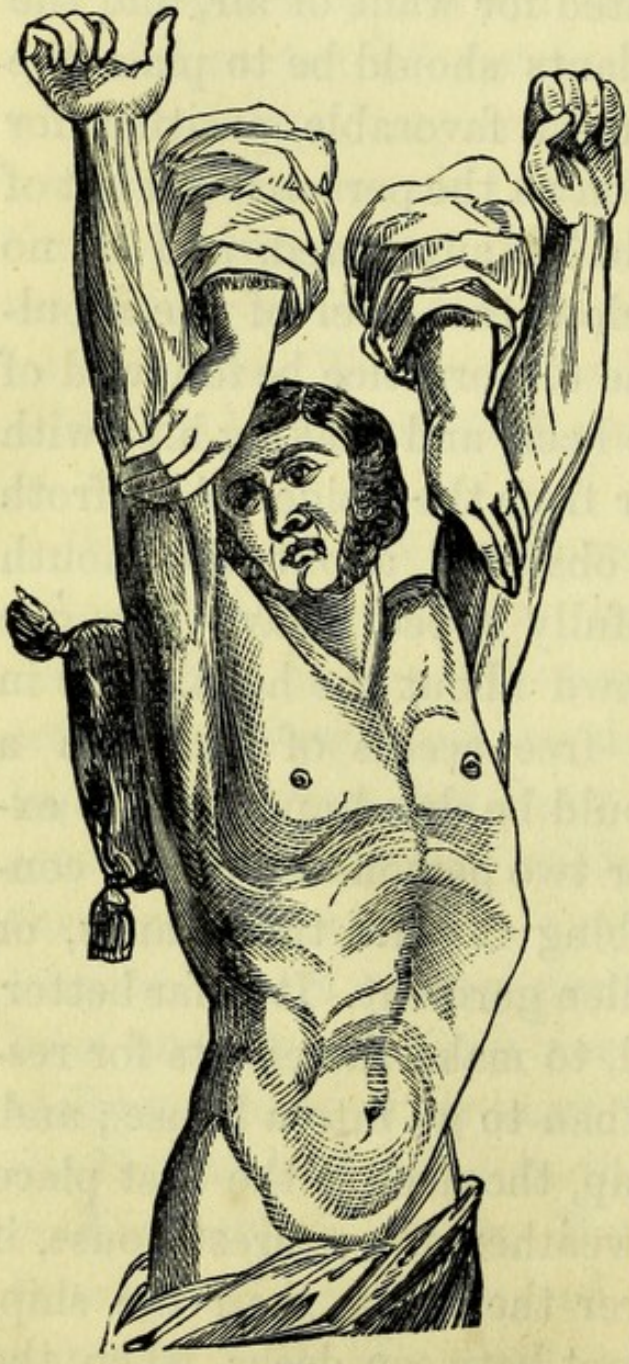
when hot. It is more frequent in hot climates than in England, and if neglected often runs on to a dangerous dysentery. In a simple attack of diarrhœa from overloaded stomach, all that is necessary is to apply warm flannel to the belly, to keep quiet, take some warm drink, and leave off meat and spirits for a day or two. If there be much griping, twenty drops of laudanum and ten drops of essence of peppermint may be given, and when the pain is relieved, a tablespoonful or two of castor-oil should be given. This will clear away any irritating substance which may remain in the bowels. Should the purging still continue, twenty grains of the compound chalk powder may be given with ten drops of laudanum after each loose motion. Barley-water is the best drink, and rice, well boiled, the best food, until all purging has ceased.

DROWNING.—When a person is apparently drowned, unless he has been for so long a time actually under water that he must necessarily be dead, the most active exertions must be made to restore him. Perhaps no person has been restored who has been actually under water *without rising* for more than three or four minutes; but these minutes appear very long to lookers on, and persons are often said to have been under water for a quarter of an hour who have really not been so for more than a minute or two after the last time of rising to the surface. Dr. Christian, medical officer of the Royal Humane Society, has known one man recovered who had really been *six* minutes under the water without rising. The time

had been noted by a park-keeper who was on the bridge, and marked the time by his watch. Persons have been restored after having lain apparently dead from six to eight hours, persevering exertions having been made nearly the whole of the time before any signs of life became manifest.

The cause of death is not, as some believe, that the lungs and stomach become filled with water. The person is stifled or suffocated for want of air, and the great object of the attendants should be to place the drowned person in the most favorable position for breathing pure air. As soon as the person is got out of the water, the head should be supported, and by no means allowed to hang below the level of the shoulders. Still less should the old practice be followed of holding the person by the heels and shaking him, with the hope of draning water from the inside. Any froth or phlegm which may be observed about the mouth or nostrils should be carefully wiped away. No one should be allowed to crowd about the head, so as in any way to impede the free access of air. In a hot climate, the body should be dried and at once exposed to the sun. One or two persons should be constantly employed in rubbing it with their hands, or with some flannel or woollen garment. It is far better, when the sun is powerful, to make the efforts for restoration in the open air than to go into a house; and, if the man is on board ship, the deck is the best place for him. But, in cold weather, the nearest house, if the accident happen nearer the shore than the ship, or some warm but airy spot between decks, when the

man is brought on board, should be selected. The body having been stripped and dried, and rubbing being constantly kept up over the arms, legs, and body, by two or three assistants, bottles or bladders should be filled with hot water, or bricks should be heated, and applied to the feet and pit of the stomach. The body should be fomented with hot flannel; or, if a hot bath can be had, should be put into one at the temperature of 96°. Liquid ammonia may be sprinkled on a handkerchief and held near the nose, and the throat may be tickled by a feather. A surgeon would inflate the lungs with air, but an unpractised person had better not attempt to do so, as he would probably do more harm than good by inflating the stomach instead of the lungs, and interrupt the rubbing, which is the principal thing to be trusted to. But an attempt may be made to empty and refill the lungs, by placing the body on the back, with the shoulders raised and supported by a pillow, or



any blanket or coat folded up. The mouth should be opened, and the tongue drawn forward, to secure a free passage for the air towards the windpipe, and clear any frothy liquid from the nose or throat. Then the movements of the chest in breathing must be imitated, by drawing up the arms by the side of the head, as shown in the cut, and then upwards and forwards, and lastly, turning them down and pressing them gently and firmly against the sides of the chest. These movements are to be repeated alternately fifteen times in a minute for half an hour or more—the rubbing being still kept up. In one case, the rubbing was continued for eight hours and a half before the drowned person showed any signs of revival, but he was afterwards restored; so that there is every encouragement to persevere even in cases apparently hopeless. The rubbers should be relieved from time to time, and the place kept thoroughly ventilated. The limbs should be rubbed upwards towards the heart, and some cold water may be dashed from time to time on the face. Another series of movements, known as the "Ready Method," is recommended by the Life Boat Society; but the method just described, which is known as Dr. Silvester's method, is very superior.

The first signs of life are a slight sigh or gasp, or some fluttering movement about the heart. The rubbing must then be continued most diligently. Breathing gradually commences; slow at first, but afterwards quicker; and the heart's beating becomes stronger. As soon as the mouth can be opened easily,

a little warm wine and water should be given in a spoon; the spoon being carried far back on the tongue, to avoid risk of choking by the liquid being drawn into the windpipe. The senses sometimes return slowly, and the person remains quiet; at others there is great agitation and distress for several hours, caused by congestion of the lungs. Dr. Christian has seen very great relief afforded in this state by the application of large mustard poultices covering both chest and back. The person must be kept extremely quiet, the place well aired, warmth kept up to the stomach and feet, and warm drinks given. Should he become sleepy, and breathe with a heavy snore, the lips being bluish and the face darkly flushed or swollen, some blood must be taken from the arm, but not more than a few ounces at a time. It is better to take about half a pint, and repeat the bleeding after an hour or two, if necessary, than to take a pint at once. Some inflammation of the lungs occasionally comes on after a day or two. This must be treated in the usual manner. (See INFLAMMATION.)

DRUNKENNESS not only seriously injures the health, and, when habitual, is almost certain to induce some disease which will shorten the life of the drunkard; but it may be the cause of sudden death. A person takes an unusual quantity of spirits, and is found in a condition very much resembling apoplexy. He is said to be "dead drunk." He is actually poisoned by spirit. He lies senseless and snoring, with a flushed face, his breath exhaling the poison he has swal-

lowed. A surgeon in such a case would use the stomach pump to draw away any spirit which might remain in the stomach; but the seaman must trust to an emetic, if the drunkard can swallow. If he cannot, the throat should be tickled with a feather. In either case, the neckcloth should be removed, the dress loosened, the head raised, and cold water dashed or poured upon it. If the feet are cold, they should be warmed by bottles of hot water. As soon as the man can swallow, a tablespoonful of mustard should be mixed in a tumbler of hot water, and given to act as an emetic. If mustard is not at hand, an emetic powder, or two tablespoonfuls of common salt, may be given instead, in the same quantity of hot water.

Drunkenness, when it does not kill suddenly, often poisons slowly, and produces what is called the *shaking delirium*, or *drunkard's delirium*, known to seamen as a *fit of the horrors*. The person becomes subject to the most distressing fears. He cannot sleep: if he dozes, he starts awake again in some frightful dream. He is passionate, and in this state often destroys himself, or dies suddenly. When in this condition, it is necessary to allow a moderate quantity of the spirit habitually taken, to clear out the bowels by one of the purging powders, giving at the same time forty or fifty drops of laudanum. It is often necessary to give twenty drops of laudanum or one of the opium pills every hour, with some hot wine and water, until the person sleeps. After a sound sleep immediate danger is generally past, but still there is much impatience and restlessness, and careful watching is needed for the

protection of himself and others from sudden transports of passion. One of the opium pills should be given three times a day, and if the bowels are confined five grains of calomel should be given at bedtime, and castor oil in the morning. But great care is necessary in giving purgatives to patients in this state. They must never be violent, and opium or laudanum must always be given at the same time. The bowels must be kept open, or the opium may produce inflammation of the brain; but, at the same time, any violent purgative might so exhaust the weakened body as to cause sudden death.

Should one such fit not induce the drunkard to give up his vicious habits, there will soon be returns increased in horror; an early death speedily terminating a miserable life.

Dysentery, or bloody purging, is most common in hot climates, and in the autumn. It sometimes commences very suddenly, and with great severity, by a discharge of slime mixed with almost pure blood. At other times there is at first a simple diarrhœa, which gradually becomes more troublesome, and reddish slime more and more mixed with blood, is passed. There is always more or less pain on pressing the belly in different parts, some difficulty in making water, and great straining on going to stool. Sometimes there is thirst, hot skin, and a quick pulse. Sometimes no thirst, feeble pulse, and tendency to coldness of the hands and feet.

In all forms of dysentery, warmth and moisture

should be applied to the belly constantly, by means of fomentations or poultices; the feet should be kept warm, and the diet should be exclusively of rice, sago, arrow-root, or similar articles, thoroughly well boiled. Milk is the only animal food which should be allowed, and this is not generally borne. Cold water may be given freely, if the patient desires it. Barley water is better in some respects, if the patient has no particular longing for cold water. No wine or spirits should be allowed.

When dysentery commences as a diarrhœa, the ordinary remedies of diarrhœa may be employed. (See DIARRHŒA.) As the purging continues and the stools become slimy and bloody, and in the more acute cases in which violent bloody purging at once appears, the most common treatment is that by calomel and opium. Sometimes a dose of ten grains of calomel with two grains of opium, that is, two of the opium pills, will at once stop the disease like a charm. Equally good effects often follow the use of doses of two grains of calomel with ten drops of laudanum every four hours; but the great objections to this treatment are, that it is uncertain, and that if it does not do good it almost always does a very great deal of harm. The safer rule, therefore, is to trust to quiet, fomentations, and the diet above recommended, applying eight or ten leeches around the fundament, if they can be procured, and injecting from twenty to one hundred drops of laudanum in a wineglassful of water into the bowels. The large dose of one hundred drops may be injected first, and then the smaller

one of twenty after every time of purging. If the leeches cannot be procured, the man being robust and feverish, and the motions very slimy, about ten or twelve ounces of blood should be taken from the arm. If the laudanum should produce much sleepiness and headache, it had better be omitted; and provided the bloody purging continue, a drachm of alum may be dissolved in six ounces of water, two tablespoonfuls, or an ounce, of the mixture being given every three or four hours, with a few drops of essence of peppermint, or fifteen drops of the spirit of turpentine, given in barley water every two hours. Sometimes after all bloody and slimy purging ceases, an obstinate diarrhœa continues; the food appearing to run through the bowels almost as fast as it is put into the stomach. Under these circumstances, twenty grains of the compound chalk powder and ten drops of laudanum may be given after every loose motion, and a small blister applied to any part of the belly which is painful on pressure.

When dysentery is known to be prevalent in marshy districts near where the ship is anchored, the men should not be allowed to sleep on shore. Should the disease appear on board, it would be advisable to put to sea as soon as possible. The medical treatment in these cases will principally consist in the opiate injections just recommended, and in the use of quinine. This drug should be given in doses of five grains every two or three hours, in severe cases, and in milder ones, two grains may be given in the morning and afternoon, and five grains at bedtime. It is

said that by the use of quinine, in doses of five grains at bedtime, or before going on shore, men may be protected from the epidemic dysentery of marshy districts. Further trials are, however, necessary to determine this point, and it is hoped that the subject will be investigated by those who have the opportunity, as it is one of great importance.

The most careful system of diet must be enjoined for several days after recovery, as there is no disease which has a greater tendency to relapse.

EAR-ACHE may generally be relieved by syringing the passage with warm water, fomenting the side of the face and head with hot water, and putting cotton wool, wetted with laudanum, into the passage. Some opening medicine should also be given. When the pain is very deep and severe, leeches should be applied behind the ear, if they can be obtained, or some blood be removed by cupping. A blister also may be applied. At the same time one of the emetic powders may be mixed in half a pint of water, and an ounce of the mixture given every two or three hours.

Sometimes flies or other insects, small pieces of wood or stone, a pea or seed, a small shot or button, and similar substances, may have been thrown or pushed into the ear. If anything of the kind can be seen, it may be pulled out by a pair of tweezers, or by passing a piece of wire bent like a hair-pin behind it. If it cannot be seen, and is likely to increase in size when wet, the ear should not be syringed, as the substance would swell and cause great pain. It is better

to treat the case as a simple ear-ache, lie on the injured ear, and wait till the body can be seen. A sharp shake of the head will often dislodge it. When the body is hard, the ear should be syringed with warm water, the head being inclined on one side so that the substance may fall out when dislodged by the water.

When hard wax has collected in the ear, some cotton-wool wetted with salt water may be put in over night, and the ear syringed in the morning. Wool should be worn for a few days afterwards, moistened with a little olive oil.

EPILEPSY, known by the name of *fits* and *falling sickness*, is a kind of convulsion, in which the person generally falls down suddenly insensible. The body is violently agitated; the limbs spasmodically stiffened and contracted; the face distorted; the teeth firmly clenched, often upon the tongue; and the breathing is heavy and laboured. When the person has been subject to these fits, he is often conscious, by some peculiar sensation, that they are coming on. They generally last from a few minutes to half an hour, and the person then sleeps for several hours.

Those subject to these fits should not be employed aloft. They should live a very temperate, regular life, and avoid confinement of the bowels. When the fit comes on, it is necessary to have the patient held, so that he cannot hurt himself. Cold water should be poured over the head, and dashed in the face, the clothing loosened, the head raised, and air freely

admitted. After awaking, a purgative is likely to be of service, if any excess in eating or drinking has been committed. Medical advice should be obtained at the first port.

ERYSIPELAS is an inflammation of the skin of an unhealthy character. It may arise spontaneously, or after some injury, especially when persons are crowded together in ill-ventilated places. The skin is red and puffy, there is often weakness and lowness of spirits, headache, thirst, and some difficulty of breathing.

When erysipelas attacks a strong man, and the inflamed skin is of a bright red colour, it is well to give him five grains of calomel, and a dose of castor oil, or a couple of the opening pills, and if there be much pain, to follow this by two tablespoonfuls of a mixture of one of the emetic powders in half a pint of water. This medicine may be repeated every three or four hours. The part should be covered with linen wetted with tepid water. When the person is a hard drinker, or weak, and suffering from feelings of depression, and the skin is of a purplish-red colour, he should have about six or eight ounces of wine daily, nourishing food, and two grains of quinine three or four times a day. The part affected should be covered with cotton wool. If the patient will submit to it, the greatest benefit may be obtained by making a number of punctures through the skin of the affected part with a lancet, and encouraging the bleeding by warm water. This is most useful when the skin is

bright red in colour. Should the part be much swollen and feel *doughy*, a large deep cut must be made to let out matter, and poultices be applied afterwards.

EYES.—(See OPHTHALMIA.)

FAINTING.—When a man faints, he should be placed on his back, lying on his bed-place, or on deck or the ground. Cold water should be sprinkled on his face. Some liquid ammonia should be held to the nose, and if the fainting continue very long the throat may be tickled by a feather. The limbs should be rubbed, and the feet warmed.

When fainting proceeds from loss of blood, the first object is to stop the bleeding. (See BLEEDING.)

FEVER.—Fevers of different forms may show themselves among seamen when at sea or in port. Those which commence at sea are usually of a continued form, unless the ship has very recently left port. Those which commence when in port assume the form of some disease known to be prevalent in the neighbourhood of the port. Thus, in marshy districts ague or intermittent fever may be looked for. On the western coast of Africa, and in the West Indies, a remittent fever peculiar to the locality, and the yellow fever, or black vomit, must be suspected.

The *continued fever* generally observed to commence at sea is commonly regarded as a mild form of typhus fever without spots. It is known to medical men as *typhoid*. The severe form of spotted typhus pre-

valent at times in emigrant ships, and other crowded vessels, is a distinct disease.

The symptoms of the two forms of fever are very much the same, to any other than a medical eye, differing only in degree. At first, there is some weakness, shivering, headache; then giddiness, with pains in the loins and limbs, and occasional flushes of heat. The eyes appear heavy and glassy, and the face is flushed. The pulse is more rapid than usual. The breathing becomes rather laborious, the headache increases, and there is considerable thirst. The patient is dull and heavy, his thoughts wander, and his sensations are imperfect or unnaturally acute. After a day or two passed in this condition there is usually some apparent disease of the organs of the head, chest, or belly; sometimes of all these together. Sleeplessness or headache, restlessness, unstable temper, and delirium in the first case,—cough, dryness of the throat, increased difficulty of breathing, and extreme heat in the second,—pains in the belly, looseness of the bowels, fœtid stools, and increased thirst in the third, may all be observed. In either case the urine is generally scanty and high-coloured, and the tongue becomes brown and dry, particularly towards the centre. Most patients are better in the morning, and become worse towards night.

This state may continue for several days; and then the patient gradually begins to recover his strength, or he sinks into the severer stage of fever. Sometimes extreme severity of the symptoms appears from the

first. At others the bad symptoms only commence after a mild fever has lasted several days.

There are certain general principles which must be borne in mind in the treatment of all varieties of fever:

1. The disease will run a certain course. It will last a certain number of days, and the patient will require all his strength to support it. Great caution must therefore be exercised before bleeding any one, or adopting any other measure which can permanently lower the powers of his system. Temporary good may be done at the expense of great future evil. A medical man often finds it difficult to determine if bleeding to relieve some urgent symptom is advisable, or if it may not do more harm than good, by weakening the patient, and prolonging the disease. A person not medically educated, therefore, should not run any risk, but rather be sure at least to *do no harm*. If he have any doubt, *let him wait*.

2. Every place in which a fever-patient remains should be thoroughly ventilated, not only for the good of the sufferer, but to prevent danger of contagion. Fevers only spread by infection when the exhalations from patients are not well mixed up and diluted with air. A screen should be placed to keep off direct draughts of cold air from the patient.

3. The greatest possible *quiet* should be enjoined.

4. The whole surface of the body should be thoroughly cleansed by hot water and soap, and dried by a coarse towel, on the first day. On every subsequent day, the whole body should be sponged with tepid

water, and dried; one part of the body being washed after another when the person is very weak.

5. Simple drinks should be freely supplied. The taste of the patient should be consulted, and he may be allowed cold water, toast-and-water, cold tea, barley water, thin gruel, weak lemonade made with citric acid, or some drink made by pouring boiling water on tamarinds, apples, or any fruit-preserve which may be on board, and straining. He may be allowed to take as much of any of these drinks as he pleases; and if he should become insensible, he should be supplied with a little from time to time by means of a spoon.

6. The bed-clothes should be arranged entirely according to the sensations of the patient. He may wish to lie with only a sheet on him, or he may desire blankets. His wishes are the best guides as to what he should be allowed.

7. The linen, bedding, and sleeping-berth should be kept perfectly clean and dry. All the patient's evacuations should be instantly removed; and chloride of zinc should be sprinkled about the place.

8. The hair of the head should be cut short; and in case of severe head symptoms with heat of the forehead, cold water, or spirits and water, may be applied on thin linen to the forehead. The linen to be moistened as often as it becomes warm, and kept applied until the forehead becomes of a natural temperature.

9. The diet should be of the simplest kind—milk, if it can be procured, or if any preserved milk is on board. Rice, arrow-root, or thin gruel, with toasted

bread, or biscuit soaked in tea, should alone be allowed until the fever subsides.

If all these rules were followed, the great majority of mild cases of continued fever would recover without any medicine whatsoever. The medical treatment, therefore, should not be severe. Still, at the commencement of fever, much good is often done by cleaning out the stomach by an emetic, and giving, two hours afterwards, three or four grains of calomel, followed, after four hours more, by half an ounce to an ounce of castor oil. In this way, any improper food is thoroughly cleared away. It is desirable, in fever, that the bowels should be opened daily; but it is not advisable to give purgative medicines to effect this purpose. When the diet is simple, no harm is done by a day or two passing without a motion; whereas great harm might ensue from irritating the bowels by purgative medicines. Effervescing draughts may be given every three or four hours; and they are quite sufficiently aperient. They are made by dissolving half a drachm of carbonate of soda in a wineglassful of water, and a scruple of citric or tartaric acid in the same quantity of water in another glass. The two solutions are then to be mixed together and drunk while effervescing. As the fever subsides, and weakness alone is felt, from four to eight ounces of wine or grog may be given daily in sago or arrowroot, and some broth may also be allowed. It is necessary, however, to increase the quantity of food very gradually, and not to give meat until all pain has subsided. Two grains of quinine given three or four

times daily will often do much good during convalescence after this fever.

In the very severe form of typhus, with spots on the skin, it is necessary to allow wine almost from the first, as this disease generally attacks overworked, ill-fed, or unhealthy persons, who readily sink under it.

During the course of either of these forms of fever, the patient is apt to become very restless and cannot sleep. He may lie awake whole nights. Under such circumstances, ten grains of Dover's powder may be given at bedtime with considerable benefit. Again, pain in the chest and cough may come on. If so, a large hot poultice may be applied over the painful part, and two tablespoonfuls of the following mixture given every two or three hours until the pain and cough subside. Mix one of the emetic powders with half a pint of water, and add forty measured drops of laudanum. Shake the bottle each time before giving the medicine. Pain in the belly, with tenderness when it is pressed, and purging, are best treated by fomenting the belly for some hours with hot water, and injecting twenty or thirty drops of laudanum in a wineglassful of water into the bowels.

Remittent fever is most prevalent in tropical climates. It differs but little from the ordinary kinds of severe continued fever. The patient, however, is better at stated hours and worse at others. He generally improves in the morning and remains apparently much improved during the day, although not free from fever, but towards night all the bad symp-

toms return. The rules of treatment are those for continued fever, except that quinine may be given as soon as the regular period of increase and decline of fever are clearly observed. Ten grains of quinine should be given about two hours before the time at which the fever increases, and be repeated daily. It is better to give one dose of ten grains once a day, than the same, or a larger quantity, in divided doses.

Yellow fever, or *black vomit*, is a severe form of remittent, attended by vomiting of black matter resembling coffee grounds. It should be treated precisely in the same manner as the remittent fever. In both, free perspiration should be procured if possible in the first day of the attack, by a hot foot-bath, warm drinks, and an extra blanket. A sort of vapour bath may be easily made by seating the patient in a chair, covering him from the shoulders downwards with blankets, which reach the deck all round, and then burning a saucerful of spirits beneath the chair, or, what is better, keeping a small lighted spirit-lamp there. When free perspiration is procured on the first day of a tropical fever, that fever is seldom fatal. Quinine may generally be given early. Glysters of a pint of warm water, in which a tablespoonful of common salt has been dissolved, are said to assist in producing perspiration. They may be given daily or oftener if they do not lead to excessive purging.

Intermittent fever, or *ague*, often called *fever and ague*, commences by a fit of violent shivering and general depression. This is followed, after an interval of from half an hour to six hours, by heat which ends

in profuse sweating, After the sweating is over, the person feels tolerably well until twenty-four, forty-eight, or seventy-two hours afterwards; a fit precisely similar comes on of cold, hot, and sweating stages. These regular intervals of health, or intermissions of fever, are quite sufficient to characterise the disease.

The treatment during the fit consists in keeping the patient well covered with blankets during the cold stage, and supplying him freely with hot drinks, as hot weak tea or hot barley-water. Very weak wine and water may be given in some cases; and if the cold fit is much prolonged, an emetic should be administered. When the hot stage comes on, the forehead should be kept cool by cloths wet with cold water, but the blankets must not all be taken away until sweating has fairly commenced. The patient may then be lightly covered; and when the sweating ceases, the body should be sponged with tepid water and wiped dry. The bedding must be also dried.

To prevent a return of the attack, quinine is the medicine in which the greatest confidence may be placed. As soon as the fit is over, if the bowels are confined, five grains of calomel and two of the purging pills should be given directly, followed by a glyster of hot water, if the bowels are not opened in six hours. Then two grains of quinine should be given, and repeated every two hours, until about two hours before the fit is expected, when one dose of ten grains should be given. If the fit should not come on, the small doses should be continued every three or four hours for a day or two. Should the attack take place, one

ten-grain dose of quinine should be given daily. It may be given at bedtime if the fit comes on in the morning, and early in the morning if the fit is expected during the day. The bowels should be kept open; and the rules recommended in other fevers as to diet, &c., insisted upon until the attacks have fairly ceased. Should pain and swelling under the ribs on either side follow the cessation of the fever, a medical man should be consulted at the first port. It would probably be necessary to give a grain or two of calomel with five grains of Dover's powder three or four times a day until the mouth become sore. This had better be done should such a case occur on a long voyage.

Quinine will not dissolve in water, but a drop of oil of vitriol in water will dissolve several grains of quinine. When more than two grains, however, are taken at once, it should be given in the solid form. It may be mixed with a little honey, or treacle, or some preserve, and taken as a powder, or made into pills in the same way. Quinine pills should be made at the time they are wanted, because they soon become hard and useless.

Intermittent fevers, like the severe forms of remittent fever of tropical climates, are produced by breathing the air of marshy or other unhealthy places. Such places should, therefore, be avoided as much as possible. When ships are anchored near them, the men should never be allowed to sleep on shore, or to go on shore between sunset and two hours after sunrise, except in case of absolute necessity. If obliged to sleep on shore, a house should be found if possible,

the upper rooms chosen to sleep in, and the windows closed. Even if it be very hot, it is better to suffer the heat than to breathe poison. If no house is near, a large fire should be lighted and kept alight, and those who sleep should keep near it. When men are sent ashore to get wood, water, or merchandise in rivers, or other spots when these fevers are known to be prevalent, each man should take two or three grains of quinine in the morning in a glass of wine or with his grog, and a good meal shortly before starting.

Should any form of fever appear on board ship not clearly traceable to some cause on shore, the limber-boards should be removed and the bottom of the ship most thoroughly cleansed. (See CLEANLINESS.) The importance of perfect ventilation, and the other means of preserving health, commented upon in the first part of this book, is at such times doubly increased.

FITS. (See APOPLEXY, EPILEPSY, FAINTING.)

FROST-BITE. (See COLD.)

GLEET is a slight discharge without pain, which may continue for several weeks after a gonorrhœa has ceased. Injections of strong cold green tea three times a day, or of a solution of four grains of alum in an ounce of water, will generally cure it.

GONORRHŒA, or *clap*, is too well known by seamen to need description. It may generally be cured in a few days if treated as soon as it commences. The

part should be hung in water as hot as can be borne two or three times on the first day for a quarter of an hour each time. One of the purging powders should also be taken, and four hours afterwards a teaspoonful of the balsam of copaiba, which may be repeated every six hours. No meat or wine may be taken, and plenty of barley-water should be drunk. Coffee does harm. If the balsam be continued regularly, the cure is generally perfect in a few days. In many cases, especially where there have been several previous attacks, it is not necessary to swallow any medicine, injections only, as in GLEET, sufficing for the cure: one grain of nitrate of silver to four ounces of distilled water makes a good injection. If there is no distilled water on board, two grains of sulphate of copper to one ounce of water may be used. If the discharge has been neglected at first, and much inflammation has come on, it is better to purge freely, and take the cream of tartar drink in considerable quantities for two or three days before taking the balsam. The parts must be kept perfectly clean by washing thoroughly several times daily. No matter must be allowed to rest under the foreskin, or this will inflame and swell and remain fixed either over or behind the gland. In the former case, it must be fomented, and all matter cleaned from under it by syringing with warm water. In the latter, the gland must be compressed by the fingers, and the foreskin gradually but firmly drawn forwards. If chordee comes on, the part should be wrapped in a cloth wetted with cold water, and afterwards some mercurial ointment may be rubbed along the under

part. Should one of the testicles become painful and swell, it must be supported by a handkerchief. Some blood should also be taken from the veins of the bag. It may be placed in hot water, the upper part pressed by the fingers, and four or five of the largest veins pricked by a lancet, and allowed to bleed into warm water. Should the swelling increase, one grain of calomel and three grains of Dover's powder should be given every four hours until it diminishes, or until the mouth becomes rather sore.

Sometimes a discharge continues after all scalding and pain has disappeared. This may be cured by injection. (See GLEET.) Great care should be taken that not a drop of the discharge reaches the eye, or a very severe ophthalmia may be caused, and many eyes have been thus lost. The powder from the dried discharge on the towel or shirt is thus particularly dangerous.

GRAVEL.—When a thick sediment settles from the urine, a person is said to be troubled with gravel. The sediment is most frequently red, but may be white. Persons so affected are subject at times to attacks of severe pain in the loins, extending to the testicle and down the inside of the thighs, accompanied by feelings of sickness. This is called a *fit of the gravel.*

The causes of *gravel* are almost always over-eating and drinking with too little exercise, and the causes of a *fit of the gravel* are some unusual excess, or a chill felt whilst perspiring. Persons subject to the red

gravel should become teetotallers, eat moderately, keep the skin clean and warm, the bowels open, and take sufficient exercise. Should a fit come on, a warm hip bath should be taken at once, and five grains of calomel with ten of Dover's powder given. The person should go to bed, drink freely of warm weak tea, and put on extra blankets to produce perspiration. Should the pain continue severely, twenty drops of laudanum may be given, and repeated every two hours, until the pain goes off. The body should also be fomented, or a large hot poultice applied. A dose of castor oil should also be given a few hours after pain has ceased.

The white gravel is most common in old men and in persons who have long suffered from the red variety, or from other diseases. It must be treated by nourishing diet, with an extra allowance of wine; and as it is always an affair of long standing, a medical man should be consulted at the first port.

Gum-Boil is a little abscess in the gum around the roots of some of the teeth. It may be opened by the prick of a penknife at the softest part, and will heal after discharging matter for a few days.

Hanging.—When a man has hanged himself, he is seldom restored if he has been hanging more than a few minutes. Still, he should be cut down as soon as observed, the rope taken from the neck, and the head, face, and chest dashed over with cold water. Some blood should be taken from the arm, if possible; and

mustard, or turpentine, should he rubbed over the chest. The limbs should also be rubbed as after drowning, and attempts to fill the lungs with air may be made in the same manner. (See DROWNING.)

HEADACHE arises from many different diseases, and only disappears when those diseases are cured. (See FEVER, INDIGESTION, INFLAMMATION.) That felt after a fit of drunkenness is best relieved by an effervescing draught of carbonate of soda and tartaric acid, with a little brandy in it. That felt after severe fatigue is only relieved by rest and sleep. The *bilious* headache attending a confined state of the bowels must be treated by a dose of purging pills, or powders. *Sick* headache follows a meal of improper food. An emetic may be taken, or warm water drunk, until vomiting comes on. *Nervous* headache over the forehead accompanies convalescence from many diseases, and also appears in weak states of the body. It is to be treated by two grains of quinine three times a day.

HEAD.—Injuries of the head are common on board ship, and chiefly occur by falls from aloft, or from deck below, by blows, or substances falling on the head. The effects may be simple stunning, or fracture of the skull, with or without compression of the brain.

Stunning varies in degree from a state of weakness and faintness, with difficulty of breathing, and a sort of bewilderment resembling drunkenness, to a state of complete insensibility like apoplexy; and is, in most

respects, similar to the effects of compression on the brain. In either case the person should be lifted and carried most carefully, shaking him as little as possible and should be placed in bed with the head supported by a pillow. The hair should be cut, the place well aired, and kept as quiet as possible. If the coldness and weakness continue, warm bottles may be applied to the feet, and some hot tea given. If the head become hot, cold water may be applied, with or without admixture of an eighth part of spirit. Patients should never be bled until the skin becomes hot, the face flushed, and the arteries of the neck and temples are seen and felt to beat strongly. When this is the case, and the person is insensible, he must be treated exactly as if he were suffering from a fit of apoplexy. (See APOPLEXY.) The treatment will be exactly the same whether the skull be or be not broken. A medical man might raise any piece of bone which was producing pressure on the brain; but unpractised persons must trust to quiet and low diet. Any wound of the scalp may be covered by lint wet with cold water, over which oiled silk should be placed. Should any dirt, pieces of wood, or bone, be seen in the wound, they must be carefully removed. If a piece of the scalp is stripped from the bone, and turned up, it should be carefully restored to its proper position, and fixed by adhesive plaster. Erysipelas very often follows wounds of the scalp. (See ERYSIPELAS.)

INDIGESTION among seamen is almost always caused by intemperance. The best cure for a violent fit is an

emetic. The only cure for habitual indigestion is temperance, moderation in food, and regular exercise. At the same time, relief may be obtained by a teaspoonful of carbonate of soda or magnesia, with a few drops of essence of peppermint; and the bowels may be kept open by taking one or two of the purging pills occasionally. Indigestion is often the cause of, and is naturally relieved by, an attack of slight diarrhœa.

INFLAMMATION may affect any part of the body. It is accompanied by pain, redness, heat, and swelling. When it affects any external part, that part should be kept quiet, covered by linen wetted with tepid water; the bowels should be kept open, and the diet simple. It may terminate in abscess. (See ABSCESS, also BOILS, CARBUNCLE, ERYSIPELAS, OPHTHALMIA, ULCERS, WHITLOW.)

Inflammation of the Bowels may accompany either Diarrhœa or Dysentery,—indeed the latter is a peculiar kind of inflammation of the larger bowels. (See DIARRHŒA—DYSENTERY.) It may also exist when the bowels are confined. There is pain in the belly, much increased on pressure, thirst, loss of appetite, a desire to lie perfectly quiet on the back with the thighs raised, and a quick small wiry pulse. There may or may not be a disposition to vomit. The patient is very uneasy, and the belly appears often to be distended with air.

In such a case the patient should not be urged to eat. He should be freely supplied with drinks, as

barley-water, toast and water, &c., but should not take more than he feels inclined to do. He should be kept perfectly quiet. Warm fomentations should be applied to the belly, and some leeches may be put over the painful part if they can be obtained. It is desirable to clear the bowels of any improper food they may contain, but purgatives do great harm. The object is to keep the bowels as quiet as possible, and purgatives prevent this by keeping them in motion. An injection of a pint of warm water may therefore be given occasionally, but purgative medicines should be avoided. Whenever there is much tenderness on pressure, it will be proper to give five grains of Dover's powder every three hours, until the tenderness disappears. During the recovery, the diet must be of the simplest kind, and meat must not be allowed until all pain and fever has ceased.

Inflammation of the Brain resembles in many respects the delirium of drunkards. (See DRUNKENNESS.) There is fever, delirium, headache, distress at the slightest noise; the light is avoided, and there is a ringing noise in the ears. When such symptoms come on after injury to the head, or after exposure to a very hot sun, and there is much flushing of the face with redness of the eyes and a strong pulse, about a pint of blood should be immediately taken from the arm, and two grains of calomel given every three hours. In other respects the person is to be treated as if for fever, by quiet, low diet, &c. (See FEVER.) It is important to distinguish this disease from drunkard's delirium, as the latter requires large doses of

laudanum and is aggravated by bleeding. As it is by far the most common disease among seamen, if from the habits of the patient there is doubt upon the subject, it is better to wait some time and observe if the peculiar shaking and fear of the drunkard's disease appear or not; and, if not, to treat the disease as an inflammation.

Inflammation of the Lungs may follow a severe cold, or may come on suddenly after blows, or exposure to wet and cold. There is cough, pain in the chest, and difficulty in breathing. The pain is increased on taking a deep breath. Hot skin, quick pulse, and restlessness, are also observed. When these symptoms occur in a strong man, he should be bled to about a pint, provided the difficulty of breathing be very great. Five grains of calomel should then be given with ten grains of Dover's powder, and the same dose repeated after four hours if the patient be not evidently better. One of the emetic powders should then be mixed with half a pint of water, and two tablespoonfuls of the mixture given every three hours. The patient should be kept quiet and on low diet. If he is not strong, the medicines just prescribed may also be given, but bleeding had better not be performed. After all heat of skin and fever has gone off a blister will prove useful, and the bowels may be acted on by castor oil or the purging pills.

INFLUENZA is a kind of severe cold attended by weakness. At times it becomes very prevalent. It is best treated by quiet, warm drinks, simple food, and

a mustard poultice to the chest. It is seldom necessary to give medicine; but, if the pain in the chest and cough be severe, a blister may be applied and the mixture of emetic powder given as directed for inflammation of the lungs. Persons often remain very weak after influenza, and it becomes necessary to give two grains of quinine three times a day.

ITCH is an eruption of little pimples with watery heads on the skin about the joints, most often between the fingers. When a man is affected by it he should be separated from others until he is cured; and an ointment should be made by mixing together equal parts of sulphur, olive oil, and simple cerate. This is to be well rubbed into every part affected by the eruption night and morning during three days. Then the whole body is to be well washed, and the man puts on clean clothes. The dirty ones should be destroyed, or soaked in solution of chloride of zinc, and thoroughly scalded. A little of the ointment should be kept to rub into any spot which may afterwards appear.

JAUNDICE is a disease in which the skin and the white of the eyes become tinged of a yellow colour. The urine also is reddish yellow, sometimes almost black. There is generally headache, lowness of spirits, confinement of the bowels, and a dry irritable state of the skin.

Five grains of calomel should be given, followed four hours afterwards by one of the purging powders. The diet must be low, warm drinks may be taken

freely, but no wine or spirits. When the bowels have been opened, one drachm of cream of tartar should be given every four hours, with a little essence of peppermint in water. If there is pain on the right side a blister may be applied. It is of great importance to get the person into a free perspiration, and for this object the vapour bath described in the article FEVER answers exceedingly well. Should pain in the right side be severe, ten grains of Dover's powder will generally relieve it.

LIGHTNING.—When a man has been apparently struck dead by lightning, all the clothes should be stripped off, and cold water repeatedly dashed over the body for ten minutes or a quarter of an hour. The body should be rubbed, and efforts should be made to pass air into the chest, as in cases of drowning. (See DROWNING.)

Every vessel should be provided with a lightning-conductor. When on shore during a thunder-storm, especially if rain fall, it is far safer to keep away from houses, trees, walls, &c., than to take shelter beneath them. It is also dangerous to hold up an umbrella during a thunder-storm.

LUMBAGO. (See RHEUMATISM.)

MEASLES are not frequent in adults, but sometimes spread in passenger ships. The disorder resembles a simple fever, with spotted eruption on the skin, very much like flea-bites. The treatment is that of simple

fever. (See FEVER.) Those affected should be separated as much as possible from all those who have not previously had the disease.

OPHTHALMIA, or inflammation of the eyes, may depend on a variety of causes, as blows, the admission of some substance within the eyelids, exposure to cold, or the glare of a hot sun. It is also one of the secondary symptoms of syphilis, and may depend upon a drop of the matter from another inflamed eye, or of the matter of gonorrhœa, touching the eye.

The white of the eye is seen to be reddened, tears flow freely, there is heat, and a sensation as of sand or dust between the eye and eyelids. A thick discharge is also liable to collect about the edges of the lids. The eye should be covered with a shade, and cloths wetted with warm water kept constantly applied. One of the purging powders should be given, and total abstinence from wine and spirits insisted on, with a low diet. A little oil should be applied with a feather to the edges of the lids at night to prevent matter from collecting there. The eye should be kept perfectly clean. Perhaps after pain and heat have gone off some redness may remain; if so, a lotion, composed of four grains of alum to an ounce of water, is very useful. A few drops should be put between the eyelids night and morning. A small blister may also be applied behind the ear.

When sand, dust, a splinter, or any other substance, has entered between the eyelids and eye, it must be removed as soon as possible. This may generally be done by syringing a little warm water between the

lids. If the substance can be seen attached to any part of the eyeball, it should be at once taken away by some fine but blunt body, as the end of a black-lead pencil or a camel's hair paint-brush. Sometimes it is felt beneath the eyelid. The under lid is easily drawn downwards by pressing a finger on the cheek-bone thus, so that anything on the inner surface can be seen and removed. The inner surface of the upper lid can only be seen by turning it outwards. This is done by pressing a small quill or pencil above the eyelashes, at the same time pulling the edge of the lid outwards and upwards. It is thus turned up over the quill, and the inner surface is distinctly seen.

When lime has got within the eyelids the most severe inflammation is likely to follow, and entire destruction of the eye. When this accident has happened, any pieces of lime which can be seen should be immediately removed by a feather or a piece of folded linen, and the eye should be well bathed with weak vinegar and water. Linen soaked in the vinegar and water should also be used to clear away pieces of lime which may have been entangled in the eyelashes. The other means just recommended for ophthalmia should then be adopted.

The Ophthalmia which comes on from secondary syphilis is more deeply seated than that from cold or ordinary injuries. The pupil of the eye is irregular,

the pain is deep seated, and a red ring of blood-vessels is seen in the white of the eye to surround the edge of the transparent central portion. In this disease it is necessary to give two grains of calomel and five grains of Dover's powder every four hours, until the mouth becomes sore.

Sometimes inflammation attacks the eyelids, and little gatherings form about the roots of the eyelashes. These are called *styes in the eye.* They often become as large as a pea before they burst and discharge the matter they contain. Bathing with warm water, touching the roots of the lashes with oil at night, and bathing the eye during the day with alum lotion, four grains to the ounce of water, is all that need be done. The bowels should be kept open, and the diet regulated.

PALPITATION OF THE HEART may attend so many different diseases, that it is only necessary to say, that during an attack the person should remain perfectly quiet, and after it is over endeavour to prevent its return by a regular mode of life and temperance, taking the first opportunity of consulting a medical man. He should avoid all violent exercise, always ascend slowly, and endeavour to moderate his passions.

PILES are painful swellings which form about the fundament, attended at times with discharge or bleeding. They generally depend upon, and are always aggravated by, a confined state of the bowels. The best

mode of cure is to live regularly, be temperate, take sufficient exercise, and have the bowels opened once daily. Opening medicine should not be violent. A teaspoonful of sulphur, with the same quantity of cream of tartar, taken occasionally in the morning will generally suffice. The habit should be acquired of going to stool just before going to bed. This is a far better time than the morning for those troubled with piles, because the swelling always increases after a motion, and disappears when the person lies down. Thus, in the one case, the person enjoys several hours' rest, in the other, the piles are irritated all day during walking or other exercise. Attention to this habit alone will cure most people of piles. When a pile inflames, it should be well bathed with warm water, and the person should rest for a day or two. A few leeches should also be applied if they can be had. Bleeding to a moderate amount from piles is generally useful. If it be excessive, injections of cold water, or of water in which alum has been dissolved in the proportion of a drachm to half a pint, may be used.

PLAGUE.—When a man is attacked by symptoms of a bad fever in a port where plague is raging, a medical man should be sent for as soon as possible. Should the same symptoms come on after the ship has left port, and the fever is attended by swellings in the armpit and groins, the disease is most likely plague, but must be treated exactly like severe continued fever. (See FEVER.) Poultices should be

applied to the swellings in the groin and armpits until they feel soft. They should then be opened. (See ABSCESS.) Plague is a contagious disease like typhus and some other fevers; but when an affected person is kept clean and in a place which is well ventilated, there is but little fear of its spreading. The only necessary precaution is perfect ventilation, and to avoid stooping over a person in such a way as to breathe his breath as it issues from the body unmixed with air. The clothes and bedding of such patients had better be destroyed and the place whitewashed. Chloride of zinc should also be sprinkled about.

PLEURISY. (See INFLAMMATION OF THE LUNGS.)

POISON.—When a man has taken poison purposely or accidentally, the great object is to remove it as soon as possible from the stomach by an emetic. One of the emetic powders, or a dessert-spoonful of mustard in a tumblerful of hot water, a tablespoonful of common salt in the same quantity of water, or any other emetic which may be at hand, should be immediately given, and the action assisted by tickling the back of the mouth with a feather. Besides the emetic, it is necessary to give some substance to neutralize the poison, or counteract the effects. To do this, it is necessary to discover which poison has been taken, then to follow the succeeding rules.

ACIDS.

Oil of Vitriol. *Nitric Acid.*
Spirits of Salts. *Oxalic Acid.*

A teaspoonful of calcined magnesia should be given in a glass of water every two or three minutes. Chalk and water, or lime from the walls, whitning, &c., are almost as good as magnesia, and better in case of oxalic acid.

Prussic Acid.

Cold water should be dashed over the face, liquid ammonia held to the nose; and a teaspoonful of the ammonia should be given with brandy, or brandy alone in sufficient quantity to rouse the person if possible.

ALKALIES.

Potash. Soda. Lime. Ammonia.

Vinegar and water, lemon juice, olive oil, and plenty of warm water, are the antidotes.

CAUSTIC, OR NITRATE OF SILVER.

Common salt should be given freely dissolved in warm water.

COPPER.

Copperas. Mineral green. Verdigris. Food cooked in copper vessels.

Large draughts of milk and water, white of egg and water, or, if this cannot be had, of sugar and

water. Strong coffee is also useful, as are filings of old iron.

ARSENIC.

White arsenic. King's yellow. Scheele's green. Ague drops.

After an emetic, large draughts of thin gruel, milk, or linseed tea.

ANTIMONY.

Tartar emetic. Butter of Antimony.

Large draughts of strong tea.

LEAD.

Sugar of lead. Red lead. White lead.

An ounce of Epsom salts to be dissolved in a pint of warm water and given freely, a wineglassful every two or three minutes.

MERCURY.

Calomel. Corrosive sublimate. Red precipitate. Vermilion.

The white of an egg mixed with water to be given every two or three minutes; large quantities of milk, or sugar and water, or flour and water, are also useful.

SALTPETRE taken in mistake for salts—Thin gruel should be freely taken.

SPIRITS. (See DRUNKENNESS.)

POISONOUS FISH, PUTRID MEAT, GERMAN SAUSAGES, and some kinds of CHEESE, produce at times violent headache, sickness, and general depression. An emetic should be given, and followed by one of the purging powders. Weak vinegar and water sweetened, with the addition of a small quantity of wine or brandy, may be drunk freely. If spasms come on, it may be necessary to give twenty-drop doses of laudanum frequently repeated according to circumstances.

POISONOUS MUSHROOMS produce the same effect, with delirium, convulsions, and stupor. An emetic, followed by frequent doses of Epsom salts in warm brandy and water, is the best treatment.

Of the vegetable poisons, some act as narcotics, others as irritants. The most common of the NARCOTICS are *opium*, with its solution *laudanum*, *hemlock*, *henbane*, *nightshade*, *coculus indicus*, and *tobacco*. The effects are a sort of dull intoxication, delirium, desire to vomit, quick breathing, feeble pulse, and convulsions or palsy. An emetic should be given instantly, and the throat tickled with a feather. Cold water should be dashed over the head and face, while the body is kept dry and warm. Liquid ammonia should be held to the nostrils. Two or three pints of warm water, with a tablespoonful of common salt, or some oil, should be injected into the bowels. Strong hot coffee should be given freely. The patient should be moved about briskly, and not allowed to sink into a state of stupor. He may be supported between two men and

made to walk about for hours. The limbs should be rubbed, and if symptoms of apoplexy come on with any heat of skin, some blood may be taken from the arm.

The most common IRRITANT vegetable poisons are *monk's-hood*, *meadow saffron*, *euphorbium*, *hellebore*, *savine*, and the *spurred rye*. The general effects are heat and dryness of the mouth and throat, vomiting and straining after the stomach is empty, purging, severe pain in the belly, with appearances at first resembling intoxication, and afterwards apoplexy. If the person has vomited, he should drink thin gruel or warm water freely. If not, an emetic should be given. Strong coffee is useful after all the poison has been got rid of by the emetic and large injections of warm water.

After the immediate effects of poison have gone off, inflammation of the stomach and bowels is very likely to follow the action of irritant poisons, either mineral or vegetable. The treatment under such circumstances must be the same as for simple inflammation of the bowels. (See INFLAMMATION.)

POULTICE. (See ABSCESS.)

QUINSEY. (See SORE THROAT.)

RETENTION OF URINE. (See STRICTURE.)

RHEUMATISM or RHEUMATIC FEVER is common among seamen. The causes are exposure to cold and wet, especially when perspiration is thus suddenly

checked. In hot climates, exercise under a powerful sun, followed by repose in the shade or some damp place, or exposure to a cold wind, is very apt to produce rheumatism. Chilliness and shivering come on, followed by flushes of heat and pain in some of the larger joints. The affected joint swells and becomes very red and painful. The patient is restless, hot, and thirsty, and the pulse is hard and full. This state is called rheumatic fever. One of the purgative powders should be given, and repeated after four hours if necessary, the patient being supplied with warm tea or barley-water to drink, and kept warm in bed to encourage perspiration. Then one of the emetic powders should be thoroughly mixed with two scruples of Dover's powder, and the mixture divided into eight equal portions, one of which should be given every four hours. Half a teaspoonful of carbonate of soda may also be given with each dose. With quiet and low diet, a rheumatic fever will generally cease under this treatment in a few days. The joints may be fomented from time to time and kept covered with flannel. Should pain in the left side of the chest come on, with difficulty of breathing and beating of the heart, two grains of calomel and five grains of Dover's powder should be given every three hours until the mouth becomes sore. A blister should then be applied to the left side. This treatment is very likely to be necessary in severe rheumatic fever.

Sometimes, without any fever, joints become stiff and painful occasionally, and the patient is said to be rheumatic; or the pain and stiffness affects the back

and loins, and he is then said to suffer from *lumbago*, or *sciatica* when the pain extends down the back of the thigh. In such cases the bowels should be kept open, the parts affected kept warm by flannel, and a liniment of olive oil and liquid ammonia, in equal parts, or of oil and spirits of turpentine, may be well rubbed over them every night. Laudanum may be added to the liniment when the pain is severe, and ten grains of Dover's powder given. A medical man should be consulted at the first port.

RUPTURE is a protrusion of a portion of one of the bowels out of the belly. It generally takes place during some violent exertion, and the most common situation of the protrusion is about the groin or the top of the thigh. The gut most frequently passes by the side of the vessels which lead to the testicles. Some pain is felt at the time of the accident, and a swelling is observed, which increases in size when the person stands, and goes away when he lies down and presses upon it. It may also be felt to distend when he coughs. The rupture may take place on one side or on both, and the person must wear a single or a double truss, accordingly. Those supplied may not fit very exactly; if so, one that does should be procured from a truss-maker as soon as possible.

Before applying a truss the person should lie down, and the rupture should be pressed up into the belly. When a single truss is used, the long moveable pad is placed over the spot where the bowel re-enters the belly above, but not pressing on the bone, and the

ring is passed around the opposite hip, the round or fixed pad resting on the spine behind. The ring may be lengthened or shortened by means of the screw upon either pad. Some chafing or uneasiness will be felt for a few days, but it soon goes off when the truss fits well. It should be worn continually. In many cases of rupture a simple and safe operation may be performed by a surgeon, which is called the *Radical Cure*, and which renders a truss unnecessary afterwards.

The trusses generally supplied to ships are those known as Salmon and Ody's. They have been lately improved by Mr. Ody, so that instead of being only adapted for the right or left side, they are made to fit either side by merely shifting the pad. They are sold at a very low rate—about three shillings each. They must, however, be merely regarded as of temporary utility; and, as it is of the utmost importance that a truss should fit perfectly well, as soon as a ruptured man arrives at a large port, he should go to the best truss-maker in the place, and have a good instrument made to his exact measure. The trusses I have found most safe and comfortable to seamen, and those least interfering with the various movements of the body, are made with a pad behind, and a spiral spring in the front part, by most instrument makers, on the plan of the expired patent of the late Mr. Coles, Charing-Cross, London. They are more expensive than many other descriptions of trusses; but a man with rupture should spend his first savings in the purchase of safety and comfort.

Sometimes a rupture comes down and cannot be returned into the belly. This is a most dangerous state of things if attended by pain, confinement of the bowels, and sickness, and when it occurs every possible means should be used to obtain medical advice. When at sea, or out of all reach of a surgeon, the patient should lie upon his back, with the head and shoulders raised, and the thighs bent upwards towards the belly. If this does not succeed, cold spirit and water should be applied on a piece of thin linen, and a current of air blown over it by a pair of bellows or a fan, the linen being wetted as often as it dries. This produces extreme cold, which may be kept up for an hour or two before fresh attempts to return the gut are made. This plan is often successful, and may be assisted by injecting warm water into the bowels. Some persons have succeeded in replacing a rupture, by placing the patient with his heels in the air and head downwards before making attempts at replacement. When the gut is returned, some inflammation of the bowels may come on, and require the use of fomentations to the belly, with five grains of Dover's powder every three or four hours, until the symptoms subside. Purgative medicines are very dangerous to persons in this condition.

If all the above attempts to reduce a rupture fail, all that can be done in the absence of a surgeon is to keep the patient perfectly quiet in bed, and on low diet, giving ten-grain doses of Dover's powder from time to time, as pain may come on.

SCARLET FEVER, or SCARLATINA, is fever attended with extreme redness of skin and sore throat. The treatment is that of continued fever. (See FEVER.) Gargles for the throat will be found useful, made of warm vinegar and water, or of a drachm of alum to a pint of water.

SCURVY, though much less common than formerly, is still occasionally met with. Men who are kept on bad or insufficient food, without a proper supply of vegetables, become weak, and blue spots appear about the legs and body generally. The breath is unpleasant, the gums spongy, with a tendency to bleeding. Old sores break out again. The men are dispirited and listless.

The first object of treatment is to get a supply of fresh provisions as soon as possible, to clothe the men warmly, and to cheer their spirits by encouraging amusements among them. In the absence of fresh vegetables, lemon juice should be regularly served out, or lemonade made with citric acid, in the manner directed at page 200 in this edition. Lemon juice is so easily adulterated, and when good is so liable to spoil, that it would be far better to oblige vessels to carry citric acid instead of lemon juice. Extensive trials have been made in convict ships of the relative value of citric acid and lemon juice in the treatment of scurvy, and the evidence leads to the conclusion that citric acid is far preferable. It is made from lemon juice, and is simply the acid of the juice in its

pure state. It will keep any length of time, and adulteration is easily detected.

When neither lemon juice nor citric acid can be obtained, sugar and vinegar should be given freely, or ten grains of saltpetre three times a day. Any pickles or preserved fruits which may happen to be on board should be used, and malt liquor is especially useful. Oatmeal with treacle, rice, and vegetable food generally should be allowed freely, and an extra quantity of mustard or pepper. If the water is impure it should be carefully filtered, or strained from one tub to another, and exposed to the air until it is sweet, before it is served out.

Sea Sickness may be troublesome among passengers. The only relief to them is to be swung in a hammock in an airy place, and eat sparingly of boiled rice or other simple food until the stomach recovers itself. A draught of half a drachm of carbonate of soda, effervescing with a scruple of citric acid, will often allay vomiting, and remain on the stomach when nothing else can be taken.

Smallpox is a fever attended by eruption. The eruption does not appear until the third or fourth day of the fever, and it is not until the fifth or sixth that the pock is so formed that the disease is to be recognised by unprofessional persons. On the eighth day the pock is full of matter, and then it begins to dry. The scab does not fall before about the fifteenth to the twentieth day.

The treatment is exactly that recommended for contined fever. Ventilation, cleanliness, simple food, and plenty of drinks, without wine or spirits, will be all that is required in ordinary case. (See FEVER.) If the eyes become inflamed, they should be frequently bathed in tepid water. When the tongue and mouth are affected, gargles of weak vinegar and water, also tepid, may be used.

SORE THROAT.—During a common cold the throat is apt to become sore, and there is a difficulty of swallowing. The same thing may occur at any time from exposing the neck to a draught of cold air, and be attended by feverishness and swelling within the throat and beneath the ears. This is called *Quinsey*. In either case the wet bandage is the best remedy. A handkerchief is folded, wetted with cold water, and tied like a cravat round the neck; over this two or three layers of thick flannel are fastened. The cold sensation only lasts for a minute or two, and is succeeded by a glow of heat and perspiration from the neck. This alone will often cure a simple sore throat in one day. It is well to wear the flannel alone for a day or two longer. A dose of opening medicine, and gargles of warm vinegar and water, or of alum and water, a drachm to a pint, are useful in more advanced cases. Breathing the steam of hot water, by holding the head over a jug, often gives relief. The person should be fed by strong broths, arrow-root, &c., if he becomes weak for want of food.

SPITTING BLOOD. (See *Bleeding*.)

SPRAIN.—When a joint is twisted or overstretched, considerable pain and swelling may come on, and some weakness and stiffness of the joint may remain for a long time afterwards.

Perfect rest of the injured joint is necessary. Fomentations with hot water and flannel, followed by a large bread poultice, should be used. When there is much redness and swelling, leeches should be procured if possible. When pain and redness have gone off, weakness and stiffness remaining, the joint may be rubbed night and morning with a liniment composed of equal parts of olive oil and spirits of turpentine.

STARVATION.—When men have been without provisions for a length of time, and are found in a state of exhaustion, it would be very dangerous to give them a full meal at once. Food must be given very gradually. A little water, followed by milk and water, weak soup, and well-boiled rice, or some thin gruel, should be given, or a little warm wine and water very weak. They should be kept warm, dry, and quiet; and solid food may after a time be given.

STINGS. (See *Bites*.)

STRICTURE.—A stricture can only be treated by a medical man, but its most serious effect, a retention of urine, or *stoppage of the water*, as it is called, may

occur when far from medical treatment. After hard drinking, exposure to cold, or injury, the same retention may occur. The water only comes away in drops, and with much pain and straining. The person should sit in hot water, and should take twenty drops of laudanum, with an ounce of castor oil. If this does not succeed, fifty drops should be injected into the bowels, with half a pint of hot water; and ten grains of Dover's powder may be given every two hours, until the patient sleeps, a large hot poultice being applied all round the lower part of the belly and between the thighs. Most likely the water will run off soon after sleep comes on; if it does not, or if it merely dribbles away, leaving pain and swelling at the lower part of the belly, the elastic catheter should be passed if possible. It is oiled and pushed gently and gradually along the penis into the bladder. The water will run through it as soon as the extremity enters the bladder. If the stricture is so tight that the catheter will not pass, all that can be done is to trust to the warm bath, and the injection of laudanum into the bowels, as before directed, every four or six hours. None of the means a surgeon could use to empty the bladder could be safely employed by an uninstructed person.

SUFFOCATION.—Under the heads CHOKING, DROWNING, and HANGING, three modes of suffocation have been considered. In all of these persons are suffocated by being deprived of air. The same effects follow to a great extent when, instead of air, certain noxious gases enter the lungs. A supply of pure air is ne-

cessary for life, and if this supply is cut off the person is suffocated. When charcoal is burned in a closed place, or when a room becomes filled with smoke from burning wood or coals, a man breathing in the place runs great risk of suffocation. There is the same danger in descending into an old well, or going into a drain or sewer; the person has no pure air to breathe, and is suffocated.

The treatment of a suffocated person is the same in all these cases. He is to be removed as soon as possible into the pure air, the clothes removed from the neck and chest, and the face and chest dashed with cold water. The chest should be expanded in order that pure air may enter the lungs, as described under the head DROWNING. The limbs should be rubbed, liquid ammonia held to the nose, and a mustard emetic got into the stomach as soon as possible.

When one man goes to fetch another from any place where suffocation has happened, he should have a rope round his waist, by which bystanders can pull him out in case he himself should become affected by the noxious gases.

SUN-STROKE.—The effects of the direct action of a hot sun upon the head, as observed in warm climates, are those either of apoplexy or of inflammation of the brain. (See APOPLEXY, INFLAMMATION.)

SYPHILIS.—One of the effects of impure connection is gonorrhœa. (See GONORRHŒA.) Another is the formation of small pimples upon the end of the penis,

which form a little watery head, burst, and then leave a sore. These sores are often accompanied by bubo. (See BUBO.) The parts must be kept thoroughly clean by frequent washing. The prepuce and gland must be separated by keeping a piece of fine lint between them. When the sore has formed, a little calomel should be sprinkled over it, and upon this the piece of lint should be placed. The calomel may be washed off every night, and reapplied until the sore heals. The diet should be low, no spirits or wine being taken. A dose or two of opening medicine will prove useful, but it is not necessary to take mercury. Extensive experience has proved that although after-consequences are more frequent when mercury has not been taken than when it has, still these consequences are on the average much less severe. In other words, although a person who takes mercury diminishes his chance of suffering from after-consequences, or what are called secondary symptoms, still, if these symptoms do appear, they are more likely to be severe and obstinate than in a person who has taken no mercury.

The usual order of secondary symptoms is, first sore throat, then some eruption on the skin, this being followed by pains in the legs, with swellings on the shins, and sometimes by inflammatiou of the eyes. The bones of the head and face may afterwards suffer. It may take months or years before these symptoms have run their course. After any of these have appeared a medical man should be consulted, as he would in all probability order the iodide of potassium to be taken in doses of four to eight grains three times a

day. This medicine is not in the list supplied to merchant vessels generally, but may be procured at most considerable ports.

TOOTHACHE may often be relieved by cleaning out any hollow place in the aching tooth, and filling it with a small piece of lint moistened with laudanum, or with Burnett's solution of chloride of zinc. If a tooth often aches, it had better be drawn at the first port. A hollow tooth may often be kept easy by filling it with common wax from a candle. This keeps food, air, or saliva, from the sensitive part of the tooth.

ULCERS.—The ulcers most common and troublesome among seamen are sores which form on the legs after wounds or bruises, or over swollen veins. They often heal and break out again, especially in those who drink freely, and in persons enfeebled by improper food.

When there is much pain in an ulcer, with redness and swelling around it, the man should be kept to his hammock for a few days, the sore being covered by wet lint, over which a piece of oiled silk is fastened by a handkerchief. The longer the leg is kept at rest, the sooner the ulcer heals. When the man gets up, the water dressing may still be continued, or long strips of adhesive plaster may be passed round the leg, covering and pressing upon the ulcer and supporting it. If the raw flesh arises above the level of the surrounding skin, it should be touched with caustic. When the sore is healed, it should be protected by a pad of soft leather until the scar is quite firm.

VACCINATION.—Every man who has not been vaccinated, or who has no distinct marks of vaccination on the arm, and has not suffered from smallpox, should be immediately vaccinated. Two charges of vaccine matter will be found in the chest, and it may be procured in most ports. In places but little visited, especially on the west coast of Africa, masters of vessels might do a great deal of good by vaccinating one or two persons, and teaching some intelligent native to repeat the operation.

A lancet or sharp knife is passed beneath the skin, merely to raise the outer skin, and just draw blood. Not so much as a drop need flow. It is only necessary to raise the outer skin completely. The two glasses between which the matter is preserved are separated. The matter is slightly moistened by breathing on the glass. The point of the lancet is passed over the surface of the glass, slightly scraping, so that a little matter may remain above the point. It is then again put beneath the skin at the spot where it was raised just before, and left for a few seconds, so that a little matter may remain. Sometimes this matter is supplied on little points of ivory, which are placed in the puncture made by the lancet and left for a minute or two. A pimple forms which becomes filled with matter on the eighth day. It may then be pricked in three or four places, and the matter preserved by pressing little pieces of glass upon the pimple, and keeping the glasses in pairs. Or a person may be vaccinated with the fresh matter taken from one arm to another on the point of the lancet.

VEINS SWOLLEN.—Sometimes the veins about the legs swell into tumours of considerable size. They are best supported by a pad and a roll of common bandage, tape, or list, by strong elastic stockings or India-rubber bandage. They may burst and bleed to a dangerous extent, but pressure will easily stop the flow of blood. (See BLEEDING.) Troublesome sores aften form over the swollen veins, and they must be treated as ordinary ulcers, the vein being supported at th‹ same time by a bandage. (See ULCERS.)

VENEREAL DISEASE. (See BUBO, GONORRHŒA, SYPHILIS.)

WARTS are most easily removed by soaking them in hot water, cutting off the thickened skin to a level with the surrounding parts by a pair of scissors, and applying caustic to the spot. The stick of caustic is to be moistened with water and rubbed three or four times over the place. A black, dense skin forms, which may be pulled off as it becomes loose, and the caustic applied again.

WHITLOW is a very common complaint amongst seamen. It is inflammation at the end of the fingers near the nails, attended with some swelling and redness. It is extremely painful. It sometimes appears without any obvious cause; but more frequently a blow on the nail, warming the hands at the fire when they are very cold, or injury to the finger by a splinter or nail, excites the inflammation.

When the inflammation is not deep, matter is seen to form by the side of the nail, the outer skin alone covering it. In this case the raised skin covering the matter should be cut away by a pair of scissors, and wet lint applied, covered by a piece of oiled silk. Should reddish flesh shoot up in a cauliflower form, it should be touched with caustic, and dry lint afterwards used as dressing. The nail is often destroyed, and gradually replaced by a new one.

When the inflammation is deeper, the pain is very acute; the finger swells, and the swelling often extends to the hand and arm. Under these circumstances the hand should be well soaked in hot water, poultices applied, and a deep cut made at the most tense and painful part of the finger, quite down to the bone. The cut should be made either at the back or front of the finger (not at the sides), and in the long direction, or from joint to joint (not across).

Sometimes severe inflammation comes on at the side of the great toe, owing to the edge of the nail growing into the flesh. The best treatment is to scoop away the back of the nail at the centre, along its whole length, until it is quite thin. This allows the edge to turn upwards and outwards. Immediate pain may be relieved by soaking the foot in hot water, cutting away the offending piece of nail, and pressing a small piece of lint between its edge and the flesh; but the only permanent cure is the thinning of the centre of the nail, and avoiding tight or ill-made shoes. The inner side of the sole of a boot or shoe should always be straight, never cut away outwards to make a

pointed end to the shoe. When proud flesh forms, it should be touched with caustic.

WORMS.—The small thread-worm, the round worm, and the tape-worm are the varieties of worms which most commonly infest the bowels of seamen. The former exist in large numbers in the same person; the latter is generally alone. The thread-worm resembles a piece of fine thread about half an inch long; the tape-worm is often many yards in length, and is formed of a number of pieces joined together, each portion resembling a piece of tape about half an inch long.

Wholesome food and temperance are the best preventives of worms. The most efficacious medical treatment for the small thread-worm is an injection into the bowels of half a pint of barley-water, in which an ounce of spirit of turpentine has been mixed up. One or two repetitions of this injection, on alternate days, will always destroy these creatures, and relieve the itching they produce.

A round worm, very much like the common earth-worm, is often observed in seamen who drink the water from marshy lands, especially that draining from the paddy fields in the East where rice is grown. The treatment is the same as for tape-worm.

The only certain sign that a tape-worm exists in the bowels of a person is the presence of portions of it in the motions. When these are seen a dose of spirit of turpentine and castor oil should be taken, from half an ounce to an ounce of each. The dose should be taken after some hours' fast—early in the morning, for exam-

ple—and the person should remain quiet for an hour or two afterwards, as the dose is apt to produce vomiting. The worm is generally expelled a few hours after taking the medicine. Should this not occur, the dose should be repeated on the following day.

WOUNDS.—The treatment of wounds varies with the nature of the injury. Parts may be simply divided by a clean cut, or they may be bruised and cut at the same time, scratched or torn, and lastly, pricked or punctured. In all these cases, the first object is to free the parts from any dirt, splinters, portions of clothing, or other foreign substances which may be observed. This is done by a sponge and water. Then bleeding must be stopped. (See BLEEDING.) The injured part should be kept quiet. If the wound is about the body, or extensive, the patient should keep in bed. If on the arm, a sling should be used ; and if on the leg, the limb should be supported, so that the ankle is rather above than below the level of the hip.

A clean cut should be treated by bringing the edges of the cut close together, and keeping them so by adhesive plaster. The plaster is cut into narrow strips, and warmed. One end of a strip is applied to the skin on one side of the wound up to its edge. The other edge of the wound is then pressed so that the two lie close together, and the loose end of the plaster brought down on it. Other strips are applied in the same way, until the whole wound is covered, with the exception of one or two spots where matter may escape

if it should form. The plaster need not be removed until it becomes loose, unless pain or swelling should come on. If adhesive plaster is not at hand, the wound is closed by pressing the edges together, and a piece of linen wound round the part. This often answers quite as well as the plaster; for some blood oozes upon the linen, and causes it to adhere to the skin as firmly as sticking-plaster. If pain and swelling appear, the dressings should be loosened, and the injured part bathed in warm water. When much matter is discharged, the parts must be kept very clean, and covered with wet lint.

A bruised wound is best treated by covering it with lint wetted with cold water—oiled silk being placed outside the lint to keep it moist. If bruised parts mortify, warm poultices are the best application until the dead flesh separates from the living; the wet lint and oiled silk being afterwards used. Should the new flesh rise above the level of the healthy skin, it should be touched with caustic.

Scratches and tears should be managed in the same manner.

The most common punctured wounds are pricks by splinters, thorns, nails, &c., and stabs by some kind of knife, sword, or bayonet. In all such wounds, it is better to apply poultices, or wet lint and oiled silk, than to use sticking plaster. The splinters may not be all removed, or the nail may have been rusty, and inflammation is excited; matter forms, and it should escape freely. It is often necessary to enlarge the wound to make a free passage for matter. A stab is

very likely to heal externally while matter forms at the bottom. This should be prevented by keeping a small piece of lint between the edges of the wound until all discharge has ceased.

A gun-shot wound is to be treated precisely as a bruised or torn wound. If the bullet is easily felt, it should be extracted if possible by a piece of bent wire or by making a cut upon it if it is at some distance from the orifice. But it is better to leave it than to disturb or injure sound parts extensively in order to remove it. Bullets often remain for years in the body perfectly harmless.

The wounds made by venomous reptiles, insects, &c., will be found under the head BITES.

Should locked jaw or violent spasms of the body come on after wounds, it will be necessary to keep the patient perfectly quiet and very warm. It is better not to disturb him even to give medicine. If the spasms are very painful, chloroform is the best remedy; or twenty drops of laudanum, or ten grains of Dover's powder, may be given every hour. But, on the whole, it is doubtful whether any known medicine does any good, and it is better to trust to warmth and quiet. The wound must be thoroughly cleansed, and kept clean. Careful search should be made about it for splinters, or other irritating substances, and any which are found must be instantly removed; beyond this everything is to be sacrificed to the mainstays of the non-medical reader—warmth and rest.

SCALE

OF

MEDICINES AND MEDICAL STORES

Suitable to Accidents and Diseases arising on Sea Voyages, to be kept on board British Merchant Ships navigating between the United Kingdom and any place out of the same, on and after the 1st day of January, 1856.

Issued by the Board of Trade, in pursuance of 17 and 18 Vict., chap. 104, section 224.

Names of Medicines, Medicaments, &c.	Proportions for Ships carrying the undermentioned number of Men and Boys.		
	Column 1. — 10 and under.	Column 2. — From 11 to 20, inclusive.	Column 3. — 21 and upwards.
Castor Oil	1 lb.	2 lbs.	3 lbs.
Epsom Salts	3 „	6 „	12 „
Calomel	.....	1 oz.	2 ozs.
Powder of Jalap	.....	1 „	2 „
Do. Rhubarb	1 oz.	2 „	3 „
Cream of Tartar	2 „	4 „	8 „
Sulphur (sublimed)	4 „	6 „	8 „
Alum	1 „	2 „	3 „
Powdered Ginger	1 „	2 „	3 „
Sulphate of Quinine	½ „	1 „	2 „
Do. do. in vessels trading to the East or West Coast of Africa, to the Coasts of China, and Borneo	1 „	2 „	4 „
Balsam of Copaiba	4 „	8 „	12 „
Carbonate of Magnesia	2 „	3 „	4 „
Olive Oil	.....	8 „	12 „
Spirit of Turpentine	2 „	4 „	6 „
Laudanum	2 „	4 „	8 „
Bicarbonate of Soda	.....	12 „	16 „
Tartaric Acid (powdered)	.....	8 „	12 „
Goulard's Extract	1 „	2 „	4 „

Names of Medicines, Medicaments, &c.	Proportions for Ships carrying the undermentioned number of Men and Boys.		
	Column 1. — 10 and under.	Column 2. — From 11 to 20, inclusive.	Column 3. — 21 and upwards.
Compound Chalk Powder (in a stoppered bottle)	1 oz.	2 oz.	3 oz.
Dover's Powder	1 „	2 „	3 „
Essence of Peppermint, each ounce to contain one drachm of the Oil	1 „	2 „	3 „
Purging Pills, each to contain of the Compound Extract of Colocynth 4 grains, and Calomel 1 gr.	3 doz.	6 doz.	8 doz.
Purging Powders, each to contain of Calomel 2 grains, and Compound Powder of Jalap 1 drachm	1 „	2 „	3 „
Opium Pills, each to contain of Opium 1 grain, and Castile Soap 4 grains	1 „	2 „	3 „
Emetic Powders, each to contain Ipecacuanha 1 scruple, and Emetic Tartar 2 grains	1 „	2 „	3 „
Blue Pills, 5 grains each	2 „	3 „	4 „
Powders, sudorific, 10 grains of Nitre, 10 grains of Cream of Tartar, and 5 grains of Dover's Powder	1 „	2 „	3 „
Simple Ointment	6 ozs.	12 ozs.	16 ozs.
Mercurial do.	2 „	4 „	8 „
Basilicon do.	3 „	6 „	10 „
Blistering Plaister	„	4 „	8 „
Adhesive do. (in tin case)	1 yard.	2 yds.	3 yds.
Disinfecting Fluid (Solution of the Chloride of Zinc)	14 pints.	28 pints.	56 pints.
Tincture of Rhubarb	4 ozs.	10 ozs.	12 ozs.
Opodeldoc	3 „	6 „	10 „
Paregoric	4 „	6 „	8 „

Names of Medicines, Medicaments, &c.	Proportions for Ships carrying the undermentioned number of Men and Boys.		
	Column 1. — 10 and under.	Column 2. — From 11 to 20, inclusive.	Column 3. — 21 and upwards.
THE FOLLOWING IN ADDITION IN ALL VESSELS CARRYING A SURGEON, WITH 50 OR MORE PERSONS ON BOARD:			
Spirit of Nitric Ether	.....	.....	2 ozs.
Acetate of Lead	.....	.....	2 „
Croton Oil	.....	.....	2 drms.
Camphor	.....	.....	1 oz.
Tartar Emetic	.....	.....	½ „
Hydriodate of Potass (Iodide of Potassium)	.....	.....	2 „
Ergot of Rye	.....	.....	2 „
Tincture of Digitalis	.....	.....	2 „
Powder of Ipecacuanha	.....	.....	1 „
Sulphate of Zinc	.....	.....	1 „
Lunar Caustic	.....	.....	1 „
Muriate of Morphia	.....	.....	1 drm.
Watery Extract of Aloes	.....	.....	1 oz.
Blue Pill	.....	.....	1 „
Aromatic Confection (in powder)	.....	.....	2 „
Prepared Chalk	.....	.....	½ lb.
SCALE OF MEDICAL STORES AND NECESSARIES:			
Arrowroot	1 lb.	2 lbs.	4 lbs.
Pearl Barley	2 „	4 „	8 „
Rice	4 „	8 „	12 „
Lint	¼ „	½ „	¾ „
Sponges	1 oz.	1½ oz.	2 ozs.
Scales and Weights	1 set.	1 set.	1 set.

Names of Medicines, Medicaments, &c.	Proportions for Ships carrying the undermentioned number of Men and Boys.		
	Column 1. — 10 and under.	Column 2. — From 11 to 20, inclusive.	Column 3. — 21 and upwards.
Graduated Drop Measure	.....	1 No.	1 No.
Scissors	.....	1 pair.	1 pair.
Syringes	2 No.	2 No.	2 No.
Lancets	2 „	2 „	2 „
Bandages of different sizes	.....	6 „	6 „
Calico	3 yds.	4 yds.	6 yds.
Flannel	2 „	3 „	6 „
Needles, Pins and Thread	.....	1 paper.	1 paper.
Splints, common	1 set.	1 set.	1 set.
Trusses, single, 36 inches in girth	1 No.	1 No.	1 No.
Pestle and Mortar	1 „	1 „	1 „
Enema Syringe, with printed Directions for Use	1 „	1 „	1 „
Tile	.....	1 „	1 „
Funnel	.....	1 „	1 „
Pewter Cup, small	.....	1 „	1 „
Teaspoons, Pewter	.....	1 „	1 „
Spatula	.....	1 „	1 „
Bougies	1 set.	1 set.	1 set.
Tape	1 piece.	1 piece.	1 piece.
Catheter	1 No.	1 No.	1 No.

NOTE 1.—Section 224 of the "Merchant Shipping Act, 1854," contains the following provisions, viz.:—"The following rules shall be observed with respect to medicines, medical stores, and anti-scorbutics; that is to say: (1.) The Board of Trade shall from time to time issue and cause to be published a scale of medicines and medical stores suitable to accidents and diseases arising on sea voyages. (2.) The owner of every ship navigating between the United Kingdom and any place out of the same, shall provide, and cause to constantly kept on board such ship, a supply of such medicines and medical stores in accordance with the said scale. And if, in any such ship as aforesaid, such medicines, medical stores, lime or lemon juice, or other articles, sugar and vinegar, as are hereinbefore required, are not provided and kept on board, as hereinbefore required, the master or owner shall incur a penaltry not exceeding twenty pounds; and if the master of any such ship as aforesaid neglects to serve out the lime or lemon juice,

or other articles, sugar or vinegar, in the case and manner hereinbefore directed, he shall for each such offence incur a penalty not exceeding five pounds; and if any master is convicted in either of the last-mentioned penalties, and it appears that the offence is owing to the act or default of the owner, such master may recover the amount of penalty, and the costs incurred by him, from the owner.

NOTE 2.—In ships employed trading solely between places in Europe, or between places on the shores of the North Atlantic or Mediterranean, and in ships employed in the Greenland or Baffin's Bay trade, or in any of the Northern Fisheries, the proportion of the various articles above mentioned need not exceed the proportions mentioned in the second of the above columns, notwithstanding that the number of men and boys may exceed 20.

NOTE 3.—Passenger ships which are certified under the 44th section of the "Passengers' Act, 1855," to be duly supplied with medicines, need not be also provided with medicines or other articles according to the above scale.

DIRECTIONS

FOR THE USE OF THE MEDICINES IN THE SCALE, THEIR DOSES, AND THE MODE OF ADMINISTRATION.

THE order of the scale is not followed, the medicines being arranged in classes according to their properties, as follows:—1. Purgatives; 2. Sedatives; 3. Salines; 4. Astringents; 5. Carminatives; 6. Emetics; 7. Specific Medicines; 8. Antidotes for Poisons; 9. External Applications; 10. Deodorizer and Disinfectant.

Directions are added for the preparation of diet for the sick, and for the use of the articles which accompany the medicines.

It has not been thought desirable to add any remarks upon the medicines which are only supplied to ships carrying a surgeon.

PURGATIVES.

Castor Oil.

This is the mildest and safest of the purgatives. The dose is one or two table-spoonfuls for an adult. The best way of giving it is to put two table-spoonfuls of water into the graduated wineglass, shake it round so that the glass is wetted and the oil will not adhere to the glass, then pour in the oil from the bottle upon the top of the water until it reaches the line which marks the dose required. If the oil be poured

gently over the back of the tongue and swallowed quietly, it is not very disagreeable, and the water following it clears the mouth. Some persons prefer taking castor oil floating on the top of a cup of coffee, and others put a few drops of essence of peppermint into the water in the wineglass before adding the oil. Either plan may be adopted; but if castor oil is known to make a person sick, some other purgative had better be chosen.

Epsom Salts.

This is the most familiar purgative to sailors. It is efficient and generally safe. The common dose is an ounce. The action is quicker and accompanied by less griping, if a large basin of warm tea be taken soon after the medicine. It is better also to dissolve the salts in a large glass of water, as a strong solution is apt to irritate the stomach and bowels. In cold, damp weather, or when there is much pain in the bowels, or anything wrong about the bladder, it is better to give castor oil, or two of the purging pills, than Epsom salts.

Calomel.

This is a purgative in doses of from two to five grains. A little moist sugar should be put into a teaspoon, the calomel weighed and mixed with the sugar, and the person is to swallow both together. It should not be given in water or any fluid, as it does not dissolve, but sinks to the bottom of the fluid, and probably remains in the glass. It is a good plan in warm climates to give three or four grains of calomel at night, and a dose of castor oil or Epsom salts in the morning, when a purgative is required.

Purging Pills.

These are very safe and effectual pills. Two or three may be taken at bedtime, and they will generally cause two or three free motions on the following day, without pain or griping. It is always well after taking these pills, or any other purgative, to drink freely of warm tea, and to eat less meat than usual until the action is over.

Purging Powders.

These are strong purgatives. One of them will generally produce free, watery purging a few hours after being taken. Put the powder into the wineglass with a little sugar, and add water until the mixture is rather thinner than treacle, then it may be swallowed, so that all the powder is certainly taken. It is necessary to be careful, because the calomel contained in the powder is likely to be left in the glass.

Powder of Jalap

Is a purgative in doses of twenty or thirty grains. It is apt to gripe, and therefore should be taken with twenty drops of the essence of peppermint. The purging powders are better than simple jalap, when no objection exists to giving calomel.

Powder of Rhubarb

Is a milder purgative than jalap. About twenty grains, with the same quantity of magnesia, forms a useful medicine in cases of heartburn.

SEDATIVES.

Laudanum.

This is both for external and internal use. Directions for using it will be found under the heads DIARRHŒA, SPRAINS, RHEUMATISM, EAR-ACHE, and TOOTHACHE; and if a person takes an over dose the mode of treatment is to be found under the head POISONS. Twenty drops are about equal to one of the opium pills, but the pills are safer, as unpractised persons are likely to make mistakes in measuring drops.

Dover's Powder.

This is a sedative like laudanum, but it also produces perspiration, and is followed by more refreshing sleep and less headache than laudanum or opium taken alone. The dose is from five to fifteen grains. Ten grains is the average

dose for an adult. It is very useful when a cold in the head is coming on, or cough and cold are troublesome. It should be taken in the same way as the purging powders, and warm drinks taken afterwards.—See COUGH, COLD, RHEUMATISM.

Opium Pills.

Each pill contains one grain of opium—an average dose for an adult. The soap is added to keep the pill moist. If opium is not mixed with soap it becomes very hard, and the stomach probably will not dissolve the pill; but when well prepared with soap the pills will keep good and soft any length of time. One of them may be taken whenever it is necessary to relieve severe pain, or procure sleep.

SALINES.

Bicarbonate of Soda.

This is useful in some cases of heartburn and indigestion, in doses of ten or twenty grains, dissolved in water; but its chief one is, with

Tartaric Acid,

to form a pleasant cooling drink in feverish cases. Dissolve twenty-five grains of carbonate of soda in one or two wine-glassfuls of water, in one tumbler, and twenty grains of tartaric acid, in the same quantity of water, in another tumbler. When the person is ready to take the draught, pour the fluid from one tumbler into the other, and a pleasant effervescing glass of soda-water is formed, which is very useful in many kinds of fever and inflammation.

Citric or Lemon Acid.

This is the acid of lemon-juice. It is not ordered in the scale, but masters are recommended to take a supply as directed in the scale of 1851. It is prepared from lemon-juice, and contains all the useful matter of the fresh juice. Thirty-six grains of this acid and one ounce of water answer every purpose of an ounce of pure lemon-juice. Twenty grains dis-

solved in a pint of water, with a few lumps of sugar, form a pleasant, refreshing lemonade. At present all merchant-ships must take lemon-juice, in compliance with the Act of Parliament; but it is probable that under the new regulations this acid will be substituted for lemon-juice, as it will keep any length of time, and adulteration can be readily detected. The lemon-juice at present supplied even to the navy, and of course even more so to merchant-ships, will seldom keep good very long, and it is so unpleasant that the men will not take it willingly. It is also very often adulterated, and it is never of uniform strength. These evils are avoided by the use of citric acid; and the increased expense is more than compensated by the certainty that it will keep good any length of time. The quantity at present ordered is not calculated to supply the place of the lemon-juice, but merely to form a refreshing drink in fevers, and to be given in scurvy, if the lemon-juice on board is not good. Surgeons of convict-ships have proved that citric acid has all the good effects of lemon-juice in scurvy.

Sulphur.

This is a mild purgative in the dose of one or two teaspoonfuls; but it is placed here rather as a cure for itch.—See ITCH. It is to be mixed up with equal proportions of olive oil and simple cerate, so as to form a soft ointment.

Cream of Tartar.

This is also a mild aperient, and twenty or thirty grains, mixed with an equal quantity of sulphur, is a safe and useful medicine in cases of piles.—See PILES. Half an ounce of cream of tartar, with from two to four ounces of sugar, and three or four pints of boiling water, form a very pleasant drink, called *Imperial.* A little ginger may be added in some cases. This drink, when cold, is very grateful to persons suffering from fever; and if it produce no purging, may be given in any quantity with safety and advantage.

ASTRINGENTS.

Alum.

This is useful to stop bleeding.—See BLEEDING, PILES, SPITTING BLOOD. In the strength of from two to four grains, dissolved in an ounce of water, it is a very useful eye-lotion, and also an excellent injection in cases of gleet.—See OPHTHALMIA, VENEREAL DISEASE. A drachm, dissolved in half a pint of water, forms a useful gargle.—See SORE THROAT. In some cases of dysentery, or obstinate diarrhœa, alum whey is very useful. It is made by boiling a quarter of an ounce of powdered alum in a pint of milk, and then straining. A wineglassful of the clear liquid is a dose. See DIARRHŒA, DYSENTERY.

Compoumd Chalk Powder.

This is very useful in some cases of diarrhœa, in doses of twenty grains, mixed up in a wineglassful of water. A few drops of laudanum, or essence of peppermint, are sometimes added.—See DIARRHŒA.

CARMINATIVES.

Essence of Peppermint.

This is useful in doses of five to ten drops, taken in water, or upon a lump of sugar, in some cases of pain in the stomach depending upon flatulency, or what is called "wind on the stomach."

Powdered Ginger.

Useful in flatulency, pains in the stomach, &c. The dose is ten or twenty grains, mixed up into a paste with a little water, and then more water being added; or it may be thrown into hot negus.—See DIARRHŒA; CHOLERA.

EMETICS.

Emetic Powders.

Mix up one of these powders in a glass of water, and let the person who should be made sick take half the mixture and then drink half a pint of warm water. If he is not sick in ten minutes let him take the rest of the medicine, and drink more warm water. After having been sick once, let him drink still more warm water, so that the stomach may be thoroughly cleaned out.

Mustard.

A dessert-spoonful of mustard, mixed up in half a pint of water and swallowed, speedily produces vomiting. If the water is warm the action is more rapid. This is the best emetic in cases of drunkenness and poisoning.—See DRUNKENNESS; POISONING. A mustard poultice is useful in many cases.—See COUGH; RHEUMATISM; DYSENTERY. The mustard is mixed with water into a paste, spread on linen, and applied to the skin. Twenty minutes is generally quite as long as it should be kept on. When it is taken off, the skin should be well washed; for if a blister forms, and any of the yellow mustard mixes with the fluid from the blister, the skin will be stained of a dirty yellow colour, which can never be removed. If vinegar be used instead of water, and the poultice be applied warm, the action is much stronger, and a blister would very soon form.

SPECIFIC MEDICINES.

Sulphate of Quinine.

This is the only medicine to be relied on in the intermittent fevers of many climates, known to seamen as "Fever and Ague." In other fevers, and in marsh dysentery, it is also most useful.—See FEVERS; DYSENTERY. It is rather expensive, but the amorphous quinine sold by most druggists is comparatively cheap, and nearly as good as the dearer preparation.

Balsam of Copaiba

Is given in gonorrhœa, in doses of a teaspoonful three times a day. It may be taken floating on the top of a little plain water, or barley-water. Barley-water should be taken freely while this medicine is used, and no acid food or coffee allowed.

ANTIDOTES FOR POISONS.

Magnesia.

This is ordered principally for its use in cases of poisoning by acids.—See POISONS. But it is also a mild aperient, and may be given in doses of twenty grains, mixed with water, in cases of indigestion, heartburn, &c.

Liquid Ammonia.

See POISONS; DROWNING; BITES OF SERPENTS. Mixed with equal parts of olive oil, or one part of ammonia to two or three parts of oil, it forms a useful liniment.

Olive Oil.

See POISONS; BURNS.

Nitrate of Silver.

This is to be used as directed in cases of bites of a mad dog, or of any venomous reptile.—See BITES.

EXTERNAL APPLICATIONS.

Spirits of Turpentine.

This makes a useful liniment, in cases of spasms, stiff joints, rheumatism, &c. It may be rubbed in alone with the hand, or with flannel. If the skin becomes red and sore, it is too strong, and some oil should be mixed with it. If it ceases to do good, it may be made stronger by mixing with it some liquid ammonia or mustard. It is also useful, mixed with castor oil, in cases of tapeworm.—See WORMS.

OINTMENTS.

Simple Cerate.

This is useful for dressing blisters. Spread on lint, it serves to keep the air or dirt away from cuts or sores, and keep them moist.

Mercurial Ointment.

See VENEREAL DISEASE. This ointment is also used to destroy vermin which collect in the hair about the person.

Basilicon Ointment.

This is a stimulating ointment often used by seamen as a dressing for ulcers or sores. It is apt to irritate raw surfaces.

Blistering Plaster.

In order to make a blister, this plaster is spread on a piece of leather, cloth, or thick paper, to the size required. It is applied to the skin, and left until the scarf-skin beneath it rises like a bladder. It is then removed. The bladder is opened by the snip of a pair of scissors, and soft linen spread over with cerate is applied. The dressing is to be repeated once or twice daily, until the blistered surface heals. Should pain or difficulty in making water come on, the person should sit in a tub of hot water for half an hour, if it can be done, and drink freely of barley-water, toast and water or hot tea.

DEODORISER AND DISINFECTANT.

Chloride of Zinc.

The uses of this preparation in preserving timber and cordage, sails and other marine stores, in destroying the odour of bilge-water, and decomposing the gases which emanate from the bodies of the sick, or from putrid animal and vegetable manure, were discovered by Sir William Burnett. Official reports to the Admiralty and to Parliament have been

printed which fully prove the utility of this chloride. Under the article CLEANLINESS its use has been described, and the benefits derived from it pointed out.

DIET FOR THE SICK.

Arrowroot.

This is most useful food for those suffering from fevers and bowel complaints. Put a table-spoonful into a basin and mix it with a spoon, adding enough of cold water to form a paste. Then gradually add a pint of boiling water, stirring the mixture quickly as the water is added. Then boil for a few minutes in a clean saucepan, and let it cool. It will form a clear jelly. A little sugar and wine may be added to it, or some milk if any can be procured.

Pearl Barley.

This is for making barley-water. Take two ounces of pearl barley and pour on it half a pint of water. Boil for ten minutes, and throw this water away. Then add four pints of hot water to the boiled barley, and boil down till about two pints remain. This makes an excellent drink in fevers, bowel complaints, and gonorrhœa. A little sugar may be added, according to taste.

Rice.

This is safe and excellent food in fevers and bowel complaints. Wash the rice and put it into *boiling* water, boil for a few minutes, and strain the water off. It may be eaten then with salt or sugar, or some hot milk may be added. About an ounce of rice will be enough for a pint of hot milk. This rice-milk is very useful to persons recovering from fevers, dysentery, &c. The rice-water, which is useful in feverish cases and cholera, is made by boiling rice instead of barley, in the way just described for making barley-water, but only half the quantity of water should be used for two ounces of rice.

ARTICLES TO ACCOMPANY THE MEDICINES.

Scales and Weights

Should always be wiped after use and kept dry.

Graduated Wineglass, and Drop-measure.

This is marked with lines measuring tea- and table-spoonfuls. Each teaspoonful is equal to one drachm, and each table-spoonful to half an ounce, so that this glass is also a measure for medicines. Tea- and table-spoons differ so much in size, that it is always better to measure by the glass. The drop-measure is marked from five to sixty drops.

Syringes.

One should be of glass, and one of pewter. Always wash them after use.

Lancets.

One should be kept for bleeding, the other for vaccination. Wash and dry after using, and then wipe with an oiled rag, to prevent rust.

Bandages.

These are to be kept ready for use, in case of accidents, sores, &c. When dirty they should be washed and rolled again.

Adhesive Plaster

Must be warmed before being applied.—See WOUNDS.

Lint.

See WOUNDS; ULCERS.

Sponge

Should always be well washed in boiling water after use.

Cotton Wool.

See BURNS.

Splints.

See BROKEN BONES.

Vaccine Lymph.

See VACCINATION. The lymph is to be had gratis, at the National Vaccine Institution, Russell Place, Fitzroy Square, on personal application, or by letter. The druggist who fits up the chest is to obtain it.

Trusses.

See RUPTURE.

Enema Syringe.

See the printed directions for its use upon the case.

Elastic Catheter.

The size No. 8 is that most generally useful; others should be taken when it is known that persons subject to stricture are on board.—See STRICTURE.

Note.—It is singular that no chloroform or chloric ether has been included in the new scale of medicines, not even in the scale for vessels carrying a surgeon. Those captains, however, who can trust themselves to use it with caution would do well to take a supply to sea with them, as it is so wonderfully useful in relieving pain of all kinds, whether produced by accident or disease. It is used simply by sprinkling twenty or thirty drops upon a clean handkerchief, and throwing this loosely over the face, so as to cover the nose and mouth. It may be repeated with safety in this manner as often as pain returns. The best chloroform is made in Edinburgh. To test the purity a few drops should be sprinkled upon the hand and allowed to evaporate. If any odour is left by it, the chloroform is impure. No odour whatever remains after the evaporation of pure chloroform.

Chloric ether is perhaps a safer agent than pure chloroform. It is made by adding three parts of spirits of wine to one part of chloroform.

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THE END.

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