

Official report on the medical topography and climate of Calcutta : with brief notices of its prevalent diseases, endemic and epidemic / by James Ranald Martin.

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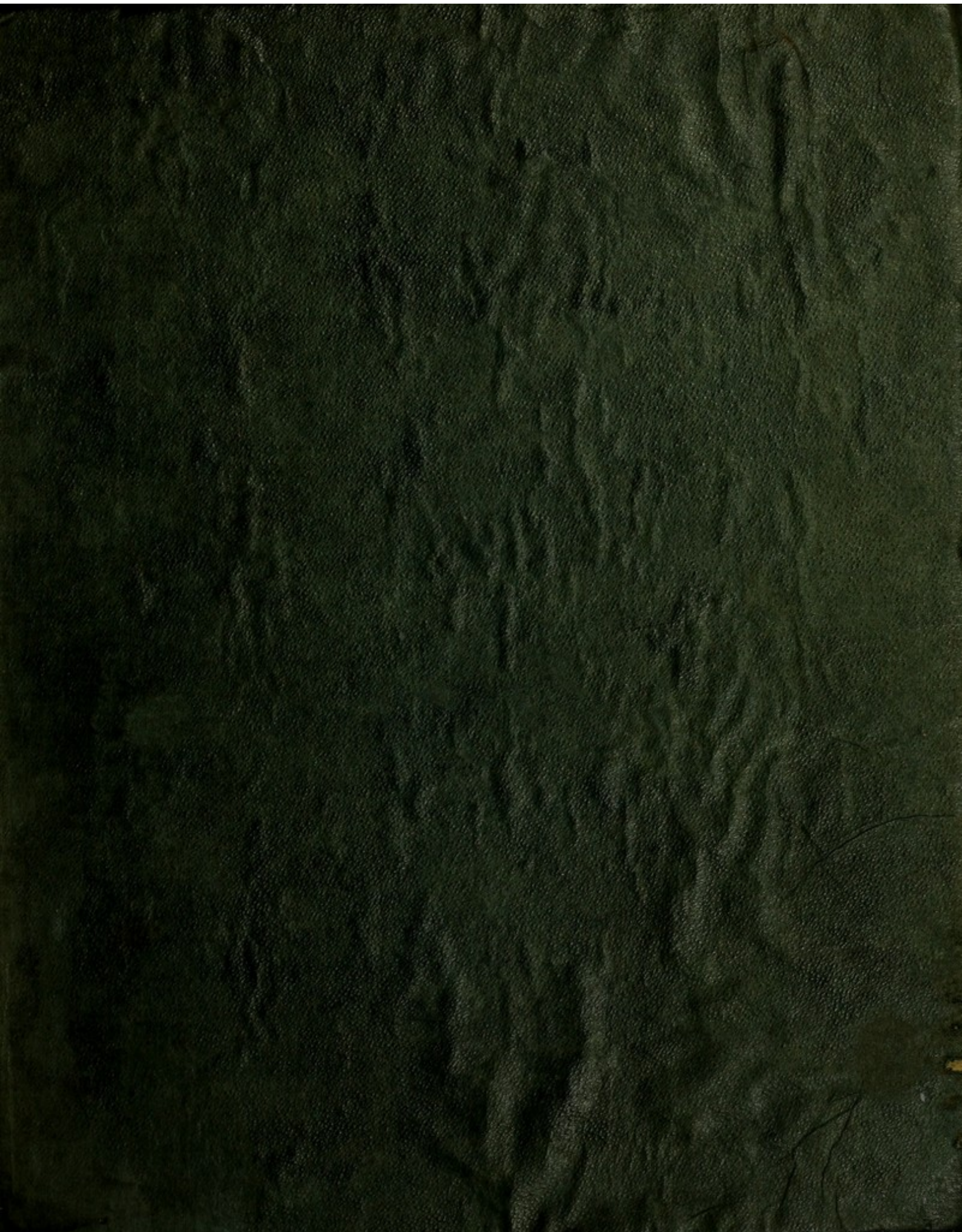
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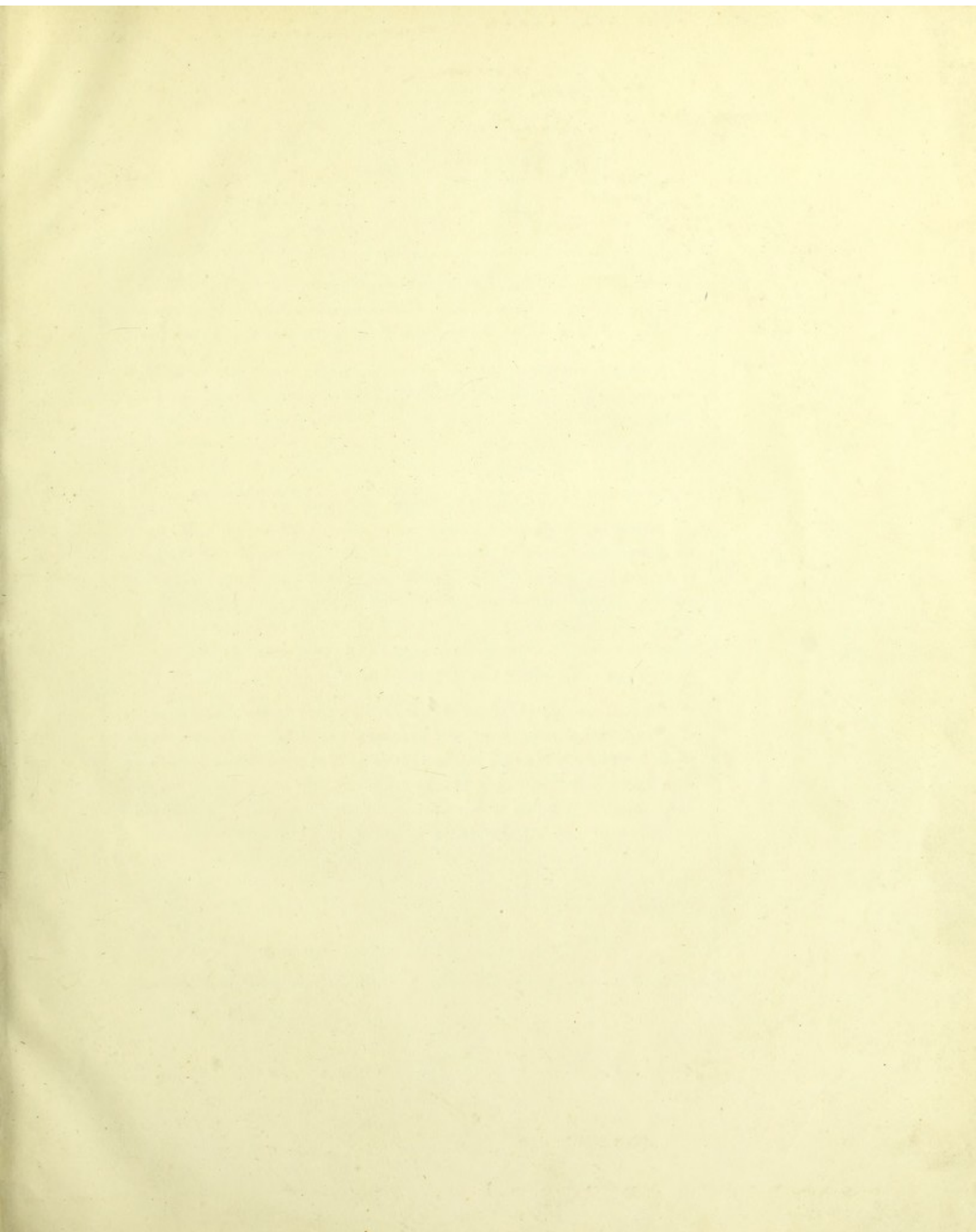
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“NEXT to the additions which have been made since the end of the last century to our knowledge of Physiology, we may place the numerous important observations by which our information as to the external causes of disease has been rendered more extensive and more precise.

“These observations and the inferences from them, demand the more attention from Physicians, that they necessarily involve a kind of evidence essentially different from that on which we proceed in other Medical inquiries, and if we durst hope that the progress of human wisdom and virtue would bear any proportion to that of human knowledge, we might expect, that the lessons to be drawn from these inquiries would prove of even greater importance to the future happiness of mankind, than any which we can gather from the history or treatment of disease.

“These inquiries have in some instances been prosecuted by individuals in civil life; but the opportunities of making decisive observations on some of the causes of disease which occur in the experience of Medical Officers of fleets and armies, who are perfectly informed of the whole circumstances of the organized bodies of men under their observations, and often see these circumstances suddenly altered, or have even the power of altering them at pleasure, are much superior to those which other practitioners enjoy; and the peculiar value of such observations has never been so well understood as during the last war.”*

“A great work might be written on the connection between the revolutions of nature and those of mankind: how they act each upon the other; how man is affected by climate, and how climate is again altered by the labours of man; how diseases are generated; how different states of society are exposed to different disorders, and require different sorts of diet; how, as all earthly things are exhaustible, the increased command over external nature given by increased knowledge seems to have a tendency to shorten the period of the existing creation, by calling at once into action those resources of the earth which else might have supplied the wants of centuries to come; how, in short, nature, no less than human society, contains tokens that it had a beginning, and will as surely have its end.”—*Dr. Arnold's History of Rome.*

* ALISON'S History of Medicine in the present century.

OFFICIAL REPORT

ON THE

Medical Topography and Climate

OF

CALCUTTA,

WITH BRIEF NOTICES OF ITS PREVALENT DISEASES,

Endemic and Epidemic.

By JAMES RANALD MARTIN,

Presidency Surgeon, and Surgeon to the Native Hospital.



Printed by Order of Government.

It is necessary for a Physician when entering a City of which he knows nothing, to examine its exposure, the predominant winds, the seasons, the nature and elevation of the soil, the quality of the waters of which the inhabitants make use, and the kind of life they follow.—HIPPOCRATES.

CALCUTTA:

G. H. HUTTMANN, BENGAL MILITARY ORPHAN PRESS.

1839.

OFFICIAL REPORT

Physical Geography and Climate

CALCUTTA

THE HINDU UNIVERSITY OF THE EAST
General and Special

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CALCUTTA

W. H. BISHOPMAN, GENERAL MANAGER

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P R E F A C E.

THE favorable notice bestowed on the former "Notes on the Medical Topography of Calcutta," by Sir James Macgregor, the Director General of the British Army Medical Department, as well as by Dr. James Johnson, has encouraged the author to enlarge, re-construct, and it is hoped, improve the present report. Nevertheless he is well aware that it requires apology, not only to the Government, which has been pleased to order its being re-printed, but also to that portion of the public that may take the trouble to peruse the work.

To write well on the all-important heads of Medical topography and statistics, requires a quality and variety of acquirement which we can rarely expect to find in a physician, even of the most extensive acquaintance with both the theory and practice of his profession: the subjects are not taught in our schools, and scarcely are recognized in the curriculum of our colleges. What then? Does the author pretend, under any circumstances, to do justice to a subject demanding so profound an acquaintance with the most recondite laws in physical science? No. Are we then to wait till we find a physician so qualified? That were a greater error still. In truth, it is not in any individual to do more than to indicate a path to accurate results in a mere department of so vast and comprehensive a field.

To develop the nature and the operation of some of the physical and moral circumstances which exercise important influences on public health, is all the author pretends to.

Let others try their best on the same objects ; and, for the rest, time, observation, and above all—*comparison*,—will do for our science what it has, and is doing for others.

To propose a general measure, or to have a direct perception of its utility, it is not necessary, nor does it always follow, that a man should be competent to carry through the said plan in all its details.

I pretend only to the first ; the second I leave in the hands of my abler brethren of the Indian Medical Services :—nor should any one be deterred by the circumstance that the public too often passes lightly over subjects on which *he* may have bestowed both time and labour ; for this must necessarily happen when the science is so intricate and little known as that of climate is : again, on such a subject, a person of the most ordinary capacity can find fault, and point out defects ;—but I can assure such that it requires much knowledge of no ordinary kind and scope to supply them.

It was at the suggestion of the author, that the order was passed by the Supreme Government in 1835, for requiring from the Medical Services of the three Presidencies of India, reports on the Medical topography of the country generally. The proposal was carried into effect through the direct act of the Government, the Medical Board's opinions having, at the time, afforded it but a very equivocal support.

In 1838 it was proposed by the author to the Medical Board, in continuation, to re-model, by means of a Committee, the reports of Military and Civil Hospitals, with a view to obtaining information on the Medical statistics of the country. It was likewise proposed to examine the records of the General Hospital of this Presidency.

It was thought that the numerous, important and interesting facts connected with the subject of our climate and Medical statistics, might be

elucidated by an examination of the records of an institution in which, during the seventy years of its existence, various plans of treatment had been followed with tens of thousands of European patients.

My plan, I regret to say, did not obtain the sanction of medical authority ; and so this important matter remains, for the present at least, in abeyance.

Of the Report itself, I shall only say that it is got up with more care than that printed by the authority of Government in 1837, and contains a third, or more, of additional matter.

The former " Notes " were put together in a few weeks ; and, for the re-construction of the present Report, I may truly say that I have had but little leisure. Such as it is, however, I have no hesitation in submitting it to the Government ; for were it of less value even than I believe it is, still its publication will prove useful, if only by giving to others such benefit as may be derivable from my example.

There are two points which I have endeavoured to keep continually in mind—namely, the investigation of climate in its most extended sense ; and secondly, its influence on military health ; for it should never be forgotten here, however we may be circumstanced, that it is mainly for the care of the troops that medical officers are sent to India.

HISTORICAL NOTICES
OF
CALCUTTA.

IT has been observed that, of all the European nations who have planted distant settlements, the English have invariably shewn least regard to the proper selection of localities for the sites of their colonial cities ; and this, I think, must in general be ascribed to the commercial spirit taking the lead: a good harbour and soundings, or else the embouchures of great rivers, were the first objects of desire ; and it generally happened that both led to the positions the most unfavorable to health.

The English careless in selecting healthy sites for their colonial cities—the reason.

This has been almost universally the case in our West Indian colonies ; but here, we have not even the consolation of a commercial expediency in favor of the choice of site for our metropolis ; for, I believe, there are many places between us and the sea, better suited for shipping, while there exists none so ineligible, in respect to its immediate and surrounding localities, as the one actually chosen. “ We are apt to be struck with astonishment,” says Lind, “ when we find that the founders of great towns and the governors of extensive provinces, through ignorance or mistake, have exposed populous and magnificent cities to an annual and pestilential destruction.”

Illustrated in the West Indies.

The same in Bengal.

The founder of Calcutta was resolved not to be outdone by the founder of ancient Rome ; for Rome, before man's art had completely rescued the very soil of the future city from the dominion of nature, was, just what modern neglect has again made it—pestilential. Cicero (de Republica) says, when speaking of the choice of situation, “ *Locum delegit in regione pestilenti salubrem.*” What it was that guided Romulus in his choice of locality we have not now the means of knowing ; but it is certain, that to “ *a large shady tree*” we owe the happy selection of Mr. Job Charnock.

The founder of Calcutta, and him of Rome compared.

Having quitted the Factory at Hooghly, he first tried to establish himself at Oolabariah, on the western bank of the river ; but the village of Sootanutty with its attractions and large shady tree, carried the palm.

Reason for the choice of site of Calcutta.

The earliest account of Calcutta by Bruce and Capt. Alexander Hamilton.

The earliest accounts we possess relating to the metropolis of British India, are those of the annalist Bruce, and Captain Alexander Hamilton, who resided in various parts of Asia, between the years 1688 and 1723.

The Phirmàn of Aurungzebe specified, in court language, that, the Mogul "having pardoned all past offences," liberty of trade was secured to the English without interruption—a style similar to that in the Phirmàn previously granted to the presidency of Surat, and which the Council of Madras declared to be "infamous and scandalous."

"Mr. Job Charnock," says Captain Hamilton, "being then the Company's Agent in Bengal, he had liberty to settle an emporium in any part on the river's side below Hooghly, and for the sake of a large shady tree chose that place, though he could not have chosen a more unhealthy place on all the river: for three miles to the north-east is a salt-water lake that overflows in September and October, and then prodigious numbers of fish resort thither; but in November and December, when the floods are dissipated, these fishes are left dry, and with their putrefaction affect the air with thick stinking vapours, which the north-east winds bring with them to Fort William, that they cause a yearly mortality."

The extent of the "Colony" was, in Captain Hamilton's time, "limited by a land-mark at Governapore, and another near Barnagul, about six miles distant; and the salt-lake bounds it on the land side. It may contain, in all, about 10 or 12,000 souls."

The name Calcutta derived from the temple of Kàlee.

According to the authority of Stewart, the name of the future emporium took its origin in the following circumstance:—"the villages of Chuttanutty, Govindpore, and Calicotta, which in virtue of the Prince's Nishàn, had been purchased from the Zemindars with their districts, extended about three miles on the eastern side of the Bhaggarutty River and about one mile inland. The latter of these villages takes its name, from a temple dedicated to Kàlee, the Hindoo Goddess of time; and from it the English called their town Calcutta."—*History of Bengal*.

Biographical notices of Job Charnock.

In the East Indian Chronologist, published here by Mr. Hickey in 1801, I find the following notices of the founder of Calcutta; and, notwithstanding the faults of his character, it is not right that he should be altogether forgotten.

“ When peace was established between the great Emperor Aurungzebe and the English, Job Charnock, the Company’s Chief at Hooghly, twice removed the Factory, and in the year 1689-90, finally formed an English settlement at Calcutta, which, ere one century terminated became a mighty city, the magazine of trade, the arbitress of kingdoms and the seat of empire.

“ Mr. Charnock,” says Captain Hamilton, “ choosing the ground of the colony, where it now is, reigned more absolute than a Rajah, only he wanted much of their humanity ; for when any poor ignorant native transgressed his laws, they were sure to undergo a severe whipping for a penalty, and the execution was generally done, when he was at dinner, so near his dining room that the groans and cries of the poor delinquent served him for musick.”

When a century had passed away, we find the character of Charnock viewed through a milder medium. Colonel Ironside, in the Asiatic Miscellany, terms him “ the illustrious Charnock, the first conspicuous Englishman in this side of the world.” Mr. Orme says (Book vi.)—“ Mr. Charnock was a man of courage, without military experience, but impatient to take revenge on a Government, from which he had received personally the most ignominious treatment, having been imprisoned and scourged by the Nabob. The sense of such indignity was doubtless deeply rooted in the mind of Mr. Charnock, and perhaps was one of the reasons for that severe usage of the natives, ascribed to him by Captain Hamilton.”

Biographical notices of Mr. Job Charnock continued.

The manly virtues here ascribed to Charnock were not perceived by his cotemporary, Sir John Goldsborough, who did not hesitate to declare his talents and services “ over-rated.”—Sir John adds, that though honest he was “ indolent and indecisive, and at no time had checked the dishonest dealings of those serving under him.”

“ From an oral tradition,” says Hickey, “ still prevalent among the natives at Barrackpore, now an established military cantonment, 14 miles distant from Calcutta, we learn that Mr. Charnock built a bungalow there, and a flourishing bazar arose under his patronage before the settlement at Calcutta had been determined on. Barrackpore is at this day best known to the natives by the old name *Channock*, and Captain

Barrackpore established by Charnock, and known to the natives by his name.

Hamilton misled by their method of pronounciation invariably writes the name without the latter R."

Death of Charnock.

" Governor Job Charnock died on the 10th January, 1692, and if the dead knew anything of the living, and could behold with mortal feelings this sublunary world, with what sensations would the father of Calcutta glow to look down this day upon his city. Charnock ! may your name and your city be immortal, and may Calcutta, the sister of England, last till time itself expires !"

Purchase of the Zumeendary right to Govindpore, Sootanuttu and Calcutta.

In 1698, the grandson of the Emperor Aurungzebe having visited Bengal, permission was obtained to purchase the Zumeendary rights to the villages of Govindpore, Sootanuttu and Calcutta, to the extent of a mile and a half square, at an annual revenue of £130 ; thus was begun " cautiously, so as not to alarm the native Government," the construction of old Fort William. It was of an irregular tetragon form, and contained the Governor's house, " the best and most regular piece of architecture" that Captain Hamilton ever saw in India. There were also lodging houses for factors and writers within the fort, besides the Company's store-houses. The residents without the fort built generally along the river, and such as made " any tolerable figure," had, in common with the Governor, gardens around their houses with " fish ponds to serve the kitchens with good carp, calkops, and mullet."

Old Fort William.

Habits of the early residents.

Beyond an occasional compliment to their hospitable disposition, Captain Hamilton says but little of the habits of life of the early settlers. Bernier, however, in speaking of the " English and Hollanders" of his time at Balasore, says that, next to the " air, in regard to strangers," is the *Bouleponge* (Anglice, bowl-of-punch.)

" Bouleponge," he says, " is a certain beverage made of arrack, that is, of strong water, black sugar, with the juice of lemon water, and a little muscadine upon it ; which is pleasant to the taste, but a plague to the body and to health."

" A little wine of Bordeaux, Canary or Chiraz," was, however, reckoned " a marvellous antidote against the ill air."

Repeated mention is made by Captain Hamilton of the extreme insalubrity of the site chosen for the factory of Calcutta; and even the presumed better habits of the clergy could not in those days protect them. "The ministers of the gospel," he says, "being subject to mortality, very often young merchants are obliged to officiate, and have a salary of £50 per annum added to what the Company allows them, for their pains in reading prayers and sermons on Sundays." Further, "the Company has a pretty good hospital at Calcutta, where many go in to undergo the penance of physick, but few come out to give account of its operation."

Captain Hamilton's frequent mention of unhealthiness.

This intelligent traveller seems, however, to have spent his time altogether agreeably in Calcutta, where the better classes lived "both splendidly and pleasantly," when such unpleasant intruders as "pride or contention do not spoil society, which too often they do among the ladies, as discord and faction do among the men."

"But there are no polemicks, except what are between our high-churchmen and our low, or between the Governor's party and other private merchants on points of trade." At that time also, all religions were "freely tolerated, but the Presbyterian, and that they brow-beat."

The first permission obtained by the British to trade with Bengal was granted about the year 1656, through the skill and influence of Dr. Boughton; so the second was obtained in 1717, through the solicitation of Mr. Hamilton, Surgeon on the then infant establishment of Fort William.

Important grants obtained through the skill of Drs. Boughton and Hamilton.

"Feroکشere had been some time engaged to marry the daughter of Raja Ajeet Sing, one of the Rajpoot Princes; and the bride had arrived, for that purpose, at the capital: but the Emperor, being afflicted with a complaint which all the skill of his own physicians could not cure, was under the necessity of postponing the marriage. At length, in consequence of the recommendation of Khan Dowran, he permitted Mr. Hamilton, the Surgeon of the Embassy, to attend him; and that gentleman having, by a judicious operation, restored the Emperor to health, became very deservedly a great favorite with his Majesty, who, in addition to many proofs of the royal

munificence, promised to grant any other favor he should ask. Mr. Hamilton, instead of requesting any further reward for himself, besought his Majesty to concede to the English Ambassadors the object of their Mission. The Emperor surprised at Mr. Hamilton's disinterestedness, promised that as soon as the marriage ceremonies were over, he should take the petition into his serious consideration, and grant the English every indulgence he could, consistent with the dignity of his own Empire."

Thus after a short time, and despite a powerful opposition, was confirmed to the British the possession of thirty-eight villages; in short, just as the Embassy was about to return hopeless of success, the noble conduct of Hamilton procured for his countrymen the realization of their best hopes, and laid the foundation of that Empire which ere long was destined to extend to the Himala mountains.

Epitaph found on
the tombstone of
Mr. Hamilton.

In clearing away the ground for the foundation of St. John's Church in Calcutta, upwards of forty years ago, the tombstone of Mr. Hamilton was discovered, which, in addition to an English epitaph, bore a Persian inscription thus translated by Gladwin:—"William Hamilton, Physician in the service of the English Company, who had accompanied the English Ambassador to the enlightened presence, and having made his own name famous in the four quarters of the earth by the cure of the Emperor, the Asylum of the World, Mohammed Feroksheer the victorious; and with a thousand difficulties, having obtained permission from the Court, which is the refuge of the universe, to return to his country; by the Divine decree, on the 4th of December, 1717, died in Calcutta, and is buried here."

"For the honor of the faculty," says Mr. Hickey, "be it remembered, that this is the second time the Honorable Company were eminently served by that learned body. The memory of Boughton and of Hamilton ought to be a standing toast at the polite tables of Calcutta."

But little known
relating to Calcutta
for many years after
Mr. Charnock's
death.

For many years from the death of Job Charnock, little is known of the progress made in his Emporium; indeed in 1717 it remained but a straggling village of mat houses, the whole of the ground south of Chandpaul Ghaut being thickly covered with jungle and forest trees. Near Tolly's Nullah there were two villages, the inhabitants of which were

induced to settle in Calcutta by the ancient family of Set, at that time the wealthiest merchants residing here. The present site of Chowringhee was occupied by villages of the most miserable kind, surrounded with marsh and jungle; and although Calcutta may be said to have extended to Chitpore Bridge, yet the intervening space was in no better condition than the rest;—all was jungle and marsh.

Former state of Chowringhee.

Commerce seems, notwithstanding the disadvantages of position to have grown up early, and with it the usual accompaniment of luxury. In the letters of the Court of Directors, we find frequent complaints and reprobations on this head, and in 1725, Mr. Deane, the President, is severely reprov'd for having charged "rupees eleven hundred" for "a chaise and pair" to the public account, which sum he is ordered immediately to refund. "If our servants," say the Directors, "will have such superfluities, let them pay for them."

Early growth of commercial prosperity and of luxury.

Despite of reprimands, however, habits of expense continued, and in 1731 we find the "foppery of having a set of musick at his table, and a coach and six with guards and running footmen," charged against both the President and "some of inferior rank;" and as if this were not enough, it is broadly hinted that "whenever such practice prevails in any of our servants, we shall always suspect that we are the paymasters in some shape or other."

Luxury objected to by the Court of Directors.

"Success," says Stewart, "produced new adventurers, and besides a number of English private merchants licensed by the Company, Calcutta was, in a short time, peopled by Portuguese, Armenian, Moghul, and Hindoo merchants, who carried on their commerce under the protection of the English flag: thus the shipping belonging to the port, in the course of ten years after the Embassy, amounted to ten thousand tons, and many individuals amassed fortunes without injury to the Company's trade or incurring the displeasure of the Moghul Government."

An old annalist refers to 1737, as a period when we had "opulent merchants, in days when gold was plenty, labour cheap, and not one indigent European in all Calcutta:" but the same year brought with it a great calamity, and from the extent of loss reported, the factory must even then have been one of growing importance. "In the night between

Hurricane of 1737, which nearly destroyed the town and shipping.

the 11th and 12th of October 1737, there happened a furious hurricane at the mouth of the Ganges, which reached sixty leagues up the river. There was at the same time a violent earthquake, which threw down a great many houses along the river side in Golgoto (i. e. Calcutta) alone, a port belonging to the English, two hundred houses were thrown down, and the high and magnificent steeple of the English church sunk into the ground without breaking. It is computed that 20,000 ships, barks, sloops, boats, canoes, &c. have been cast away : of nine English ships then in the Ganges, eight were lost and most of the crews drowned. Barks of sixty tons were blown two leagues up into land over the tops of high trees ; of four Dutch ships in the river, three were lost with their men and cargoes ; 300,000 souls are said to have perished. The water rose forty feet higher than usual in the Ganges.”—*Gentleman's Magazine for 1738-9.*

Construction of
the Maharatta Ditch
in 1742.

In 1742 was began the ditch round Calcutta, intended at the time as a defence against the incursions of the Maharattas. It never completely invested the town, but, in so far as it went, the work may have had the effect of draining the grounds to the north and east, though for purposes of defence it could not have proved of much use.

The construction of roads was early recommended by the Home Government, in order as they said, “to see through your bounds into the country of the neighbouring zumeendars, who attacked you some time before, as to facilitate the march of your soldiers when necessary to support your outmost outguards, and prevent private robberies.” These prudent instructions do not appear to have been followed.

Modern Calcutta
dates from 1756.

We may in reality then, date the origin of Calcutta from the year 1756, when the reconstruction of the city commenced, after its capture and destruction by Suraj-ud-doulah ; at which period, according to Orme, there were but seventy houses belonging to the English. What are now called the Esplanade, Fort William and Chowringhee, were so late as the above year, a complete jungle, interspersed with huts, and small pieces of grazing and arable land. The Old Fort and Clive Street, then and for many years afterwards, comprehended the whole of Calcutta, Clive Street being the place of all business.

Nowhere has the activity and enterprise of British commerce been better displayed than in the rapid rise of this Capital ; for, even within the memory of persons still living, the houses of Europeans were few in number, and of mean appearance. Previously to 1756, Calcutta was, in short, but a trading factory—a valuable one to be sure, but yet affording little promise of its future greatness. It has often happened that the value of an acquisition has only become known by its loss ; and it may have been here, as elsewhere, that necessity has proved our best friend, and, without our knowledge, turned out the best promoter of public health. Soon after the re-occupation of Calcutta by the British, an extraordinary impulse seems to have been given to the spirit of improvement, so that within forty years, and notwithstanding all the disadvantages of position, it became a city numbering five hundred thousand individuals—a degree of prosperity unparalleled, perhaps, in any other quarter of the world, and which has increased to such a degree, that in 1796 some commercial houses were supposed to have had dealings to the amount of two crores of rupees annually. Soon after the battle of Plassey in 1757, Fort William was commenced by order of Lord Clive, and I know of no other work, performed at the instance of Government, of the same value to public health, through the opening out and clearing of so large a piece of ground. It has justly been said that the Esplanade of Fort William forms the lungs of Calcutta, and certain am I that we should breathe but thickly without them.

Its rapid rise and prosperity.

The New Fort begun by order of Lord Clive.

The year 1770 was memorable for a grievous famine and pestilence, which afflicted Bengal generally, and carried off, according to Mr. Hickey, 76,000 souls in the streets of Calcutta, between the 15th of July and 10th September. In addition to that calamity, several great granaries were destroyed by terrible fires, which occurred in May and June. “There was not a corner in the city or any lurking place in the vicinity of Calcutta where the living, the dying, and the dead were not mingled or heaped together in melancholy confusion. It was impossible to stir abroad on business or recreation, where these offensive and mortifying associations were not in the way. The daily employment of hundreds was to remove the dead, in proportion as they became a nuisance to the living. These in cart-loads, and without any funeral or religious obsequies were promiscuously plunged into the river. By this increasing and prodigious mortality, notwithstanding the most

Severe famine of 1770, and consequent sufferings.

constant attention to decency and cleanliness, the town and suburbs were so much infested, that from the raging heat of the weather, the foul congregation of vapours which incessantly ascended from the unburied dead, and the torrid or intemperate state of the atmosphere, a pestilential influenza was generally and seriously apprehended. Fortunately an extraordinary flock of carnivorous birds, animals and vermin were allured from their fastnesses and their solitudes by the putrefaction of the scene. The water of the Ganges became loathsome and corrupt from the loads of dead bodies which it daily received. Pork, geese, ducks, and every species of provisions, fattened by substances thus gross and abhorrent, were avoided as poisonous. The fish in the river were noxious, and even sometimes fatal to those who eat them. Mutton, which could hardly be obtained at any price, became the only food which could be enjoyed with safety or satisfaction."—*Transactions in Bengal*.

Plan for improving Calcutta submitted to Government by Colonel Campbell in 1781.

In Hickey's Gazette for 1781, I find notice of a proposal submitted to the "Board" (meaning I suppose the Council Board) by a Colonel Campbell for cleaning and draining the town, on an estimate of two lacks of rupees per annum; but it would seem that the Board, "for certain reasons best known to the parties themselves," declined the Colonel's plan and actually imposed or intended to impose, a "stupendous tax" of from 7 to 14 per cent. on landed property for the same objects; whether this latter measure was found impracticable in itself, or whether it gave way to measures of external political importance, I cannot say, as there is no further notice regarding it. In 1784, a Mr. Henckell effected a clearing of considerable portions of Sunderbund land near the town, which contributed in some degree to diminish the local sources of fever; but it is evident from many remarks of Tenant, that in his time, 1796, much of the original cause of unhealthiness remained. "If Bengal," he says, "and particularly Calcutta, are deemed less fatal to European constitutions than formerly, this must rather be ascribed to a reformation in the manners of the people, than any melioration of the climate."

Progressive clearing of Sunderbund land around Calcutta, but the improvements in the habits of life greater than those of locality.

Construction of Circular Road by order of Lord Wellesley.

One of the first acts of the Marquess Wellesley was, in 1799, to enlarge and extend the roads around Calcutta, especially the Circular Road,—a great improvement; but to effect which the famous "Bythna Kanna" tree was cut down: it had been the place of assemblage for native merchants from the earliest period, and its fall was looked upon

with superstitious regret. His Lordship, with the same spirit that influenced all his actions in this country, contemplated extensive improvements both within the city and around it. The means even "for the purpose of defraying the expense which must attend the execution of important improvements" were brought by his lordship to "the early and deliberate consideration of Government," and a committee of engineers and other gentlemen was formed, with ample and detailed instructions.

Further extensive improvements contemplated by the Marquess Wellesley.

I have never heard what resulted from the labours of this committee; but a reference to dates makes it probable that ere the desired information had been obtained, the incomparable statesman who called for it had departed from the scene of his Indian usefulness.

Calcutta of the present century owes the greater part of its improvements, certainly those affecting health, to the well directed labours of the Lottery Committee. I believe it was at the instigation of this intelligent public body, that the river bank has been cleared for the construction of the present ghauts, and the magnificent Strand Road, the two greatest improvements within my personal recollection. I believe also, that all the new squares, and fine open roads leading to and from them in various directions, owe their construction to the same authority. There can be no doubt of the beneficial effects of these measures in repressing the causes of fever, by draining, cleaning and promoting freedom of ventilation and cleanliness. But so long as we are without a complete system of draining, all else is but palliative; for if it amounts to a demonstration, as stated by a distinguished author, that "freedom from some of the most fatal scourges of the human race, and a gradual amelioration of health," can be traced to the "free exposure of the streets of London to the sun and wind, a hard regular pavement preserved clean by proper scavengers; the construction of common sewers and privies, and the advantage of a flowing stream," what amelioration of the public health may not be expected from similar measures in such a city as this, situated as it is within the tropics?

The greatest of the modern improvements executed through the Lottery Committee.

All improvements of but partial benefit, so long as we are without an effective plan of draining.

Dr. Cains, the most eminent physician in England at that period, states the mortality of London from ague in 1588, was such that the living could hardly bury the dead: now, such is the effect of local improvement on health, that ague is almost unknown in modern London.

Former state of London compared to its present healthiness.

Dr. Lind's notices of the former and present state of Calcutta.

Even in this city, such had also been the result of all the progressive improvements above noted, that Dr. Lind, comparing the state of health in his time to what it had once been, says—"Calcutta, built literally on a swamp, on the east side of the Hooghly, and surrounded to this moment by immense lakes at a few miles distance, has by the draining of that part of the city inhabited by Europeans, become as healthy as any country of the same latitude on earth."*

"Ten miles below the city where the country is not cleared, and the rapidity and rankness of vegetation is suffered to infect the air; the jungle or violent bilious fever is sure to attack any one who comes for a time within its atmosphere: yet the old village of Fultah, while the Dutch had an establishment there, was healthy, because the ground was cleared; since they left it, it has become more unhealthy."

Malte-Brun, when speaking of the most temperate climates, declares, "that it is man himself who has in a great measure created these salubrious climates. France, Germany and England, not more than twenty ages ago, resembled Canada and Chinese Tartary, countries situated, as well as our Europe, at a mean distance between the equator and the pole."

Captain Hamilton on Calcutta in his time.

On the insalubrity of Calcutta in the earlier period of its occupancy by Europeans, we have again the evidence of Captain Hamilton:—"One year I was there, and there were reckoned in August about twelve hundred English, some military, some servants of the Company, some private merchants residing in the town, and some seamen belonging to the shipping lying at the town, and before the beginning of January, there were four hundred and sixty burials registered in the clerk's book of mortality."

This, worse than Batavian condition, and frightful sacrifice of life, are ascribed by the same authority to the annual subsiding of the Salt-water Lake, leaving its marshy banks covered with fish and exposed to a vertical sun. No doubt this had a most injurious effect; but the unimproved state of the ground in and about the town itself, consequent

* I fear the Doctor has here gone a little too far, and that we have not as yet reached that point of excellence.

on the unsettled state of our possessions previously to the grant of 1765 ; the marsh and rank vegetation, producing constant and unwholesome exhalations, retained and accumulated in a humid atmosphere—these too, had their full share ; and what with their operation, and those of habits of life totally at variance with any tropical climate, no wonder that the first inhabitants should have fallen as Captain Hamilton relates.

Of the climate generally, Lind said in his time that—“ Bengal next to Bencoolen, of all the English factories, proves the most fatal to Europeans.”

That it was not less fatal to our Mahomedan predecessors, is evident from the following translation of Gladwin's from the Persian :—“ In former reigns the climate of Bengal, on account of the inclemency of the air and water, was deemed inimical to the constitution of Moghuls and other foreigners, and only those officers who laboured under the royal displeasure were stationed there ; and this fertile soil which enjoys a perpetual spring, was considered as a strong prison, as the land of spectres, the seat of disease, and the mansion of death.”

In more recent times, it was the custom of the European inhabitants of Calcutta to meet on the 1st of January of each year, to congratulate each other on their escape from the period so emphatically marked by Captain Hamilton ;* but though this is no longer considered necessary on account of the insalubrity of the place, still I think it will not be difficult to shew that we are far indeed from having effected for our “emporium” all that might or ought to be done for it. For many years to come, little more can be done or expected from that commercial or private enterprize to which Calcutta has hitherto owed so much. From the natives we cannot expect any great aid, until they are shewn the usefulness of public works, when, I am confident, they will readily comprehend how clearing and proper draining will make the value of landed property in certain quarters, incalculably greater than it is now,

* About 30 years ago, it is said, that an undertaker of Calcutta, who was about to retire with a large fortune, demanded an extra sum of £2000 for his business, if it were sold *before* the month of August, as he looked upon that and the four following months as the most *productive* of the whole year.

by rendering what is at present useless, fit for building and similar purposes; so that what we know to be most conducive to health, they may at the same time be led to perceive as greatly conducive to their pecuniary interests. "It is only by constant efforts of industry that the salubrity of any spot is maintained; when these are relaxed, or when prosperity and civilization decline, the seeds of disease are immediately deposited in the earth."*

Again, if we accord with Sir Gilbert Blane's opinion, that all predominant diseases are referrible to the following general heads, viz. 1st; Vitiated exhalations and secretions of the human body; 2d, Noxious exhalations of the earth; 3dly, Depraved habits of life; we shall at once see how much of public health in the great matter of prevention of disease, may be effected through a practical application of the science of medical topography.

The injury from human exhalations is removed simply by prevention of crowding, by exposure of the streets and houses to the sun and wind, cleanliness, &c.; and that from terrestrial exhalation, by draining, clearing, leveling and paving, &c.

Conclusion to be drawn from this sketch.

The brief topographic history of Calcutta here attempted, proves what may be done by a well applied capital to render one of the worst known localities habitable; it also proves that a further application of the same means might even render it healthy.

P O S T S C R I P T.

I may here notice a prospect which has at length opened to the inhabitants of Calcutta, of having their city improved and embellished.

The circumstance took its origin in documents submitted by the author of this work to the governors of the Native Hospital, on the subject of the medical topography of the town and suburbs, and on the urgent

* Hawkins' Statistics.

necessity for establishing an hospital for the relief of natives suffering from fever, and other diseases incident to the climate.

For the consideration of these important questions, the governors of the above named institution, held a special general meeting,* on the 20th May 1835, at which a set of resolutions were framed, and addresses ordered to be made both to the Government and the public at large; the latter requiring subscriptions for the proposed institution, and the former submitting to the Government the consideration of the important matters relating to the improvement of the town and suburbs.

The Honorable Sir C. T. Metcalfe, Bart., then at the head of affairs, directed the resolutions of the governors of the Native Hospital, together with the report on the state of the town and suburbs, by the author, to be circulated amongst the several magistrates for their consideration and suggestions; but before these last were made, Lord Auckland took charge of the Government, and to his Lordship's enlightened encouragement of all the measures proposed by the author, and supported as they were by the authority of the governors, is due the completion of the inquiry in all its parts.

The several points of improvement aimed at can alone be here mentioned; but the extent of labor and the time required for the investigation may be guessed at, when I state that the evidences alone comprise upwards of 600 pages of printed folio, besides a very elaborate and luminous report, drawn up by the Honorable Sir John Peter Grant, comprising upwards of 200 pages of quarto. The information arranged and collected in the Report, is of the most valuable and interesting kind, and having now obtained it, let us hope that the Government of Lord Auckland will not here stop.

The improvements suggested by the Municipal Committee, after the most rigorous inquiry, comprehend the following subjects:

1st.—A new and complete system of drainage.

2d.—Cleansing, clearing jungle, and leveling of ground.

3d.—Ventilation of the city.

4th.—Construction of large tanks, and supply of water for all purposes.

* The Lord Bishop of Calcutta, Daniel Wilson, D. D.

The Hon'ble Sir Edward Ryan, Chief Justice.

The Hon'ble Sir John Peter Grant, Judge.

C. W. Smith,
C. R. Barwell,
B. Harding,
R. Saunders,
T. C. Robertson
and
S. Nicolson,

Esqs., Govrs. of the Native Hospital.
The Meeting was attended by J. R. Martin, Esq., Surgeon to the Native Hospital, Dr. A. R. Jackson, Surgeon to the Gurranhutta Dispensary, and by Baboo Ram Comul Sein.

5th.—All the said improvements for the surrounding suburbs.

6th.—Drainage of the Saltwater Lake.

7th.—Improvement of the native habitations.

8th.—Widening and paving of streets, improving and watering of roads.

9th.—Detailed plans and estimates for all the above works.

10th.—Improvement of the public markets and slaughter-houses, inquiry into the state of the weights and measures.

11th.—The better regulation of the police in respect to nuisances.

12th.—The removal to a distance of the burying places, and their better regulation.

13th.—The removal of all old buildings and walls.

14th.—The establishment of a great central hospital for the reception of natives suffering from fever and other diseases incident to the climate.

15th.—The establishment of dispensaries in various parts of the native town.

16th.—The assessment of the town, its mode of collection and appropriation.

17th.—The Abkaree taxes.

18th.—The canal tolls.

19th.—The ground rents.

20th.—The Calcutta Lottery for the improvement of the town.

21st.—The conservancy executive departments in all their details.

22d.—The police of Calcutta.

23d.—River police.

24th.—Police hospital.

25th.—House of correction, including the labour and condition of the convicts.

26th.—The fire engine establishment.

27th.—Lighting of the town.

28th.—Suggestions for improving and new-modeling the police.

29th.—Plan of taxation for carrying on and continuing the city improvements.

The mere perusal of the above abstract will afford a sufficient coup d'œil of the actual condition and wants of this city. That there are causes constantly in operation here, *and which may be easily removed*, that tend to produce great public unhappiness, by abridging both the usefulness and the term of life, any one may see; that it is the duty of Government—the only moving power in India—to obviate all these causes, no one can reasonably doubt.

The amelioration of public health to be derived from the improvement of locality is not a mystery in science; it is a matter plain to any man's understanding.

“ I have travelled,” says Fodéré, “ I have lived in different countries ; I have reflected on the condition of man in different circumstances of life ; I have seen that it is in the power of Governments to do him infinitely more good than all the books of medicine put together.”

That the Marquess of Wellesley, had he been allowed to govern this empire a little longer, would have carried into effect most, if not all, the improvements above noted, there can be no doubt ; and I cannot better conclude this part of the subject than by the following noble declaration from that highest of all authorities on Indian policy, whether general or local, in confirmation of the opinion I have always held, that Government is mainly liable for such matters.

“ It is a primary duty of the Government to provide for the health, safety and convenience of the inhabitants of this great town, by establishing a comprehensive system for the improvement of the roads, streets, public drains, and water courses, and by fixing permanent rules for the construction and distribution of the houses and public edifices, and for the regulation of nuisances of every description.

The appearance and beauty of the town are inseparably connected with the health, safety, and conveniency of the inhabitants, and every improvement which shall introduce a greater degree of order, symmetry, and magnificence in the streets, roads, ghauts, and wharfs, public edifices and private habitations, will tend to ameliorate the climate, and to secure and promote every object of a just and salutary system of police.”—*Lord Wellesley's Minutes.*

CALCUTTA.

Geographical position.

Calcutta stands in Lat. $22^{\circ} 33' N.$, and $88^{\circ} 20' E.$, the distance from the sea being about a hundred miles.

Topographic sketch.

Viewing the modern city as depicted on a military map, which, as exhibiting the most perfect and detailed topography, should always be preferred, it may be described as occupying a space, along the left bank of the Hoogly, of four miles and a half estimated from Chitpore to Kidderpore, north and south, and of one mile and a half from west to east; that is, from the river-bank to the Circular road. To the north, it is bounded by the outer-suburb of Chitpore, and to the east and south-east, by those of Nundenbagh, Behar-Simlah, Sealdah, Entally and Ballygunge; beyond which are the two canals and the Salt-water Lake. South of the town and fort are the great suburbs of Bhowaneepore, Alipore and Kidderpore.

More remotely, Calcutta has to the south and east, extending for 180 miles along the sea, the woody tract of the Sunderbunds, consisting of jungle and marsh, including the embouchures of the Ganges: to the north and west, is the tract of annual inundation, anciently called Beng—"the work of the Ganges"—deeply covered over during the rains, and intersected by innumerable rivers. Like Guiana, "the unhealthy kingdom of Bengal," or more properly, the lower portion of the delta of the Ganges, is below the general level of the sea at high-water mark; and like Guiana also, it would be uninhabitable from continued stagnation, but for the silted elevation of the river-banks, and the fluctuating declivity occasioned by the retiring tides. The reason why the delta of the Nile is not infested with remittent and intermitten fevers is, that the fall towards the sea is so great as to admit of no stagnation.

The actual site of Calcutta, once a portion of the Sunderbunds, with here and there a patch of rice ground, is a very slightly undulating surface, or *saucered*, as it is called. It has a gradual, but to the eye

imperceptible slope from the river towards the east, a condition natural to most of the river-banks in Bengal and Orissa, owing to the gradual process of silting from the turbid streams during the rains, in a long succession of ages. The inclination of the soil eastward is such as to admit of complete drainage, the details of which will be explained under the proper head.

The extent of Calcutta, from the Maharatta ditch at the northern extremity, to the Circular road at the southern circuit of Chowringhee, is not more than four and a quarter miles, and its average breadth is only one mile and a half. The average level of the ground is between 3 and 5 feet above the average of high water. Both the upper and sub-soil are pervious to water, the general character being alluvial; and brackish water is reached at a depth of from 18 to 20 feet. A section of the several strata gives alternations of loose sand, blue and yellow clay, with here and there a stratum of peat. At 357 feet deep, bones were found, and further down, pieces of decayed wood. Spring water was not obtained at 404 feet below the surface.

NATIVE CITY.

The native town and the portion occupied by Europeans must be described separately, as they have few points of resemblance.

The former fortunately occupies the northern section of the area already described: had it been ordered otherwise by Mr. Job Charnock, and that we had the black town to windward during the S. W. Monsoon, then must the Europeans have tried their fortune somewhere else: here, at least, accident has favored us. The lower or southern division of the town which comprises Chowringhee is but thinly peopled; the houses of Europeans being widely scattered, and Kolingah, which is a part of it, is chiefly occupied by natives.

Native City.

The division between Durrumtollah and Bow Bazar has a denser population; it comprises the most thickly inhabited European part of Calcutta, as well as that occupied by a great number of country-born Christians, who reside in the town with their families.

The north division between the Bow Bazar and Muchoa Bazar, comprises perhaps the most dense part of the native population of Calcutta. The upper division to the north of Muchoa Bazar is, comparatively speaking, but thinly covered with habitations, presenting towards the north and east extensive gardens, large half-dried tanks and ruinous tenements. It is surprising how much the condition of the native portion of the town has been neglected in this great city and its suburbs, in which are to be found all the faults of all the cities in India. It may not be very easy efficiently to interfere in this matter, and it may be very true that it is less difficult to find fault than to remedy the evil complained of; but in an affair of so much importance to the public health, something may be done and at least ought to be tried, if only in the way of municipal or police regulation.

In the event of a contagious disease (and there is no reason why such should not occur here) the dense state of the Burra Bazar and the surrounding parts, the want of water courses, and means of facility for removing accumulations of filth, &c. would stand as insuperable bars to the best devised regulations of Medical police. All masses of buildings should be opened out, old walls and decayed houses removed; for even under ordinary circumstances these are fertile sources of fever.

D W E L L I N G S.

"The people of India are not infected with that plague of building, as the Italians call it. The poor cannot afford to erect sumptuous piles, and the grandees do not care to do it."—*Old History*.

Former want of security in property gave rise to the miserable style of native building.

There can be no doubt that to former want of security in property, even more than to the improvidence and indolence of the natives, must be ascribed that character of building, amongst the better classes even, which necessarily excluded all taste for the fine arts, and that the houses of the people, within their greatest cities, disappeared like empires of which the cities themselves were centres; and it is to a continuance of these feelings amongst the people, after the political causes have been removed, that we must ascribe the general wretchedness of the Bengalee huts up to the present day.

The houses of the wealthier classes are brick-built, from 2 to 3 stories high, closely constructed and divided only by dirty, narrow and

unpaved streets ; the roofs are flat and terraced. This is the general character of that portion of the black town called Burra Bazar, in which are to be found, however, some residences which, on account of their peculiar arrangement, require a separate mention ; I mean the houses of the Baboos. These are uniformly built in the form of a hollow square with an area of from 50 to 100 feet each way, which, on the occasion of Hindoo festivals, is covered over, and when well lighted up, looks very handsome. The house itself is seldom of more than two stories, the lower portion on three sides of it being used only for store-rooms, or for domestics ; on the remaining side, and that always the northern one, is to be found the Thakoor-Ghur, or abode of the Hindoo Gods ; this is always finished with care, and when the owner is wealthy, the lustres contained in this sacred apartment are of considerable value. Above stairs are the public apartments, with verandahs, always inwards ; these are generally long narrow slips, containing a profusion of lustres and wall lights, altogether affording but a mean view to an European. Jutting out from this main building are situated the accommodations allotted to the females, and family : they consist of smaller hollow squares, with petty verandahs opening inwards, and some houses have 2 or 3 sets of these zunnanahs, with one or more tanks attached, but which are generally kept in a very neglected state. Altogether, this form of building, if placed on open ground and made more roomy, would not appear ill calculated for the climate.

Houses of Baboos.

The mass of labouring classes live in huts, the walls of which are of mud, or of matted reed or bamboo, roofed with straw or tiles, according to the means of the occupant ; these would not be so bad, but that they are uniformly placed on the bare ground, or on damp mud, but little raised, which continually emits injurious exhalations. Great numbers know nothing of the comforts of a bedstead, and the inconveniences to which they are subjected are greatly increased by the pits of stagnant water often made close to their doors.

Houses of the poorer classes.

While in Ava, I was forcibly struck with the superior style of buildings amongst the natives, which, in point of airiness, elevation, and mode of construction, constitute the best habitations for the poor I have ever seen in any country ; and I have no doubt they contribute much in aid of a climate in itself very superior to that of the delta of the Ganges, to

Mode of buildings amongst the Burmese excellent.

The Bengalee behind savage tribes in his mode of buildings.

form the hale constitution of the Burmese, as contrasted with other Asiatic races. There, every man is raised above the ground in proportion to his means, and even the poorer classes are three feet above it; while here, nine-tenths of the entire population sleep on the bare ground. In this important matter the Bengalee is behind many savage tribes. The miserable wood-cutter, on the banks of the Mississippi, raises his hut as high as he can on posts, and the Guanaco of the delta of the Orinaco climbs into the tallest palm trees, as a protection from the exhalations with which both are surrounded.

Dr. MacCulloch, in his account of the Hebrides, states that, while the inhabitants had no shelter but huts of the most simple construction, which afforded free passage to currents of air, they were not subject to fever; but when, through the good intentions of the proprietors, such habitations were provided as seemed more comfortable and commodious, but which afforded recesses for stagnating air and impurities, febrile infection was generated.

In 1793, the number of houses, shops, and other habitations in the town belonging to individuals was as follows :

To natives of Great Britain,	4,300
Armenians,	640
Portuguese,	2,650
Hindoos,	55,460
Mahomedans,	11,700
Chinese,	10

Total, independently of Government premises, 75,760

The number of premises in Calcutta to be considered as containing any population amounted in 1822 to a total of 67,519, of which 5,430 were upper-roomed houses, 8,800 lower-roomed houses, 15,792 tiled houses, and 37,497 straw huts. By the very latest returns, but little increase would seem to have taken place in either kinds of premises, since 1822.

THE STREETS.

Whoever has visited the native portion of the town before sunrise, with its narrow lanes, and "rankest compound of villainous smells that ever offended nostril," will require no argument in favor of widening the streets, so as to effect the two greatest improvements of all, as respects the salubrity of a city, free exposure to the sun, to rarify and elevate the vapours, and to the winds to dilute and dissipate them.

Streets require to be opened out.

It were easy to point out where clearing out masses of building, and widening and new forming of streets should be effected; but here I shall only indicate the necessity for these measures, in almost every part of the native town: the details could easily be arranged. When new streets are formed, they should be as much as possible in the direction of the prevailing winds: all streets should have raised pavements on each side for foot passengers.

As economy is always the argument of the opposers of improvement, it may be well to state that, in widening the streets of London, it was generally found that the building-ground on each side of the new street paid the purchase money of the old houses.

If, as I believe to be true, we can promise the same profitable result in Calcutta, we shall have all the retrenchers on our side.

The want of watering has been severely felt in every part of Calcutta of late years, and the more the city extends, the greater is a matter of so much importance to health needed.

The absence of watering injurious to health.

Dr. Fordyce considered the dust of the streets of London, in his day, "a serious detriment to health."

The deficiency in the supply of water is highly injurious in other ways; and in order to illustrate this point, I may mention, on the authority of published reports, that during an epidemic fever in Belfast, the quarter where water was wanting, and consequently, where cleanliness and sewerage were comparatively deficient, supplied three-fifths of the whole amount of fever cases.

Great value of public cleanliness.

It must be confessed, the natives have yet to learn, in a public and private sense, that the "sweet sensations connected with cleanly habits, and pure air, are some of the most precious gifts of civilization, and that a taste for them tends to give a distaste to degrading and grovelling gratifications; the common saying that cleanliness is next to godliness, is founded on reason, in as much as it is conducive to moral purity as well as health and pleasure."

DRAINS AND SEWERS—THE LEVELS.

Great importance of the subject.

There is probably no subject connected with the public health and comfort of a city, of more consequence than the state of the sewers. Those of Calcutta throughout, I believe to be defective in number, construction, and fall, without which last the most approved plan gives no real usefulness; indeed, in most parts of the native town, they are only receptacles for every kind of filth, and must ever continue in a most offensive state till better constructed.

Stagnation from want of sufficient fall very injurious.

It is stagnation from want of sufficient fall in the drains, that gives rise to deleterious exhalations, and the same applies to the half-dried tanks so numerous here, and to the water retained by inequalities of soil. Captain Forbes, in his evidence before the Municipal Committee, says, that the joint areas of the stagnant ditches, eventually dried up by evaporation, may be added to the total area of obnoxious evaporating puddle-surface, generating rank jungle and other vegetation ultimately left to decay.

Lord Wellesley's account of the drainage in his time.

In a minute of Marquess Wellesley's, of June 1803, it would seem that at that time an "original error" existed "in draining the town towards the river;" and so little had this important matter been attended to, that at the time his Lordship wrote, the greater part of the town had remained under water during a week. "The defects of the climate of Calcutta," says his Lordship, "during the latter part of the rainy season, may indeed be ascribed in a great measure to the state of the drains and water-courses, and to the stagnant water remaining in the town and its vicinity."

Levels of Calcutta.

The natural fall from the river-bank towards the salt-water-lake is considerable; the lowest level in the town being eight feet, while the

highest is twenty-two feet, above the lake. Chowringhee, and a portion of the Esplanade, may be conveniently drained into Tolly's Nullah.

The most complete evidence on all that relates to levels, construction of drains and sewers, &c., is now recorded on the Proceedings of Municipal Committee, already mentioned, and Government has only to order the "necessary funds" indicated by Marquess Wellesley, and Calcutta will be as well drained as any city in the world.

The great sewers should be of solid masonry, arched over; they should also have lesser communicating sewers proceeding from each house, and their fall should be such as to admit of no arrest of their contents: such of the sewers as of necessity terminate in the river, should have their mouths at ordinary low water mark. Open sewers, or surface-drains should, where practicable, be made in the direction of the prevailing winds, and wide, so as to admit of exposure to the sun, and free ventilation.

Great sewers.

ON THE GENERAL SUPPLY OF WATER—THE TANKS.

The natives do not seem any where impressed with the importance to health of a plentiful supply of pure water, and therefore it is that we every where find the tanks and wells in an impure and neglected condition, from the annual accumulations of vegetation going on at the bottom, so as to render them progressively shallow, until at length they become the half-dried, green and slimy puddles which so contaminate every portion of the native town.

The natives not aware of the importance to health of a plentiful supply of pure water.

The tanks within the premises of the Baboos are universally in a neglected condition, and should be well looked to by the police. No person ought to have exclusive right or property in what is injurious to the public health.

The tanks attached to the Baboos' houses all bad.

All half-dried tanks and wells should be filled up, and bathing, clothes washing, &c. only permitted in such as are unfit for other purposes.

Half-dried tanks and wells to be filled up.

It is but a very few of the newer tanks that are kept in any thing like cleanly order; and out of about 537 in and about town, by far the

Actual state of the water now in use amongst the poorer natives.

greater portion are foul and offensive in the extreme; so much so, that a witness before the Municipal Committee described them as emitting "a stench like that of a putrid carcass, and that in some places there was not a single reservoir of wholesome water in a neighbourhood." It is in the months from the end of March to the setting in of the rains that the poorer natives suffer most from deficiency of water, the tanks and wells being then in process of drying, and the river water saline, in addition to its other impurities: even during the rains, the lower classes of natives use the river water in its turbid state, when it cannot be wholesome.

Captain Thomson stated in his evidence before the Municipal Committee that a mussuk of water (or about eight gallons) is generally sold in the streets of Calcutta for a quarter of an anna, *i. e.* one third of an English penny, at two shillings per rupee, and that in a country where the wages of a common labourer does not exceed two annas per day. Again, the supply, taking it at a mussuk per man per day, amounts only to two-fifths of that allotted to each inhabitant of London, and less than a fourth part of the quantity distributed in Rome and Constantinople.

Rain water used by Europeans.

The better classes of Europeans use rain water, kept in Pegue jars, and which, on account of their great dimensions and narrow mouths, seem well adapted to the purpose.

Good tanks in sufficient numbers still a desideratum in Calcutta.

This being the purest of the natural waters, ought to be more in use in a country where it can be so readily obtained. The best tank water is said to be in those filled from the river during the height of the rains. Complete and detailed plans for the construction of new tanks, at convenient distances, are given in the report of the Municipal Committee, and it only rests with Government to carry them into execution.

It must however, be matter of surprise to strangers, that, in a climate like this, the construction of tanks containing good water should still remain a desideratum in the capital of British India.

CHOWRINGHEE—THE EUROPEAN QUARTER.

The European quarter.

Chowringhee extends south of the native town, and from the corner of Durrumtollah road, is a mile and a quarter in extent: it faces the

glacis of Fort William, and is altogether as well arranged as the locality admits: the ground is also well drained, excepting those portions of it occupied by natives, which are in an extremely neglected condition. The houses of this quarter, and of Garden Reach, have an imposing exterior, which incautiously obtained for them from strangers, the magnificent appellation of palaces!

The style of building is Grecian, ornamented with spacious verandahs, the pillars of which are generally too lofty to afford much protection from the sun's rays. Each house has a piece of garden ground, which gives to this quarter as well as to Garden Reach, a great advantage in point of airiness over the commercial part of the European city. In Chowringhee the garden walls are too lofty, and thus obstruct the ventilation of the lower floors of the houses.

I cannot help thinking that a different arrangement in regard to the aspect and interior of the houses, to that which is now general, would be more suitable to the climate and conducive to health. In place of the present mode of a northern and southern aspect, with the entrance to the north, I would have the aspect to the east and west, with the entrance always to the east. Fronting in this manner, the eastern face becomes rapidly a complete shade after noon at all seasons, whereas the now common entrance exposes the portico to the sun from 6 to 9 A. M. and from 3 to 6 P. M., besides admitting the chilling currents of the N. E. monsoon. The porticos too should be arched, and not pillared as now constructed.

A modern scientific writer proposes an easy mode, if it be a correct one, of determining the proper aspect. The most healthy exposure, he says, is to be found "by cutting one of the trees that grow there transversely with a saw, observing the rings; the side of the tree on which the distances between each ring is widest is the most healthy exposure, and the windows of the house, all other circumstances being the same, should ever face that way.*

All dwellings in countries subject to inundation, like Bengal, should be raised on arches of from 4 to 8 feet in rise, and have western as well as

Mode to determine the proper aspect.

Buildings in Bengal should be raised on arches.

* Encyclopædia Britannica.

southern verandahs, the lower portion to be arched and the upper pillared. Private rooms should for coolness and convenience be larger and loftier than are now common, and their windows fewer in number, loftier and narrower. The importance of space in private apartments is forcibly impressed by the fact stated by Dr. Edwards, "that persons who have what is called delicate lungs, owe in a great degree the difficulty and oppression which they feel to the smallness of their apartments, a difficulty which decreases on going into a large room or into the open air." The lower floors of our Calcutta houses as now constructed, become sooner or later unfit for habitation, depending as to time, on the quality of the building material and the nature of the locality. I have known the ground floor of some houses to become useless in five years—so that, even on the score of economy, it were best in the end to build on arches.

Injury to health from occupying the ground floor of houses.

The lower ranges of dwellings are generally believed to have an attractive power over marsh exhalations; and hence, in malarious countries, the second stories of houses are always found to be more salubrious than the first. I have frequently known slow fever contracted by persons occupying the ground floors of our houses and which yielded only on a removal to the upper-rooms. I have also known severe visceral congestions produced by occupying the same situations during the cold season, as offices of business. Troublesome ophthalmies, various local rheumatisms, and swelled face are the more ordinary effects of inhabiting the floor ranges, and will be found very prevalent amongst the natives employed as writers in the Government and mercantile offices of this city.

Private dwellings have been erected by the natives as a speculation, and are not built with reference to climate or convenience.

Hitherto, private dwellings have been erected by natives and other speculators on their own plans, at the cheapest rates, and for the mere purpose of letting to the highest profit: no wonder then, that they should be constructed without reference to locality, climate or convenience.

Great importance of the subject.

That this is a matter of importance to health will be made evident from the following report of Mr. Ralph, of Her Majesty's 2d Regt. of Foot, on the difference of health between the upper and lower stories of barracks occupied by that Corps in the West Indies. "By a calculation it appears that in the month of August, one case of fever presented itself in every twentieth man of those quartered on the ground floor, and in each thirtieth man of those in the upper floor. During that part of September

which has elapsed, each *twenty-fourth* man was attacked with fever of those stationed in the *upper-rooms*, and each fourteenth among those in the *lower*."

Dr. Fergusson found two-thirds more men were taken ill on the ground floors at St. Domingo, and the same observation was made by Cullen at Porto Bello in 1740. Walcheren afforded several instances to the same effect.

FORT WILLIAM.

The citadel of Fort William stands in latitude 22° 33' north and longitude 88° 20' east, about a quarter of a mile below the town, and is superior in strength and regularity to any fortress in India. The Fort was begun, says Orme, upon a scale of expense which its founder Lord Clive had no intention of. It is of an octagan form, five of the sides being regular, while the forms of the other three next the river, are according to local circumstances. The works are scarcely raised above the level of the surrounding country, and make no imposing appearance.

Latitude of Fort William.

Construction.

The ditch is dry, with a cunette in the middle, which receives the water of the ditch by means of two sluices that are commanded by the Fort.

The Ditch.

The garrison usually consist of a Regiment of European Infantry and one of Sepoys, with a detachment of Artillery. For purposes of defence five times this number would be requisite.

The Garrison.

THE BARRACKS.

There are five barracks for the accommodation of Officers, one of which is three storied. They are generally well arranged, and excepting Staff barracks, they are not intended for habitation on the ground floor.

The Barracks.

The Artillery Barrack for the men is 420 feet in length by 320, height 36 feet. On the peace establishment it is arranged for 1,000 men, and in war for 1,782. The Infantry Barrack 313 by 300, and 27 feet

Dimension.

high, accommodates 900 men on the peace establishment and 1,602 in war. Both are damp on the ground floor.

The late Inspector General Burke, described Fort William as one of the very worst of our Military Stations. "The buildings are too crowded together, the estimate of space, and of domestic convenience has been too confined for the climate, the apartments for the men are deficient in height and ventilation."

"From the crowding of the buildings, the height and proximity of the fortification, the radiation of heat is not only very great, but there is prevented the dissipation of those malarious vapours of which there appears to be so copious a supply from various sources in Fort William."

HOSPITALS.

New Hospital for
H. M.'s Troops on
Dr. Burke's plan
well constructed.

There is no room within the Fort for sick accommodation, and the Garrison Regimental Medical establishments are therefore placed in one of three old-fashioned buildings comprising the General Hospital. That they were built seventy years ago would seem *prima facie* evidence against them, and in reality they are very defective in construction, besides being surrounded by a wall sixteen feet in height, as if on purpose to obstruct ventilation. The situation too is on every account ill-chosen and inconvenient for a General Hospital. The distance from town is considerable, and the actual site is close upon the most unhealthy of our Suburbs. To one retrospective good purpose, however, the General Hospital might yet be made subservient, that of its Medical statistics since its foundation; but the subject is unhappily, up to this day, a sealed book in Bengal.

From the antiquated establishment last described, it was the anxious desire of the late Inspector General Burke, a man of talent and extended experience as a Military Surgeon, to remove the sick of Her Majesty's Troops, and an Hospital on a suitable scale was erected on his plan and recommendation seven years ago. The new hospital is airy, commodious, and beyond all comparison superior to any hospital at the presidency; but, after having laid empty since its completion, it was recently, and for

reasons I am not acquainted with, given over for the accommodation of the chief Civil and Criminal Court.

So far as I have been able to consider the matter, I am disposed to think that hospitals in the Lower Provinces should face directly East and West, with a spacious verandah on these two faces.

Opinion as to the aspect and mode of erecting hospitals in Bengal.

By this arrangement the convalescents would have complete shade in either verandah, morning and evening, for exercise—an advantage not possessed under the now prevalent mode of building with a Southern and Northern aspect. It may be objected, that by the Eastern and Western aspects, the long face of the buildings will be exposed morning and evening to the direct rays of the sun; but spacious verandahs will obviate this; and it should be recollected that in the end the most expensive hospital will prove the least so in lives. It is a solecism in economy, says Dr. Moseley, to have a bad one. I lost (he continues) more value in men at Castille Fort and Up-park in three months from the miseries of the hospital alone, than would have been adequate to the expense of erecting a proper one for all the troops in the island—meaning Jamaica. St. Sauveur remarks of a badly constructed hospital at Corfu: “c’est la, que le soldat alloit au devant de la mort plutôt que de la santé.”

The selection of the aspect now generally adopted in Bengal appears to originate in the desire to solicit, what is called a “thorough draught,” by means of a thousand doors and windows, such being considered necessary to due ventilation. I believe this to be a mistake, and one from which a large portion of sick suffers injury, especially during the cold season, when the strong northerly current is felt to be very uncomfortable, even by persons in health. The most liberal ventilation should doubtless prevail in all hospitals, but this is best secured, and a lower temperature maintained, by space, especially elevation, aspect, &c. and a proper adjustment of doors and windows, open down to the floor, with alternate apertures in the upper and lower walls, fire places, &c. &c. In lower Bengal and countries like it, all such buildings should be raised on six or eight feet arches, left open for ventilation: The roof should also be double.

THE SUBURBS.

Attention to the state of the Suburbs necessary in the first instance.

Without attention to the state of the Suburbs in the first instance, it is useless to attempt any great improvement within the city : while every square acre of the circumference is left in a state worse than that of nature, it were in vain to work in the centre. The improvement of the Suburbs too, as it will prove of the greatest benefit to health, so I think it will also be least in point of cost : here, great works in masonry will not be required.

VILLAGES ALONG THE CANAL.

Villages along the canal.

Their miserable condition.

What I am about to notice is from repeated personal observation. I began north-east of the town about Chitpore, and carried my examinations toward the south, until I reached Mr. Kyd's dock-yard. I have personally examined Chitpore, Nundenbagh, Behar-Simlah, Komarparrah, and Sealdah, and find that one description will serve for all ; viz. general irregularity of ground, affording lodgment of various extents for stagnant offensive waters ; drainage everywhere defective, and good tank water scarce. There are also belts of jungle tree and underwood, obstructing ventilation. In all these villages the replies of the natives confirmed what indeed any one could have predicted, as to the general prevalence of remittent and intermittent fevers with their sequelæ, during the whole period of the drying process from October till June. The new earth dug from the canal, and now heaped all round might readily be made use of to level and fill up the thousand pits and half-dried tanks which now form such fertile sources of noxious exhalations in these villages.

Canal and its banks.

The banks of the canal should be carefully preserved from all accumulation of filth and rank vegetation.

This applies especially to the head of the old Canal at Baliaghatta, where it should be deepened ; and where I have observed the banks in a noisome and neglected state.

Spacious tanks should be dug at convenient distances, and the earth thus procured, made use of to fill up the irregularities of ground. All underwood and belts of jungle trees should be rooted out.

ENTALLY.

From the frequency with which I have seen the unhealthy state of the suburb of Entally set forth in the daily prints by persons professing themselves inhabitants, I had expected to find more of the sources of fever there than in the last mentioned villages; but in truth they are all bad enough, and the difference as regards Entally lies chiefly in this, that a large proportion of its inhabitants are Christians, and can make their grievances known. Entally is fully in as neglected a state as any locality pointed out in this report, and any one need only observe, to know the remedy. It is so obvious, that I need not enter on what would be but repetition. The drains here and at Bally Gunge are all in neglected condition, and require clearing, with a proper fall. There is also much bamboo and other jungle all round, which ought to be rooted up. I know of no quarter near Calcutta so much in need of this measure.

Entally as bad as any of the suburbs.

BALLY-GUNGE.

Here, I beg to solicit attention for a moment to the beneficial effects resulting from very simple and apparently trifling improvements, executed at my suggestion some years back in the cantonment of Bally Gunge.

Having shortly before served with troops in the field in the very unhealthy countries of Orissa, along the borders of the Chilka lake towards Ganjam, and in the interior of Gundwana, on the Mahanuddy, I was appointed to the charge of the Governor General's Body Guard at Bally Gunge in 1821; and there I found severe remittent fever, such as I had first seen and personally suffered from in the jungles, prevailing to a great extent, and I learnt that it had been so for years. To ascertain the cause of a state so different from what I had been led to expect, I made several careful examinations of the localities, and discovered that in the men's lines alone, besides stagnant drains, there were sixty pools and

Former unhealthiness of Bally Gunge remedied at the suggestion of the author in 1821.

pits of various dimensions, to all which, and the neglected state of the grounds around the regimental hospital, I had no hesitation in referring as a sufficient cause of the extreme unhealthiness of the corps. I represented the necessity of drainage with a sufficient fall—the filling up of the pools and pits, and the construction of two large tanks at a proper distance from the men's lines. The then Governor General, Marquess of Hastings, was pleased to order all my suggestions to be carried into effect, and the result during the three following years, was a reduction in the frequency and intensity of fever, as remarkable as it was satisfactory. I had intended to have brought the details to the notice of the authorities, but I lost my papers in a shipwreck on the coast of Ava, when proceeding thither during the late war with the Body Guard. The fact, however, is as I have stated.

BHOWANEEPORE.

Bhowaneepore ;
sufferings of the na-
tives in 1833.

This is the most populous of the native suburbs, and I believe it was the most severely visited by the epidemic remittent fever of 1833. To this calamity it would seem peculiarly exposed through its low, closely-built, and ill-ventilated streets, its great stagnant ditches, lined with rank vegetation, its back ground of extensive marsh and underwood, and its innumerable half-dried tanks and pools. The native residents, whom I questioned on the spot, spoke of the last year's fever as universal, and declared its ravages to have been more extensive than the oldest of them had ever previously seen. No doubt all this is true, for epidemics are observed in all countries to fasten with the firmest gripe on such localities.

Good tanks are very much wanted in this suburb, the inhabitants having now to proceed to the distant "General's tank" in Chowringhee, that being their only source for the supply of wholesome water.

ALLIPORE.

Allipore a better
locality.

Allipore has long been considered a healthy locality, and was early occupied by Europeans. It still contains the favourite villa of Warren Hastings. Cossipore and Russapuglah are also esteemed more healthy than Calcutta, and I believe with justice. This suburb (Allipore) from

being better raised and better drained, did not suffer nearly so much from the fever of 1833, although natives of respectability assured me, it carried off at the rate of eight out of ten of the occupants of each house in the villages to the south and east of us during that season. This circumstance is well deserving of notice when compared with the state of Garden Reach, where scarcely a house escaped the epidemic fever, and I knew one, in which every individual was attacked. Finally, it may be said with truth, that of all the places noticed, there are not six square acres of soil occupied by natives, which do not contain marsh and other concentrated sources of periodic fevers, which in the course of time establish their inevitable sequelæ of spleen and fatal diarrhæa—the brief history of the life and death of two-thirds of all the poor inhabitants around us.

General unhealthiness of the Suburbs.

Where all positions are so bad, I find it difficult to select even by comparison what are usually designated by medical topographers healthy situations and unhealthy situations. The sections Boitakana and Entally, I am informed by a gentleman, now 50 years resident in Calcutta, were considered healthy, when about 35 years ago, he first took up his residence at the former place ; but since the construction of the canals, they have become notoriously the reverse : fevers formerly infrequent are now general, especially on the drying up of the rains, and are commonly attended with yellow suffusion on the surface. The cause of this change appears to me to arise from the banks of the canals impeding the natural drainage towards the east, and the inquiries made from natives would lead to the belief that the inhabitants suffer severely at all seasons. Those who frequent the borders of the Lake and places about Ullabarea, to collect the reeds used for the manufactory of floor mats in common use here, are unusually short lived, even for Bengalees, and in the season of the inundation, in 1833, most of them died.

Difficulties in their present state to say which is best and which the worst.

KHIDDERPORE.

I thought I had visited the worst of the Suburbs in Bhowaneepore, but Khidderpore, which is next in populousness, greatly surpassed it. I think I never saw in any part of Bengal or Orissa, a locality so generally bad, and the result corresponds entirely with its condition. Fever is

Kidderpore ; its neglected state.

general throughout, even in the healthiest season, and the want of good water forms an universal complaint amongst the inhabitants. There is not a square rood that is not in a surprising state of neglect, and the portion between the bridge-end, and Kyd's dock is one entire jheel. I need not again speak of the remedy for all this ; but I beg to mention what I would consider a great improvement to this and the other suburbs, viz. flood gates, from the Tolly's nullah, to wash out the drains. Those from the left bank would fall into the Hooghly, clearing out the drains of Garden Reach in their course ; whilst those from the right bank, having swept through Bhowanepore, should enter the Mahratta Ditch, and pass along the Circular Road, terminating in the head of the Canal. Calcutta itself would be much improved by this measure.

From their situation and neglected state the great Suburbs of Bhowanepore and Khidderpore are peculiarly exposed to the effects of inundations, such as occurred here in 1833. All I have said of the native city and suburbs applies with equal force to the portions called Kurbullah, Simla, Mirzapore, Paritollah and Collingah, where defective drainage, half-dried tanks, and "*saucers*" are every where to be found. These saucers, as the engineers call them, should be well looked to, for they are very productive of disease, fever especially.

HOWRAH.

Howrah.

Howrah is directly opposite to Calcutta, and, like the parent city, it has its proportion of marsh in its rear.

The oldest Suburb of Calcutta.

This would appear to have been the oldest of our suburbs, and to have been considered by Captain Hamilton as preferable for the site even of the great emporium. Speaking of Howrah in his time (1688-1733) he says,—

Captain Hamilton's description of, in 1688-1733.

" On the other side of the river are docks made for repairing and fitting their ships' bottoms, and a pretty good garden belonging to the Armenians, that had been a better place to have built their fort and town in, for many reasons. One is, that, where it now stands, the afternoon's sun is full in the fronts of the houses, and shines hot on the streets that

are both above and below the fort; the sun would have sent its hot rays on the back of the houses, and the fronts had been a good shade for the streets."

For the following particulars I am chiefly indebted to Dr. Duncan Stewart, many years Civil Surgeon of Howrah, and founder of the excellent establishment for European Seamen.

This Suburb is long and straggling, extending along the river about six miles, its greatest breadth being about two miles.

The country around and inland is very low; the river bank, on which the better of the houses is built, being like Calcutta, the higher, and having at some places an elevated upright river front, shewing that the deep channel formerly took this course. Of late years a sand bank has been rapidly forming south from the head-land at Howrah Ghaut, which now crosses the stream near to Calcutta, and extends down to Seebpore.

Description.

Inland, the country is very low, and like that beyond Calcutta, is devoted to rice culture, with here and there patches of underwood; it may be said to be in a humid state for nine months in the year. The number of houses is as follows:

Houses.

Mehals.	Brick Houses of one Floor.	Brick Houses of two Floors.	Matted and Thatched Houses.	Tiled Huts.	Native Chowk.
250	1982	1215	47178	573	1

There are no *puckah* drains, but the water has free course, the bank being high, and great attention being paid in repairing the drains that exist.

Drains.

In the back part of the Suburb the necessary fall being wanting, there exist many stagnant pools and half-dried tanks.

Wells.

The number of *puckah* wells is 54—kutchra wells 216—tanks and pools 380.

Public Buildings.

There are three Churches capable of accommodating about 150 persons ; there are likewise two Hospitals, one for natives supported by voluntary contributions, and furnishing medical aid to about 30 to 40 patients daily, and the Hospital for European Seamen established by Dr. Stewart at Howrah Ghaut : the number of patients admitted into this latter from the ships in the river have been, within the last twelve months, 348. There is besides the above, a District Charity Fund similar to that in Calcutta for the relief of needy Christians. The Government Salt Golahs form an extensive range of building, very defective in original construction and constantly in need of repair. The roads and houses in their vicinity are often encrusted with a deposit of salt, and the natives employed suffer in consequence from ophthalmia and other diseases of the eye.

There are seven or eight Docks on this side the river, the older ones being the most spacious and considered the best. A Slip Dock has lately been built, and with these exceptions all the rest are Mud Docks. In all of them much attention is paid to the proper accommodation of the workmen.

Population.

The following is the population, according to a census taken last year :

Resident Hindoo Adults.	Resident Hindoo Children 6 years old and under.	Hindoos in Service.	Mosulmaun Adults.	Mosulmaun Children 6 years old and under.	Mosulmaun Servants.	Native Lodgers or Passengers.	European Adults.	European Children.	East Indian Adults.	East Indian Children.	Total.
33,223	20,342	8,106	12,154	4,395	2,019	3,153	43	24	63	49	83,571

Howrah healthier than Calcutta.

Dr. Stewart considers that the Howrah side of the river is the more salubrious from the S. W. monsoon blowing fresh along and across the

river. The inhabitants residing along the bank he considers healthier than such as occupy the low back grounds bordering on the marsh. He likewise considers the locality of the Bishop's College healthy, and ascribes this to the circumstance of the grounds about it being kept in a state of dryness by sluice drains.

Bishop's College healthy.

In the Docks, he says, the natives employed in stripping off old copper from the ships' bottoms frequently suffer from "sudden attacks like cholera or apoplexy."

TOPOGRAPHIC DETAILS
CONNECTED WITH THE CAUSES OF PHYSICAL CLIMATE.

“ L'ensemble de toutes les circonstances naturelles et physiques, au milieu desquelles nous vivons dans chaque lieu.”—CABANIS.

“ The best observations upon climate often lose half their value from want of an exact description of the surface of the country.”—MALTE-BRUN.

Whoever considers climate, with reference to its vast importance to human welfare, must feel some degree of disappointment, if not astonishment, at the meagreness in which the advanced state of knowledge in the nineteenth century has yet left this most interesting branch of inquiry. One philosopher will view climate as any space distant from the equator and poles; another, as nothing more than a well-arranged table of the winds, of the thermometric, barometric and hygrometric, degrees; a third, as having reference solely to elevation above the mean level of the earth's surface; a fourth, as consisting only of the internal heat of the globe; while a fifth, supposed to be better informed than all the rest, pronounces climate to be influenced only by latitude and local elevation, and allows it to be but slightly affected by any other causes. We may, then, with some shew of reason exclaim with Dr. A. T. Thomson, what is climate?

That such partial views are unequal to the elucidation of the great and intricate subject of climate, will at once be apparent by reference to the common geographical fact, of two places in the same elevation and degree of latitude possessing climates the most opposite. We must then, look for the causes of climate elsewhere; and however much those may be influenced by elevation and latitude, we shall find other and powerful accessories which greatly influence health, and consequently human happiness. He must be a bold, if not a presumptuous man, however, who shall pretend to do full justice to a subject so elaborate, and that demands the application of such refined principles in physical science as climate; yet I cannot help thinking that much that

is important may be done, by a careful observation and comparison of facts, made at different times and places ; for, it is by such means that a science like that of climate can alone be perfected.

Whether we view the subject in a physical or medical sense, we shall do well to carry along with us the maxim of Professor Adam Fergusson, "that all observation is suggested by comparison." The value of all scientific facts depends in a great measure on their being comparable, and this in an especial manner applies to inquiries relating to climate and medical statistics. I am satisfied that, in a professional sense, it is impossible to take too extended a view of the subject of climate, and that he who succeeds best must follow the indication of Cabanis—"l'ensemble de toutes les circonstances naturelles et physiques, au milieu desquelles nous vivons dans chaque lieu ;"—for this much is certain, that the framers of elaborate tables of the winds and of the degrees of the thermometer, have as yet done nothing either to inform our minds, or guide our inquiry.

Medical men, to whom a right understanding of the subject is so paramount, are happily beginning to be aware of this fact, and it is with much satisfaction I find one of the latest writers on medical topography in England declaring, that the character of a climate is much more faithfully indicated by such a natural test as its influence on vegetable products, "than by any instrumental, or artificial, means whatever."

Malte-Brun's division of physical climate shall here be adopted, because it marks the points to which our inquiries may most profitably be directed, and because it is most appropriate to medical topography, inasmuch as the consideration of the details as given by that admirable writer, brings us at once to the discovery of such errors in the physical conditions of any given place, as may lead to their improvement, and the consequent prevention of disease—the great end of medical topography. When again, we look back to our native country, and boast of its pure and bracing air, let us not forget the all-important fact, "that it is man himself who has in a great measure created these salubrious climates."

"Whenever nature is more powerful than industry, whether for good or for bad, man receives from the climate an invariable and irre-

sistible impulse," and so it is here in Bengal, "*for bad*," in consequence of the total absence of that "industry," which elsewhere moulds nature to the purposes of man, for his "good."

Physical climate, says Malte-Brun, comprehends the degree of heat and cold, the drought, the humidity, and the salubrity which occur in any given region of the earth.

The causes of physical climate he states to be nine in number :

- 1st. The action of the sun upon the atmosphere.
- 2nd. The interior temperature of the globe.
- 3rd. Elevation of the earth above the level of the ocean.
- 4th. The general inclination of the surface and its local exposure.
- 5th. The position of its mountains relatively to the cardinal points.
- 6th. The neighbourhood of great seas and their relative situation.
- 7th. Geological nature of the soil.
- 8th. Degree of cultivation and of population at which a country has arrived.
- 9th. The prevalent winds.

To these may perhaps, be added—

- 10th. Position in respect to the equator.
- 11th. Position in respect to large rivers or lakes.
- 12th. Position in respect to forests.

By tracing these causes, and by uniting and arranging, under general points of view, the results of particular local observations, we shall, according to Malte-Brun, arrive at an approach to *climatology*, in some measure corresponding to the present state of the other sciences.

ACTION OF THE SUN UPON THE ATMOSPHERE.

At all places between 20° and $23\frac{1}{2}^{\circ}$ of latitude, the solar rays during two months fall at noon either perpendicularly, or at an angle which deviates from a right angle only by $3\frac{1}{2}^{\circ}$ at most. The degree of temperature is also increased by the greater length of the longest days, which, near the tropic, are $13\frac{1}{2}$ hours. The application of these facts to the geographical position of Calcutta during portions of May, June, July and August, are sufficiently obvious, and would not seem to require the lengthened details offered by some writers.

The difference between sensible heat and that indicated by instruments, is nowhere more remarkable than within this city during the hot months, when, from the length of time the houses, walls, and roads are getting heated by the sun, the first hours of the nights are rendered even more oppressive than the day, from the copious radiation going on for some time after the sunset. "The true indication of the force of the solar rays would seem to be, *not* the statical effect upon the thermometer, but their momentary intensity measured by the velocity with which they communicate heat to an absorbent body."—*Sir J. Herschel.*

Difference between sensible heat and that indicated by instruments.

Chowringhee and Garden Reach have a perceptible advantage over Calcutta, from their openness and the great extent of evaporation from trees, which tends so much to reduce temperature.

This delightful property in trees should always be turned to our advantage; and where the grounds are kept in proper order, a moderate number of trees will prove grateful and beneficial in every sense, but especially in the hot dry season.

Cooling property in trees.

In the rains, the evaporation from trees can add but little to the humidity already existing in the atmosphere. It has been computed that a country covered with trees emits more vapour by one-third, than one even covered with water, and it is this property that gives to the shade of vegetables a coolness so much more effectual and agreeable than that of rocks or walls.

In the sweeping condemnation by that clever writer, Dr. McCulloch, of trees, &c., down to the very flower-pots, he goes a length unwarranted by any known facts. It is surely unphilosophical to view every thing in nature as made only for man's destruction.

Temperature, weight and humidity of the atmosphere in Calcutta during six years.

The following table will exhibit the state of the atmospheric temperature here, its weight and humidity, during the years specified. The thermometer in the open air is found to vary from 40° to 110° in Calcutta.

		<i>Maximum.</i>		<i>Minimum.</i>		REMARKS.
1830...	Thermometer, ...	90° 4	53° 3	Mean Barometer. Wet bulb depression
	Barometer,	30	..... 131	29	..... 512
	Hygrometer, ...	16	..... 9	1	..... 5
1831...	Thermometer, ...	95° 8	57° 8	Mean Barometer. 29°..... 764
	Barometer,	30	..... 122	29	..... 456
	Hygrometer, ...	14	..... 5	1	..... 5
1832...	Thermometer, ...	96° 9	54° 6	Mean Barometer. 78°
	Barometer,	30	..... 071	29	..... 467
	Hygrometer, ...	15	..... 2	1	..... 6
1833...	Thermometer, ...	97° 2	61° 1	Mean temperature. 78°
	Barometer,	30	..... 095	29	..... 485
	Hygrometer, ...	17	..... 3	2	..... 3
1834...	Thermometer, ...	99° 4	58° 9	Mean temperature. 78°
	Barometer,	30	..... 022	29	..... 470
	Hygrometer, ...	13	..... 8	1	..... 4
1835...		In the Sun.		On the ground.		Mean temperature. 78°
	Thermometer, ...	110°	..... 2	42°	..... 0
	Barometer,	30	..... 033	29	..... 480
1836...	Hygrometer, ...	13 9	3 2	Mean temperature. 78°
		May		January		
	Thermometer, ...	97°.9.....	...	53°	..... 5
1837...	Barometer,	January	30.087	August at 9 h. 50	29.569	Mean temperature. 78°
	Hygrometer, ...	March	14.8	August	5.6	
	Thermometer, ...	June	98.2	not absd.		
1837...	Barometer,	January	31.101	July	29.547	Mean temperature. 78°
	Hygrometer, ...	April	20.4	July, August	4.2	

During these years the observations were registered four times a day, at sun rise, 10 A. M., 4 P. M. and 10 P. M., hence the variations of maximum minimum are greater.

Observations only registered at 10 A. M. and 4 P. M.

Mean temperature in Calcutta for 12 months.

The mean temperature of each month in Calcutta, may be seen by the annexed Table :—

January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
66°.2	69°.8	80°.0	85°.4	85°.7	83°.7	81°.8	82°.0	82°.0	79°.2	74°.2	66°.6

The greatest range of temperature takes place in December and January, when it amounts to about 18° , the least range is in July, when it is about 6° . The mean hour of minimum temperature for the year is about sun rise :—that of maximum temperature, 2.40 P. M.

INTERNAL HEAT.

Some philosophers have sought the cause of climate in the internal heat of the globe. The subject of the interior temperature of the earth has engaged the attention of scientific men in various countries, but it is only of late that any thing approaching to precise information has been obtained. From experiments recently made, it would appear to be ascertained, that in proportion to the depression below the earth's surface, so does the temperature steadily increase; and, even when the depths were very small the elevation was quite perceptible.

Internal temperature of the globe supposed the cause of climate.

From one experiment of Professor Phillips we find that in a mine at a depth of 525 yards below the surface, the temperature was 78° Farht. while the mean temperature of the place was $47\frac{1}{2}^{\circ}$.

Inferior temperature.

It is stated on the other hand by Fourier, that at 100 feet below the surface the influence of the solar rays is extinct.

The position where this takes place he calls the invariable stratum; all variations above this place are imputed to the influence of radiation, all below to the native or primeval heat of the globe.

A successive influx and efflux of heat is constantly going on in the strata above that of invariability. The heat of the solar rays is constantly acting on it during the day, and with an intensity depending upon the absorbent power of the surface, and the latitude.

The temperature of seas and lakes being much below that of continents, the inference is that in summer the atmosphere which is in contact with the masses of water must always be less heated than that portion of it which is contiguous to the earth. The temperature in the caves below Paris is constantly between 52° and 54° of Fahrenheit; while at the surface the difference between summer and winter exceeds

Temperature at different depths and in different countries.

90°. At the bottom of Joseph's well, Cairo, latitude 30°, at the depth of 210 feet, the thermometer stands at 70°. In the mines of Mexico, latitude 20°, at a depth of 1650 feet, it is 74 $\frac{3}{4}$ °, appearing to augment in approaching the Equator.

The mean results of the temperature of six mines in Cornwall was found as follows :

<i>Depth in feet.</i>	<i>Mean Temperature.</i>		<i>Remarks.</i>
	<i>Air.</i>	<i>Water.</i>	
200 to 250	50	56	From a point 200 feet below the surface, the temperature was found by Dr. Forbes to increase about one degree for every 50 or 60 feet of descent.
400 — 450	61	54	
800 — 850	66	66	
1350 — 1400	83	79	

At Bombay.

A scientific friend informs me that at Bombay, he found the temperature near the surface in the cold season to be 82°, and at Poonah 78°. The temperature at great depths, I have not been able to ascertain. At

In Fort William.

a depth of 75 feet 3 inches in Fort William, the thermometer stood at 82°, while above ground, it ranged in the shade at about 76°.

ELEVATION OF THE GROUND.

Cold increases with elevation, and for every 300 feet of altitude the thermometer sinks one degree.

When we consider the accuracy and extensive knowledge we have arrived at in the position of points of interest on the surface of the globe, with regard to the co-ordinates of latitude and longitude, and how little has been done for the third co-ordinate of elevation, we shall have a field before us, open to cultivation in many parts of our empire, and of the greatest interest within the Tropics.

With the elevation of the land, cold increases in a very rapid progression, being caused by the enlarged capacity which air acquires by rarefaction.

The rate of increase of cold is one degree for every hundred yards of altitude ; and this beneficent appointment of nature considerably

increases the number of habitable countries in the Torrid Zone : “ In ascending from Bengal to Thibet, we imagine ourselves in a few days transported from the Equator to the Pole.”

The site of Calcutta is said to be, on the average, but little, if at all, above the level of the tides at Saugor; in the diplomatic language of Asia, “ what more need I say,” as to the choice of our position ?

GENERAL AND LOCAL ASPECTS.

The general aspect should be distinguished from the local aspect. The general declivity of a country, large in itself, does not exclude the most opposite local declivities. It may, however, be admitted as a general principle, that the positive sum of all the local aspects is in the same direction as the general aspect.

This principle can only be applied to spaces of great extent; for example, the entire tract of country through which a river flows. Every one knows of what effect as to temperature, is the exposure of a soil relatively to the sun. A hill inclined 45 degrees to the south, when the sun is elevated 45 degrees, receives solar rays perpendicularly, whilst upon a plain the same rays strike the soil under an angle of 45 degrees, that is, with one quarter less of force; and a hill inclined 45 degrees to the north, will be struck by the solar rays in a horizontal direction, which makes them glide along its surface.

Effect of aspect on temperature.

Malte-Brun, speaking of the northern hemisphere, says that the *south-south-west* and *south-west* situations are the warmest of all;—whilst on the contrary, those of the *north-east* are the coldest. The general aspect of the valley of the Ganges is about east and west, with an inclination of the delta to the south.

Aspect of the valley of the Ganges.

POSITION OF MOUNTAINS.

Mountains act on climates in two ways. They attract the vapours suspended in the air; these vapours, by their condensation, produce clouds and fogs—often also, these assemblages of watery substances, which the winds waft in every direction are stopped in their devious course by chains of mountains, in the elevated valleys of which they continue to

Mountains act on climate in two ways.

accumulate. These effects are still more sensibly felt, when a chain of mountains is crowned with extensive forests.

Elevated lands in Bengal have no influence.

The elevated lands in Bengal merit the name of inequalities more than hills, and are mostly situated in the districts of Bheerboom, Sylhet, Chittagong, and along the eastern boundaries of Tipperah. They are limited in extent, and exert little or no influence on our climate.

EFFECTS OF THE NEIGHBOURHOOD OF THE SEA.

Effect in moderating temperature.

The neighbourhood of the sea moderates the excess of temperature, besides contributing, according to Pouillet, through evaporation, one of the most important sources of atmospheric electricity.

In hot climates the maritime regions are not so warm as the centre of the plains ;—of this we have an annual example in the marine current of the south-west monsoon.

Calcutta how affected by the vicinity of the sea.

Calcutta is situated about a hundred miles from the sea, but so level is the country that the tides ascend in the dry season as far as Sooksagur, being 140 miles from Saugor Point.

In the beginning of March, when the S. W. monsoon sets in, the currents set up the Bay of Bengal, and gradually raise the sea at its head several feet, raising the river Hooghly with it, and that long before the freshes are felt. This continues till October, when the pouring of the rivers into the Bay, during the rains in July, August and September, and the change of the monsoon to N. E. in the end of October, give the current a set in the contrary direction, and gradually restore the sea and river to their condition in the previous March. The effect of the two monsoons upon the currents, and the height of the sea in the Bay of Bengal, may therefore be considered, as that of two long unequal tides during the year,—eight months of flood and four of ebb. From the point of lowest low water in the dry season to that of the highest high water in the freshes, is twenty feet ten inches.

The greatest mean rise of the tide, from low to high water mark in the freshes, is ten feet. The smallest mean rise of the tide in the dry

season, neap tides, is four feet. The bores in the Hoogly occur only in the highest, or alternate spring tides;—their appearance may with certainty be predicted by the season of the year and the parallax of the moon. They are greatest under the influence of the S. W. monsoon, and are only felt in those portions of the river where the peculiar form of the sands, and the direction and set of the tides in any particular reach actuate their rise.*

Persons who speak confidently, and enter into minute details on the tides and levels, assert that we are only protected from irruptions of the sea, by the counter currents of the rivers, and the friction of the tides against their banks. They state the tides in the Salt Lake to be but two feet above the mean level at Saugor, and consequently several feet at flood tide, below that at Saugor. Of the truth of some of these assertions we had a calamitous illustration on the 20th and 21st May, 1833; when the sea, backed by a storm from the E. S. E. and S. E. overran the low countries along the coast from Balasore along Hidgelee and up to Tumlook and Diamond Harbour, making a breach over the Sunderbund as far north as Calcutta, and extending its devastations as far east as Dacca. There have been many irruptions of the sea within fifty years, but none to equal this last in violence and extent. For some days the barometer stood at 28 inches and 8 decimals, being lower than it had been known for years, the thermometer averaged 84°.

The tides and levels.

Inundation of 1833.

The tide, which ran for seven hours, rose to a height of 12 feet above its ordinary level, destroying embankments and buildings of every kind, while the storm levelled the trees: nothing stood within the influence of tide and wind, and the loss of human life and destruction of cattle must have been enormous.†

Its calamitous effect.

Saugor Island was covered seven feet deep, and out of a population of 7,000 persons, few escaped. The rains were nearly a month later than usual in setting in, and the ordinary cultivation was arrested from the saturation of the soil with salt. The starving survivors from these united calamities crowded about the outer Suburbs of Calcutta,

* Vide the interesting paper by Mr. Jas. Kyd, Trans. A Society, from which the above is collected.

† Vide Page 7, giving an account of the inundation of 1837.

and were at last reduced to the necessity of supporting the parents' lives by the wretched and unnatural traffic in their children, the most emaciated of whom sold at last *for one rupee*. Government did much to relieve the more pressing necessities of these poor people; but there was much that no power could relieve. Towards the end of August, there broke out a severe epidemic fever, which by the end of September and during the drying process, ripened into terrible violence—carrying off, according to the reports of respectable natives, nearly three-fourths of the remaining population to the south and east of us. Neither did Calcutta escape: thousands of the natives died, particularly in the Suburbs, nearest the land inundated in May;—even the Europeans suffered severely, though there were not many casualties.

GEOLOGICAL NATURE OF THE SOIL.

Influence of climate in various ways.

The internal nature of the soil must have an influence on climate in a variety of ways. All grounds are not heated equally soon. One soil quickly parts with its acquired heat, while another retains it for a long time. Exhalations, which vary according to the nature of the soil, rise into the atmosphere, and become identified with it. Clayey grounds, and those which are impregnated with salt, cool the atmosphere; extensive accumulations, when they are dry, augment the heat. The general soil of Bengal is clay, with a considerable proportion of silicious sand, fertilized by various salts, and by decayed substances, animal and vegetable. Both the upper and sub-soil are generally pervious to water, but on an average depth of 20 feet is found a tenacious clay: at this depth too, brackish water is found. In sinking wells in the vicinity of Calcutta, no springs of fresh water were reached at a depth of 470 feet.

In the old Magazines and Newspapers printed in Calcutta, I find very frequent mention of earthquakes; but in none of these does there seem to have been any material injury sustained, which looks as if the causes were remote from us. Of the surpassing fertility of the soil—"the work of the Ganges"—nothing need here be said; it has been the theme of admiration of all travellers from the earliest times; and, according to Bernier, gave rise to this proverb amongst the Portuguese, English, and Hollanders, viz. that there are an hundred open gates to enter into the kingdom of Bengal, and not one to come away again.

INFLUENCE OF THE LABOUR OF MAN—GENERAL POPULATION.

Without cultivation, few climates would be salubrious or agreeable, and it is by its means that man exercises so powerful an influence upon the temperature of the air.

Influence of cultivation on health.

Let us contemplate a desert country, the rivers, abandoned to themselves, become choked and overflow, and their waters serve only to form pestilential marshes. A labyrinth of thickets and of brambles overspread the most fertile hills. In the meadows, the unsightly wild mushroom, and the useless moss choke the nutritious herbs; forests become impenetrable to the rays of the sun; no wind disperses the putrid exhalations of the trees which have fallen under the pressure of age; the soil, excluded from genial and purifying warmth of the air; exhales nothing but poison; and an atmosphere of death gathers over all the country. But what do not industry and perseverance accomplish? The marshes are drained; the rivers flow in their disencumbered channels; the axe and the fire clear away the forests; the earth furrowed by the plough is opened to the rays of the sun and the influence of the wind; the air, the soil, and the waters acquire by degrees a character of salubrity; and vanquished nature yields its empire to man who thus creates a country for himself.

Agriculture must be much improved in Bengal before the European, in the language of Malte-Brun, can be said to have created a country for himself. A Hindoo field is described by Mill to be in the highest state of cultivation, where only so far changed by the plough, as to afford a scanty supply of mould for covering the seed, while the useless and hurtful vegetation is so far from being eradicated, that where burning precedes not, the grasses and steriles which have bid defiance to the plough, cover a large portion of the surface. The same author concludes that "every thing which savours of ingenuity, even the most natural results of common observation and good sense, are foreign to the agriculture of the Hindoos"—"Their ideas of improvement are very limited; they scarcely extend beyond the introduction of irrigation into land which was formerly cultivated dry. Each small proprietor is content

Agriculture but little improved in Bengal.

Shore's Notes.

Example of Europeans of little influence.

to follow the customs of his forefathers ; the same rude implements of husbandry, the same inferior race of cattle, and the same practices are still in operation, which have existed unchanged for centuries. As to any new experiments of general measuring, draining, differences in the rotation of crops, introducing new grain or vegetables, or new sorts of those already known, any attention to their breed of cattle, any adoption of a better and more combined system by which a smaller number of people could raise the same or a larger proportion of produce,—all these are out of the question.” I cannot find that the example of European superiority has had much influence on the state of agriculture around the metropolis. It is certain that in the cold season the markets are supplied with excellent vegetables of every kind ; but beyond this I believe matters are much the same as in the days of Job Charnock. The general crops are of rice. In the appendix to the Parliamentary Reports of 1831, I find the population of the 24-Pergunnahs, Suburbs, and City rated at 1,225,000, which I have reason to think is over-estimated.

General population.

THE PREDOMINANT WINDS.

Influence on prevailing winds of the other elements forming climate.

The united influence of all the elements which constitutes physical climate is variously modified by the prevailing winds ; and all their variations depend on the equilibrium of the atmosphere, the heat of one climate and the cold of another exercising a continual influence on each other.

The monsoon.

The northern parts of a great continent will sometimes send forth their cold air towards the southern parts ; and sometimes they will receive warm air in return. The monsoon always changes sometime after the equinoxes, and constantly blows towards that hemisphere in which the sun is found.

The action of this luminary on the atmosphere, is therefore plainly one of their causes—the cold air from the mountains of Thibet following its course for half the year, and that from the southern seas during the other.

The south-west rainy monsoon.

The south-west rainy monsoon, the most remarkable of our periodical winds, begins on the Malabar Coast in May, and reaches Delhi by

the end of June, extending to the north-eastern parts of Afghanistan, but greatly modified. It prevails more in the mountains than the flats of the Punjaub :—the hills and valleys of Cashmere have their share of it, and it gradually loses itself westward in the valley of Peshawur, where it appears only in clouds and showers. On the Coromandel Coast it is retarded, the clouds brought by the S. W. winds being detained by the Ghauts. It reaches Bengal by the 15th June.

Owing to the arrest of the S. W. monsoon by the mountains, and consequent accumulation of vapour, an extraordinary deposition of rain takes place on the Malabar Coast, being not less than 123.5 inches in the year in the latitude of $11\frac{1}{2}$ N.

When not influenced by elevated lands, this monsoon generally prevails north of the equator from April to October, accompanied by tempests, storms and rain, while a north-east wind blows during the other six months. The periodical winds that prevail in the Bay of Bengal extend their influence over the flat country, until they are diverted by chains of mountains into another direction, nearly correspondent, however, with the course of the Ganges. When the sun has passed into the southern hemisphere, the monsoon alters its direction ; the mass of air which had been accumulated during the hot season and rains on the central platform of Asia, now bestirs itself, and moves towards the regions south of the equator, where the atmosphere has been dilated and dissipated by the solar heat. Over most parts of the Indian Ocean, this monsoon proceeds from the north-east, because the central platform lies to the north-east. On the other hand, as the seas of China, of Borneo, of New Guinea, of Java, have the centre of Asia to the north and north-west, the monsoon comes to them from these points.

North-east monsoon.

In the south of Bengal, the prevalent winds are north and south ; in Behar east and west, and the same takes place in Assam, following the course of the Berhampooter.

That the monsoons exercise a beneficial influence on health cannot be doubted, but especially the south-west, from its prevalence during the greatest heats, and from its greater power of thoroughly ventilating the country. Stagnation would prove immediately destructive to health in

Influence of the monsoon on health.

a climate where there are so many various and abundant sources of noxious effluvia, to ripen into activity by such a cessation of wind as should admit of their accumulation and that of heat, in any one place or in such streets, for instance, as those of the native portion of Calcutta. Of the N. E. monsoon I must limit my praises solely to its ventilating properties; for in every other respect, it exercises an unfavorable influence on health to a degree not generally known; indeed, so far from it that it is common to hear the accession of the cold season hailed by invalids who are ignorant of the many dangers it carries along. It is the true "Sirocco of the North." The following Table gives the direction of the winds at noon during the years specified.

Table of Winds at noon during the years 1832-8.

	N.	N. W.	W.	S. W.	S.	S. E.	E.	N. E.	Calm.	
	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	Days.	
In 1832 the wind was	44	60	26	44	67	49	4	71	9	No register 1 day.
" 1833 " " "	56	39	14	30	115	24	25	32	29	Ditto ditto 2 days.
" 1834 " " "	53	52	12	25	99	22	26	40	36	
" 1835 " " "	41	65	31	84	41	45	12	31	7	Ditto ditto 8 days.
" 1836 " " "	67	58	88	38	46	7	23	20	12	Ditto ditto 6 days.
" 1837 " " "	83	26	77	43	76	6	21	13	7	Ditto ditto 3 days.
" 1838 " " "										
Tota l.....	344	300	248	264	444	153	111	207	100	

THE RAINS—SOURCES OF AQUEOUS EXALATIONS— HUMIDITY.

The endiometric processes having failed of discovering in the atmosphere of places the most opposite, such as the narrow lanes of London and the summits of lofty mountains, any difference in the constituent properties of their permanent gases, it becomes a question of the highest interest and importance to ascertain the varying quantity of aqueous vapour in our atmosphere; for it is the only fluctuating ingredient in its composition. To the medical topographer, a minute inquiry of the kind stated may lead to a knowledge interesting and important respecting the causes and cure of certain diseases, in so far as these may be connected with climate, and this is no small benefit from the proper application of instruments.

Without taking into view the expanse of the Bay, the coup d'œil of a good map of Bengal will at once shew how bountiful nature has been to that country, by means of her majestic rivers with their innumerable tributaries, in yielding the sources of aqueous exhalations, and it were gratifying to the medical topographer, could his description be limited to these. There are not any lakes in Bengal resembling those of Scotland, or Canada, but there is a profusion of extensive jheels, which may be either denominated shallow lakes or morasses. A large proportion of these in the dry season contain little or no water, but during the rains present immense sheets, over which boats of the greatest magnitude may be navigated, and some are navigable a certain extent throughout the year. There is reason to believe that nearly all these stagnant sheets of water rest in what were at a remote period the channels of large rivers, which have since altered their courses and now flow in another direction. The area of Bengal and Behar is 149,217 square miles, and with Benares not less than 162,000 square miles. The following proportions of the surface are grounded upon many surveys after making allowance for large rivers :

Great extent of the sources of aqueous exhalations in Bengal.

	<i>Parts.</i>
Rivers and lakes (one-eighth),.....	3
Deemed irreclaimable and barren (one-sixth)	4
Sites of towns and villages, highways, tanks, &c. (one twenty-fourth),	1
Free land (three twenty-fourths) remain liable to revenue,	3
In tillage (three-eighths),	9
Waste (one-sixth),	4
Total,.....	24*

According to another calculation Bengal contains 97,244 square miles : if from this, that portion of Tipperah which is independent, the tract of the Sunderbunds and other wastes, equal to 13,244 square miles, be deducted, the remaining inhabited country will be equal to 84,000 square miles ; but the extent of waste and surface occupied by rivers, marshes, &c., seems here greatly under-rated.

* W. Hamilton.

When all this is considered, along with the complete saturation during five months in the year, of every inch of soil, even that which may not be actually inundated, the extent and sources of aqueous exhalation, the commerce of land and water, may be imagined. It is ascertained that the capacity of the atmosphere for moisture varies with its temperature, so that at 113° , it holds a twentieth part of its weight of moisture; at 80° a fortieth, and so on.

To a scientific officer well acquainted with the localities, I put the two following questions: 1st. Taking the area of the 24-Pergunnahs to be 882 square miles, what proportion should you say the water surface bears to the land, on the 30th May and the 10th of October, the first being just before the rains, and the latter just after? 2d. What proportion does the cultivated land bear to the waste and jungle within the said area?

Answer to 1st question.

I should say that, on the 10th of June, you might assume one-twentieth part as the proportion of the water to the land;—of course I mean by water, ground from which exhalations could arise.

Answer to question 2d.

The cultivated land may be about 14-20ths; water, 1-20th; roads and villages, 2-20ths; uncultivated, 3-20ths.

The subjoined Table will shew the annual fall of rain during the years specified—the average annual fall is about 60 inches.

RAIN.

1830	63.28
1831	57.50
1832	49.26
1833	60.56
1834	68.73
1835*	85.50
1836	45.39
1837	43.6
1838	
	Mean..... <u>59.228</u>

* Sixteen inches fell on the 10th May, in less than 12 hours.

The following are the average rates of evaporation for the dry months: January, three inches—February, five—March, seven—April and May, nine inches.

It is during the periods of the rains when the drying process is in greatest activity that unhealthiness prevails with greatest severity, namely, the commencement and termination of the season. In the former, or that called by the natives the lesser rain (Chota bursât) common remittent fevers arise, and at the termination, or that from 15th September to the end of October, the severest forms of the same fever prevail, but chiefly amongst those newly arrived.

The connexion of the rainy season with disease would, in such a climate as this, form a highly interesting branch of inquiry; but the absence of every thing like statistical object in our hospital reports, prevents even an approach to accuracy on this, or indeed on any subject connected with climatorial influence.

THE RIVER.

By some persons who have spoken of our climate, a large portion of the evils under which we suffer, have been ascribed to the river—its supposed overflowings—its sluggish tides and foul waters—its muddy and slimy banks, and the action of a vertical sun upon them, &c.; but I shall view the river in a different and more friendly light, *as the purifier of our city.*

Certain am I that without this great scavenger, to whose tides we owe more than Captain Hamilton ever dreamt of, we should now be in a worse condition even than when he left us, an hundred years ago. The truth is that, under moderate supervision on the part of the Police, the river banks are inoffensive; and along their whole extent, although crowded with buildings for a space of nine miles, disease will be found less prevalent by far, than in the interior quarters, towards the east; in short, the causes of fever are to be traced to other and more palpable sources than the river-bank, which is the most elevated of all our grounds, being from three to four feet above the surrounding levels.

The river of service as a scavenger.

The causes of unhealthiness in Garden Reach after the Salt water inundation of 1833, could be readily traced to the state of the back grounds —no one ever thought of looking for them in the river-bank.

The annual rise of the Ganges and its branches is in

Annual rise of the Ganges—its branches.

	<i>Feet.</i>	<i>Inch.</i>
May,	6	0
June,	9	6
July,	12	6
Half of August,.....	4	0
Total.....	32	0

Temperature of the surface water.

From above 350 observations of temperature made by Mr. G. A. Prinsep, of which the details are given in the Journal of the Asiatic Society, it would appear that “the mean temperature of the surface water exceeds 81 Faht. every where between Calcutta and the sea.”

The rate of motion.

In the dry season the mean rate of motion is less than three miles per hour; in the rainy season, and while the inundations are draining off, the current runs from six to seven, and even eight miles in particular situations.

The river is at its lowest in the beginning of March, and the freshes are at their height in September, when the tides are scarcely visible off Calcutta; and the river water is “perfectly sweet, far beyond Saugor in the open sea.”

The following table exhibits the depths of the river channel at the different seasons.

Minimum depth,	8½ feet.	} Dry Weather.
Maximum average depth of 11 of the shallowest places in the Hooghly spring ebb,	15¼ ”	
Maximum average depth over the same place spring flood,	31 ”	
Minimum depth,	16 ”	} Rainy Season.
Minimum average depth of 11 of the shallowest places in the Hooghly spring ebb,.....	22¾ ”	
Maximum average depth over the same places spring flood,	32¼ ”	
Highest rise ditto ditto,	36 ”	} Dry and Rains.
Difference between highest and lowest,.....	20¾ ”	

THE SALT LAKE.

The Salt Lake lies about three miles east of the town, extending upwards of four miles north and south: it is divided into two portions, the eastern division averaging 3 feet in depth, the area being seven square miles or about 12,000 beegahs, the western is two feet in depth, and its area five and half square miles, or about 10,630 beegahs. The borders are generally under rice cultivation, with occasional patches of reed grass.

Description.

To drain the Lake for the purpose of native agriculture is therefore easy, but to deprive the ground of the sources of noxious exhalation is not so. It is not sufficient to convert the ground into a state of soft low meadow land; for the most dangerous exhalations are those which are retained, and occasionally emitted from under a crust of earth during the drying process, whereby they would appear to acquire unusual concentration, and prove the origin of the worst fevers.

Mode of draining the Lake.

It is necessary that the grounds be *thoroughly* drained, leaving none of the characters of marsh, otherwise it had better be left as it is; its present condition being one of far greater safety than such half-drained soil as that obtained from the marsh of Chartreuse, for instance, near Bordeaux, which caused in the year 1805 alone, 12,000 persons to be affected with fever, within the city, of whom 3,000 died within five months!

Necessity of a thorough draining.

Injury to health at Bordeaux from partial draining.

Two modes of effecting the drainage suggest themselves; the one by letting in the river during the rains, and thereby gaining a succession of deposits of the river silt, so as gradually to fill the Lake, and thereby bring it in time to a level with the surrounding land; this would seem the easiest; it imitates the simple operations of nature, and would be the cheapest; but perhaps not the most conducive to health. Another mode is by a deep and well constructed canal, so as to effect the drainage; but as even this must to a certain degree prove a receptacle for noxious matter, and offer a considerable surface for evaporation, a close line of umbrageous trees should be planted along each side of the canal, as being powerfully attractive of marsh exhalation.

Different modes of effecting drainage.

This property in trees was practically known to the ancients,* and is now beneficially exemplified in Demerara, and other parts of Guiana, “where the humid heat constantly cherishes the seeds of disease.”

Great importance
of the subject as
affecting public
health.

The ground cleared from water, should be well ploughed and cultivated, the ploughing to be done during the heaviest rain, so as to prevent exhalation; for it is during a certain stage of the *drying process*, that marsh exhalation is most concentrated, and it has been observed in many countries, that the drying up of brackish water is more injurious than that of either salt or fresh alone. A succession of crops purifies and evaporates the soil, and thereby obviates exhalation; but they should not be of rice, or such crops as require profuse irrigation. The want of attention to some of the precautionary measures above hinted at, has neutralized the advantages that would otherwise have resulted from extensive draining executed in some parts of France and Italy; and I have only thus long dwelt on that of the Saltwater Lake, because I believe its proper performance to be a matter of great importance to this city, as far as regards the prevention of disease; and I need not here insist on the superior efficacy of *preventive* measures, such as have advanced in our own country apace with our civilization, and altogether banished from us some of the severest calamities that have ever afflicted the human race.

WOODS OF THE SUNDERBUNDS.

Imperfect as the sketch-map attached to this memoir confessedly is, it is still sufficient to afford such a view of the extent of the Sunderbunds,—that labyrinth of jungle and rivers—as may supersede any lengthened description. Extending 180 miles south and east of Calcutta, and covering a superficies of upwards of 20,000 square miles, it must necessarily exercise a very powerful influence on the temperature, humidity and free circulation of our atmosphere, besides loading it with all kinds of exhalations. The electric condition of our atmosphere must likewise

* Regond de L'Esle says of the malaria of Italy, that various obstacles form barriers which they cannot pass, and against which they deposit themselves.

be greatly influenced by the combination of oxygen with the materials of living plants over so vast a surface, as also, by the extent of evaporation from it. That the clearing of this extensive surface therefore, would tend greatly to the improvement of our local climate, no one can doubt, who considers the question either in reference to the history of this city, or that of effects resulting from similar operations in other countries.

It would open out the city to the freer influence of the sea breezes, diminish the moisture of our atmosphere, and greatly purify it.

It is found, contrary to the vulgar notion, that in cleared and cultivated tracts, the air is rendered drier and warmer in summer, and colder in winter, than in such as, from want of cultivation remain, like the Sunderbunds, covered with wood and marsh.

If then, to counterbalance the only disadvantage attendant on clearing—some little increase of temperature, we obtain purity and dryness of our atmosphere, we shall still be very greatly the gainers; for it is not so much from the high rate of temperature we suffer, as from the excessive humidity that is conjoined to it for so many months in the year, and both which, commingled with the terrestrial exhalations, tend gradually to undermine through their united influence, the best and most robust of European constitutions.

The clearing and draining immediately around the city, partial as these are, have yet removed much of the more concentrated evil; but that which was death within a few yards, cannot but be insalubrious even at a distance.

For the following interesting observations I am indebted to Mr. MacLelland.

“ I first perceived about the end of May last, that a column of clouds to the eastward of Calcutta is more or less prevalent from a little before, to an hour, or an hour and a half after sun-rise, of sufficient density to interrupt the rays of the sun and prolong the cool and freshness of morning to a later hour in Calcutta, and I presume the several stations along the Hooghley, than in any of the western provinces that I have been in.

The clouds are no doubt emanations from the Sunderbunds, and are easily accounted for by the more equable diurnal temperature secured to the swamp itself than to adjoining districts: the exhalations that rise from the Sunderbunds before daybreak are condensed on ascending into the general air, which at that hour is lower in temperature than the air on the swamp, and clouds are the natural result.

The only circumstance that interrupts the regular appearance of the clouds in question is when a fall of rain has taken place in the night, when we are sure, unless it still rains, to have a very bright morning, the precipitation having prevented the usual formation of clouds to the eastward, the sun appears earlier as it were, and if we happen to be exposed to it, we are apt to think ourselves unusually late.

For the last few mornings this friendly shield has been less regular, and it will be curious to observe what appearance the eastern horizon will present during the ensuing month, as well at the beginning of the hot season, and whether early rains in the Silhet and Chittagong districts have any thing to do with it: the subject is interesting, and one that deserves more attention than casual observation."

Calcutta, September 29, 1838.

PHYSICAL CHARACTER OF THE NATIVES OF BENGAL.

Bengal is inhabited by various races, among which the Hindus may be estimated at four-fifths of the population. They are the aborigines of the country. Early in the thirteenth century, the conquest of India by the followers of Mahomed brought a considerable number of that sect into the province. The hilly country which forms the northern and eastern boundary of Bengal is inhabited by a race whose features prove them to have been of Tartar origin, while to the west there is a mixed population, made up of various races, among whom Mahomedans and Afghans are the most numerous. In the parliamentary report of 1831, the total population of Bengal is estimated at 23,358,750.

The Bengalees are of slender, delicate frames, the muscular structure and stature being expressive of weakness and want of animal courage.

As a race they are handsome, the countenance being lively but devoid of fixed expression. The general features are well proportioned, with exception to the mouth, which is almost universally defective of expression, the lips being coarse and thick. Malte-Brun justly considers that violent passions, the yoke of superstition, dull or cheerful occupations, habits of activity or indolence, stamp a permanent character on the physiognomy of whole nations; and traces of most of these influences are to be found in the countenance of the Bengalee.

It were curious to compare the mean stature and weight of the natives of Bengal with those of the European races.

I am not aware that any very accurate observations on the subject have been made in England; but in Belgium the following results were obtained by M. Quetelet, by weighing and measuring a great number of individuals at each age respectively.

1st. That the weight of the male infant, at birth, is nearly 7 lbs. avoirdupois; while that of the female is not quite $6\frac{1}{2}$ lbs.

2d. That the maximum weight ($140\frac{1}{2}$ lbs.) of the male is attained at the age of 40; while that of the female (nearly 124 lbs.) is not attained till 50: from which ages they decline afterwards; the male to $127\frac{1}{2}$ lbs., the female to 109 lbs. nearly a stone.

3d. That the full grown adult is twenty times as heavy as the new born infant.

4th. That the average stature of the adult male was 5.52, while that of the female was 5.18.

From observations made under my direction at the Native Hospital, but which are not yet completed, it would appear that the mean weight and stature of the adult native is as follows: viz.

	Average stature in		Average weight in
	Ft.	In.	lbs.
Hindoo,.....	5	$5\frac{4}{7}$	$96\frac{1}{8}$
Mahomedan,	5	3	$103\frac{3}{4}$

POPULATION OF CALCUTTA.

The subject of population, one of interest and importance.

The population of Calcutta has long been an object of curiosity, and till lately has never, I believe, been accurately ascertained. It is however, a subject of great importance in every sense.

The salubrity of towns is every where found to be less, in proportion to their magnitude and the consequent amount of population, so that it were wise to apply the known measures of prevention of disease while population is on the increase. The rule of decrease of health according to increase of population was of much greater application to former

times, when the preventive means, now commonly in use, were unknown or disregarded.

In the year 1800, according to a report of the Police Committee furnished to the Governor General, the population of Calcutta, exclusive of the Suburbs, was estimated at 500,000, and according to another calculation in 1814 at 700,000.

The former return was given on the authority of the Magistrates, but the data on which it was founded cannot now be ascertained: the latter computation was adopted probably on a consideration of the above estimate taken in connection with a supposed increase in the wealth and prosperity of the town. The employment however of four Assessors in 1819, to revise the whole of the rates assessed upon the houses, buildings and premises of Calcutta, seemed to the Magistrates to present a favorable opportunity of obtaining an accurate census of the population, which one of the gentlemen of the Committee undertook to prepare from authentic statements furnished by the Assessors, the result of which is here submitted.

Recent employment of Assessors.

The following were the returns given for the four divisions of Calcutta :

Former Returns.

Total Christians,	13,138
Mahomedans,	48,168
Hindoos,	118,203
Chinese,	414
	<hr/>
Total..	179,913

By some strange arrangement, as stated by Mr. Hamilton, the population the of Suburbs appears to be excluded in the above calculation, and separated from that of the town, a process which, if adopted in England, would reduce the inhabitants of London to a very moderate number.

Population of the Suburbs omitted.

The great difference between this total amount and former estimates is very striking, and a general opinion prevailed that the population could not but exceed the total returned by the Assessors.

Total population supposed to exceed the returns of the Assessors.

Mode adopted for ascertaining the population.

It is not improbable that the large estimates made of the population of Calcutta at former periods, may be owing to the crowds of artisans, labourers, servants and sircars, and to the numerous strangers of every country which constantly meet the eye in every part of the town. Indeed, the numbers entering the town daily from the Suburbs and opposite side of the river were estimated by the Magistrates at 100,000. This was done by stationing sircars and peons at all the principal outlets of the town. The peons counted the passengers by flinging to the sircar a cowrie for every hundred passengers, noting separately the carriages and hackeries, and the average of different returns gave an influx of about 100,000 individuals, besides carriages and horses. Upon the whole then, it appeared to be the opinion of the Magistrates of Calcutta, from all the returns laid before them, that by taking the resident population at about 200,000, and numbers entering the town daily at 100,000, we shall have a statement of population probably not much wide of the truth. The simple expedient of counting the houses within the City and Suburbs would probably lead to a more accurate estimate than any hitherto made.

The number of respectable native families diminishing.

It has been ascertained in the course of the enquiries which led to the results above given, that the number of respectable and wealthy native house-holders is not increasing in Calcutta; on the contrary, that they have been decreasing.

W. Hamilton states that the great Native families who now contribute to its splendour are of very recent origin; indeed, scarcely ten could be named who possessed wealth before the rise of the English power, it having been accumulated under our Sovereignty, chiefly in our service, and entirely through our protection. In the visits which the Magistrates are continually making to the various parts of the town, they do not observe the same rapid progress of building in the Native as in the European quarter, whilst they are perpetually struck with the appearance of ruinous and decayed premises, either vacant, or occupied by the remnants of wealthy families.

We may naturally ask what has led to this? It has been conjectured that the mercantile adventurers of Calcutta had retired to spend their wealth in other quarters, and that the old and indigent inhabitants of the

place had not been able to preserve their former station in the increased prosperity of the place, but we very much fear that this is not the cause assigned by the natives themselves.*

I have been favored with the following return by Captain Birch. It is the latest and the most correct :

English,	3,138
Eurasians,	4,746
Portuguese,	3,181
French,	160
Chinamen,	362
Armenians,	636
Jews,	307
Western Mahomedans,	13,677
Bengal Mahomedans,	45,067
Western Hindoos,	17,333
Bengal Hindoos,	120,318
Moguls,	527
Parsees,	40
Arabs,	351
Mugs,	683
Madrassees,	55
Native Christians,	49
Low Castes,	19,084
	229,714
The population of the Suburbs is stated in round numbers to be,	200,000
	Total..... 429,714

MORALS.

“ It is the duty of the Medical Philosopher to investigate the nature and causes of moral evil as well as of physical ills—and for this good reason, that both are inseparably connected, in causes, effects and consequences.”—DR. JAMES JOHNSON.

It has been asked, says Hennen, what has a Medical Topographer to do with the morals of the natives of a country? And it has been asserted that their immoralities cannot affect the health of the troops quartered among them, if proper discipline be observed. These opinions, however, are founded upon a very superficial view of the subject. The soil and inhabitants, if I may be allowed the expression, always react on

A knowledge of the morals of a people, of great importance to the Medical topographer.

* Calcutta Journal.

each other. A sober, industrious race of inhabitants, for example, will have a greater desire to improve their country than men of a contrary character, and will also possess greater physical power to carry their desire into execution. Place such a body of men in a district overrun with noxious weeds and timber, and fast degenerating into a morass; and can there exist any rational doubt that they will clear it sooner, and longer preserve it in that improved state, than men of a different disposition? Place in a similar situation, or even in the district thus improved, a body of men who are idle and intemperate, and the immediate result will be, that the soil will deteriorate for want of proper care, the weeds will re-appear, the drains will become obstructed, the edible products of the earth will lessen in quantity, and diminish in their nutritive quality; the inhabitants will become unhealthy from the bad state of their grounds; and the diminution of their physical powers thus produced, will disable them progressively more and more from remedying the causes of the evil. Many of these effects will doubtless first be felt in their own persons, but it is undeniable that they must ultimately operate on their visitors. On this obvious principle is founded the axiom of Medical Topography, "that a slothful squalid-looking population invariably characterizes an unhealthy country."*

The Bengalee partakes pre-eminently of that "strange mixture of strength and weakness, of ferocity and gentleness," which characterizes the Hindoo in general. "This portion of the human race has, without passing through the various steps of a free civilization, been enslaved, refined, and degraded, by a political system which is both a theocracy and a despotism.

Here, the man who sacrifices life to the observance of an absurd law of caste, never has the daring to raise the arm of self-defence or of vengeance against the oppressors of his person and country."

Such is given as the character of the Hindoo, and of the Bengalee Hindoo especially. I fear that in the lower provinces, at least, the more rational creed of the Mahomedan raises him but little above the moral level of his countrymen of the caste.

* Dr. Hennen's Note.

The Bengalee, unlike the Hindoo of the north, is utterly devoid of pride or sense of dignity, national or individual. His moral character is matter of history; and I think it were ungracious now, when we are looking forward with such well-founded hope to the improving results of European knowledge and example, diffused among the Natives, to bring unnecessarily into relief their worst qualities, or those engendered by ages of atrocious tyranny, civil and religious.

Moral character
of the Bengalee.

How can that people be happy or virtuous, who have probably never known what it was to have a good government, and who can scarcely be said to appreciate the justice and protection now extended to them?

It is not necessary that I should here follow the Bengalee in all the detail of his practice of falsehood and perjury, his insensibility to the feelings of others—his “perfection in timidity,”* his cruelty and ferocity, his litigiousness, his physical uncleanness, and obscene worship; for my part, I prefer turning my recollections, although it may be a digression, towards that class of Hindoos whose sense of military duty forms so powerful an incentive to good conduct in civil life—the up-country sepoys;—a class of men at all times respectable, when justly treated. When treated otherwise (as I have seen them, and that under the privation of active service) their worst, instead of their best qualities, may be elicited; yet, under a humane and just management, together with the example of their officers, it is surprising how respectable the sepoy may be rendered, even in the estimation of the Soldiers of Her Majesty’s Army, who are not lavish of complements. Those who observed the good conduct, on all occasions, of the Body Guard in Ava, felt satisfied that Captain Williams’s account of the Bengal Sepoy is in no way exaggerated.

Excellent character
of Hindoo Se-
poys.

In Calcutta, the influence of education and European example is seen to influence the moral character of the more enlightened individuals in a surprising manner, and in a thousand ways. Here I shall only mention one of these;—I mean the humane and charitable feeling evinced

The influence of
education in India.

* Speaking of their unfitnes for Soldiers, Mr. Shore says, “It would probably be an impossibility to make a Bengalee Hindoo fight, such inveterate cowards are the whole race.”

Charity of the
educated as con-
trasted with the
orthodox Hindoo.

by the *educated* Baboos, as contrasted with that of the bigoted or, as they call themselves, the *orthodox* Hindoos,—the one bestows largely ; the other gives nothing.

An hospital for the sick poor, says, Dr. Tennant, was never known in India before the establishment of the British, though there were for dogs, cats, lions and several other animals, but none for men ! !

It is but fair, however, to mention that asylums for the sick and destitute are Institutions of *Christian growth*. The fine buildings of Greece and Rome were erected for purposes far other than *charity*.

Let us hope, then, that despite the all-powerful influence of climate, and the nearly equal influence of the depraving political and religious institutions of ages, the natives may yet learn to conquer both through the benefits of education, and the example of their European governors.

INFLUENCE OF THE HINDU SUPERSTITION AND MORALS ON HEALTH.

We have not to travel to the banks of the Ganges to learn, “ that the *uninstructed* man cannot even read the true character of the Deity ; that the works of nature address their eloquent language to him in vain, that the destiny of man is obscurely beheld by him, and that it is only as he advances in knowledge that he becomes *capable* of receiving and comprehending divine truths, abandons ceremonies stained with blood, and tries to imitate the goodness which he then alone discerns in action all around him.”

If we take a general survey of the institution of caste amongst the Hindoos (and, without doing so, we can know nothing of the natives) we are inevitably led to the conclusion, that it wars with every passion of the human mind, good as well as evil, and that by being prejudicial to public happiness, it is eminently injurious to public health. In it we find none of the purifying influences of the Eleusinian rites of the Greeks, whereby both Isocrates, and Cicero in later times, considered that their morals and civilization were so much advanced.

There is nothing in the rites of the Hindoo that, in the estimation of his countrymen, absolves him from former crimes, to restore him, a new man, to the bosom of society—a renovating principle so powerful in morals.

I am here speaking of the practical operation of religion on the native mind, for I am well aware that in the *abstract*, it stands on high pretension, both as to its tenets and its rites :—yet, what are we to think of both, when, with connivance at every crime, the slightest infringement of the rule of caste consigns a man to despair—the most deadly of all corruptors.

“The Hindoo will utter falsehoods that would knock down an ox, and will commit perjuries so atrocious and disgusting, as to fill with horror those who visit courts of justice ; but he will not violate his Shastres by swearing on the waters of the Ganges.”

I know but one redeeming quality in the Hindoo religion—its toleration ; and here, for once, it comes into pleasing contrast with the otherwise more enlightened faith of the Mahomedan.

The system of the Hindoo never influences the national genius beyond the addition of another arm or leg, a bull’s head, or a serpent’s tail, to the figures of their deities. Whatever may be said by imaginative writers, I cannot learn that there is any thing in the mere abstract contemplation of the Hindoo religion to injure the health by over-exciting the emotions, or, in other words, through an over-wrought exercise of the nervous system.

On the contrary, in the “Hindoo act of devotion there is not a vestige of reference to the divine attributes, nor to moral duty. The Hindoo rehearses in his mind the form of the God, his colour, the number of his heads, eyes, hands, &c. and nothing more,” and he who preserves his caste, need not disturb his mind on any other subject connected with moral or religious obligation.

“If there is any part,” says Tennant, “of his conduct with which his religious ideas have no concern, it is his moral character. In

‘doing justly,’ or ‘loving mercy,’ he is apparently left to act as he pleases.”

I shall now proceed to note briefly some of the effects of caste on the health of its votaries. Instead of a purification, the Hindoo seeks oblivion in his orgies.

On the last day of their holidays, it is a common custom enjoined by the Brahmins to drink plentifully of a kind of sherbet containing *Datura*, or *Bhang*, (*Cannibus Sativa*), either of which produces total insensibility for a time, ending frequently in wild delirium, and sometimes in permanent loss of reason.

One of the most pervading injuries inflicted by caste on public health is that arising from the too early marriage it enjoins. The history of every people proves the injurious physical results; and as respects the Bengalees, I need only quote the following paragraph from Ward, to exhibit some of its moral horrors :

“These very early marriages are the sources of the most enormous evils : these pairs brought together without previous attachment, or even their own consent, are seldom happy. This leads men into unlawful connections, so common in Bengal, that three parts of the married population, I am informed, keep concubines. Many never visit, nor take their wives from the house of their fathers-in-law, but they remain there a burden and a disgrace to their parents ; or, they abandon the paternal roof at the call of some paramour. Early marriages also give rise to another dreadful evil : almost all these girls after marriage remain at home, one, two, or three years ; and during this time numbers are left widows, without having enjoyed the company of their husbands a single day : these young widows, being forbidden to marry, almost without exception, become prostitutes. To these miserable victims of a barbarous custom are to be added, all the daughters of the *koolēnàs*, who never leave the house of the father, either during the life, or after the death of their husbands, and who invariably live an abandoned life.

The consequences resulting from this state of things, are, universal whoredom, and the perpetration of unnatural crimes to a most shocking extent.”

Polygamy again,—“that source of a thousand evils”—is injurious in various ways; indeed the Hindoos themselves speak loudly of its miseries, and declare it altogether incompatible with domestic happiness (if such a term may be allowed amongst a people who seldom can be happy in the married state); for, where can that happiness exist, when the females are complete slaves, “neither qualified nor permitted to be companions to their husbands:”—where widowhood, in place of respect, meets with every kind of ignominious treatment.

Effects of polygamy.

No wonder then, as noticed by Bartolomeo, that their women should “alter much faster than women in any of the nations of Europe. Early marriages, labour, and diseases exhaust their constitutions before the regular time of decay.” He adds that, before their thirteenth year, their women are “stout and vigorous.”

“Men are sufficiently corrupt by nature, without any outward excitements to evil in the public festivals: nor have civil nor spiritual terrors, the frowns of God, and governors united, been found sufficient to keep within restraint the overflowings of iniquity; but what must be the moral state of that country, where the sacred festivals, and the very forms of religion, lead men to every species of vice.”*

“These festivals, continues Ward, and public exhibitions excite universal attention, and absorb, for weeks together, almost the whole of the public conversation; and such is the enthusiasm with which they are hailed, that the whole country seems to be thrown into a ferment: health, property, time, business, every thing is sacrificed to them.

Injurious effects of the festivals.

“In this manner are the people prepared to receive impressions from their national institutions. If these institutions were favorable to virtue, the effects would be most happy; but as, in addition to their fascination, they are exceedingly calculated to corrupt the mind, the most dreadful consequences follow, and vice, like a mighty torrent, flows through the

* The accounts recently published of the systematic murderers, calling themselves Thugs, puts at nought all other descriptions; for in the history of mankind there is nothing to equal it in systematic and cool-blooded atrocity; and all under the formal appeal to, and sanction of the goddess Kålee!

plains of Bengal, with the force of the flood tide of the Ganges, carrying along with it young and old, the learned and ignorant, rich and poor, all castes and descriptions of people—into an awful eternity ; in short, the characters of the gods, and the licentiousness which prevails at their festivals, and abounds in their popular works, with the enervating nature of the climate, have made the Hindoos the most effeminate and corrupt people on earth.”

“ I have, in the course of this work, exhibited so many proofs of this fact, that I will not again disgust the reader by going into the subject: suffice it to say, that fidelity to marriage vows is almost unknown among the Hindoos ; the intercourse of the sexes approaches very near to that of the irrational animals. The husband almost invariably lives in criminal intercourse during the pupilage of his infant wife, and she, if she becomes a widow, cannot marry, and in consequence, being destitute of a protector and of every moral principle, becomes a willing prey to the lascivious. Add to all this, the almost incredible number of human victims which annually fall in this Aceldama. I have ventured on an estimate of the number of Hindoos who annually perish, the victims of Brahminical religion, and have supposed, that they cannot amount to less than 10,500 ! Every additional information I obtain, and the opinions of the best informed persons with whom I am acquainted, confirm me in the opinion, that this estimate is too low, that the havock is far greater, however difficult it may be to bring the mind to contemplate a scene of horror, which out-does all that has ever been perpetrated in the name of religion by all the savage nations put together.

These cruelties, together with the contempt which the Hindoos feel for the body as a mere temporary shell, cast off at pleasure, and the disorganizing effects of the caste, render them exceedingly unfeeling and cruel : of which their want of every national provision for the destitute, their leaving multitudes to perish before their doors, unpitied and even unnoticed ; the inhuman manner in which they burn the bodies of their deceased relations, and their savage triumph when spectators of a widow burning in the flames of the funeral pile, are awful examples.”

This last disgrace to the Hindoos, and to their Christian governors, has been swept away under the enlightened Government of Lord William

Bentinck ; yet enough remains, calling aloud to his Lordship's successors for a century to come to follow his noble example. The work of reformation is unhappily, and despite all we can do, but slow of results in this country. It therefore requires equal energy and judgment.

The number of victims of superstition sacrificed on the altars of the Indian gods, was estimated by Ward, as follows—viz.

Ward's estimate of the number of victims.

Widows burnt alive on the funeral pile,	5,000
Pilgrims perishing on the roads, and at sacred places,.....	4,000
Persons drowning themselves in the Ganges, or buried, or burnt alive,	500
Children immolated, including the daughters of Rajpoots,	500
Sick persons, whose deaths are hastened on the banks of the Ganges,..	500

Total.....	10,500

If to this we add, twelve thousand abortions annually procured in Calcutta alone, through the abominations of the Kooleen Brahmins, we shall arrive at some faint notion of the extent of injury inflicted on public health by caste.

Abortion in Calcutta alone 12,000.

“ By fevers, by dysentery, and other diseases arising from exposure to the night air, and the privations of a long journey, crowds are carried off in a few days : sometimes numbers involuntarily fall under the wheels of the monstrous car of Juggernath, five or six hundred persons, principally women, I am informed were crushed to death before the temple of Juggernath, in the year 1810, by the mere pressure of the crowd. The reader must consider that these sacred places, the resort of pilgrims, are spread all over Hindoostan, and that pilgrims travel to them from distances requiring journies of three, four and five months.”

Endless quotations to the same effect might be added, in illustration of the fact, that, in the caste, there is nothing but what is opposed, in every sense, to the moral and physical welfare of man. But, confining myself to what has come under my personal notice, during my residence in various parts of India, I must declare that it confirms all that Ward and others have said on the subject ; and, were I to enter into details, I should write a well-sized book on it alone. No festival ever takes place, that crowds of sufferers are not presented to me at the Native

Hospital, labouring under every variety of disease and misery, mental as well as bodily.

The Shraddus.

At the Shraddus, or rites for the repose of the souls of deceased, especially at those of men of wealth, vast crowds of mendicants collect for days together, and instances are common of the weaker among them being trodden to death in the scramble for money.

The sum of 1,200,000 rupees is said to have been spent by a head writer of Warren Hastings, on the Shraddhu of his mother, and it is even now common to see men who are reduced to beggary by such extravagancies.

Cruel custom of removing the sick to the river-banks.

I shall here close the subject of caste by a brief notice of the murderous ceremony of removing the sick and moribund to the banks of the Ganges, a proceeding that sets natural affection at defiance, and is frequently applied all over Bengal to the most atrocious purposes. For this we have the best authorities.

To die under a roof, or out of sight of the Ganges, is considered a heavy misfortune, and the patient is therefore removed from his house under all inclemencies of season, and frequently from considerable distances to the river bank, there to be "let down into the water up to the middle;" and if this be not sufficient, the friends, instigated by their own impatience, or by the grave sanction of a native doctor, "pour water down his throat; shout the names of different deities in his ears, and, by this anxiety after his future happiness, hurry him into eternity."

I have written this article with much reluctance; but it was necessary to make some attempt of the kind. The influences spoken of are equally pervading, whether we consider the physical or the moral nature of the Bengalee. Their importance therefore cannot be disputed.

EMPLOYMENTS, CUSTOMS AND AMUSEMENTS.

Cabanis's just views on the subject.

It has been well observed by Cabanis, that it is difficult to separate the customs of a people from their employments. In many countries some employments depend on the customs of the people, and in others again the customs are but the necessary result of the employments to

which the greater portion of the people give themselves up, or those who exercise the greatest influence in society ; thus manners, in some countries, have rejected certain kinds of occupations, whilst these again are encouraged in others to the extent of becoming objects of passionate taste, or wants of necessity. Under the barbarous institutions and absurd prejudices of the Spartans and Romans, all the labours of industry and of commerce withered. Arts which wanted delicacy, and that were carried on by the rudest hands, could not progress : they were a kind of disorder in the state. Most of the Egyptian works seem to have been the product of slave labour, whilst all those of Greece were the occupations of freemen : those of the Phœnicians and Carthaginians were in keeping with the ingenious commercial industry of a people who placed riches above all things. The labour of the Romans were those of a conquering people ; and differed but little whether in the highest or lowest stage of their fortunes. Their habits were essentially predatory.

Employments, customs and amusements are likewise powerfully influenced by climate and form of government : the effects of both these are every where conspicuous in Asia. The languid and slothful habits of the Hindoos, together with the absence of motive for labour, are all rightly ascribed by Mill to their "wretched government under which the fruits of labour were never secure."

Influence of Government on employments, customs, and amusements.

Climate again, which enables the Hindoo to live heedless and slothful, forces the native of Holland to be careful, laborious and attentive to excess ; or as remarked by Cabanis, he must render back to the ocean that soil which a free government and his own care enable him to secure.

Influence of climate.

These three, architecture, weaving and jewellery, says Mill, are the only arts for which the Hindoos have been celebrated, and even these, with the exception to weaving, remained in a low state of improvement. He might have added that all three are arts found to flourish under despotic Governments, and that frequently to the exclusion of others of more general utility. There are no remains of great public works in any of our eastern dominions, none certainly of utility belonging to the Hindoos, and most of those that belonged to their more civilized conquerors of the Mahomedan faith, have fallen into decay. I have never

seen but two or three natives who seemed to be fully alive to the value of public works.

With exception to a few educated Baboos, the Hindoo, of whatever fortune, still retains his narrow ideas and parsimonious habits. His pious contributions, and the expenses of the Zunanu are the greatest drains upon his income: in his dress and table there is little devoted either to the purposes of elegance or magnificence, unless the insipid nautches, marriage and religious festivals deserve that name.

Injurious consequences of borrowing.

The general practice of borrowing even among the poor, and that at a most enormous interest (as high as 30 per cent.) is a heavy tax on industry, and keeps the lower orders in a wretched state of dependence. A Hindoo seldom makes provision for the future; he borrows to supply his most common wants, and then evades payment as long as he can. I am told this is the case with all (even the best paid) labourers employed by Europeans in Calcutta, and that not satisfied with borrowing from the Shroffs, they are largely paid in advance by their employers. The extraordinary sums spent at marriages as well as at the celebration of the rites for the repose of the dead, entail future poverty: not a vestige remains, says Ward, by which the married pair may be made happy or wealthy; the whole sum evaporates in show, noise or smoke. The Bengalees are a loquacious people only in bargaining and wrangling; the noise at one of their haunts, or markets, goes beyond any thing of the kind in any European country; they are on the other hand never seen assembled in groupes, like all European people, to discuss news or matters of public interest. The long fasts likewise practiced by the lower orders are injurious, as is the Hindoo habit of dress, especially in the cold weather. Away from the ceremonies of religion, marriages, &c. the Bengalees have no public amusements, no manly sports or exercises—nothing to develop the muscular frame. They take no pleasure in agriculture—"their prejudices prevent them from rearing poultry, and but few possess the convenience of a kitchen garden." If the Bengalee be in easy circumstances, the whole day is passed in eating, smoking, and chewing the pawn, reclining and sleeping. It is a proverb amongst them that the life of a woman being more sedentary, is happier than that of man, and that nothing but the dangers of bringing forth children "makes them content to be men still." To

Poverty caused by lavish expenditure at various ceremonies

They have no public amusements.

Indolence proverbial amongst them.

some amongst the Hindus especially, it would seem as if it were too much trouble to live.

The Natives are very fond of pantomimical exhibitions, and I am told that all manner of jugglers thrive here. They are also much given to musical entertainments, of which the singing at their nautches is the best specimen, though sufficiently monotonous to an European ear ; but in regard to their band music (if I may so call it) at marriages, &c., and on religious ceremonies, never was the maxim de gustibus, &c., more true than here. It is impossible to speak of the Bengalee music with any feeling short of disgust, or to compare it to any thing but the noise made by cows in distress, with an admixture of the caterwaulings of a feline congregation and the occasional scream of an affrighted elephant. It is said of the Natives, that our superiority in every respect is readily acknowledged, but that we are altogether deficient in music!! In their idea the most pleasant and harmonious is that which makes the loudest noise, and the Nagari, or great Drum, is an emblem of sovereignty.

Fond of pantomimical amusements.

Bengalee music.

Gambling is eagerly pursued, and the numerous gambling houses wherein stolen goods are received from servants in order to entice them to play, are every day crowded in certain parts of the town and Suburbs. The languid game of *Pucheesee*, is the one in general use on these occasions.

Eager pursuit of gambling.

To conclude ; when the child is born, the father puts a piece of *money* into his hand, and when the man dies, the same father employs two or three persons of the vilest caste, with long bamboos “to keep the limbs and bones in the fire.” The ceremony at birth and at death is performed with the same want of natural feeling : in the one case there is no rejoicing, and in the other “no children or relations are seen weeping over the pile ;” none of the tender feeling cherished in burying the dead among Christians, and “no vestige that can remind the living of their deceased friends.” When we reflect upon the habits and customs of the Natives ; their long misgovernment ; their religion, &c. ; their diet, clothing, and withal, their *climate*, the problem of their moral and physical depravation is solved.

DIET—CLOTHING—BEDDING—FUEL.

“ La diète atténuante, que les législatures de beaucoup d'ordres religieux ont prescrite n'a pas l'effet de diminuer les desirs vèneriens (au contrair,) mais d'enflammer, ou de dèrègler l'imagination, eu diminuant les forces, et de rendre par là, les homes plus faibles, plus malheureux, et plus aisès à dominer.”—CABANIS.

The diet of the Hindoos prescribed by the founders of religion and not by climate.

Whether the founders of the Hindoo faith were aware of it or not, is immaterial to the present inquiry ; but there can be no question that, by depressing all the physical energies, through a diet purely vegetable, they fastened with a stronger hand the moral bonds of Brahminical domination on the people. “The use of certain kinds of food or drink,” says Cabanis, “may tend to confirm or impair certain moral habits. Sometimes, it may operate directly, and by the immediate impressions which it produces ; at other times, by the different states of health or disease which it occasions, or by the changes in the fluids and solids which result from it : for all these different alterations in the system soon manifest themselves more or less distinctly in the ordinary dispositions of the will and understanding.” It has always appeared to me a great mistake to view the diet of the Bengalee as *prescribed by climate*: on the contrary, I believe it to be far below the standard required for his support under all the changes of his seasons : in the hot weather and rains, it is not sufficient to supply the great waste, and in the cold weather, its poverty is alike injurious to his health.

Sufferings in the cold season from want of clothing.

W. Hamilton, speaking of the luxuries of woollen clothing and fires used by Europeans in the cold season, says, the natives enjoy neither luxury, and suffer exceedingly all night ; they shiver and lament, and in the morning continue benumbed, both in body and mind, until the sun acquires some height, dispels the fogs, and invigorates them by its cheering beams.

Who can doubt the beneficial effects of a more generous plan of diet, and better clothing, on both mind and body ; but the Brahmins have ordered it otherwise ! Poverty, instead of exciting pity in this country, only gives rise to the reflection—“He belongs to a degraded

class ; he is suffering for the sins of a former birth, and is accursed of the gods." !!

"Even on nations," says Dr. Hawkins, "exposed to the same scorching sun, the influence of *diet* seems to be more powerful in forming the constitution and the character than the mere climate, as is evinced in the wide diversity existing between the Hindoo and the Malay. The *nature of the soil* is the earliest element which operates in creating a national character ; but religion and government produce a second, a more essential, a moral climate, which ultimately determines not merely the health of citizens, but the existence of a state."

Let us now inquire what the actual diet is, which supports the miserable existence of the Bengalee. I do not here speak of the well-paid labourers of Calcutta, or of the servants of the Europeans, (the Topographer has little to do with the habits or luxuries of the well-paid or the wealthy,) but of the great mass of the people ; and it is truly surprising in what a state of indigence they are placed by their own inveterate habits of indolence, derived from long political and religious misrule. In some places their wages do not exceed a penny a day ; in others three half-pence, and in others two-pence. "Those who are very poor eat with their rice only herbs gathered in the fields ; the middling classes eat split peas, greens, fish, &c."

The diet common to the Bengalee.

To enable us to form some idea how these people are able to maintain their families on so small a sum, it is necessary to consider that their firewood, herbs, fruits, &c. cost them nothing ; (that is in the country) they wear no shoes nor hats ; they lie on a mat laid on the floor ; the wife spins thread for her own and her husband's clothes, and the children go naked at all seasons.

A man who procures a rupee monthly, with his wife, and two children, eat two maunds of rice in the month, the price of which is one rupee ; they eat twice in the 24 hours, at 8 A. M. and at 10 P. M. From hence it appears, that such a day-labourer must have some other resource, otherwise he could not live : if he is a Musselman, he rears a few fowls ; or if a Hindoo he has a few fruit trees near his house, and he sells the fruit. If by these, or any other means, the labourer can raise half a rupee or a rupee monthly, this procures him salt and a little oil, and

one or two other prime necessaries ; though vast multitudes of the poor obtain only from day to day boiled rice, green pepper-pods, and boiled herbs ; the step above is a little oil with the rice.* The lowest class often want beetle and salt, and in place of the latter use the ashes of various plants containing different saline substances. Altogether, we may conclude with Dr. Hamilton, that " whoever has travelled much with the Natives and been witness to the weakness of their constitution, in resisting the changes of air or water, will agree with me in saying that those who enjoy a diet which includes animal food and strong liquors in moderate quantities, are best able to resist the influence of unhealthy climates, and the sudden change of air." The more rational religion of Mahomed permits a better system of diet to its followers, and they are therefore on the whole more robust and more capable of sustaining effort than their Hindoo brethren ; if the very poor of them imitate the Hindoos in their nakedness and poverty of diet, it is through necessity alone, not choice. Dr. Duncan Stewart, to whom the public and the profession here are so much indebted for his researches in the department of statistics, has favoured me with a table by which it appears that, for six years, the average annual mortality of the Hindoo population of Calcutta is one in $17\frac{1}{3}$: while in the better fed and clothed Mahomedan portion, it is but one in $38\frac{1}{2}$ —a most remarkable fact.

A better system of diet conducive to health and vigour.

CLOTHING.

If the Bengalee had any thing deserving the name of clothing, the circumstance of its remaining the same under all the various changes of their seasons would render it useless. The kummerbund, of the protecting influence of which so much has been said, is in reality too slight and worn too low down over the haunches to be any protection to the abdomen. The head and feet are uncovered, and during the cold season the poor are eager to obtain shreds of coarse woollen cloth, and their general dislike of this season proves that they suffer much from it. The garments of a farmer for a year (two suits) cost about two rupees. Diseases of the skin are of extraordinary prevalence among the lower orders, arising no doubt from poverty of diet and the absence of due clothing.

Wretched clothing : remains the same under all the changes of season.

* Ward.

BEDDING.

Of bedding but little need be said, as there is in reality none in use by the lower orders. Many poor natives, says Ward, sleep in places where, if some people were to set their feet they would receive cold. Almost on the soft earth, with a single cloth for their covering, multitudes may be seen every night lying by the side of the streets in Calcutta. One night's lodging of this kind would in all probability, hurry an European to his grave. A remarkable illustration of the value of comfort in this article is given in the Madras report of Drs. Ainslie, Smith and Christie, wherein it is said that the inhabitants who were elevated ever so little above the soil on bed-frames, or who were defended by rugs were decidedly more exempt from fever and its fatal consequences, than such as had not these advantages.

Bedding of any kind but little used.

Remarkable illustration of the value of comfortable bedding.

FUEL.

I am not aware that fuel is used, even by the wealthier classes of Natives, for purposes other than the dressing of food: fire, as a luxury in the cold season, or to dispel the excessive damp during the rains, is unknown to the Natives generally. Though familiar with the establishments of the Baboos of Calcutta, I have never seen any thing like a fire-place in any of their houses: when they do use fire in their rooms, it is in the form of a moveable grate filled with charcoal. The common fuel of the poor of Bengal is bamboo, certain kinds of reeds, and cow dung mixed with husks of rice, dried in the sun. In Calcutta, the fuel in general use is the soondree wood from the Sunderbunds: and a servant who receives monthly wages of six rupees, expends half a rupee on this article.

The luxury of fire-places unknown to the Natives.

POPULAR MEDICINE AND SURGERY.
EMPIRICS.

Medicine and Surgery in a degraded state not matter of surprise.

All the institutions of the Hindoos opposed to advancement in these humane sciences.

Those who have not considered the extreme deficiency of medical knowledge, even in our own days, in European countries, otherwise highly civilized, and who are not aware of the difficulties of medical science, have expressed much surprise at the degraded state of Medicine and Surgery amongst the Hindoos. It may be said with truth, I think, that all their institutions, but especially those of religion, were in opposition to any great advance in this humane pursuit, both from the feelings that were aroused by them, and those they suppressed. The active humanity of all Europeans, and the habitual indifference to the feelings of others, so general in Asia, would of themselves go far to account for the difference in knowledge in the healing art, without going deeper into their relative institutions of Government and national character.

Even Medicine and Surgery, says Mill, to the cultivation of which so obvious and powerful an interest invites, had scarcely, beyond the degree of most uncultivated tribes, attracted the rude understanding of the Hindoos.

Leisure of Brahmins worthlessly used.

Miserable state of Surgery.

Though the leisure of the Brahmins has multiplied books on astrology, on the exploits of the gods, and other worthless subjects to such a multitude "that human life," according to Sir W. Jones, "would not be sufficient to make oneself acquainted with any considerable part of Hindu literature, he yet confesses, that there is no evidence that in any language of Asia, there exists one original treatise on Medicine considered as a science." "Surgery," says an author, who believes in the high civilization of the Hindoos, "is unknown among the people. In the case of gun-shot or sabre wounds, all they did was to wash the wound and tie it up with fresh leaves, the patient during the period of convalescence, eating nothing but the water gruel of rice." The examples of native surgery that have come under my

observation were much worse than this; all cases of wound or fracture having been tied so as to impede circulation and thereby invariably cause mortification of all the parts. Many such cases have been presented at the Native Hospital. Of native medicine and medical treatment, I cannot speak more favourably. The articles employed in medicine by the Hindoos are doubtless extremely numerous, and some of them even of great value: there are others the value of which is not well ascertained, and the practitioners have not the semblance of correct instruction in this, or any other department of professional knowledge: were any of them to seek it, he could only be referred to the "hundred sections of a thousand stanzas each" of the Ayurveda—the very title of which is unknown to most of the present day, who seem to have forgotten that one of the fourteen retnas or precious things, which their gods are believed to have produced by churning the ocean, was a learned physician. The doctors are well rid of the learning here spoken of, however, lest their ingenuity should be exercised in reducing error into a kind of system, the most deceitful bane to which the human mind is exposed, and of which medicine in all countries has had its due share. It is fortunate too, that this said Ayurveda has come down to us in but a very imperfect state; for, being the work of an "inspired physician," and, consequently, a revealed science, the knowledge of it would preclude all improvement, whether in theory or practice.

Examples brought to the Native Hospital.

The practice of Medicine equally worthless.

The inductive mode of reasoning is unknown to the Brahmins; they have never been observers of common facts; there are no treatises on particular diseases: all they have of record in medicine is in the shape of diffuse general system, or systems, of which the greater part relates more to mythology than medicine. Professor Wilson, to whose learning and accuracy of observation we hope to be under further obligations, states that "in the treatment of disease, the Hindoo writers are essentially deficient, and the notion of augmenting efficacy by multiplying ingredients disfigures their works with a prodigious number of the most preposterous and ridiculous compounds." The Professor adds, "that in proportion as the work is more modern, the compounds become more extravagant, and assume a more important place in practice." "The imperfection of their medical system," says Ward, "and the ignorance and rapacity of the quacks who bear the character of physicians, greatly adds to the general misery."

Inductive mode of reasoning unknown to the Brahmins.

Ignorance and rapacity of empirics a great addition to the general misery.

After this it were unprofitable to pursue the native empirics, whether Hindoo or Mahomedan, in all their shameless impostures on their fellow countrymen. It is sufficient to remark here, that they are not to be surpassed by any of their trade, for mystery of deportment or self-sufficient and impudent knavery.

The foundation of an *English* School of Medicine of vast importance.

The abolition for ever of the barbarous rite of the Suttee, will doubtless hand the name of Lord William Bentinck to the grateful remembrance of remote ages in India; but the foundation of an *English* School of Medicine (the success of which is no longer doubtful) will prove of far greater importance, in as much as the diffusion of European medical science, with all its collateral branches, must prove one of the most direct and impressive modes of demonstrating to the natives, the superiority of European knowledge in general, and that they must cultivate it actively, if they would rise in the scale of nations.

INSTITUTIONS FOR THE EDUCATION OF THE NATIVES.

Two circumstances appear calculated more than all others to keep the people in their present state of moral degradation; the first and greatest is the caste; the second is the want of any national plan of education.

The extinguishing influence of caste has been elsewhere spoken of; and here it only remains to remark briefly on the other great evil—the absence of education.

In most European communities, education is a national affair—a part of the political system,—and has for ages been subordinate, in the best regulated of them, to what is termed the law of society, and to that assemblage of opinions, customs, and habits which is not inappropriately called by some writers, the positive morality of society, or the law of opinion. Now, here the people have never had any of these; and so long as they and education are wanting to the society of India, it cannot possess a shade of sovereign or independant quality, but must remain in its present anarchy.

The people must look upon us as strangers, and we must look on them with the reserve of conquerors.

I must here be understood as speaking only of education for the better classes of natives, and within the capital.

For India and the people at large, I am well aware that in matters affecting education as well as in others, to use the words of Sir Thomas Munro, "no system for any part of the municipal administration can ever answer that is not drawn from its ancient institutions or assimilated with them."

Of the institutions established within this city by the Government or by private individuals, the most important are those in which the English language is the medium of instruction; for where else are we to look for the means of informing the understanding by unlocking the stores of useful knowledge; of inspiring a taste for intellectual pursuits; of teaching each man his proper relations with society; of, in short, raising him above the thousand enslaving influences of caste. It appears to me that, through the channel of the English language alone, can these and many more great national results be obtained; and whatever orientalists may say to the contrary, a practical inquirer must look back to the facts, and ascertain what the Sanscrit, Arabic, and Persian courses of instruction have effected for the native mind, during the ages that have passed, and as compared even to what he already sees, as the result of the European system, small as that is, in a national sense. Indeed, the little of moral regeneration perceptible within this city, the capital of a Christian Government, and the focus of Christian Institutions and example, must prove a source of astonishment to those who do not perceive how long it was before we found out the true road to the cultivation and moral improvement of the native mind. For any thing discernible to a casual observer, the power of caste is as dominant now in Calcutta as on the day the sun of Bengal first shone on the European stranger.

COMMITTEE OF PUBLIC INSTRUCTION.

Though not the first in the order of time, the Committee of Public Instruction, as the advising institution of Government in its management of native education, may properly be noticed here.

The appointment of this Committee took place by order of Government in July 1823 ; and through the judicious selection of its members, it became the principal organ for the regulation and diffusion of knowledge amongst the people, whether by the medium of Asiatic or European languages.

That the services of the Committee were every year becoming more extensively beneficial to the cause of native education, was universally admitted ; yet, it was the opinion of many well informed persons, that too much attention had been bestowed, and too large a share of the public funds allotted, to the translation into the native languages of detached works of European science, and “ the printing of Oriental works.” In a resolution of Government dated March 7th 1835, this system was ordered to be discontinued, and it was directed that “ all the funds which these reforms will leave at the disposal of the Committee, be henceforth employed in imparting to the native population a knowledge of English literature and science through the medium of the English language.”

This, as the Committee states in its report for the year 1835, constituted an epoch in the history of the Committee ; and though it be again going out of the order of time, I shall begin my notice of the institutions for the improvement of the natives with that of the Hindoo College, because it was the first extensive establishment founded on the European plan.

HINDOO COLLEGE.

The establishment of the Hindoo College is ascribed to Mr. David Hare of Calcutta, who framed a plan which was submitted by some intelligent and influential natives, including the celebrated Rammohun Roy, to Sir Hyde East. This led to the calling a meeting of native gentlemen on the 4th May 1816, at the house of Sir Hyde East, where large sums were subscribed both by natives and Europeans. It was then resolved “ that an establishment be formed for the education of native youth.”

At a general meeting held on the 21st May of the same year, the primary objects of the institution were declared to be “ the tuition of the

sons of respectable Hindoos in English and Indian languages, and in the literature and science of Europe."

Two distinct funds were established; one denominated "the College fund" and the other the "Education Fund."

The object of the College fund was to form a charitable foundation for the advancement of learning in aid of the education fund, the purchase of ground and construction of suitable buildings; while the amount of the education fund was ordered to be appropriated to the education of the pupils, and the expense of tuition.

On the 20th January 1817 the College was opened, the students amounting to twenty; this small beginning induced "a learned native to express his hopes that the Hindoo College might resemble the *Bur*, the largest of trees, which yet is at first but a small seedling."

In less than three months the students amounted to 69, of whom 16 were free scholars. English was the principal study. The capital amounted to 72,000 Rs. From 1819 to 1823, but little progress was made, and, but for the unwearied exertions of Mr. Hare, it is certain that the institutions, so auspiciously commenced, would have fallen into decay.

At this crisis an appeal was made to the Government, which happily, at the very moment, had under consideration the abandonment of the original design of founding two Colleges at Tirhoot and Nuddea, for the revival and cultivation of mere Hindoo literature. It thus happened that the two objects became conjoined, so as to form the present flourishing and noble Anglo-Indian institution of the Hindoo College, comprising two schools, essentially distinct in constitution, management and purpose—the one being solely for the cultivation of English language, literature and science, and the other for the exclusive pursuit of the Sanscrit, and other Brahminical sciences.

The Anglo-Indian portion it was determined to place under the direction of Native and European gentlemen, while the Sanscrit should remain under the controul of Government. The sum of a lakh and

twenty thousand rupees was allotted by Government for the purchase of ground and the erection of the present building, with a grant of thirty thousand rupees per annum for the support of the institution. A portion of the funds was formerly assigned to the support of one hundred foundation pupils, who received from five to eight rupees per mensem. These were either strangers, or sons of indigent inhabitants of the town and suburbs.

The number of foundation pupils is now very properly reduced, and parents are encouraged to pay for the education of their sons.

The course of study comprehends the following classes, viz. 3 grammar—1 general literature—1 rhetoric and prosody—1 law—1 logic—1 arithmetic—1 medicine—1 theology.

On the completion of the present building and the extension of the institution, it was found desirable by the native gentlemen who presided to obtain the co-operation of some competent European, and Mr. Horace Hayman Wilson was nominated by Government Vice President. To this happy selection is mainly to be ascribed the existing prosperity of the College; for, to a profound knowledge of the Hindoo languages and literature, which obtained for him the unlimited confidence of the Natives, he added the higher qualifications of an European scholar, and gentleman—the latter an important qualification in all intercourse with Asiatics;—in short, Mr. Wilson confirmed and established, what the efforts of the Natives, even aided by Government, could not have effected without him. This is a great honor; and Mr. Hare, by his humane and indefatigable endeavours must be allowed to share it; for he has devoted his life to the humbler duties allotted to him.

Every description of useful reform was instantly put into active effect by Mr. Wilson, and in a short time the pupils increased from one to two hundred, with a large accession to the paying class—a circumstance most conducive to the advancement of the College.

Scholarships were instituted, the object being, by a monthly bursary of sixteen rupees, to induce the pupils of the first class to remain for a further period, and thus complete their course of studies.

This plan, which originated with Mr. Wilson, has been attended by the happiest results.

In progress of time, however, some of the pupils became, not only accomplished, but bold. In 1829, the principles and practices of the Hindoo superstition were held in open contempt, and in their ill-directed zeal, the sentiments of Hume and Gibbon were warmly adopted instead of sounder principles. These sentiments were proclaimed at debating clubs, and some went so far as to refuse investment with the Brahminical thread ; others, when called on to repeat the *montras*, or prayers, used instead, lines out of the Iliad ! The degradation of the female sex was viewed with indignation and horror ; and the remedy proposed was the immediate study of moral philosophy and Algebra !! But it was not till advantage had been taken by some clergymen of this growing liberality, by proposing to give lectures on the evidences of Christianity, that the managers of the College took the alarm, and the result was a summary order announcing their “ strong disapprobation and prohibition of such practices ”—followed by the removal of one of the teachers, who was supposed to have misled the pupils, and likewise of several of the refractory reasoners amongst the higher classes. Order was however, soon restored by the influence of Mr. Wilson and Mr. Hare, and the harmony of the institution has not since been disturbed.

It is most gratifying to record that the union of English and Sanscrit teaching in the same institution, has ended, as that of English, Arabic and Persian in another.

The language which leads to the knowledge of history, natural and experimental philosophy, is taking the complete lead ; so much so, that pupils cannot be got to pay for the Asiatic departments, and the institutions are consequently obliged to grant the Sanscrit and Arabic pupils stipends as an inducement, whereas the number who pay for English instruction is increasing largely every year.

This, for the better classes, is as it ought to be ; and when they become versed in European knowledge, through the more ready channel of the English language, that knowledge can the more easily be

propagated to the people at large, through the only channel for them—the vernacular dialects.

There will always be found a sufficient number of individuals, Hindu and Mahomedan, disposed to pursue and keep up a knowledge of mere oriental literature, for its own sake.

I shall conclude this notice by a brief summary of the statistics of the Hindoo College—economic and educational.

A new, and very successful mode of raising funds has been found in the distribution of honorary titles, such as Raja, Bahadur, &c., through which source, up to the present time, the following scholarships have been procured from wealthy natives ; each being equal to Rs. 10,000—

5	Scholarships of Raja Budenath Roy,	Rs. 50,000
2	„ „ Nursinghunder Roy, „	20,000
3	„ „ Bunoilall Roy,	30,000
2	„ „ Seebchunder Roy,	20,000
2	„ „ Hurrinauth Roy,	20,000
2	„ „ Kally Sunkur Roy,	20,000
2	„ „ Bejoy Gobind Singh, „	20,000
1	„ „ Gooroopursad Roy,	10,000
5	„ „ Chuttoodaree Singh, „	50,000
—		
24		<u>Total Rs. 2,40,000</u>

There are besides vested in Government Securities, Rs. 28,000

The monthly income is as follows :—

By Government Allowance,	Rs. 2,131
School Society,	„ 160
Pay Scholars including donation,	„ 1,698
	<u>Total monthly income, Rupees . . . 3,989</u>

List of Boys taught in the Hindoo College.

<i>Years.</i>	<i>Months.</i>	<i>Pay Boys.</i>	<i>School Society.</i>	<i>Free.</i>	<i>Donation.</i>	<i>Total.</i>
1825.	December,	105	30	60	10	205
1826.	Ditto,	208	30	60	10	308
1827.	Ditto,	263	30	60	10	363
1828.	Ditto,	337	30	60	12	439
1829.	Ditto,	336	30	60	12	438
1830.	Ditto,	290	30	60	12	392
1831.	Ditto,	221	30	60	12	323
1832.	Ditto,	207	30	60	11	308
1833.	Ditto,	209	30	60	14	313
1834.	Ditto,	226	30	60	17	333
1835.	Ditto,	223	30	60	17	330
1836.	Ditto,	269	30	60	20	379
1837.	Ditto,	291	30	60	23	404
1838.	Ditto,	309	30	60	24	423
Total in 14 years,		3,494	420	840	204	4,958

THE SCHOOLS OF THE SCOTTISH MISSION.

It has been seen in the last note that in the Hindoo College, the evidences and doctrines of natural and revealed religion are purposely excluded from the course of study—I now proceed to notice an institution founded on the very opposite principle, viz. of basing upon, and incorporating with the truths of Christianity, the whole of the education imparted.

It is denominated the “General Assembly’s Institution,” from its having been founded and still maintained by the General Assembly of the Church of Scotland.

It was established in the month of August, 1830, by the Revd. Dr. Duff, the General Assembly’s first Missionary to India; and though its

objects and character were distinctly avowed, met with the most unequivocal success from the beginning. The countenance of the celebrated Ram Mohun Roy, who attended the school for several days in succession after its opening, contributed in some degree to this auspicious result; but the chief causes of it are to be found in the uncommon ability of the teacher, the character of the education given, and the rapid progress of the pupils. In the following cold season a public examination was held in the Town Hall, in the presence of many European and Native Gentlemen, and the manner in which the scholars acquitted themselves, even at that early period of their studies, elicited very warm expressions of admiration, and excited general attention. From that time to this, the prosperity of the School has not sustained any check; it has always been numerously attended; and indeed, the applicants for admission have often exceeded the limits of the accommodation.

All the instruction is conveyed through the medium of the English language, though a Moonshee and Pundit are retained for the purpose of teaching the vernacular languages.

The General Assembly's Institution, as has been mentioned, differs from all those institutions in which knowledge is severed from religion, in imparting instruction in literature and science only in connexion with Christianity. In it the Bible is regularly read; all the elementary class books contain frequent allusions to the facts and histories of the sacred volume; and the evidences of its divine authority and the doctrines embodied in it form a prominent subject of study in the more advanced classes.

The course of general instruction followed in the General Assembly's Institution is of a comprehensive character. In this respect it does not yield to any of the Government Institutions, while it excels any Christian School in this side of India. Besides the elementary branches, History, ancient and modern, Geography, Logic, mental and moral Philosophy, Mathematics, Astronomy, Optics, and English Composition are taught; and the proficiency attained by many of the pupils in these branches reflects the greatest credit both on them and on their teachers. The system of tuition pursued is the interrogatory, and tends not only to improve the memory, but to strengthen and cultivate the understanding.

This extended and intellectual course of instruction is attended with the happiest effects upon the minds of the scholars. At an early period of it, their prejudices are gradually undermined; the folly of the native superstition becomes apparent to them; the tone of their moral feelings is raised; and they cease to be idolators, though few of them hitherto have had the courage to make an *open* profession of their belief in Christianity.

The General Assembly's School was held for several years after its opening in a hired house in the Chitpore Road;—this site having been fixed upon from being in the heart of the native population.

The General Assembly, however, encouraged by its remarkable success erected during the past year a very handsome and commodious structure in Cornwallis Square. It was designed and built by Messrs. Burn and Co., and, together with the ground, cost between 50,000 and 60,000 Rupees. It was opened for the reception of the scholars on the 2d January 1838, and is crowded in every part. The number in the list is 730, and the average daily attendance is about 550—no fee is exacted from the pupils, but they are required, excepting when very poor, or when engaged as monitors, to pay for their class-books.

BISHOP'S COLLEGE.

This Institution originated with Bishop Middleton of Calcutta, to whom several Societies in England applied for opinion as to the best mode of propagating Christianity in India.

The objects of the College are, “the education of Christian youth in sacred knowledge; in sound learning; and in habits of piety and devotion in their calling, that they may be qualified to preach among the heathen.” The foundation was laid by Bishop Middleton in December 1820, and the present building, which cost above £13,000, was soon completed.

By collections throughout the Churches of England and Ireland, together with donations from various religious Societies, the sum of about £60,000 was at once obtained for the support of this Institution, which

is formed for a Principal and two other Professors from the English universities, and as many students as can be maintained, either on the foundation of the Incorporated Society, or on the endowment of any other religious Society of the established Church, or of the local government, or individuals.

The students are to be educated either as Missionaries, or as Schoolmasters, for the dissemination of general and useful knowledge.

The numbers qualified for these respective duties since the foundation of the College, are—

For the duties of Missionary,	9
Chaplains, (not in the H. C.'s Service)	2
Catechists,	8
Teachers in different schools,	4
	—
Total	<u>23</u>

The permanent funds are vested in England, and amount to about £70,000.

THE NEW MEDICAL COLLEGE.

In the earlier history of our native army, there existed no other mode of instructing such as presented themselves for the office of native doctor, than the hospitals of divisions, or, as they were called, the general hospitals. Here the candidates were entertained while yet boys; and when in course of time they became sufficiently qualified to act as dressers and compounders, they were drafted off in the proportion of one or two to each Battalion, according to the exigencies of the Service. I have had some of the last of these old doctors under my orders, and always found them highly respectable in conduct, useful and attentive to the duties of their regimental hospitals.

Many years before I entered the Service, these schools of practical instruction for native doctors—the general field hospitals—were abolished; and it was only in 1822, when the oldest of the men thus trained were

dying off, and their successors became reduced in number, utterly un-instructed and inefficient,* that Government was called upon by the Medical Board to do one of two things;—either to dispense with the existing class of native doctors altogether, or to establish some course of education calculated to improve them, and thus meet the increased wants of the Army.

Mr. Jameson was the promoter of this plan, and his extensive acquirements pointed him out to Government as the fittest person to conduct the proposed institution, or “school for native doctors;” but he did not live to do more than sketch out the general plan. The class was to consist of not less than twenty students, who should be capable of reading and writing Hindustanee fluently in the Nagree or Persian character. This number was afterwards increased. The youths were regularly enlisted as soldiers, and were allowed eight rupees per mensem till they received certificates of qualification for the public service, which was generally at the expiration of three years. The ordinary pay was then fixed at twenty rupees per mensem in Garrison, or at Civil Stations, and twenty-five in the field; after seven years, this rate was increased by five rupees; and furthermore, pensions were to be the rewards of long service and certified good conduct. Such was the outline of Mr. Jameson’s plan, and which, through his death, was carried into effect by Mr. Breton, an officer also singularly qualified by temper, habits of industry, knowledge of the natives, and their languages, to do justice to so delicate an undertaking. The medium of instruction was the vernacular language, into which Mr. Breton translated several elementary treatises on Anatomy, Medicine and Surgery, *Materia Medica*, &c. &c.

Under this system there were instructed in thirteen years, and ushered into the public service, two hundred and seven native doctors.

* I had one of these fellows in Camp at a very unhealthy outpost in the southern part of Orissa, during the disturbances, and all he knew of medicine was the use of opium, which he eat liberally: not satisfied with this, he made the dooly bearers rub him, with liniment of the same drug, all night. For this, and sundry neglects, I brought him before a Court Martial, which dismissed him, after a little previous chastisement; but the General Commanding disapproved of both, and desired that we should reform the man by “conciliation!” The doctor had been an arrack-vender in the Rada-bazar of Calcutta previously;—so we tried the General’s plan of conciliation, but failed; the opium and arrack proving too strong, both for our coercion and the General’s conciliation.

On Mr. Breton's death, which occurred in 1830, the school for native doctors was handed over to Mr. John Tytler, a gentleman versed in oriental literature, and an eminent mathematician: under him, there was no falling off in the progress of the institution; but, when the entire cost, from first to last, was taken into consideration by the searching government of Lord William Bentinck, and the benefits accruing to native education, compared with the costs, his Lordship began to think that the incomparable benefits of European instruction, through the channel of the English language, might be extended to the natives, without much increase of expenditure. A Committee was accordingly directed to investigate the whole question, and a report, in full accordance with his Lordship's enlightened views, was framed at great length, and with much ability by Mr. John Grant.

But before proceeding to the important matters contained in the report, I will give a statistical sketch of the school for native doctors. From its foundation under Mr. Jameson, in June 1822, to its abolition on the departure of Mr. John Tytler in March 1835, its total interior cost amounted to Sicca Rupees 3,83,732-7-8.

Amount of cost for lithographs and translating into the oriental languages,* books and pamphlets for the use of the students, salaries, &c., more or less, Rs. 40,000.

Number of students reported qualified for the public service from June 1822 to March 1835—207 men.

Cost of educating each native doctor, so far as ascertained, Rs. 2047, or upwards of £200 sterling.

I shall now extract such portions of the report made by order of Lord William Bentinck, as it led immediately to the establishment, by his Lordship, of the new Medical College, on the European system.

The report begins by stating the result of a personal examination of the pupils at both the medical class of the Sanscrit College, and the school for native doctors, to have been highly creditable both to

* Several thousands of rupees were spent on translation into Sanscrit and Arabic of Hooper's *Vademecum*, and other works, for the use of the medical pupils of the Hindu College, and which are not here included.

themselves and their teachers ; but that so long as the theoretical part of instruction took so great a lead of the practical, and that human dissection, and a knowledge of the English language were wanting, no real improvement on the existing system could be anticipated.

The report then goes on to detail the following defects ;—1st. The want of concert between the Medical Board and Superintendent, is stated to be a “ clogging of the machinery of the institution.” It is also explained that the interferences of the Medical Board had produced “ much misunderstanding and difficulty, clearly prejudicial to the best interests of the institution.”

2ndly. The nominations by the Medical Board of persons unqualified by any previous education.

3rdly. The inadequacy of the medical tracts to furnish correct information on the subjects they treated of.

4thly. The incompetency of one person, however talented, to teach all the branches of medical and surgical knowledge.

5thly. The increase of subsistence money according to length of residence, and not according to merit, thereby rendering it a premium on idleness.

6thly. The period of study (two years and a half) far too short.

7thly. The want of means for private study.

8thly. The desultory attendance at the several hospitals.

9thly. The vexatious interference of the Medical Board with the conduct of the institution by the Superintendent.

10thly. The very injudicious modes of examination of the pupils by the Medical Board ; and their minute interrogation of them on points of no practical importance—all being calculated to perplex and mislead their minds.

On the superior advantages of the European system of instruction, a great deal is stated by the Committee that will readily be present to the minds of most Medical men.

I shall merely state then, that the result of the enquiry satisfied Lord William Bentinck, that such a plan could alone lead to great results; and in March 1835, the new Medical College was established. The General Order directed the abolition from the 1st April following of the Sanscrit College Medical class, that of the Madrissa, and the Native Medical Institution. After directing the disposal of the students of the old institution, the order declared, that in exchange for the government of the Medical Board, the new institution be under the controul of the Education Committee, assisted by the following medical officers, ex officio :

The Surgeon to the General Hospital,
 The Surgeon to the Native Hospital,
 The Garrison Surgeon of Fort William,
 The Superintendent of the Eye Infirmary, and
 The Apothecary to the Hon'ble Company.

It was ordered that there should be foundation pupils, divided into grades according to their respective acquirements, and the number not to exceed fifty;—each of that description receiving a monthly stipend of seven rupees for the first class; for the second, nine rupees per month; in the third, twelve rupees per month. “The foundation pupils should be expected to remain at the institution for a period of not less than four years, and not exceeding six years.” The final examinations to be publicly made by the Committee of Education, assisted by the medical officers above mentioned. To induce pupils of a respectable class to enter the institution, the rate of pay of native doctor was increased, as follows :

Pay on entering the public service,	30	Rs. per month.
„ after seven years,	40	„
„ „ fourteen years,	50	„

and after twenty years service, a pension was ordered according to the proportions granted to native commissioned officers of the army.

After constituting the offices of Superintendent and Assistant professors, it was directed that both should devote the whole of their time to the duties of the institution, to the entire exclusion of private practice or other pursuits.*

The benefits of the College are open to all classes of natives "without exception to creed or caste," provided they are of certified good conduct and qualification. There is no limit set forth to this class of pupils.

The order concludes with the appointment of Mr. M. J. Bramley to the office of Superintendent—a nomination singularly happy on various accounts; for though Mr. Bramley could not, from his short residence in the country, have acquired much personal knowledge of the natives, or of the languages; yet, from his general character and manner, together with his good sense and solid professional acquirements, he was particularly qualified for the delicate office in hand; and had he lived, it was confidently anticipated, that he and his able coadjutors would have brought the European system of medical education to a high state of advancement.

On the death of Mr. Bramley, a new arrangement took place.

Instead of a Superintendent, or Principal, two clinical Professors were added, one for the department of Medicine, and the other for Surgery; but so long as there exists no hospital of easy access to the professors and pupils, these nominations cannot be expected to prove, to the full, so useful as otherwise they certainly would be; indeed, the Medical College, as a whole (the department of Chemistry has always been complete), cannot be expected to come up to the public expectations, or yet those of its enlightened founder, so long as a school of practice—an hospital—is wanting to it;—for no ability in teaching can compensate for this defect; words are heard, but nature remains unseen.

These facts are as old as Hippocrates, and it is astonishing that Governments, otherwise sufficiently enlightened, should still overlook

* This prohibition has since been withdrawn by Lord Auckland.

them, and conceive it possible to educate physicians or surgeons away from the daily examination of patients.

The physicians of Cos, says Cabanis, were far from imagining that the history of disease, the doctrine of symptoms, and the science of indications, could be separately treated and distinguished. Still less did they suspect that practical medicine, of which they form, as it were the indivisible members, could ever be taught from a professorial chair, at a distance from the objects of its application.

The following gentlemen have for some time past conducted the duties of the Colleges, viz.

Dr. Goodeve, Anatomy and Medicine,
Dr. O'Shaughnessy, Chemistry and Materia Medica,
Mr. C. Egerton, Surgery,
Mr. R. O'Shaughnessy, Anatomical demonstration,
Dr. Wallich, Botany,
Mr. Evans, Curator, and
Mr. David Hare, Secretary.

To conclude the general subject of native education on the European plan.

One discouraging circumstance I have heard remarked by many and various observers, and more than once also by the teachers of the native youth; namely, that though they are very generally clever as boys, they degenerate rapidly, and even become stupid in manhood. Here would seem to be a moral precocity in old age, accompanying the physical one alleged by Cabanis, and of which there can be no doubt.

To both, their diet, their climate, their early marriages; in short, all the physical circumstances under which they are placed; and the equally irresistible, though less powerful influence of religious and political institutions which modify these circumstances, so as to form the national character—all may be said to tend, in a peculiar manner, to an early developement and premature decline of the physical and moral energies.

No doubt also, that the absence of encouraging employment on the part of our Government, and the want of books, will have helped to this

depressing end; yet, much remains to be accounted for; and were I asked to state the causes in the order of their importance, I should, in opposition to Dr. Hawkins, (vide pages 80-81) place poverty in diet and early marriage even before climate and the institutions already named—admitting at the same time, to the full extent, that here, as elsewhere, it is to the conjoint operation of all the circumstances stated that we must ascribe the moral and physical precocity of old age in the Bengallee.

In illustration of the effects of habits of life, I may mention, that the two most intelligent Hindus within this city—men of really masculine understandings—threw off the prejudices of caste soon after the age of twenty, and adopted the European plan of diet. I am aware that to generalize on an isolated fact like this would not be just; yet, it is worthy of remark; and the whole question is one of extreme interest.

MADRISSA OR GOVERNMENT MAHOMEDAN COLLEGE.

The Madrissa was founded by Warren Hastings in 1780, for the purpose of instructing native officers for the Courts of Justice. Mr. Hastings, after having granted building ground at his own expense, made a Government assignment of lands, equivalent to 29,000 Rupees per annum, for the support of the institution; but from the apathy of the natives, and want of proper European supervision, the institution, it is said, languished during the first forty years of its existence, so as to have proved wholly useless for the purposes of general education. In 1820, however, a plan of invigoration and retrenchment was commenced, under a Committee of Government officers, with a paid Secretary; and the result has been altogether satisfactory. The students may enter at any age under twenty-two years, and continue in it for seven years. The course of education comprises the Arabic language, law, philosophy of law, the traditions of Mahomed, rhetoric, logic, geometry and arithmetic. There are here, as in the other institutions, foundation pupils paid and divided into classes, as follows—

First class,.....	15	Rupees	per	mensem.
Second ditto,.....	10	„	„	„
Third ditto,	8	„	„	„

An attempt was made about the period of regeneration to introduce English and English literature, but neither can be said to have approached that interest or proficiency to which they attained amongst the youths of the Hindoo College. The bigotry of the Mahomedans has here stood greatly in our way, and will long continue to thwart our best endeavours for their improvement.

The number of students who left the Madrissa with certificates of qualification between January 1791, and January 1838, is 940.

The permanent annual income of the Madrissa is Sicca Rupees 32,000, which, multiplied by 48 years, makes Sicca Rupees 15,36,000.

By this it would appear that the education of each student cost Sicca Rupees 1,634-0-8½; but, as the records of the Madrissa are imperfect, there may be some error.

POLICE.

GENERAL AND MEDICAL.

Police, or that department of criminal justice, which aims at the systematic prevention and detection of crime, ought to prove a subject of interest and careful examination to the medical philosopher of whatever nation.

India is the only country on earth where men are trained, and educated in whole tribes and families, to be murderers, robbers, thieves, and spies, as regular professions, to be followed through life, and handed down from father to son; and where, moreover, such pursuits carry with them, not only no degree of infamy, but where they are put in practice under the solemn appeal to, and sanction of the popular religion. When such is the state of moral feeling amongst the people, no wonder that all systems of Police, hitherto devised, should have failed of satisfaction to their European projectors: no wonder that "the people find the evil of the *thieves* much less than that of the visitations of the *Police*;" no wonder that "to the people of India there is no protection of person or property:" no wonder that our systems have neither the energy of

military nor of popular police. What are we to do in a condition of society wherein the convicted felons are said to be in point of morals, "as good as that of their free countrymen," and where "several of them are sought after as servants in preference to other servants"!!

What can be expected from systems of Police where the oldest European resident in Calcutta, and the best informed person on the subject of native character and habits, when asked whether the natives, with advertence to their religion, caste and manners, are adapted to administer criminal justice, answers, that his principal doubt of the working of the system "is, the finding persons of sufficient integrity to act with strict impartiality."

Without doubt, the corrupt administration of civil and criminal justice under all the native governments, whether Hindoo or Mahomedan, will go far to account for this unhappy condition of the public mind, but there are other and deeper sources also in the all-degrading institution of caste; and till that influence and the prevalence of perjury are overcome, by means of a national education, and a better feeling planted in consequence, the best intentions of our legislators will be set at nought.

Of general police, however, it is not my province here to speak—that of municipal and medical police belonging more properly to my subject.

The police of a large city cannot rightly be restricted to preventive justice merely; for there are many other matters that contribute largely to the health, security and convenience of the public, and that must consequently be attended to—such as, the suppression of tumult, noise and disorder—the regulation of locomotion and traffic—the correction of indecency—and the prevention of a numerous class of annoyances and impositions—all demanding a summary control.

In Calcutta many of these matters are not sufficiently understood:—Neither are those more immediately affecting health, such as usually come under the head of medical police, on which the Government of India has followed the negligent legislation of that of England; forgetting that the wealth, energy, cleanliness and good order for which the

inhabitants of London are so pre-eminent, are not characteristics of either Hindoos or Mahomedans, who must be coerced into such habits, for their own good as well as ours.

Several important reforms, in the general and medical police of this city, have been suggested by the general Municipal Committee, and which it is hoped the Government will carry into effect.

ROADS AND COMMUNICATIONS.

So early as 1721, the suggestions of the local authorities were approved by the Home Government, as to the necessity "for making new roads on the S. S. E. and E. sides;" in order "that thereby the wind hath a free passage into the town, and likely to contribute to its healthiness," while the civil and military advantages were not overlooked.

The density of the surrounding jungle may be conceived from its being stated as one of the benefits from the proposed roads, that they would enable the inhabitants "*to see through your bounds into the country of the neighbouring Zumeendars.*"

Benares military road—and that to Juggernaut.

Of roads leading to the interior, there are but two that merit notice; and these are not of importance in a general or commercial sense; I mean what is usually called the great military road to Benares, made by the Government, and the Pilgrim road to Juggernaut, begun by bequest of Rajah Sookmoy Roy of Calcutta, in 1810, and said to have been finished in 1820; but like most undertakings of this kind, it has fallen into decay, either through neglect, or the difficulties arising from badness of material, and the force of the annual floods. The Benares road has not answered the expectations of Government, or of the public. The portion which traverses the plains is nearly impassable at all seasons for wheeled carriages, and completely so in the rains. Of permanent inland communication therefore by road, Calcutta is deficient; but nature has been bountiful in the other way, water communication being free and ample in all directions but the west, and at all seasons, if the hotter months be excepted, when both the Cossimbazar and Jellinghee rivers become so shallow, as to be navigable

Permanent inland communication only by water and that is open at all seasons.

for the smallest description of country boats only. The interior communication is then kept up by the larger vessels and steamers through the Chandna river, a secondary branch of the Ganges, navigable at all seasons. So completely are the various branches of the two great rivers diffused through the lower country of Bengal, that there is, during the rains, hardly any place above ten miles distant from a navigable river.

During the hot and dry season there may be places 20 miles removed.

Of beaten pathways there are numbers in all directions, over which the post letter-bags are carried to all parts of India, at the average rate of three and a half miles per hour. The first dāk was that established in 1765, between Calcutta and Allahabad.

The following are the average rates of letter dāk to the places stated:—

To Bombay, 1277 miles,	N. E. monsoon,	11 to 12	days.
" " "	S. W. " "	12 to 14	"
To Madras, 1056 miles,	N. E. " "	9 to 10	"
" " "	S. W. " "	10 to 11	"
To Delhi, 976 "	N. E. " "	8 to 9	"
" " "	S. W. " "	9	"

MEDICAL AND STATISTICAL DETAILS.

EFFECTS

Of Climate and Season on Health, commonly called Medical Climate.

First.

INFLUENCE

On Health of the High Temperature of our Hot Season.

“ Si l'histoire naturelle a besoin d'une géographie physique, la science de l'homme a besoin d'une bonne géographie médicale.”—CABANIS.

Under the head of effects of climate I shall offer some cursory observations on what is usually called by physicians, “medical climate,” and also some brief notices of the geography of disease as connected with our climate and seasons.

Temperature and humidity the most influential as affecting public health.

Temperature and humidity being the elements that give activity to terrestrial emanations, and all the external causes affecting health derived from locality, I shall now consider them apart from the subjects above classed. Much has been said and written on the superior capabilities of adaptation to climate in man over the lower animals; but if the power and just application of the arts of civilization be deducted, I am disposed to think, with Dr. Johnson, that the difference would be but small; for, even with these aids we find that in this climate “many die suddenly, others droop, and all degenerate,” very much as with the lower animals of more temperate regions; and all we can hope to learn is how best to conquer by obeying nature. It is thus that man, the weakest of animals, is, in reality, the strongest; and it is under circumstances apparently calculated to overwhelm and destroy his vigour that he finds the means of developing new faculties and resources which excite even his own astonishment.

Gibbon, after stating that the Roman soldiers, from their “excellent discipline,” maintained “health and vigour in all climates,” adds,

that "man is the only animal which can live and multiply in every country from the equator to the poles. The hog seems to approach the nearest to our species in that privilege." It is true, as stated by the historian, that men do "live" in other than their natural climates, but their existence is very unlike to the health and vigour of the Roman soldier.

"The truth is, the tender frame of man is incapable of sustaining the degree of exposure to the whole range of causes and effects incident to, or arising from vicissitudes of climate, which so speedily operate a change on the structure, or at least the exterior of unprotected animals. The object of these remarks, which at first sight might seem irrelevant, will now appear. Since it is evident that nature does not operate more powerfully in counteracting the ill effects of climate on man, than any other animal, it follows that we should not implicitly confide, as too many do, in the spontaneous efforts of the constitution, but on the contrary, call into its aid, those artificial means of prevention and melioration, which reason may dictate and experience confirm. In short, that we should study well the climate, and mould our obsequious frames to the nature of the skies under which we sojourn." The above quotation I have made from the work of Dr. James Johnson, a gentleman to whom the Indian military surgeon is under a weight of obligation, which those only can duly appreciate, who look back to the state of medical practice in India when he first wrote.

Effects of Climate influenced by the degrees of civilization.

Although the physical effects of climate, in forming or influencing the differences by which the varieties of tribes of the human species are characterised, such as stature, physiognomy, colour of skin and hair, or form of the skull, are foreign to the present inquiry, still, one cannot help remarking that, if the Bengalee is to be classed among the Caucasians,—the standard of the human race—the effects of climate and locality must indeed be great and remarkable.

Influence of climate in forming the existing varieties of the human species.

No climates exist that are uniformly hot and dry, hot and moist, cold and dry, or cold and moist; yet certain countries have such a preponderance of one or other of these qualities, as to give a very marked character to the physical and moral nature of man; and physicians would do well to observe these results of climate more closely than has yet been

Necessity of observing all the effects of climate.

done. "La science de l'homme a besoin d'une bonne geographie médicale.

The moral as well as the physical influences of climate have been considered so powerful by certain philosophers, as to make some persons doubt whether a people situated as our Asiatic subjects, are capable of receiving the impress of European knowledge and institutions. Let us hope the contrary, notwithstanding the authority of Montesquieu.

"The astonishing rapidity of political revolutions in Asia arises, however, out of one fact which is really dependent on its physical geography. In that part of the world, says Montesquieu, weak nations are opposed to strong; people warlike, brave and active, border upon those who are effeminate, idle and timid; the one must necessarily be conquerors, and the others conquered. Here we have the principal reason of the liberty of Europe, and the slavery of Asia. It is necessary, says Malte-Brun, to combine this just remark with another truth proved by physical geography, namely, that Asia has no temperate zone, no intermediate region between very cold and very hot climates. The slaves inhabit the hot, and the conquerors the elevated and cold regions."

Duration of the hot season—range of temperature.

The hot and dry season in Bengal extends from the beginning of March to the middle of June, during which the winds are steady and strong from south and south-west. The temperature rises gradually from 80 to about 90°—95° in the shade, and reaches to 100°—110° in the open air. Notwithstanding the high temperature, this season is rendered far less oppressive to the feelings than might be supposed, by means of the moisture carried along with the monsoon in its passage over the Bay, and likewise by the frequency of refreshing storms, accompanied by rain, lightning and thunder.

Effects of the hot season in Bengal.

The most ordinary and simple effects of the season just described, when "the earth is iron and the heavens brass,"—are, determination of the fluids generally, and of the blood to the surface of the body, the blood being less venalized in proportion to the elevation of temperature: it swells the exterior and produces that general chubbiness of appearance which is so remarkable in the torrid zone, even where the weight of the body is sensibly diminished: it increases the animal heat, and acce-

lerates the pulse, accompanied by a prodigious increase of the pulmonary and cutaneous transudations : it produces nervous excitability to a remarkable degree in some persons : Eruptive diseases, latent during the cold season, become actively developed : it increases the biliary excretion, and diminishes that of urine, which is surcharged with saline impregnation. In ordinary seasons, we find that, here as in the West Indies, the most healthy season is from February till April ; while in seasons of epidemics (Cholera in particular.) March, April, and May are the months in which the disease is most fatal and long continued ; indeed, when it appears at this season, it seldom vanishes till the setting in of the rains.

Under exposure and neglect of temperature in diet, results ardent fever, with some serious local determination, and that very frequently to the cerebral organs ; occasionally to the liver ; but though this is admitted, under the measures of precaution dictated by common sense and experience, the very hottest are yet the very healthiest of our seasons ; and of our stations also,* which goes far to prove that it is not heat *alone* that does all the mischief, but something else that is superadded by the stranger European, and which is not in use, or practically known to the natives of the climate. From the results of my observations on active field service, both in this country and in Ava, I am led to conclude that mere heat, unless combined with intemperance, is very rarely the cause of disease.

The troops from Bengal and Madras were exposed to an excessive heat in crossing the desert from Kosseir ; yet they enjoyed excellent health, because they were not exposed to excesses, and their minds as well as their bodies were kept in activity.

The equable determination to the surface consequent on the progressive increase of temperature, seems to exercise an agreeable as well as

* At Agra, the hottest of our stations, the percentage of death has not been two, or one in fifty per annum, out of a Garrison of one thousand men—a more favorable result than shewn in any table hitherto prepared in India.—*Asiatic Researches*.

favourable influence on general health, especially in the old Indian, and even a new-comer seems to bear without complaint or injury the great augmentation of the sensible perspiration. It is only the opposite condition—the total suppression of it in our cold season, that is felt by all so unnatural and unhealthy.

Miscarriages, frequent at all seasons in India, occur yet more frequently in the hot season, and the recovery is more protracted, owing to the increased force and frequency of the circulation, especially in those of plethoric habits.

There are two classes of persons to whom our climate seems genial, the weak-chested, as they are called in England, who are of a scrofulous habit, but in whom pulmonary disease has not actually declared itself. These are saved by coming here, and I have known them to enjoy good health, and survive their brothers and sisters at home. The fate of persons who come to Bengal with tubercular disease is, on the other hand, only precipitated. Persons of phlegmatic habits also, with dyspepsia, languid circulation and cold extremities, seem to have better health here than in Europe.

Speaking of the effects of tropical climates, and of the means of obviating them, Dr. James Copeland remarks that the general adoption of too rich and nourishing foods and beverages by those who remove from cold to hot climates, tends greatly to increase these evils; and the influence of high temperature and of a vertical sun upon the European head, is productive of disease both of it and of the liver. To these effects, the mental cultivation and activity of Europeans somewhat predispose them; whilst their heads are not so well guarded from external influences by the constitution of its integuments and hair, and the thickness of the cranial bones, as those of the negro and mongrel varieties of our species.

Precautions necessary to guard against the effects of high temperature.

The obvious indications resulting from these facts are, that natives of cold countries migrating to warm climates should, particularly if the change has been made abruptly, live abstemiously and promote the functions of those organs which perform the most essential part in

excreting effete or injurious elements from the circulation. The head should be kept cool, and protected from the rays of the sun; the surface of the trunk and lower extremities ought to be preserved in a freely perspirable state so as to take off the load of circulation, and derive from the excited liver. In order to promote the secreting and depurating functions generally, active exercise, short of fatigue, should be taken, without exposure to the causes of disease, particularly those which are endemic. As the maladies which most frequently supervene on change from cold to a warm climate proceed neither from the increased temperature alone, nor from greater moisture of the air, but from these conjoined with malaria, and not unfrequently also with wide ranges of temperature during the twenty-four hours, especially in high and inland localities, with hot days, and cold, raw and dewy nights, and with a too full and exciting diet and regimen causing fevers, dysentery and diseases of the biliary organs—care ought to be taken to avoid those causes, as well as whatever may tend to assist their operation on the frame, and to protect the system against sudden changes by warm clothing at night.

“The consideration of the effects produced by migration, during a state of disease, from a cold to a warm and moist climate, is of the utmost importance. Keeping in mind its influence upon the healthy frame—chiefly in exciting the functions of the skin and liver, and diminishing those of the lungs—we are led to prescribe it in the treatment of various diseases.

In hæmoptysis this change is obviously beneficial, especially as a warm and moist atmosphere, by this mode of operation, lessens the activity of the pulmonic circulation, and the disposition to sanguinous exudation from the surfaces of the bronchi; bronchitis and tubercular phthisis are also often benefited, and the progress of the latter much delayed, by this change of atmosphere, especially when adopted early.

Cases in which a high temperature is beneficial.

Chronic rheumatism is sometimes cured by this measure, seemingly owing to its influence in promoting the biliary and cutaneous functions.

Dropsies, particularly anasarca and hydrothorax, have been in a few instances, removed by a change to a warm climate; but whilst a moist

state of the air is most serviceable in pulmonary and hæmorrhagic diseases, dry warmth seems more beneficial in dropsies, dyspeptic affections, and hypochondriasis, evidently from its effects in augmenting the insensible perspiration and the pulmonary exhalation, and imparting tone to the capillary circulation.

Besides these, gout in its early stages, *dysmenorrhœa* and *scrofula*, in nearly all its forms, are benefited by a change to a warm, or even a mild atmosphere.

The above extracts are from Dr. Copeland's Dictionary of practical medicine, wherein are to be found observations of great value on climate and endemic influence.

Second.

INFLUENCE OF A HIGH TEMPERATURE WITH MOISTURE.

THE RAINY SEASON.

"Of all the physical qualities of the air, humidity is the most injurious to human life."—CLARKE ON CLIMATE.

Although medical authorities have not been able accurately to estimate the effects of moisture, either acting simply, or in combination with heat, yet it is certain that this last is more injurious than either applied separately. In warm and moist climates, obesity and laxity of frame are induced, a fact which was very early observed; thence the proverbial acuteness of the Athenians, and the sluggishness and stupidity of the Bœotians.

Effects of humidity with heat.

The effect of situation upon the state of the habit may in some degree depend also on the gravity or weight of the atmosphere connected with locality. When the barometer is high, we feel vigorous and cheerful; when it sinks, languor and low spirits oppress us. "Accumulations of fat are said to take place in some animals in a few hours, in certain states of atmosphere. During a fog of 24 hours' continuance, thrushes, wheat ears, ortalans, and red-breast are reported to become so fat that they are unable to fly from the sportsman."—*Bichat*.

During the first month of the rainy season, the temperature falls considerably, accompanied by a freshness of the air delightful to the senses, after the previous excessive and dry heat. The monsoon is steady and veers to the south and south-east; vegetation springs up with all the exuberance of a tropical climate, and the dust, so offensive at all other seasons, subsides, and is washed into the drains.

From 15th July to 15th October again, we live in an atmosphere having all the properties of a tainted vapour bath; and when the wind comes sifting through the Sunderbunds at south-east, we experience many of the inconveniences ascribed by Hennen to the Sirocco of the Mediterranean, which, "*without affecting the thermometer or barometer in any remarkable degree,*" yet inflicts on persons exposed to it a feeling of indescribable languor and oppression, with an exhausting perspiration, much like what we suffer from in Bengal during the latter portion of the rainy season, and which a West Indian lady, speaking of the Sirocco, described as giving "*the feel as if she had been bathing in a boiler of syrup.*" This is the moist Sirocco of Bengal.

Injurious effects of heat and moisture during the rainy season, and not to be ascertained by either thermometer or barometer.

At this season, through the saturation of the atmosphere, the perspiration by evaporation is suppressed, but that by transudation is enormously increased. If it be true that an individual in health ought to be in that state of perspiration in which it is insensible, what are we to think of the exhausting drain flowing from the pores of an European during this and the preceding season, though differing in their modes of action.

As in the Sirocco we here experience an extreme oppression of the nervous energy, and consequent muscular lassitude, with disinclination to active exertion of mind or body, the body seems more bulky and *feels* heavier to the individual; the hair looks dank and greasy, while the scalp is covered with furfuraceous eruption, and exudes an unpleasant acid odour." "The walls of houses, stone floors and pavements," says Dr. Hennen, "invariably become moist, when the Sirocco blows. I have seen the stone floors at Corfu absolutely wet without any rain having fallen, and gentlemen who made hygrometrical experiments, state to me, that the instrument has frequently fallen from ten to twenty degrees during the prevalence of this wind—wine bottled in a Sirocco is greatly injured, and often destroyed. Meat taints astonishingly soon during its

The Sirocco of the Mediterranean.

prevalence. No prudent housekeeper ever salts meat at this time, for it either taints at once, not taking the salt, or else it keeps very badly. Drains emit more putrid smells in a Sirocco, than at any other period. No carpenter uses glue in the Sirocco, for it does not adhere. No painter willingly works during its prevalence, for his paint will not dry. Bakers diminish the quantity of their leaven during the Sirocco, as dough is found to ferment sufficiently without. It is a remarkable fact that wounds and ulcers, and the discharge from mucous surfaces generally deteriorate during the prevalence of the Sirocco, and it is equally certain that if vaccination, or small pox inoculation are performed at this period, they are extremely liable to fail: and if they succeed, the progress of the pustule is often suspended, and it is frequently ten or twenty days in reaching the state, usually attained in six or eight." When we come to the influence on vegetable life the parallel ceases. Hennen says that though "the Sirocco is so charged with moisture, vegetables, especially that part of them exposed to it for any length of time, appear quite shrivelled and burnt up, and very frequently they are destroyed altogether."

Many of the effects of the Sirocco observable in Bengal.

The whole of the latter observations are annually verified in the surgical wards of the Native Hospital under my charge; and we have the same discomforts in perhaps a severer degree whenever a calm of any duration exists during the rains: in former times ulcers used to assume a gangrenous condition, but rigorous measures of prevention have entirely obviated these occurrences of late years.

I know nothing I should dread so much as a long calm at this season in Calcutta. It might not be followed by plague as in London, Nimeguen and Vienna, in former times; but in the result as affecting human life, I think we should not fare better than these cities.

Diseases of Europeans of this season.

Amongst Europeans, the diseases of the rainy season assume a character of diminished vital action; the ardent fever, with burning skin and racking head, of the hot season, degenerates into the congestive form, with moist or cool skin, oppressed pulse; and the complications are generally abdominal. Dysenteries, as well as fevers, become more frequent as the rainy season advances, the former also implicating the whole of the abdominal organs; but the most severe cases, especially

amongst newly arrived Europeans, are at the commencement and termination of the rains : during the former, or that called by the Natives Chota Bursàt, which leaves some days of sunshine between the falls, fevers of a severe and complicated form arise, and during the drying process which terminates the season, they are even more so : occasionally these last are attended with a yellow suffusion of the skin ; but I have only once seen any thing like black vomit.

The abortions of the rainy season appear to arise from simple relaxation—the natural result of excessive humidity joined to a high temperature.

Humid air, says Dr. Edwards, at an equal or even superior temperature produces a peculiar sensation of cold which differs, not in its intensity, but in its nature. It is more profoundly felt, and seems to penetrate the whole system, and particularly disposes to paleness and shivering. By these characters, I could not mistake a species of refrigeration, which consists in the diminution of the power of producing heat.

Dr. Edwards on
the effects of humid
air.

In dry air, on the contrary, a sensation is experienced, which is called a *sharp cold*, and which designates rather the nature than the degree of sensation ; moreover, it is superficial, and when the reduction of temperature is not too great, an increase of activity is experienced ; the skin reddens ; and in extreme cases, the limbs have a tendency to stiffen, instead of yielding to their irregular and involuntary motions, which constitute shivering. It may be seen by this comparison, and by what we have stated above, that damp cold must tend to produce in individuals whose power of developing heat is rather feeble, the series of actions which constitute the accession of an intermittent fever, especially if they are exposed to that influence during sleep. The confirmation of this will be found in the study of medical topography. In a great number of cases, these fevers are ascribed to marsh-miasmata in fine weather, but others occur in places and at seasons at which the atmospheric-constitution which we have mentioned predominates.

A familiar but remarkable illustration of the effects of our climate may be seen in its influence on the habitations of this city. Constructed of the finest known materials, whether of wood or mortar, and of such solidity that in England they would endure for centuries, and in Upper

Egypt for a thousand years, they are here, through the destructive influence, and severe alternations of climate alone, rendered in a score of years fit habitations only for crows; in less time indeed, they may be seen reduced to a heap of rubbish, covered with vegetation.

Of all the causes which thus render household property so surprisingly perishable, humidity would seem the most influential.

Third.

THE COLD WEATHER AND ITS EFFECTS.

Unfavorable influence of the cold season on general health.

I believe it was Charles the First who described the best climate as that in which a man could bear exposure during the greatest number of hours at all seasons: on this view, ours is assuredly one of the worst; for even during the cold weather, from the end of October to the beginning of February, an European cannot be exposed for any length of time with impunity; the hot sun and cold parching wind, with its evening and morning rawness, cause the most uncomfortable feelings of external dryness and internal fulness, unless it be under exercise sufficient to determine moisture to the surface.

Partly to be ascribed to the relatively low electric state of the atmosphere during the N. E. monsoon.

The unfavorable influence which the N. E. monsoon exercises on general health, may in some measure be ascribed to its relatively low electric state, or its being in a negative state, thus attracting the positive electricity of the animal frame, as well as that of the soil. If the powerful physical agent of electricity is that which, through the system of organic nerves, influences the various secretions, how much must our climate, and consequently our health be influenced by those causes, whether general or local, which affect the proportions of electricity in our atmosphere. Coming down upon us directly from the frozen platform of Central Asia, the temperature of the monsoon is also relatively reduced, so as to absorb much of our terrestrial heat; while at the same time its hygrometric capacity is much increased, parching up the soil along with the animal and vegetable fibre. People on coming into Lower Bengal from the Upper Provinces, during the cold season, perceive an extraordinary change in the condition of the atmosphere, on first approaching the Delta of the Ganges: the bracing elastic cold is exchanged for that of a damp cellar, and thus they invariably describe it.

Remarkable change perceived by persons on descending into Bengal from the Upper Provinces.

At the commencement of the cold season in October, the temperature and the winds are variable, the drying process is in full activity and the unhealthiness is consequently great. In the report, of Dr. Marshall and Captain Tullock on the West Indies, it is stated that though the months previous to the cold ones have the most sickness, yet, "the principal mortality is during the cool dry weather, which generally prevails at Christmas."

Description of the cold season.

Here, from want of statistical information, we have no means of making a just comparison.

From the 1st November to the end of February, the weather is settled and agreeable to persons in health, the monsoon keeps steadily to north-east, the atmosphere during the day is dry, and a slight rise takes place in the barometer—the thermometer ranging from 45° to 75°. The nights are damp as well as cold during this season, the dewing process being excessively productive; and the fogs which prevail occasionally are of a nature more dense than I have any where seen, except at Rangoon. On the contrary, during the day, the cold north-east wind absorbs moisture with extraordinary rapidity from every object, animate and inanimate, over which it passes. Furniture, although made of the most seasoned wood, foreign or native, warps and cracks audibly—plaster newly laid, falls from the wall through rapidity of evaporation; the old Indian becomes goose-skinned and shrivelled, with a sense of dryness in the palms of the hands, so uncomfortable as to give some persons of irritable habit, and in whom the power of generating heat may be diminished by a long residence in India, a constant sense of nervous uneasiness of the whole sentient surface, not to be described. It results also from the cold season that the blood is more venalized, a larger quantity of oxygen being consumed in the maintenance of the temperature of the body

Its effects on animate and inanimate substances.

Its effects on health.

Chronic eruptions, in an active state of developement during the previous hot season and rains, now become suddenly repelled, accompanied by headache and vertigo. In old residents the appetite fails, accompanied by an oppressive sense of abdominal fulness; and when this state is not met by a suitable change of diet, clothing, and some medicine to act on the skin and bowels, visceral congestion, œdema of the lower extremities, or some more active disease may ensue. New

born infants suffer materially from, and are sometimes destroyed by the impression of the cold on the unguarded surface. The most fatal forms of apoplexy that have come under my observation in Bengal, have occurred at this season, and paralytic affections are not unfrequent amongst the aged and infirm: indeed, it requires a degree of equilibrium, not commonly enjoyed by persons of long residence in Bengal, to take kindly to the alternation from copious and incessant discharge from the surface, to its total suppression, and consequent abdominal and cerebral engorgements. It is only to the sound of constitution, who are temperate in all ways, and thereby able to bear the cold bath, or to such as are recently arrived from Europe, that our cold season is either agreeable or healthy.

“ I can bear the chilling blasts of Caledonia,” says a Scotchman, quoted by Ward, “ but this—this cold, I know not what to do with it.”

But here I would observe, that the degrees of health and disease are not to be measured by the thermometer, taken singly; such observations in connection with health afford little information to the medical inquirer; and it has been well observed in our own country, that the influence of the weather on the human frame is not to be estimated merely by thermometrical changes in the atmosphere.*

An east wind with the thermometer at 56° will impress the body with a more chilling effect than a south-west wind, when that instrument indicates a temperature of ten degrees lower; and a foggy atmosphere, in like manner, much more injuriously than a clear one of equal cold. In the statistical report on the West Indies already quoted, it is stated that in Jamaica the lowest mortality throughout a long range of observation was, in the three months prior to June 1827, when twelve deaths only were reported through the whole quarterly returns. The next quarter, remittent fever broke out, and among a diminished force the deaths amounted to 252 in the same period, without the thermometer indicating any further increase of temperature than about 3°, and without any remarkable change in the weather.

* Dr. Bateman on the diseases of London.

The diseases prevalent at this season in Bengal are, congestive fever of the continued form, intermittents, with their sequelæ of tumid or indurated spleen; hepatic insidious sub-acute inflammation, terminating rapidly in abscess, if not promptly and vigorously treated; dysentery, frequently complicated with hepatic congestion, more or less acute according to individual habit, or length of residence in India. Hæmorrhoids, with many persons, follow immediately on the drying up of the surface, and consequent fulness of the internal vessels.

Diseases prevalent in the cold season.

The abortions of the cold months have always appeared to me connected with venous congestion, and so have the intermitting states of the pulse and epigastric pulsations common to old Indians at this season. The kidneys act during the continuance of the cold weather with diabolic violence, the urine being limpid, and they only cease to do so on the return of a warmer season, and consequent equability of circulation, causing moisture of the surface. The biliary excretion is diminished, as indicated by the whitish or clay-coloured state of the alvine discharges.

From the sketch now given of our locality and climate, it will be seen that, without taking the malarious influences into account, we are here exposed to atmospheric changes to an extraordinary degree: to an extreme of heat and dryness—extremes of heat and moisture—cold and moisture—cold and dryness. The European exile may well join in the “complaint of the black knight” of Chaucer.

Nowe hote as fire, nowe colde as ashes ded;
 Nowe hote for colde, nowe colde for hete again;
 Nowe colde as yse; and nowe as coles red,
 For hete I brenne.

Bengal has received a bad character for insalubrity, says Malte-Brun, and certainly it is in an eminent degree exposed to a succession of violent extremes and vicissitudes; at one time to excessive rain, at another to hurricanes; then to scorching heat, and frequently to thick fogs; yet the English have, by dint of prudent regimen, accommodated themselves to the climate. When Malte-Brun wrote, I fear there was not much of that “prudent regimen” to which he ascribes such happy results; but

let us hope that it is now about to be attained, and that it may no longer be a reproach to us that, not satisfied with choosing the worst localities, we also adopt habits of life the worst calculated for the accommodation of our constitution to them, and their climates.

PREVENTION OF DISEASE.

Nothing new to be said on this head.

Health not to be maintained by drugging.

On the important matter of prophylaxis, nothing new can be urged, as the chief means of prevention of disease are present to the common sense of most nations to a certain degree, if they only chose to act upon them. But there is one circumstance which ought to be impressed every where on the public, and it is, that however useful medicine may be in moderate and judicious doses, under occasional circumstances of change of season, or during certain epidemics, it is yet more on the proper selection of localities, the avoidance of day and night exposure, and care in diet, exercise, clothing, &c., that disease is to be prevented, and not by a system of self-quackery, with calomel and other mercurial preparations, such as many persons pursue in this country to their great injury, for the removal of what they call "*biliousness*."

Its injurious effects in cholera.

Many is the strong habit I have seen impaired by this senseless custom ; and I have known several lives lost, and others put in jeopardy by the use of saline purgatives during seasons of cholera. "If the truth were told," says Dr. Paris, "a large portion of dyspeptics seek the advice of a physician not so much for the adjustment and better regulation of their diet as for the means by which they may counteract the ill effects of their indulgences—hence the popularity of those "*antibilious*" remedies, which promise to take the sting out of their excesses and to enable the unhappy dupes to fondle and play with vice as with a charmed serpent."

Dr. Copeland on the abuse of Calomel for the little disorders of health.

Ingenuity, says Copeland, cannot possibly devise a more successful method of converting a healthy person into a confirmed invalid, of destroying many of the comforts of existence, and of occasioning hypochondriasis and melancholy, than the practice of prescribing large doses of calomel on every trifling occasion, or when the bowels require gentle assistance ; or because the patient erroneously supposes himself to be *bilious*, or is told so by those who should know better.

The unfortunate word "bilious" is the scape-goat of the ignorant.

The same distinguished and experienced writer ascribes the lapse of occasional indigestion into confirmed stricture of the rectum, and of hæmorrhoids into fistulæ, to the frequent and injudicious use of calomel for the removal of mere occasional derangements of health.

Another extensive source of disordered health I must here mention, as it has come frequently under my notice ;—I mean the long continued use of aperient medicines containing the mercurial preparations. It is common for patients to obtain from their physicians aperient pills, for instance, containing some portion of calomel, or blue pill. This may have been given with a particular view, or for an especial occasion only ; but it often happens that the patient continues for months, and even for years, that which was intended to be used but for days, or weeks. The results are very lamentable. I have seen persons in a state of nervous irritability, bordering upon insanity, from this cause, with a sub-acute inflammation of the mucuous digestive surface, and chronic ptyalism—all resulting from the long continued, and frequently unconscious use of mercury.

Mercury used in ever so small a quantity highly injurious when long continued.

One field officer used blue pill and colocynth for two years and a half ; and an American gentleman took the same preparation with ipecucuanha, during a voyage from a sister presidency to America, and back to Calcutta. It is needless to detail how ruined were the healths of both.

The quantity of trash imported into Calcutta, under the *names* of the finest vintages of France, and used at the tables of European residents, is a fruitful source of various disorders of the digestive organs, occasionally terminating in actual disease. French gooseberry wine, passed off as Champaign, and the vilest Clarets under the names of the first growths, as Lafitte, Chateau-Margaux, and Latour, are continually selling at prices so low as at once to stamp them sophisticated.

The general use of the inferior wines of France, injurious to public health.

The public is itself to blame in this matter. Most persons are in settled positions, and it is no great trouble, one would think, to order ones supplies from Europe. Such as wish to practice economy at the expense of their stomachs, may then continue to use the market wines.

Of wine it has justly been remarked, that it may injure by disordering the stomach, or the head. " Good wine does the latter alone : bad wine both."

The American ice a valuable means of promoting public health.

In speaking of the means of preserving health, which depends so much on the tone of the digestive organs, I must not omit the new luxury, the American ice—which I hope soon to see becoming an article of necessity amongst us. It would be out of place to speak here of its use in the treatment of various diseases and of fevers—especially those of a gastric nature. I shall therefore simply express my entire accordance with Dolomieu. Nothing, he says, is more salutary during the Sirocco than iced beverages ; they revive the spirits, strengthen the body, and assist the digestion. Such as have used this luxury in Calcutta during the hot season and rains, need no arguments in promotion of so remarkable an instance of American commercial enterprise.

Admirable rules of Dr. Johnson.

The admirable rules prescribed by Johnson regarding dress, food, drink, exercise, sleep, bathing, &c. &c., and the regulation of the passions, are well known ; but perhaps better known than regarded : they are like the vital points in religion and morals ; all men agree in them ; yet how easily are they forgotten ! In order to think seriously on health, most men require to suffer from disease : the lessons derived from such experience are longest remembered.

Most diseases contracted during the night.

The reason as given by Dr. Edwards.

It is a remarkable fact, and one often observed, that most diseases, in malarious countries especially, and where vicissitudes are great, have their origin in *night* exposure ; but I believe the reason has only lately been rightly explained by Dr. W. F. Edwards.

" During natural sleep," he says, " there is a diminution in the power of producing heat, and this explains why a damp cold air, or a dry and piercing air, which is borne without inconvenience while the individual is awake, even without the aid of exercise, may be hurtful during sleep." It may in addition be remarked, that the effect of exposure to cold during sleep, must necessarily vary according to the power of producing heat. As a means of guarding the system against the effects of atmospheric vicissitudes, I know of none more influential than the cold bath, provided always that the subject be temperate in habits and healthy.

Speaking of the yellow fever, Dr. William Fergusson says "it is my belief that malaria can only prevail upon the body during the passive state of sleep; in fact, that to sleep is the danger."

Dr. Wm. Fergusson on malarious influence during sleep.

On this subject, as applied to troops, I cannot do better than quote the sensible observations of Dr. Hennen, who speaking of the value of medicines, says, he does not question their proper use in the cases of reflecting individuals; "but I do not hesitate to say, first, that they cannot be generally applicable to a whole corps or garrison. Secondly, that although the soldier may submit in passive obedience, he will invariably make himself amends (as he supposes) for the restriction, by subsequent excess of one kind or other; and thirdly, although military officers are sufficiently enamoured of any favorite theory originating with themselves, they view the proposals of medical men but too often with a jealous eye, especially when the advantages to be derived from them are merely prospective. We possess the power, by means of the established medical inspections, to meet the approaching disease as early as possible, but I question the prudence (in a military point of view) of anticipating it before its arrival by a general administration of medicine throughout the garrison; because, nearly thirty years experience has convinced me that no power on earth will reconcile British soldiers to taking physic en masse, when they are not sick, nor will they ever view the man who orders it in any other light than that of a speculative experimentalist. The true preventives to disease are shelter from the heat of the day and from the dews and cold of night, avoiding the neighbourhood of marshes and other unhealthy spots in military exercises, mounting guards at such an hour that the least possible number of fatigue-parties may be employed in conveying dinners, &c.; timing duties in such a way that the men may enjoy their natural sleep, regulating the messes so that the soldier shall always have a due proportion of vegetables, and especially a comfortable breakfast before going on duty in the mornings; furnishing every man with flannel waistcoats, or cotton shirts,* enforcing personal cleanliness by frequent bathing, and by daily washing the feet, &c., but,

The subject of prevention as applied to troops; Dr. Hennen's views.

* During the rainy season in Bengal, the suit should be changed after exercise, or whenever saturated with perspiration; and friction with a dry cloth used at the time of changing. The bedding should also be daily exposed to the sun.

above all, regulating the canteen, so that access can be had to liquor only in the evening, and then taking every precaution that the bad spirits and sour wine of the country be rigidly withheld. We may refine as much as we choose, and we may modify our plans according to circumstances with critical precision, but these are the basis upon which health is founded so far as the soldier is individually concerned."

Dr. William Fergusson's views.

The flannel is a debatable question with military surgeons; and the distinguished Dr. William Fergusson considers it only required for the bivouac. As an article of ordinary wear, it is one of which "the healthy, hardy soldier (and there ought to be no others in the army) can never stand in need."

The recommendations of Dr. Fergusson are worthy of all attention on another important point—the night covering and accommodation of the soldier. He says that in every part of the British Empire the men should sleep in separate hammocks, which are cool, soft, and elastic and can be washed like a garment, while they cannot be used without raising the body off the ground, or the hard boards, and they require no aid from flocks or straw to make the inhabitant comfortable, an additional blanket in a cold climate being all that is necessary.

The hammock-railings have the great advantage of preserving freedom of ventilation, even during the night, and of being altogether out of the way during the day.

"Wherever a couple of stakes can be driven into the ground, it will serve all the above-mentioned purposes in the bivouac.

The erection of hammock railings, consisting of uprights with cross posts and hooks, would be as simple as it is economical."

PUBLIC BATHS—WARM AND COLD BATHING.

So long as the Hindoos remain orthodox, and consider the water of the Hooghly, notwithstanding its indescribable impurities, not only pure, but holy ;—not only good to bathe in, but altogether excellent to drink, when not brackish, we need not trouble ourselves about public baths as respects the natives. We have only to take care of ourselves, while they may repose in the mercies and drink the sweets of their munificent river god.

It is very common to hear warm and cold bathing spoken of and recommended, without any reference to season or regularity of habits, although these should form essential conditions, as it appears to me, for guiding a choice between them. It may be concluded for certain, that to persons who have suffered from severe tropical illnesses, or who are affected with visceral enlargement, the result of fever, or dysentery especially—the warm bath is the only safe one at *all seasons*. To persons in ordinary Indian health, on the other hand, the cold will be found both tonic and agreeable, if used under regularity of habits, from the beginning of March to the end of September. I say, *regularity of habit*, because to the dissipated, or such as are in the practice of keeping late hours, the cold bath is always imminently unsafe ; as with such persons, the balance of circulation is already unnaturally disturbed, and the effect of the cold is to throw its force on the organs chiefly irritated by irregular habits of life—the abdominal viscera. Under such unfavorable conditions, with the whole external surface parched, and the digestive mucous surface in a state of irritation, it is not to be expected that the “ conservative energies ” should be capable of being “ roused to successful resistance ; ” in other words, there will not be a healthy re-action ; and I have known most formidable fevers produced by the incautious use of the cold bath, in young men of perfectly sound constitution, but of irregular habits, which, besides the effects already stated, would seem to reduce the power of producing heat in the system below the standard of health. Of the cold bath during the cold season, I shall only say,

Necessity of discrimination in the choice of the bath.

The choice influenced by season and state of health.

The cold bath during the cold season unsafe, except

under the condition
stated.

that to such as feel themselves sound in constitution, and whose habits of life are strictly regular, no more efficient means exists of obviating the most unpleasant effects of our cold season in Bengal : he who re-acts well under the cold bath, will not be troubled with dry skin and sense of internal fulness, &c. &c.

Rules for persons
in delicate health.

“ It should be a constant rule,” says Dr. Forbes “ that persons with a feeble circulation and cold extremities must endeavour to invigorate the circulation, and increase their temperature previously to using the cold bath. To ensure the proper degree of power, it is even necessary, in some cases, to administer a warm beverage before entering the water ; and were it always convenient, it would often be beneficial in cases of this kind, to go into the warm bath for a few minutes before immersion in the cold.” It is a common error to think that before using the cold bath one must get *cooled first*. The very opposite rule is the right one, and I know of no better plan than *immersion* in a warm bath for a few minutes, and then the immediate *affusion* of one, two or three vessels of cold water : It is a safe and excellent plan, under appropriate conditions of health.

Of the old baths in Armenian street, I am not able to speak from personal knowledge, but warm, vapour, and cold baths, on an excellent and commodious plan have recently been erected by Mr. Spence, and which are highly deserving the support of the community.

As many persons have but an imperfect knowledge of the relative temperatures of warm and cold baths, I here subjoin them respectively :—

Cold bath, from 60° to 75°	} A lower temperature is used in Euro- pean Countries.
Tepid bath, „ 85° to 92°	
Warm bath, „ 92° to 98°	
Hot bath, „ 98° to 112°	

ON THE EFFECTS OF CHANGE OF LOCALITY ON SICK AND CONVALESCENTS.

This subject has not met with the attention it deserves, from writers on the diseases of warm climates especially; but it is one of high importance, and proper to the objects of this memoir.

The subject of great importance, but not sufficiently attended to by the profession.

He who has witnessed the surprising effects of change of locality on the sick of an army in full march, and that frequently under disadvantages as to ease and comfort, which would lead the inexperienced to form the most gloomy prognostics, will agree with me in viewing change of locality as tantamount to a transition from almost hopeless disease to rapid recovery, in many forms of protracted fever and other disorders.

When we see the patient worn out from recurrences of fever, and the treatment directed to its removal, yet suffering a daily or other periodical accession, amounting in the latter stages only to dryness and slight warmth of skin, followed by restless nights, then it is that the immediate and astonishing effects of change are shewn; and how many a poor soldier dies annually throughout the crowded hospitals of India for the want of it; indeed, I might add that many a patient in civil life is allowed to die in our ports that might be saved by a timely removal to sea or other situation.

Occasions when change is most beneficial.

“In India,” says Sir James Macgrigor, “when patients whose condition in life permits them to take a voyage to Europe are in this state (meaning diseased liver) they never fail to take it, and most commonly are recovered by it, but there is no hope for the poor soldier or sailor.”

Dr. James Johnson, speaking of sufferers from repeated tropical dysentery, says, “they waste away and die for want of the only remedy that possibly could arrest the hand of death—change of climate.”

Dr. Robert Jackson the best authority on this head.

Dr. Robert Jackson, in his work on the medical department of the British army, speaks of it as "proved incontestably in a multitude of instances, that the act of travelling in the open air, is a powerful remedy in some of the least manageable cases of fever. It is not indeed, found in the catalogue of remedies mentioned by medical writers."

Danger from this plan altogether visionary.

Some practitioners entertain a dread which I believe to be altogether visionary of the "danger" attending a removal of the patient, in, what they call, his exhausted condition, and continue the routine of drugs until both the patient and their remedies are in reality exhausted. Here, again, I must beg to quote Dr. Jackson, whom I believe to be seldom equalled as an authority on matters connected with the medical management of troops. Speaking of his experience in America and the West Indies, as Surgeon to the 71st Regiment, he says—"It is safe in the late periods of fever, and few cases occur where apparent weakness forbids its use if it be conducted with caution: nay, many cases have happened in the author's experience when the functions of life, from a state of apparent stagnation, have been speedily and effectually restored to alacrity, by the use of this means alone."

"It is certain," says Lind, that a person labouring under a fever or flux, will be much less endangered by being conveyed thirty miles on his bed, in a proper carriage, than by continuing twenty hours in the air which produced his distemper. The immediate removal of a patient, in such cases, into another air, often abates the most alarming symptoms of disease, and that even in a few hours."

Condition of the army of Rangoon.

Those who marched with the miserable remnant of the army, from Rangoon to Upper Ava, will never forget the drooping form and haggard eye of the European soldiers on the day we broke ground, and the condition of the same men on entering Prome, two months afterwards.

Remarkable improvement on quitting.

It is true, there were many circumstances in operation in this case that are not usual; but there were, on the other hand, many common to all such occasions. On quitting Rangoon, we left all our misfortunes behind us, along with the four thousand and some odd hundreds, whom

want and misery of every kind had buried there :* while before us were changes of every kind, *without a possibility of reducing our condition to worse* : there was change to a pure atmosphere, from the marshy tainted burying-ground that we had occupied for so many months—improved diet and wholesome exercise ;—hope, “ the first of the mental tonics,” with “ its kind cheat and fair fallacy,” that makes us believe.—

“ We are not where or what we be,
“ But what and where we would be ;”

in short, it was Phillip le Hardi, with the wreck of his army, quitting Tunis : every thing for which a man lives, we thought before us, while all for which he dies, we knew we had left behind us.

Even in that terrible disease, ophthalmia, which one would think the least amenable to such influences, the effects of change are most remarkable. Dr. Vetch, speaking on this subject, observes, that even when the second stage has commenced, he has never seen any other than the best effects to attend a change of place. Soldiers who have commenced a march with this disease completely formed, though exposed to heat, dust, and fatigue, and not abstaining even from intoxication, are invariably better at the end of the journey, than when they set out. The 2nd Battalion 14th N. I., says Mr. Geddes, left Jaulnah with about 500 sick in hospital from fever ; by the time of their arrival at Vellore, nearly the wholly of these had perfectly recovered. Drs. Evanson and Maunsell, speaking of infantile remittent fever, state that they have frequently seen a patient, who had been several weeks labouring under the disease, restored to the enjoyment of tranquil and refreshing sleep the night after his removal to a distance of three or four miles from his ordinary abode.

Influence of change of place in ophthalmia.

Dr. Vetch on this subject.

Dr. Geddes.

I will add one more quotation in support of my opinion as to the great importance of this subject, from one of the ablest writers of the day on elementary medicine.

* “ The deaths in the 89th regiment,” says Mr. Walsh, “ sometimes averaged 100 per week—a number exceeded in other corps. The aggregate deaths during the first three months, exclusive of casualties in action, must have amounted to upwards of three thousand Europeans, or more than one half of the force originally despatched.” It was not climate that occasioned this wreck ;—indeed it was one of the least of the causes.

Dr. George Gregory.

Dr. George Gregory, speaking of the general effects of change of air, says,—where the circumstances of the patient admit of it, this last resource of medicine should never be neglected. It seems to act as a general tonic, invigorating the whole frame, improving the quality of the blood, and stimulating every organ to a more healthy performance of its office.

ON THE CHOICE OF LOCALITIES FOR THE SICK OF CALCUTTA.

The want of a place of resort in sickness a matter of surprise.

It is a subject of general remark and some surprise amongst strangers, that no place of resort for sick and convalescents has been established by the inhabitants of this large, and but lately wealthy city. It was but the other day that capital to any amount might be obtained for the wildest of commercial and other enterprises; and it is much to be regretted that the only attempt of the kind here contemplated, partook but too much of that character.

The Saugor Island scheme in 1819.

Had the projectors of the Saugor Island scheme confined their views to the banishment of tigers, the growth of rice, and the making of salt, we could have nothing to complain of; but when “Members of Council, Judges of the Supreme Court, Generals, Civil Servants, Divines, Lawyers, Physicians, Military Officers and Merchants,” propose that “farms and granaries, and towns and busy population shall succeed,” in defiance of the tides and inundations, “to all the frightful silence of sterility and pestilence;” moreover, when these gentlemen propose to lay out large sums for a “lodging house” on Saugor Island, to which the agreeable accompaniments of baths, palanquins, horses and elephants were to be added—all “*for the benefit of the sick who require sea air,*” it might have been expected that some step had previously been taken to ascertain whether the position really possessed any, and what, capabilities for the residence even of Europeans in health.

That it had not any, even for the latter purpose, the least preliminary examination would have satisfied any one qualified for the task; for, had the whole Island been as thoroughly cleared as the glacis of Fort William, it had yet in its soil, and in the condition of the immediately

surrounding localities, what must for ever have rendered it a place of residence fatal to all but molunghees. Altogether, the attempt did little credit to the scientific or commercial forecast and precaution of so enlightened a community as that of Calcutta in 1819. The fault, however, must lay chiefly with the "*physicians*," for they certainly should have known better. As for the others, they were willing to bestow their capital in promotion of what they believed to be an object of great public utility; but all hope of success was vain, owing to the signal want of every previous information requisite to give direction and effect to their endeavours.

This notable scheme cost from first to last, in human life, including all who died in the clearing operations, and the six thousand odd who perished in the inundation of 1833, more or less, seven thousand souls.

Wasteful expenditure of life and money in this ill-judged project.

It cost in money—

Government preparations for a Light House,	60,000
Expended by the Saugor Island Society,	3,39,000
Expended by the Lessees,	5,81,000
	9,80,000
	Total Sa. Rs. 9,70,000

Any comment on the above summary would only destroy the impression: Let us only hope that the next attempt may prove more successful.

In former times, we hear that "the unhealthy town of Calcutta, in Bengal, has in its neighbourhood the healthy situations of Barasette and Ghyretti; where the gentlemen residing in Calcutta should retire in the months of July, August, September and October. Both Chandernagore and Chinsurah, the French and Dutch settlements in Bengal, are more healthy than Calcutta."

Places of resort in former times according to Dr. Lind.

Their necessities drove the older inhabitants to seek shelter during the period of danger, in the healthier localities mentioned by Dr. Lind; and admitting their superiority over Calcutta, the advantages to the sick must yet have been small. I see the same measure continually under

Their advantages but small compared to the real wants of the sick.

An insular position, or one on the sea coast the most desirable.

trial here, from the want of a better resource, and in severe cases, with little or no benefit; indeed, there is but one direction that offers a fair chance of recovery to the really sick, and that is, the neighbourhood of the sea, or an insular climate. It is to these above all others that the inhabitants of Calcutta should look, and there is not a year that I do not witness the most lamentable sacrifice of health, and of life too, from want of such a place of resort, especially during the S. W. monsoon, when persons in a state of extreme illness are unable to undertake a long voyage, in the face of such a wind and a southern winter.

Results of the author's experience on this head.

From an extensive observation of the effects on health of a residence in the mountain ranges, I should be disposed to consider them as chiefly beneficial in *preserving* health, and in this sense they will always be found of the greatest importance to military prophylaxis.

I see officers in great numbers every year proceeding to the Cape and to England, in whose cases a residence of one or two seasons in the hills has been insufficient to overcome the habit of recurrence even of common intermittent fever. I have witnessed better results in a great variety of instances from a two months' voyage to sea;—such is its superior influence on health.

The result of an extensive personal observation would therefore lead me to the conclusion that when Europeans have contracted disease, or are suffering from protracted convalescence in the marshes of Bengal, there are distinctive characters which give a preference to an insular climate over every other, viz. the purity of its atmosphere, and its equality of temperature, both which are enjoyed by an insular position in a degree no where else to be found. In Madeira, for instance, the winter is 12° warmer than in Italy or France, while the summer is 5° cooler; and while the mean annual range at Madeira, is only 14°, it is double that amount at Pisa, Rome, Naples and Nice.

Malte-Brun's preference of an insular climate.

Malte-Brun again, speaking of the air of open and elevated plains as conducive to health and longevity, remarks, that "the same thing may be said of an insular atmosphere, which is always renovated by the breezes from the sea."

The nearer mountain ranges have of late been looked to with much solicitude by the inhabitants of Calcutta; but without comparing the qualities of their atmosphere, or reckoning the difficulties to the really sick in reaching such places, my own experience, together with the results all over India, lead me to the conclusion already stated.

The climate of the mountain ranges inferior.

But it is not alone to the sick that a suitable place of resort is necessary, as a means of recovery: the healthy are also in need of it, as a means of prevention during the unhealthy months, but especially such of them as are not inured to the climate. To these last it will afford one valuable protection—that from an otherwise very probable attack of serious illness within the first year of their arrival in the country—an accident from which many will otherwise inevitably suffer.

Importance of the subject even to persons in health, and considered as a measure of prevention.

Pooree and Amherst Island, situated on the opposite shores of the Bay of Bengal, have been talked of as eligible places for the sick of Calcutta, and so have some positions along the sands of Balasore: but as the localities on the western shore only pretend to salubrity during the hot months, and are then inconvenient, if not difficult of access, no serious steps have ever been taken regarding them. Some of the smaller islands on the coast of Arrakan might reward the trouble of examination; but in the absence of information regarding these last, it has always appeared to me that our ancient establishment of Negrais merits our especial notice, and that amongst the least of its advantages may be numbered its proximity to Calcutta and Madras, being but four days steaming from the former, and its accessibility at all seasons. Its insular climate too,—its geological character—its free exposure to the influence of the S. W. monsoon during eight months of the year—its noble harbour, easy of ingress and egress under every change of season—all point it out as a place of the highest promise; in short, next to the improvement of our city, the possession of some such place of resort for its sick, is the desideratum.

Pooree and Amherst Island have been spoken of as places of resort.

Preference given by the author to the ancient British settlement of Negrais.

The country adjoining Negrais—the Delta of the Irawady—is very unlike that of the Ganges, being generally salubrious.

Salubrious nature of the Delta of the Irawady.

This quality is ascribed by Dr. Francis Hamilton, who accompanied Colonel Symes on his first embassy to Ava, to the “anastomosing

branches of the Pegue rivers" which carry off the "superfluous water, and prevent it from corrupting the air."

The geological nature of the soil, as described by Dr. Hamilton, would also seem to contribute materially to this end, by affording a considerable fall towards the sea; for, he speaks of rocks, eminences, and ridges of considerable length;—all which give to the valley of the Irrawady its acknowledged advantages over ours.

Climate of Pegue
of acknowledged
salubrity.

The indisputable superiority of the Burmans, amongst the nations inhabiting the vast peninsula that separates the Gulph of Bengal from the sea of China, is doubtless to be ascribed mainly to their fine climate; for, in their habits of life, diet, &c., they are even below the natives of Hindustan.

It is then, to their climate, and to nothing else that they owe their superior physical developement. Their entire exemption also, from the prejudices of *caste*, gives them a great moral superiority, which leaves them open to a degree of improvement here unattainable.

Dr. F. Hamilton speaks of Rangoon as "situated in a very healthy and fertile country, near the former town of Tagoon—very unlike Calcutta, Dacca, or the intermediate places, which are still more unhealthy."

The destruction
of the Rangoon Eu-
ropean force by
causes other than
climate.

Those amongst us who would judge the climate of Pegue by the fate of the European army at Rangoon, must be told that, neither there nor any where else were the soldiers cut off by tropical diseases, as in India. It was scorbutic disease, and that alone, that destroyed the force; and this terrible scourge was no more affected in its progress by the climate of Pegue than would have happened at any of our best stations in India during the rainy season.

Comparative ex-
emption in the na-
tive portion of the
army.

Climate, in short, was one of the very least of the causes that led to the destruction of the European force, and this truth is amply borne out by the healthy condition of the native portion of the army.

The writer of this report served with the forces under Sir Archibald Campbell, with which he marched from Rangoon to Upper Ava. The

climate throughout was both agreeable and salubrious; and with all the hardships and privations of the two campaigns, there were but few deaths in the body-guard, other than casualties in the field.

Colonel Symes speaks every where in the most favourable manner of the climate, in which during his long residence he “lost only one man by disease.” Lastly, of the more immediate object of this inquiry—Negrais,—Mr. Crawford, while Civil Commissioner in Pegue, reports that “the result of all his inquiries on the subject is, that the climate is considered by the natives perfectly salubrious.” Doubtless, three quarters of a century of utter neglect is sufficient to injure the best locality, and Negrais must stand in need of that without which no climate ever can be really salubrious—*the labour of man*.

As this subject is one of great importance, I beg, though it be a digression, to state some reasons in favour of Negrais as a naval, military and commercial position.

Advantages of Negrais in a naval, military and commercial sense.

That its harbour is extensive and commodious, affording “perfect shelter and smooth water” both for anchorage and for the construction of wharfs, we have the authority of Admiral Sir Edward Owen. Of the river also, the same distinguished officer says, that it affords naturally one of the best positions for a naval station on the east side of the Bay of Bengal; nor is it less adapted for the purposes of commerce, having water to Bassein, near sixty miles above its mouth, for ships of the largest size, and for forty miles higher up for those of 300 tons: its other inland water communications are innumerable, joining the main branch of the Irawady in lat. about 17° 40 N., thereby affording a direct communication to the heart of the kingdom of Ava, as well as to the city itself.”

The Island is described by Sir Edward as “an abrupt height rising from a level plain, and might be made almost impregnable:” he further adds, that it affords a constant supply of fresh water.

Colonel Burney while resident at Ava, February 1837, wrote as follows to the address of the author: “Your scheme of taking possession of Negrais and forming a Sanatarium there, is so good that, ever since the receipt of your letter I have been turning the matter over in my mind,” * * * * *. “If we took possession of Negrais, it would soon become a second Singapore, and all the English merchants at

Rangoon would remove to it. In another war with France, Negrais would prove a splendid port for our vessels of war to victual and refit during both monsoons, and a settlement there could communicate with the seat of government at Calcutta in about the same number of days at all seasons of the year."

The advantages above stated are certainly very great, and it appears to me that Rangoon shares largely in them. With Negrais, Rangoon and Bassein, we should padlock the military energies of the Burmese, by placing our garrisons at the mouths of their two greatest rivers, besides eliciting for the benefit of both countries the commercial resources of Pegue and Ava.

The positions of Negrais and Rangoon too, might be retained with ease by a trifling force against any efforts of the Burmahs to dispossess us—a great advantage over the Tenasserim and the Arrakan provinces, which do not repay the cost of their retention; indeed, on the contrary, the former alone are stated by Major Sutherland to cost "ten or twelve lakhs a year."

The only excuse I have ever heard for holding the latter province—so destructive to European and native health—is its forming, what is called, a good military frontier towards Ava; but, were a range of mountains a better barrier than the history of most countries and of most wars proves it to be, we do not now, and cannot at any time stand in need of such a protection against the Burmahs:—the question is otherwise in respect to the *Indus*—the ultimate line of real security to our empire, and the only one necessary to us in a military sense.

To conclude:—I have no doubt that the possession of a suitable insular climate would save many an officer from a comparatively useless visit to the hill ranges, and likewise from an expensive and protracted stay in the colonies.

There went to the hill ranges during the ten years ending 31st December 1837,	723	Officers.
Ditto ,, to the Colonies of N. S. Wales, the Cape, and Mauritius,	242	„
<u>Total during ten years ..</u>	<u>965</u>	<u>„</u>

ON THE SELECTION AND IMPROVEMENT OF LOCALITIES FOR THE EUROPEAN TROOPS.

“ There are instances, where the sick list in armies amounts to one-third of the total force, and others, where it does not exceed one-fiftieth, even one-hundredth part. The causes of such difference are sometimes visible and obvious. To discover their sources and to prevent their operations is important ; and it frequently is a work of no great difficulty.”—DR. ROBERT JACKSON.

It has been well observed by an able modern Surgeon, that “ where the hygiene of an army is judiciously regulated, the soldier may be kept in health and vigour ; but allow an ignorant General to encamp on a marsh, let filth stagnate, fatigue excessively the men, crowd them in low damp rooms ; and despite drugs, they will fall as unripe and blasted fruit, not by the sword but by the fever.” Injury to troops from being ill-located.

Dr. Robert Jackson complains that in the West Indies facilities of accommodation for trade—the polar star of British policy—condemns the soldier to the scourge of disease without a necessity. Whoever looks at the distribution of the European military force in this country, will come to the same conclusion.

With reference to the purposes for which the European soldier is brought to India, and with reference also to the efficient exercise of his powers when called into action, it has always surprised me that so large a portion of this arm has been retained in the plains throughout the country, and at stations such as Fort William, Dum-Dum, Berhampore, Dinapore, &c.—With urgent political reasons, or state necessities, I do not pretend to deal ; but if these do not exist, I know of no defence that can be set up, either on the score of humanity, or of expense, in plea of the “ serious loss in the balance of national accounts,” consequent on the loss of men. “ The case is important, and the sovereign power will be false to its own interests, if it do not apply a remedy when furnished All the stations below Benares unhealthy.

with proof that a remedy is attainable, and particularly when informed that it is not difficult of attainment."

Deaths at the lower stations during 5 years.

The number of lives lost from endemic causes at Fort William, Dum-Dum, Berhampore and Dinapore during the five years ending 31st January 1834, has been as follows:—

Died and invalided H. M.'s Army,	917
Ditto ditto H. C.'s Service,	469
	—
Total	1,386
	—————

The subject merits the consideration of Government.

Looking at the above list, what a melancholy picture does it afford of the cost to humanity at which we have for the last fifty years derived protection from the European arm; but if this arm be not really necessary to our protection, *where we have chosen to place it*, what a cruel neglect does it imply on the part of the State. "The ground-work of our power in India," says Major Sutherland, "is our substantial body of British soldiers." Believing this to be essentially true, I hope it may be thought "worthy the parental care of the State to examine the subject with attention, for the sake of ascertaining whether or not it be possible to unite defence and protection with such a disposition of the military force as is consistent with the preservation of health."

In the East as in the West Indies, the loss of military life from disease has always been great—sometimes prodigious. "If the subject be viewed correctly and without prepossession, the loss sustained will be found to have been principally owing to mistake, that is to inattention to truths furnished by experience for the choice of healthy positions."

The above quotations are from the celebrated work of Dr. Robert Jackson, entitled "*A view of the formation, discipline and economy of Armies*," and especially that portion of it which he devotes to "a general view of service in tropical climates,"—wherein, though he speaks with reference chiefly to the West Indian colonies, there is much that necessarily applies with justice to all tropical climates. Dr. Jackson's work

ought to be in the hands of every officer, whether military or medical.*

It is positively true, he says, "proved to a demonstration in numerous instances, but proved by accident, not by avowed experiment—that European troops may be so stationed at the islands of the West Indies as to retain their health nearly as well as they could be expected to retain it in their native country. The air of the interior and mountainous parts of the larger of the intertropical islands is comparatively cool and pleasant, and not unfriendly to the European constitution."

Dr. Robert Jackson on this subject in the West Indies.

In another work by the same Author, is the following instructive example of the useful application of the labour of the soldier :—

"Fort King George, island of Tobago, was at one time unhealthy ; it is now, as appears by a comparative view of the sick returns of the army, one of the healthiest quarters in the Windward and Leeward island station. The means through which it was made so, as not of common application, deserve to be brought under public notice. The fact is strong, but it has not made useful impression upon the official authorities. Fort King George stood in 1803, under the lee of a swamp, at a distance of nearly one mile, and at an elevation of five hundred feet above the level of it. The exhalations which arose from the swamp, carried to the height by currents of strong wind, were supposed to be injurious to the health of the garrison.

The cause was obvious, and the effect was so destructive at one time, that the commanding officer of the Royal Scots regiment which then formed the garrison, acting with the impulse of a soldier, determined to drain the swamp by the labour of the men rather than allow them to be destroyed in detail by its pernicious exhalations. The fact is authentic,

* This work is not sufficiently known in India ; and as I am anxious that military men should have a better warrant for its excellence than my opinion, I beg to subjoin that of one of the very highest of British critics on such a subject,—Sir John Moore's :

"MY DEAR JACKSON,—I have perused your military book, with which I am much delighted. There are none of us, even the most experienced, who may not derive instruction from it ; and I only regret that you, who possess a soldier's mind, had not been a soldier by profession."

and it is important. It furnishes unequivocal proof that the European is not less capable of sustaining labour in tropical climates, even severe field labour, than the African ; and it is further of value as it shows that the most of what relates to the quarters and accommodations of the military may be effected by the military themselves without expense to the public. The planters lent the tools in the present case ; the soldiers of the Royals drained the bog ; they did it without reward, and without injury to their health. Fort King George is now a healthy station ; and as rendered so by the Royals its future garrison may be supposed to bear an everlasting sense of gratitude to the memory of Lieutenant Colonel Macdonald, who conceived the feasibility of the undertaking from his own good sense, and executed it at his own responsibility. What he did was contrary to common medical opinion ; it was moreover done without the sanction of the chief military authority."

In Dr. Jackson's works there are many instances of similar results from the gratuitous labour of the soldiers ; and, what is very important, this distinguished military physician always concludes, that the thing was done, "with obvious effect upon health, morals, and happiness, while the work was under execution."

The practical question may now be asked—have we not in our Asiatic possessions any mountainous tracts conveniently situated, wherein the European soldier might live in vigour through the advantages of a better climate, and the proper application of his own labour, and if so, why are they not made use of?

Healthy localities
to be found in the
East.

That such favourable localities abound, no one can doubt ; and I am disposed to think that the calling the attention of authority to them, for the important purposes stated, will prove one of the most valuable results arising from the plan of calling on military surgeons for notices of the medical topography of the country generally.* We should not forget

* The plan here alluded to was suggested by the Author of these Notes in a report submitted to the Governor General in Council (Sir C. T. Metcalfe, Bart.) on the 26th March 1835, and which was finally adopted and ordered for the three presidencies of India on the 23d November of the same year.

The matter is now in the hands of a large body of highly intelligent officers : the field is almost untouched before them ; and I, for one, do not doubt the result, or its great value, even within a few years to come.

that "the slaves inhabit the hot, and the conquerors the elevated and cold regions," wherein the severer forms of fever are unknown; indeed, it has been observed that the diseases of the tropics seem, like the vegetable productions of the same regions, to be restricted to certain altitudes and particular degrees of temperature.

Humboldt states that yellow fever is never known beyond the height of 2,500 feet. The most remarkable instance on record of the value of mere elevation as a prophylactic means, is to be found in Maroon Town Jamaica, which is elevated but a little beyond 2,000 feet above the level of the sea; yet here, during a period comprising twenty years, the ratio of mortality per thousand of the force did not exceed 22, while throughout the other Stations in the island the average ratio of mortality per thousand was, for the same period, 143. This surprising comparison will extend so far back as the year 1795.

Where European troops are now well located, as respects health, it has happened, just as in the West Indies,—“by accident.” But it must not be supposed that it is only in the selection of sites for permanent camps and cantonments that care is necessary: the occupation of a bad locality, *if but for one night*, may be productive of serious evil, as I witnessed, and suffered from in my own person, in Upper Ava. Happy the condition of the European soldier, had a tithe of the sums spent in erecting barracks, been applied to purposes of preparing suitable accommodation in positions of ascertained salubrity; but, instead of that, we have all over India, buildings occasionally of good construction, erected at enormous cost, but which are ultimately abandoned, because, from their faulty positions and consequent insalubrity, their inmates are found to die in a proportion to shock even the humanity of Governments.

Importance of care
in this matter.

“The different erections of the Company for the accommodation of their troops,” says Tennant, “have cost several millions, and may be regarded as splendid instances of their economical principles giving way to the comfort of their army. The sums thus expended, laid out at the compound interest of this country would, at a determinate period not very remote, have equalled the national debt.”

The buildings for the troops at Berhampore, lately abandoned for the unhealthiness of the station, are said to have cost, including capital

and interest, from first to last, the enormous sum of sixteen millions, eight hundred and odd thousand pounds sterling.

The details* are from the office of the Accountant General, and that of the Military Board.

To conclude: the whole of this subject, as affecting troops, is of the highest importance: it was owing to the ignorance or neglect of *military* topography, that so much suffering and loss attended the several attempts against Ava during the late war, and that every ultimate object aimed at by Government in sending a force to Arracan in particular, failed; and it was a similar disregard of *medical* topography that caused the destruction of that force.

The following interesting comparative results of locality and climate have been obtained from documents furnished by the Inspector General Macleod, and by the Medical Board, the range of observation being from ten to twelve years:—

<i>Stations.</i>	<i>Ratio of Deaths to Strength per cent.</i>	<i>Ratio of Deaths per thousand of Strength.</i>
Berhampore,	8.27	82.742
Dinapore,	6.42	64.261
Fort William,	6.27	62.781
Chinsurah,	6.29	62.954
Cawnpore,	4.76	47.689
Ghazee-pore,	3.69	36.922
Kurnaul,	2.60	26.81
Meerut,	2.80	28.16
Agra,	2.40	24.33

* The military buildings of Berhampore were estimated, in the year 1757, at £302,278, or Rupees 38,23,657 14 8
Compound interest on this sum for 77 years, at 5 per cent., 16,37,02,404 0 0
Average annual charges for repairs, &c., during 77 years, at the annual average of Rupees 18,000, 13,86,000 0 0

Total ... 16,89,12,061 14 8
Total..... £16,891,206 3 10

Exchange at 2s. per Rupee.

POSTSCRIPT.

A comparative table was given in the concluding page of the article, exhibiting the relative salubrity of several of the military stations in the Bengal presidency. I now subjoin two tables shewing a very unusual rate of mortality, and that chiefly from the ill selection of the respective stations; but large as is the loss of life, it is believed to be far below what a range of observation through an earlier period would furnish, were records of these years available.

To the actual deaths it is necessary to add those of invalids who may die on their way home, or soon after their arrival there, and which increases the ratio by two, or more; but even this leaves it far under the mark; for the strength of the troops, as stated in the older medical returns, exceeds by more than ten per cent. the mean monthly strength, so that, making the required correction for this and the former error, we shall have, for Secunderabad, the very high ratio of ninety per thousand annually, or twelve beyond that exhibited in the table; and making the same correction for Berhampore, gives 114 as the ratio per thousand.

There died of the European corps stationed at Secunderabad, during a period of eleven comparatively healthy years, as follows:—

Years.	1827.	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	Total.	Average.
Strength, ...	786	817	662	819	885	716	622	611	613	706	888	8125	738
Deaths,.....	101	52	30	41	32	35	53	74	48	42	130	638	58
Ratio of Deaths per 1,000 of Strength...	128.592	63.429	45.210	50.50	36.140	48.632	85.130	121.60	78.186	59.346	146.352	.....	78.536

REMARKS.—The great mortality at the station of Secunderabad is referrible to the following causes; viz. the occupation by the troops of one of the worst known localities, as regards health, yet surrounded by such as are quite as noted for their salubrity; barracks and hospitals of unusually bad construction, the former, being “composed of two squares enclosing one another, so as to make assurance doubly sure against the possibility of perfect ventilation;” defective drainage and sewerage.

In no station in the south of India, except Masulipatam, which have been abandoned, is the mortality so great; and it is produced, as might be expected, chiefly by fever and dysentery of formidable characters:—in short, it would be difficult to determine which is most to be lamented in this unhappy choice of position—the defects of nature or those of art. There died at this station between the years of 1804 and 1835, the large number

of 2620, being officers, soldiers, women and children of the British regiment, inhabiting the objectionable locality and buildings spoken of.

It is sufficient here to state, on the authority of the late Dr. Burke, Inspector General, that the excess of casualties in Her Majesty's regiment at Secunderabad, over that of any Corps in the other stations of the Madras Presidency during four years, "is 117 men—a loss intrinsically of that station, exclusive of officers, women and children." By another report it appears that:—

In 1804	the proportion of deaths to strength	was	1 in 3.75
„ 1805	„	„	1 in 8.22
„ 1811	„	„	1 in 5.08
„ 1814	„	„	1 in 8.73
„ 1815	„	„	1 in 3.26
„ 1816	„	„	1 in 6.56
„ 1826	„	„	1 in 5.26
„ 1827	„	„	1 in 8.96
„ 1834	„	„	1 in 8.39
„ 1837	„	„	1 in 7.10

Average proportion of deaths to strength during 35 years: — 1 in 11.89

The average of deaths during 35 years is stated, in a return by the Madras Medical Board, to be 84.89, making 96.89 according to the corrections, per thousand of strength.

Dr. Burke is worthy of being heard on another important question arising out of this subject—namely, that of finance. "It has been stated that every European soldier landed in India costs the State £100 sterling, calculating from which, the intrinsic loss of 117 European soldiers by Secunderabad in $4\frac{3}{4}$ years £11,700 sterling; but as these 117 men have to be replaced, the doing so will cost also £11,700, to which must be added the loss in acclimatizing these latter, amounting on the lowest calculation, to $\frac{1}{3}$ th, or £1462, giving a sum total of £24,862, as the actual loss sustained in $4\frac{3}{4}$ years, or probably as three lacks of rupees in five years. But as Secunderabad would appear to have been a station for European troops for at least thirty years, the cost to the State for that period may be estimated at twelve lacks at least."

Many persons (of the class who would save farthings at the expense of the health, comfort and real efficiency of the soldier) will give ready ear, and take care thoroughly to understand this kind of reasoning, who would not be at the trouble even to listen to medical representations. These last are easily disposed of; and wherever it is troublesome to think, they have only to be stigmatized as a *speculative philanthropy*, and the question is set at rest, for another term of years.

Dr. Robert Jackson assures us that this state of things—so injurious to the soldier's welfare—will continue, "until physicians have the place in councils of military commanders that is due to science:—the health history of the late wars in Europe is demonstrative in proof of the important fact, that military life has been sacrificed in an enormous proportion to ignorance; that is, to the unwillingness of commanders to be advised on subjects which they could not themselves be supposed to know."

11700
1462
£13162

The reflection here cast on British commanders, by the ablest and most experienced military physician of any age or country, is deserving of all consideration. The character given to the generals of his country (and no man knew them better) does not belong to military talent; for Napoleon—the first of commanders—was most careful of military health, where military or political necessity did not imperiously controul him.

This is true, whatever prejudice or ignorance may urge to the contrary; and it is also true that the hospital arrangements for the French troops in the Peninsula were far superior to ours.

Napoleon knew both how to estimate and reward military surgeons, and “there was no point of warfare which more engaged his attention than the care of sick and wounded; and he being monarch as well as general, furnished his hospitals with all things requisite, even with luxuries.”—*Colonel Napier's History.*

Of all British commanders, Moore cultivated and understood this subject most attentively:—he, who of all our generals knew best how to train the soldier for battle, knew also how best to preserve the soldier's health.

I must now recal attention to the station of Berhampore, which was occupied by European troops since the battle of Plassey till 1834. It has always been a low malarious station, and therefore remarkable, even in Bengal, for its unhealthiness; but in the year 1793, some changes took place in the condition of the river, which, according to Dr. Burke, gave additional vigour to the local causes of disease, and from that time the mortality greatly increased. The cost in money on account of lives lost in excess, if added to the finance statistics given at page 144, would go to make this station one of the most expensive ever occupied by British troops, Up-Park, Jamaica, perhaps excepted.

There died of the European Corps stationed at Berhampore, during twenty years, as follows:—

Years.	Strength.	Deaths.	Ratio of Deaths per 1,000 of Strength.
1814	756	76	100.529
1815	584	62	106.164
1817	785	105	133.757
1818	770	64	83.177
1819	494	68	137.688
1820	860	48	55.814
1821	838	38	45.346
1822	693	78	112.554
1823	1,033	84	81.316
1824	484	58	119.834
1825	636	55	86.477
1826	527	136	258.64
1827	878	61	69.474
1828	897	105	117.56
1829	799	131	163.954
1830	708	50	70.621
1831	752	67	89.95
1832	710	57	80.208
1833	712	36	51.561
1834	850	31	36.471
Total,	13,766	1,410	
Average, ...	$668\frac{5}{10}$	$70\frac{1}{2}$	102.498

REMARKS.—Here, the injury to health lay in the locality, the barrack and hospital accommodation being unexceptionable; but these last, after 77 years of trial, were found insufficient to the correction of an original error, and the station was abandoned in 1835, by order of Lord William Bentinck.—It is believed that the period back to 1793 was far more fatal than that exhibited in this table.

HABITS OF THE EUROPEAN SOLDIERY, AND THEIR INFLUENCE ON HEALTH.

“ An estimate of materials is primary to the erection of the military as well as other fabric ; and as medical men are, or ought, from the nature of their studies, to be better acquainted with the materials of which armies are composed than men of other professions, the author is not disposed to admit the charge of encroachment, nor even to allow that he has exceeded the limit of his station in doing what he has done. He desires to be useful.”—DR. ROBERT JACKSON *on the Formation, Discipline and Economy of Armies.*

It was with a sagacity and penetration of the subject in all its latitude, belonging only to an officer of the highest order of talent, that Sir John Moore declared “ a Roman army would have gone through their military exercises in the West Indies (he was then in one of the worst parts of it) and have been healthy.” The same distinguished authority adds;—“ the troops I observe, which have been most active, are the most healthy ; a proof that the sun is not the cause of sickness. But in general the greater part of the sickness proceeds from want of interior discipline and economy in regiments.

Opinions of Sir John Moore on this head.

The same on service in the West Indies.

“ Great attention should be paid in this country to the cleanliness and even neatness of the soldier’s person, and the regularity of his diet in addition to the eating part of his ration instead of rum ; sea or river bathing, constant activity and movement. In short, general, (excuse the pedantry of the expression), but with a Roman instead of a modern, exercise and discipline, the troops in the West Indies might I am convinced be kept healthy.

“ A parade twice a-day, consisting merely of an inspection and exercise of arms is easy for officers ; it leaves them what they call more time, but it leaves the soldier also to lounge the whole day in barracks, where the air cannot be good ; and where from indolence his body becomes enervated and liable to disorder.” How much that is preventive of disease do these short sentences enjoin, and how applicable is the entire reasoning to the condition of the European soldier in this country.

His opinion applicable in this country.

Dr. Robert Jackson on the same subject.

Dr. Jackson, in his celebrated work already quoted, says, that “planters, who may be said to work hard, experience good health comparatively; even soldiers are healthy when actively employed; they suffer when they remain immured in barracks in ease and apathy.” Again;—“the writer ventures to say, by fair induction from fact, that if the soldier in the West Indies, instead of being restricted from labour, were permitted to do for himself whatever he is capable of doing, his health would suffer less than it now does, the mind would be occupied, there would be satisfaction and fewer of those causes of temptation, which in idleness lead him into error.”

Habits of the French army in 1805 under Napoleon.

The most complete army of modern times, in *health*, discipline and equipment, was that mustered by Napoleon in 1805, on the shores opposite to England, and which a distinguished British historian declares to have “acquired a degree of perfection, in point of discipline, organization, and military habits, unprecedented since the days of the Roman legions.”

It amounted to one hundred and fourteen thousand combatants; and it is highly deserving of notice that its exemption from disease was ascribed by its incomparable leader to habitual light and cheerful occupation of body and mind, short of fatigue. “Constant employment,” says one of his Generals, “was the true secret both of their good health and docile habits; neither officers nor soldiers were ever allowed to remain any time idle; when not employed in military evolutions, they were constantly engaged either in raising or strengthening the field works, or in levelling down eminences, draining marshes, or filling up hollows, to form agreeable esplanades in front of their habitations and where their exercises were performed.”

Marlborough's discipline.

What the economy of Marlborough was, I do not know; but there must have been something great in that discipline which, according to one who served under him, made his camp resemble “a well governed city. Cursing and swearing were seldom heard among the officers; a sot and a drunkard was the object of scorn; and the poor soldiers, many of them the refuse and dregs of the nation, became, at the close of one or two campaigns, tractable, civil, sensible, and clean, and had an air and spirit above the vulgar.”

On the existing abuse of spirituous liquors it were in vain to speak : before that terrible habit is overcome, something far more powerful than medical reasoning on facts, or the warnings of experience founded on these facts, must be brought into active operation : discipline must alter its direction : in place of being active only to punish wrong, it ought and must, be exerted in the encouragement to good conduct.

Abuse of spirituous liquors.

The subject is one of the highest importance and interest, as affecting the character, efficiency, and entire discipline of the army ; it cannot therefore be too often urged on the notice of authority ; and I am sure I shall be excused for making a few brief quotations from the melancholy but emphatic report of the Deputy Inspector Marshall on this baneful habit of the European soldier in India. " By the daily custom of imbibing spirituous potations, a new want is created, intemperance is established as a habit, and frequent intoxication is the consequence. The wretched drunkard must now have a large supply of liquor in the morning to recover him from the effects of the quantity drunk the preceding night. He perhaps has neither money nor credit, and his clothes are then sold at a small portion of their value. Some do not stop here : for after having sold all their own clothes, they will rob their comrades and with the produce of their dishonesty provide the means of intoxication. Confinement follows upon confinement, court-martial upon court-martial, and punishment upon punishment, until the worn-out wretch dies in hospital of the " horrors" (delirium tremens), fever or dysentery ; or if he should for a time resist the fatal effects of disease, his constitution becomes broken down by the combined influence of the poison of spirits, an exhausting climate, and repeated attacks of illness, so that in a few years he is found unfit for further service in India, and is sent home to be invalided. Death is the last but perhaps not the worst result of intemperance. This description of the life of a British soldier in India is by no means highly coloured. But the evil does not fall on the heads of the unfortunate sufferers ; military discipline in all its branches becomes deeply affected by habits of intemperance. To the generally prevailing vice of drinking are to be attributed almost every misdemeanor and crime committed by British soldiers in India. The catalogue of these, unhappily, is not a scanty one ; for, by rapid steps first from petty, and then more serious neglects and inattentions, slovenliness at and absence from parades, follow disobedience of orders, riots and quarrels in barracks, absence from guards and other

Deputy Inspector General Marshall on the same.

duties, affrays with natives, theft, and selling of their own and their comrades' necessaries—robberies, abusive language and violence to non-commissioned officers, and last of all desertion, mutiny, and murder, may be traced to this source. This frightful picture is not exaggerated. I have seen thirty-two punished men in a regimental hospital at one time, perhaps not a single individual of that number suffered for a crime which was not a direct or indirect consequence of the immoderate use of spirits.

I recollect attending to the punishment of seven men of the same Regiment who received among them 4,200 lashes. They had been all tried for crimes arising from habits of intemperance. Since the institution of the Recorder's and Supreme Court of Madras, no less than thirty-four British soldiers have forfeited their lives for murders, and most of them were committed in their intoxicated moments."

How, I may ask, can commanding officers and courts martial totally reject the excuse of intemperance so long as a soldier is furnished by Government with the means of depriving him of his reason as part of his daily subsistence, all of which he is directed to use.

Becaria is of opinion that the punishment of a crime cannot be just (that is necessary) if the laws have not endeavoured to prevent that crime, by the best means which times and circumstances would allow. We instil the moral and physical poison with one hand, and hold out the lash with the other as the antidote against indulgence. Coercive measures are very ineffectual for preventing the evils arising from intemperate habits, partly because soldiers do not generally regard drunkenness an ignominious vice. Where punishment has no influence in checking a man from repeating a breach of discipline, or in preventing others from committing a like offence, it is worse than useless.

Desgenettes, on
the French army in
Egypt.

Where endemic fever prevails, the temperate, it is true, are attacked as well as the intemperate; but it is universally admitted by medical men that the former has a much better prospect of recovery than the latter. Desgenettes, in his medical history of the French army in Egypt, observes that daily experience demonstrates that almost all the soldiers who indulge in intemperate habits, and that are attacked with fevers, die; nay, we may go still further and say, that they have been more

liable to an attack of disease. Sir James Macgrigor repeats the same observation even more emphatically.

The obvious purport of Dr. Marshall's able report is to recommend an abolition of the indiscriminate and uniform issue of spirit rations to European troops in India, with the view of abating the extent of crime, lessening the proportion of sick, reducing the ratio of mortality, diminishing the number of men discharged on account of disabilities, and of promoting the welfare, efficiency, and discipline of corps.

Means of ameliorating the condition of the European soldier.

There is another habit, however, on which I shall venture to say a few words, because it is a new one;—I mean the immoderate use of tobacco—a habit brought into fashion amongst us from the Continent, on the cessation of the wars that sprung out of the French revolution, and one which is considered by many, a manly habit, until the pale yellow face, shattered nerves and disturbed action of the heart, rotten teeth and gums, foul breath, &c. begin to shew themselves; and then it is frequently too late to stop. All this and much more I have seen in numberless cases, and I regret to say amongst a class of persons who have not the same excuse that is claimed by the poor soldier. I have also heard a great deal said on the good effects of tobacco-smoking in damp climates, and that by persons, who, in defiance of geographical distinctions, invariably carried the habit from the marshes of Arracan to the arid plains of Delhi, and the mountain ranges of the Himalas; but I think there is reason to question the good effects of this drug even in the fatherland of fog and damp, or that it ever acts as a preventive to any disease;—least of all to fever. The truth is, that many use cigars by the dozen now, on the same plea that Lord Chesterfield drank and smoked in his time, notwithstanding his aversion to wine and tobacco: he did both, “because he thought such practices very *genteel*, and made him look like a man.” How his lordship *looked* under the united influence of wine and tobacco, his biographers have failed to relate; but we all know how our modern beaux “look” after a course of some months’ smoking alone.

The use of tobacco injurious.

Damp and cold climates may confer a greater tolerance of, or immunity from the evil effects of the narcotic; but these are perhaps all

that can justly be admitted; for the rest, it produces all and more evils than those stated, together with some of the worst forms of dyspepsia. Dr. A. T. Thomson, speaking of the tobacco medicinally used, says,—“Its narcotic power, when it is employed in excess, weakens the digestive organs, obtunds the nervous sensibility and depresses the whole vital energy.” Of the empyreumatic oil of tobacco, which is produced in the ordinary process of smoking, the same author says that when introduced into a wound it “causes instant death;” and of the other active principle, the nicotina, that, upon the whole, it is evident that tobacco is a direct sedative whether employed in the form of infusion, or that of smoke; and lastly, he declares that under all circumstances tobacco must be employed with the utmost caution. If such checks are necessarily put on the use of this drug in the hands of the physician, what need be added on the unlimited use of it in those of the heedless and ignorant soldier. Of hookah smoking, I need say little, as happily its day is nearly gone; but I have witnessed many cases of severe constitutional indisposition from its use, with perfect recovery on the discontinuance of the habit; the digestive function, that of the heart and the nerves, suffered alarmingly in some of the more inveterate smokers. Many persons flatter themselves that through long use such habits become a harmless second nature; they are a second nature, *for they have nothing to do with the first*, as was said of graver matters.

A medium in diet as in other things desirable.

It must not be supposed from these observations, that I am desirous of seeing the British soldier placed on a diet of vegetables, treacle and tea; far from it: I would take nothing from him that constitutes a liberal and wholesome diet—not even a moderate spirit ration, provided at the time of using it, he is a seasoned soldier, and kept in full exercise: cooped up in barracks, as he is now, however, there can be no question that the spirit ration is highly injurious in every sense, and that it “constitutes a pernicious bounty” to the men. In diet, as in other things, extremes meet. Monsieur Jacquemont and the full-blooded British grenadier—each meets his death after his way; the man of extreme abstinence and the inordinate dram-drinker, are here on a par. Monsieur Jacquemont prided himself on his abstinence and rigid adherence to a spare vegetable diet, through which he made certain to triumph over all tropical ills; while he should live to see his numerous English friends go before him

Monsieur Jacquemont's abstemiousness too rigid.

with tumid livers and inflamed stomachs. He died, however, just as does the British soldier; without one other point of resemblance, moral or physical, here they met for once on a footing of perfect equality; the Frenchman inane from defective nutriment, and the soldier collapsed after his deadly debauch—each rendered incapable of resisting the *external causes* of disease, falls a victim to endemic fever, and its sequel, organic lesion.

The British soldier in the opposite extreme.

There is nothing more necessary to the full powers of the soldier than a sufficiency of wholesome diet, with a due proportion of animal food; but here we should stop him, if we would preserve his moral and physical integrity; if we would preserve for him in India, the pre-eminent station, he has everywhere else maintained; if, in short, we would justify our boast, that the sun never sets on the British standard.

A generous diet necessary to the soldier on active service.

It is very easy for England to keep the muster-rolls of India full; but this will be useless, in a military sense, unless the habits of the men, and the climates in which they are placed, be carefully looked to. It was not by soldiers enfeebled by bad climates and worse habits that the hill of Albuhera was won.

POSTSCRIPT.

For the following gratifying practical confirmation of all the foregoing medical reasoning and experience, I am indebted to Dr. Macleod, Inspector General of Her Majesty's Hospitals; and, though the term of observation is but for the first half of last year, no Surgeon who has served with troops, and witnessed the baneful effects of the prevalent manner of living amongst the soldiers, can for a moment doubt but that equally favorable results will attend the further adoption of improved habits.

I here give but the abstract of a table representing the comparative state of health of the Temperance Societies in Her Majesty's 3d, 13th, 16th, 31st and 49th Regiments.

Abstract Return of the State of Health of the Temperance Societies in Her Majesty's Regiments serving in the Bengal Presidency, from 1st January to 30th June 1838.

MONTHS.	Strength of the Temperance Society.	Strength of the Remainder of the Regiment.	Relative Proportions admitted to Strength.		Average Number of Men daily in Hospital of the Society.	Per Centage of the Society.	Average Number of Men daily in Hospital not of the Society.	Per Centage not of the Society.
			Temperance Society.	Remainder of Regiment.				
January,	1953	2569	1 in $18\frac{77}{104}$	1 in $9\frac{220}{261}$	$49\frac{24}{31}$	2 54	$206\frac{27}{31}$	8 05
February, ...	1840	2639	1 „ $20\frac{80}{88}$	1 „ $9\frac{246}{266}$	$41\frac{20}{28}$	2 27	$218\frac{11}{38}$	8 27
March,	1542	2879	1 „ $14\frac{43}{107}$	1 „ $7\frac{140}{390}$	$45\frac{12}{31}$	2 94	$248\frac{19}{31}$	8 63
April,	1359	3081	1 „ $10\frac{2}{133}$	1 „ $5\frac{261}{384}$	$74\frac{12}{30}$	5 47	$316\frac{22}{30}$	10 28
May,	1282	3161	1 „ $18\frac{40}{69}$	1 „ $6\frac{55}{78}$	$67\frac{6}{31}$	5 24	$336\frac{10}{31}$	10 66
June,	1364	3065	1 „ $19\frac{53}{69}$	1 „ $6\frac{71}{449}$	$62\frac{8}{30}$	4 55	$317\frac{6}{30}$	10 35

ON THE
TERM OF EFFICIENT SERVICE IN INDIA.

“ Unie a la chaleur, l'humidité de l'air debilité d'une manière plus profonde et plus radicale encore, et dans ces pays malheureux, les personnes qui, par la force de leur constitution, ou par un régime très attentif trouvent le moyen d'échapper aux principaux dangers qui les environnent n'entraînent pas moins habituellement une vie languissante et timide qui glace toutes leurs facultés et les décourage dans tous leurs travaux.”—CABANIS.

Since my entering on public service in India, I have endeavoured attentively to observe the moral as well as the physical effects of climate.—“The slow blight of the constitutional power”—in Europeans of long residence in it, but especially amongst those of the military classes; and the result, as far as I can judge from an ample field, is, that the term of twenty-five years is the very utmost that persons under ordinary health may, on the average, be expected to retain their British vigour of thought and action. Of the precocity spoken of by Drs. Moseley and Ainslie, I have never seen any evidence: they seem to have found in every other British youth within the tropics, a second Grotius:—*Relique viri tandem fuere*; GROTIUS *vir natus est*.

Average term of years during which an European may retain mental and bodily vigour.

Precocity not a general feature. Cabanis speaks of but one form,—that of old age.

Cabanis, however, speaks of but one form of precocity in such countries—that of old age (*vieillesse précoce*)—and I fear, this latter is nearer the truth. On the other hand, if the age of 48 be the stage of highest intellectual power in Europe, this period would seem to be anticipated here:—after that, the decline of the mental and corporeal power is steadily progressive. “*We may stop when we are rising, but never when we are going downwards.*” Certainly, all of my profession, and I think I may say of the services generally, who have attained to eminence in this country, have done so long *before* the twenty-five years, and few indeed have retained much of it for long *after*. One is delighted, however, by occasionally meeting in general society with exceptions to this melancholy rule; but how rare: you may perchance, see the veteran of 40 years service in all the mental freshness of youth, and beside him the officer of 25 years, superannuated and feeble in every respect; but the first is the exception; the last must ever be the rule that governs the mass.

Exceptions to the influence of climate very rare.

The character of a people connected with the soil.

Extraordinary influence of soil and climate.

The whole subject of great importance in India.

Thirwall, in his History of Greece, observes, that “the character of every people is more or less closely connected with that of its land,”—and we should take but a limited view of the effects of climate, and especially of localities abounding in marsh poison, if we considered only the more familiar effects of those agents on the European constitution, such as the various forms of fever, &c. The state of the air affects the mental energies, and moral feelings of many individuals, to a degree inconceivable to those who are not thus subject to its influence; and it should be recollected that even in Europe, the long continued application of such causes affects the mind to very idiocy, as commonly observed in some quarters of Tuscany and Switzerland.* Here also, how often do we perceive that, through the gradual operation of that climate which causes the native to be effeminate, idle, and timid, the fear of responsibility paralyzes the latter years of the once able civil functionary, doubt and hesitation those of the once vigorous British soldier, and that, before either is overtaken by years.

The causes, and their consequences, have not been sufficiently before authority; but they demand the most serious consideration, so long as we may be expected to hold India through what, in European states, is called the power of opinion. There is no country in the world where so much depends on the *persons* of the functionaries and the spirit which animates them, as in India, and consequently, where the right selection of persons is of so much public importance.

* The fevers of the Tiracc and Arracan frequently leave the same moral and physical effects.

ON THE
MORTALITY AND PHYSICAL MANAGEMENT OF
EUROPEAN CHILDREN IN CALCUTTA.

The diseases of childhood run their course very mildly in Bengal, and, upon the whole, it cannot be said that, under proper management, the climate of Calcutta is unfavourable to infant health up to five or six years of age, when however, the offspring of Europeans generally begin to shew the necessity for change of climate, by out-growing their strength. This portion of medical statistics, however, is quite as unsatisfactory as all that relates to the subject in India ; but I believe the results of a close observation would afford corresponding facts to those obtained in France and England, viz. that the greater mortality exists under the extremes of temperature—the very colder, and the hotter months.

Calcutta on the whole not unfavourable to infant life.

Dr. Stewart states the interesting fact that amongst the European inhabitants of Calcutta the ratio of mortality of adults is greater than that of children in the proportion of five to one, while of the poor degenerate Portuguese Catholics, that of children exceeds adults in the proportion of four to one. Amongst the heedless European soldiery, and such as are unable to send their children to Europe at the proper age, the mortality in the early years of life is excessive. Dr. Burke states Fort William to be “ one of the worst, if not the very worst, of the Military stations in India for children,” the average mortality per cent. per annum, being 16. 29.

Dr. Edwards' observations on the difference of constitution at different periods of life are of the highest importance as affecting children, and if generally understood and put in practice, they would, as he says, considerably reduce one of the most powerful sources of mortality. The power of generating heat is so feeble in the infant system, probably from their consuming less oxygen in proportion to their bulk, that it is impossible to be too guarded in the matter of clothing during our cold season in Bengal ; for scarcely a year passes that I do not witness the most serious results from the exposure of infants, imperfectly clothed, to our piercing N. E. wind. All newly born infants should sleep with the

Dr. Edwards on the difference of constitution at different periods of life.

mother or nurse during the cold season, in order to escape its injurious, and occasionally fatal influence on their delicate skins.

Where, however, the opposite system is adopted of *hardening*, by means of half-clothing, or the yet more unreasonable one, of *strengthening* by that of double diet, the results are even more speedily destructive than in Europe. They are brought about through the supervention of gastric fever, with occasional cerebral determination; diarrhœa, or the more slow process of mesenteric fever.

Under ordinary care as to diet and clothing too, the operation of teething proceeds kindly in this climate. Speaking of my own experience only, I should say that severe teething irritation is seldom a primary affection: on the contrary, it has always appeared to follow upon previously existing febrile or intestinal disorder; and it is not too much to say that, in 19 cases out of 20, these last are the results of mis-managements in diet and clothing;—errors of ignorance and weakness, it is wonderful to say, more common to the most civilized than to the most barbarous communities. To read some books and hear some people talk, one might be led to suppose that the teething process is a *morbid* one from beginning to end.

Results of an inquiry
at Narbonne.

At Narbonne, about the centre of France, on taking the proportion of deaths to births, the average for the winter quarter is one in 8.43 births, for the spring quarter one in 12.05, for the autumn quarter one in 10.60, and for the summer one in 8.95.*

The extremes of
season in Bengal the
most unfavourable.

I believe the periods in which the greatest mortality occurs amongst children in Calcutta are,—in the cold season, December and January; April and May of the hot season. In the former, congestive and catarrhal fevers prevail, and in the latter remittent fever, occasionally of an ardent form, and diarrhœa. Altogether, the deaths are not numerous as compared to the births, and this is mainly owing to the generally rational plan of treating the children of the better classes, where the wet-nurses, the aliment, cleanliness, air and exercise, are well attended to.

* Dr. Robertson.

I have not seen one case of small pox amongst the children of the better classes during my residence in India—a fact which speaks powerfully for the protecting influence of vaccination ; for not a year passes that small-pox is not prevalent in the city.

It is stated by Lind that “ European women in general enjoy a much better state of health than the men,” but that “ child-bearing is peculiarly fatal to them in Calcutta ; on which account it would be advisable for them to retire to a more healthy situation at the approach of their delivery.”

From whatever cause it be, the very contrary of this holds at present ; for, during sixteen years that I have been familiar with the state of health among the better classes of Europeans, I heard of but one death connected with parturition, independantly of previous disease ; and I do not recollect one instance of a child born dead. Some three or four cases of dysentery or fever, inducing premature delivery and death, I have heard of, during the time referred to. I would therefore ascribe the fatality mentioned by Dr. Lind to the circumstance that, in the olden time, the management of parturition was left to native Dhàees ; indeed, in Hickey’s Journal, published here in 1780, the public is frequently warned against permitting what the editor terms, the *improper* interference of European physicians !

On the subject of rearing children entirely in Bengal, I would only observe that, on the ground of experience, the thing appears to be generally impracticable.

Mr. Twining says, that he has not been able, after much and careful inquiry, to find anywhere a sample of the third generation from unmixed European stock. I believe it is scarcely to be found in any part of India, least of all in Lower Bengal ;—so much for the question of European colonization, on which a great deal has been said and written here, without ever reflecting that nature had already set her ban upon it.

Experience against rearing children entirely in Bengal.

Dr. A. T. Thomson, in quoting Volney, the eloquent historian of Egypt, states the remarkable fact, “ that neither the Mamlooks, who

Remarkable similarity in Egypt.

were a *Caucasian* race, nor the Turks, who are Mongolians, unless they married native women, which the Mamlooks never did, could continue their race in Egypt ; all their offspring perishing in the first or second generation."

Without an accurate census of the Protestant population, tables, such as the one here appended, afford but slender information, whether for the purposes of the topographer or the actuary :

Burials in Calcutta of Protestant Christians.

<i>Years.</i>	<i>Adults.</i>	<i>Children under 5 years.</i>	<i>Total.</i>
1820	239	43	282
1821	196	50	246
1822	275	47	322
1823	215	55	270
1824	209	63	272
1825	240	54	294
1826	234	36	270
1827	190	45	235
1828	157	77	234
1829	128	32	160
1830	180	28	208

ON THE MORTALITY OF THE NATIVE AND FOREIGN RACES.

In any inquiry as to the duration of life, and the causes of mortality amongst the natives of Bengal, we must consider, not only that general climate and temperature have great influence upon the longevity of different races, by accelerating or retarding the development of the human system, but that, along with the worst of climates, all the institutions and habits of the Bengalees tend powerfully to abbreviate the term of life: their premature decay is in perfect accordance with their early and forced development.

The law of correspondence of the period of puberty with the whole term of life is subject to few exceptions, and has been well expressed by Lord Bacon in his *Historia Vitæ et Mortis*, by "Nature's finishing her periods in larger circles."

The following comparative view of the effects of different climates on health and mortality, I have taken from the recent work of Dr. Prichard, on the physical history of mankind. The rates of mortality for Calcutta are wanting in Dr. Prichard's work, and I have endeavoured to supply them from the best sources. They are here placed in juxta-position with the rates of other and remote places, as I believe the best mode of considering such questions is, through a wide field of comparison.

"The proportionate duration of human life in different climates has lately been an object of statistical enquiries, in which many distinguished writers have been engaged. It would be superfluous to enter on the present occasion into the statements connected with this subject; but it is necessary to form some idea of the manner and extent in which the duration of life is affected by climate, in order to be prepared for estimating the facts which relate to longevity in particular races of men.

It is well known that the proportional number of individuals who attain a given age differs in different climates, and that the warmer the climate, other circumstances being equal, so much the shorter is the average duration of human life. Even within the limits of Europe, the difference is very great. In some instances, according to the calculations of M. Moreau de Jonnes, the rate of mortality, and inversely the duration of life, differ by nearly one-half from the proportions discovered in other examples. The following is a brief extract from a table presented by this celebrated calculator to the Institute. The table comprehends returns belonging to different periods, illustrative of the effect produced by political changes and improvements in the state of society on the duration of human life. I have omitted this part, and have only abstracted that which illustrates the influence of climate.

Table exhibiting the annual mortality in different countries in Europe.

In Sweden, from 1821 to 1825	1 death in 45
Denmark, 1819 „ 	45
Germany, 1825 „ 	45
Prussia, 1821 to 1824	39
Austrian Empire, 1825 to 1830	43
Holland, 1824 „ 	40
England, 1821 „ 	58*
Great Britain, . . 1800 to 1804	47
France, 1825 to 1827	39.5
Canton de Vaud, 1824 „ 	47
Lombardy, 1827 to 1828	31
Roman States, . . 1820 „ 	28
Scotland, 1821 „ 	50

The difference of twenty-eight and fifty is very considerable; but even the latter rate of mortality is considerably greater than that which the data collected by M. Moreau de Jonnes attribute to Iceland, Norway, and the northern parts of Scotland.

* There must be a mistake in this number. According to Porter and Reikman, the number of annual deaths in England from 1821 to 1831, is one in fifty-one.

In approaching the equator we find the mortality increase, and the average duration of life consequently diminish. The following calculation obtained by the same writer will sufficiently illustrate this remark.* Increase of mortality as we approach the equator.

Latitude.	Places.	1 death in
6° 10'	Batavia	26 inhabitants
10° 10'	Trinidad	27 „
13° 54'	Sainte Lucie	27 „
14° 44'	Martinique	28 „
15° 59'	Guadaloupe	27 „
18° 36'	Bombay	20 „
22° 33'	† Calcutta	20 „
23° 11'	Havanna	33 „

It has been observed that in some of these instances the rate of mortality appears greater than that which properly belongs to the climate, as some of the countries mentioned include cities and districts known to be by local situation remarkably unhealthy. In some the mortality belongs in great part to strangers, principally Europeans, who coming from a different climate suffer in great numbers. The separate division from which the collective numbers above given are deduced will sufficiently indicate these circumstances.

In Batavia 1805	Europeans died	1 in 11	Batavia.	
	Slaves	1 „ 13		
	Chinese	1 „ 29		
	Javanese, viz. Natives ..	1 „ 40		
Range of observation.				
† Calcutta 1817 to 1836	Europeans and Eurasians	1 „ 23	Calcutta.	
	Portuguese and French ..	1 „ 8		
	1832 to 1836	Western Mahomedans		} 1 „ 36
		Bengal Mahomedans ..		
		Moguls		
	Arabs			

* Notice sur la Population des etas de l'Europe, par M. Moreau Jonnes. De l'Homme et de ses Faculte's, par M. Quitelet.

† By Dr. Duncan Stewart's table.

‡ Journal of the Asiatic Society, No. 82.

	Calcutta continued }	Western Hindus	} 1 in 16
	1832 to 1836 .. }	Bengal Hindus	
		Low castes	
		Mugs	
Bombay.	Bombay 1815	Europeans	1 ,, 18.5
		Mussulmans	1 ,, 17.5
		Parsees	1 ,, 40
	Guadaloupe 1811 to 1824	Whites	1 ,, 22.5
		Free men of colour	1 ,, 35
West Indies.	Martinique, 1825	Whites	1 ,, 24
		Free men of colour	1 ,, 23
	Grenada 1815	Slaves	1 ,, 22
	Saint Lucia, 1802	Slaves	1 ,, 20

The comparatively low degree of mortality among the free men of colour in the West Indies, and the Javanese and Parsees, in countries where those races are either the original inhabitants, or have become naturalized by an abode of some centuries, is remarkable in the preceding table. It would seem, that such persons are exempted, in a great measure, from the influence of morbid causes which destroy prematurely Europeans and other foreigners. That the rate of mortality should be lower among them than in the southern parts of Europe, is a fact which, in the present state of our knowledge, it is difficult to explain."

The following Tables and remarks were found by me amongst the stores amassed by the Municipal Committee, and were handed to Mr. James Prinsep, who published them in the 82d number of the Journal of the Asiatic Society.

Mortality for all classes in Calcutta.

Mortality among all classes in Calcutta for 20 years; but for the Native Population only 5 years.

Years.	Protestant burials.		Catholic burials, D. Rozario.	Catholic burials, Boitockannah.	Greeks.	Armenians.	Indo-Armenians.	Native Christians.	Natives.
1817	216		313	169	4	10	3	...	
1818	272		211	159	2	20	3	...	
1819	275		284	158	...	23	3	...	
1820	281		282	136	...	17	1	...	
1821	246		277	172	...	16	3	...	
1822	324		294	140	...	16	2	...	
1823	270		277	156	...	10	2	...	
1824	278	Scotch burying ground began 1826.	282	188	...	21	1	...	
1825	297		285	154	1	12	10	...	
1826	275		309	145	2	19	17	...	
1827	254	11	308	174	...	15	16	4	
1828	256	19	250	170	2	15	12	3	
1829	184	21	209	146	3	12	16	2	
1830	224	26	236	138	1	14	15	...	
1831	186	29	236	122	3	17	19	8	
1832	217	25	269	121	1	17	16	1	
1833	302	30	288	204	2	23	14	5	
1834	281	35	257	199	2	16	17	4	
1835	233	18	233	115	1	7	16	4	
1836	197	26	188	104	0	15	13	3	
	5065	240	5288	3070	24	315	199	34	
	20	10	20	20	12	20	20	9	
Average,	253	24	264	153	2	15½	10	3½	11178

Native Deaths for 5 years.

Hindoos, 8299
 Mussulmans, ... 1009

 9308 in 1832.
 Hindoos, 15138
 Mussulmans, .. 2385

 17523 in 1833.
 Hindoos, 11167
 Mussulmans, ... 1900

 13067 in 1834.
 Hindoos, 6873
 Mussulmans, ... 1229

 8102 in 1835.
 Hindoos, 6366
 Mussulmans, ... 1515

 7881 in 1836.

Mortality per cent. of the several Races. *Statement of the average rate of Mortality per cent. among the different classes of Inhabitants in Calcutta per Census and Table of Mortality.*

Denominations.	No. of Inhabitants.	Total.	Average Mortality p. annum.	Average Mortality per cent.				
English,	3138	7884	277	3½ pr. ct.	1 in 28			
Eurasians,	4746							
Portuguese,	3181	3341	417	12½	1 in 8			
French,	160							
Western Mahomedans,	13,677	59,622	1607	2¾	1 in 36			
Bengal Mahomedans,	45,067							
Moguls,	527							
Arabs,	351							
Western Hindus,	17,333							
Bengal Hindus,	120,318	157,418	9558	6½	1 in 16			
Mugs,	683							
Low Castes,	19,084							
Armenians,	636					25¾	4½	1 in 25
Native Christians,	49					3½	6¾	1 in 14
Chinese,	362							
Jews,	307							
Parsees,	40							
Madrasses,	55							

“ The great difference in mortality between the* Hindus and Muslims is striking, while the difference to be observed between the Portuguese, as compared with the English and the Eurasians, is equally so.

Here is much room for speculation, and it cannot be said that as yet we have as good means of getting correct information upon this subject as they possess in Europe : nevertheless, we may approach as near as we can to the point we wish to ascertain, and we may hope to improve in such statistical records.

The Portuguese, among whom so great a mortality is shewn, are a suffering race very subject to the catalogue of complaints enumerated in

* The difference of mortality amongst the Mahomedans and Hindus may be accounted for by the circumstance that the Hindus of Calcutta, consisting of families, include a much larger proportion of infant life. The same circumstance will explain the great difference between the average mortality amongst the Portuguese and the Europeans of Calcutta.—Ed. Journal Asiatic Society.

these papers ; while the English and Eurasians are far more prosperous in life, and enjoy comforts and happiness in a very high degree, as compared with the former section of society. The mortality of English and Eurasians $3\frac{1}{2}$ per cent. per annum, while that of the Portuguese being $12\frac{1}{2}$ per cent. is very great. In 1830 I ascertained, and published in the *Gleanings of Science* the burials in Calcutta of Protestant Christians from the year 1820. To shew at that time, that although the European population must have greatly increased, yet, that the deaths and burials had not increased, and now that the same population is acknowledged to have increased very materially indeed, yet we see upon referring to the first column of one of the tables, giving the Protestant burials, for the last 20 years, no increase of deaths. The years 1833-4, the two years following the sea inundations, shew the greatest mortality of late years ; while among the native population those two years, shew an extraordinary mortality. The two last years shew in much of both European and Native population that healthiness is restored. The mortality among the other columns of society, the Catholic, Greek, Armenian, Hindu, Armenian, and Native-Christian, are for the last 20 years, and I believe them to be nearly correct. The Chinese and Jews keep no account of their burials ; I of course could not include them, and they form a minute portion of the population of this city."

The native soldiers on the Bengal establishment, says Capt. Henderson (*Asiatic Researches*, Vol. 20, part 1st,) are particularly healthy under ordinary circumstances.

Mortality of the
Hindustanee Soldiers
resident in Bengal.

It has been found by a late inquiry embracing a period of five years, that only one man is reported to have died per annum, out of every one hundred and thirty-one on the actual strength of the army.—So injurious, however, is Bengal Proper to this class of natives, in comparison with the Upper Provinces, that although only one-fourth of the troops exhibited, are stationed in Bengal, the deaths of that fourth are more than a moiety of the whole mortality reported.

For the following Table, shewing the Mortality of the Native Population of Calcutta, from various diseases, during the Years of 1832, 1833, 1834, 1835, 1836, and 1837, I am indebted to Dr. Duncan Stewart:—

Diseases.	Hindoos 151,473.		Mahomedans 59,622.		Total Native Population 217,095.		Proportion of Deaths from various diseases in every 100 Deaths.		Average proportion of Deaths, from various diseases in every 100 Deaths.
	Ratio in Six Years.	Annual Ratio.	Ratio in Six Years.	Annual Ratio.	Ratio in Six Years.	Annual Ratio.	Hindoos.	Mahomedans.	
Cholera, {	7.6 per cent. or 1 in 13 nearly,	1.26 per cent. or 1 in 79,	3.94 per cent. or 1 in 25,	.656 per cent. or 1 in 152,	6.6 per cent. or 1 in 15,	1.1 per cent. or 1 in 90.	22 $\frac{1}{4}$ in 100,	25 in 100,	23 $\frac{1}{2}$ in 100.
	1.77 per cent. or 1 in 55,	.295 per cent. or 1 in 339,	.768 per cent. or 1 in 130,	.128 per cent. or 1 in 782,	1.5 per cent. or 1 in 66,	.25 per cent. or 1 in 400.	5 $\frac{1}{4}$ in 100,	6 in 100,	5 $\frac{1}{4}$ in 100.
Small Pox, ... {	25.2 per cent. or 1 in 4 nearly,	4.2 per cent. or 1 in 24,	.11 per cent. or 1 in 9 nearly,	1.8 per cent. or 1 in 54 $\frac{1}{2}$,	21.3 per cent. or 1 in 4 $\frac{3}{4}$,	3.55 per cent. or 1 in 28.	72 $\frac{1}{4}$ in 100,	69 in 100,	70 $\frac{1}{2}$ in 100.
	Miscellaneous } Diseases, ... }	34.5 per cent. or 1 in 2 $\frac{1}{4}$,	5.7 per cent. or 1 in 17 $\frac{1}{3}$,	15.7 per cent. or 1 in 6 $\frac{1}{3}$,	2.6 per cent. or 1 in 38 $\frac{1}{3}$,	29.4 per cent. or 1 in 3 $\frac{1}{2}$,	4.9 per cent. or 1 in 20.	100,	100,	100.

The following Table is collated from the interesting and valuable article of Mr. H. T. Prinsep on the mortality for ages and births in the Lower Orphan School of Calcutta, during 40 years, and published in the Journal of the Asiatic Society for September 1838.

Age.	Boys.			GIRLS.		
	Number in the House, on 31st December of each year.	Total Deaths.	Ratio of Deaths per 1000.	Number in the House, on 31st December of each year.	Total Deaths.	Ratio of Deaths per 1000.
0	2,713	486	171.480	2,766	416	144.980
1	2,430	498	185.890	2,436	496	184.830
2	2,169	186	82.220	2,203	170	74.300
3	1,968	113	55.830	2,030	80	38.640
4	1,845	65	35.230	1,790	77	42.120
5	1,725	56	31.940	1,788	52	28.690
6	1,587	42	26.110	1,677	49	28.800
7	1,451	41	27.870	1,572	30	18.900
8	1,314	36	27.270	1,431	36	24.910
9	1,186	15	12.570	1,322	14	10.530
10	956	33	33.960	1,210	17	13.950
11	750	20	26.300	1,140	18	15.660
12	528	8	15.040	1,071	12	11.130
13	287	3	10.450	951	15	15.650
14	138	1	7.240	799	5	6.240
15	70	6	82.190	626	4	6.360
16	38	3	76.920	449	6	13.270
17	19	0	.....	295	7	23.490
18	14	1	.....	194	4	20.400
19	11	0	.....	131	1	7.630
20	8	1	.....	89	1	11.230
Total ...	21,207	1,614	908.510	25,970	1,510	741.710
Mean ...	530 $\frac{7}{10}$	40 $\frac{1}{4}$	22 $\frac{28}{10}$	649 $\frac{1}{10}$	37 $\frac{5}{10}$	18 $\frac{13}{10}$

N. B. In forming this Ratio, as the number of Boys and Girls is stated for the last day of the year, and therefore does not include the deaths during the year, it has been necessary to add half the deaths, on the calculation that each person that died gave the rest of his life for half the time of those who lived out the year.

There died in twenty-three years, of the European Troops forming the Garrison of Fort William, as follows :—

Years.	Strength.	Deaths.	Ratio of Deaths per 1000 of strength.	REMARKS.
1815	762	31	40.520	
1816	516	57	110.240	
1817	603	44	72.588	
1818	649	97	149.299	
1819	832	59	70.760	
1820	971	52	53.537	
1821	997	76	76.228	
1822	576	62	107.368	From 11th May—8 Months.
1823	760	51	67.80	From 23d May—7 Months.
1824	736	103	139.696	{ From 8th June—7 Months.
1825	902	110	121.838	
1826	863	96	111.207	{ 47th Regt. from 20th April, } 8 Months. { 87th Do. for Nov. and Dec., }
1827	893	56	62.634	
1828	913	42	45.815	{ 14th Regt. from January. 59th Ditto ditto 1st February.
1829	885	58	65.465	{ 47th and 59th Regts. from January. and 16th Ditto, 1st February.
1830	808	59	73.16	
1831	831	57	68.492	{ 16th Regt. from 1st Jan. to 31st March. 3d from 1st April,
1832	771	59	77.633	{ 3d Regt. to 31st October, } { and 49th Do. from 1st Nov. }
1833	687	64	93.109	
1834	608	57	93.456	
1835	743	33	44.308	
1836	734	25	34.44	
1837	709	26	36.476	
Total,...	17749	1364	=	
Average.	$771\frac{6}{11}$	$59\frac{7}{11}$	$76\frac{3}{4}$	

REMARKS.—The above must be taken as the mortality on the spot only, and does not include the invalids, who died on their passage to England, or shortly after their arrival there, amounting to $3\frac{1}{2}$ annually. If, as is well known also, the Medical Returns be taken at the highest strength in course of the year or quarter, or a tenth part higher than it ought to be, instead of the mean monthly strength, the ratio of mortality will be greatly increased. A correction of all errors would bring the annual mortality to about ninety per thousand.

That in India as elsewhere age materially influences the ratio of mortality will be seen by the following Tables for the Officers of the Bengal Army, and those of the Civil Service. Out of 1184 deaths among Officers, the proportion occurring annually in each rank, and at each age, has been as follows :—

	Colonels, average age 61.	Lieutenant Colonels, average age 51.	Majors, average age 40.	Captains, average age 36.	Lieutenants, average age 18 to 33.	Cornets and Ensigns, average age 18 to 33.	General, average at all ages.
Died Annually per thousand of each Class,	59.4	48.4	41.0	34.5	27.5	23.4	31.2

The mortality among the Civil Servants, for a period of forty-six years, from 1790 to 1836, exhibits almost precisely the same results,—viz.

	Above 50 years of age and 30 of service.	Age 40 to 50; service 25 to 30.	Age 40 to 45; service 20 to 25.	Age 35 to 40; service 15 to 20.	Age 30 to 35; service 10 to 15.	Age 25 to 30; Service 5 to 10.	Age 20 to 25; service 1 to 5.
Died Annually per thousand of each Class,	48.6	36.4	35.4	23.4	16.6	20.8	19.9

Between ten and fifteen years' service is the period, when leave of absence is allowed to those who choose to return to Europe for three years, which of course must have a material tendency in reducing the mortality of that class. With this exception the results are uniform for both civil and military servants, and they are no less so when extended to the officers of the other Presidencies.

The official results in regard to the mortality at each age among the Military Officers, and Civil Servants of the Bengal Presidency, afford a convincing proof that in the East Indies no advantage has hitherto been derived from length of residence. As those individuals are never employed out of India, and generally arrive there about the age of eighteen or twenty, their respective ages and ranks may be assumed as a criterion

for estimating their length of residence in the country. On that principle, then, we find, taking equal numbers of each rank, that the mortality among the Ensigns, for the most part youths but recently arrived, is only twenty-three; while that of the Lieutenants, who must have been at least three years longer resident to have attained that rank, is twenty-seven; and that of the Captains, who must have been about twelve or thirteen years longer, is thirty-four per thousand, and so on in a corresponding proportion with the higher grades. In case it should be objected that this does not exhibit the precise operation of mortality during the first year or two of residence in the country, when the influence of acclimatization is supposed to be most strongly manifested, the following information in regard to the Civil Servants in the Bengal Presidency will supply that defect:

	Numbers alive.	Deaths in first year.	Ratio of Deaths per thousand of living.
1st Year of Residence,	975	19	19.5
2d Ditto,	933	22	23.5
3d Ditto,	906	18	20.0
4th Ditto,	874	19	22.0

Here, then, we have traced the same individuals through four successive years of residence, with the liability to mortality constantly augmenting; and unless we are to suppose that a different law regulates the mortality among Europeans in the tropical climates of the eastern and western hemisphere, we are inevitably led to the same conclusions which we have already demonstrated from the previous numerical results.—*Dr. Marshall and Captain Tullock's Report.*

The comparative annual per centage mortality of the officers belonging to the armies of the three Presidencies of Bengal, Madras and Bombay, is stated by Captain Henderson to be as follows:—

Total for Bengal, including Medical Officers,	3.12	per cent.
„ Madras,	4.49	„
„ Bombay,	3.94	„

The subject of Hospital Statistics is one that has been altogether neglected in the Medical Establishments of the Bengal Presidency; and, though the example of the Hospitals of Her Majesty's army from which the most complete reports are made, has now been fifteen years before us, this important branch—the very central point of Medical Science—can scarcely be said to have been approached by us. It is the deficiency here complained of that has caused the omission in this report of all mention of the hospitals of Calcutta, and of the General Hospital in particular;—an institution that has existed for more than seventy years, and in which tens of thousands of European Soldiers have been treated under three or four different Medical systems, yet no one fact, out of the numerous and important observations made during that long time is known to any one of us. All this and much more has been urged by me in what I thought the right quarter, and in the most emphatic manner; but though my proposition met with no very flattering reception, I have yet the satisfaction to know that I have produced some action, tardy perhaps, yet such as will lead to some ultimate improvement. We are in India continually kept in mind of that law of our nature, by which the activity of men decreases in the ratio of their senility, causing that inertness and disinclination from undertaking any thing, however excellent, of which they cannot be expected to see the end.

From the circumstance that no general mode of registering and recording exists, on statistical principles, which all may adopt, the great majority of experience in India perishes with individuals, and the valuable materials of a long and active life are for ever lost to the public service.

So serious an evil results naturally from the total absence of all organized plan, by which the duty of simplifying and recording facts and individual observation may be facilitated.

The labour of analysing observations which have been irregularly kept is immense—to some men impossible; while by order, a habit of observation is fostered and kept alive, through the increasing facility in the process, and the interest excited by the subject. Such are the opinions of some of the ablest writers in England.

To insure precision and uniformity in reports, the nomenclature of hospitals is systematic and strictly ordered in the Royal Army, and this is one of the many advantages its plan of arrangement possesses over ours.

By a statement forwarded by the Medical Board to the Municipal Committee, it would appear that during the thirty years, from 1st January 1808 to 31st December 1837, there were of admissions and deaths amongst the European patients of the Presidency General Hospital as follows :—

Total Admissions,	35,119
Total Deaths,	3,607

This, for the thirty years, gives a mean ratio of $10\frac{2.7}{100}$ deaths per cent. of the admissions.

The Quinquennial ratios are as follows :—

	Admissions.	Deaths.	Ratio of Deaths per cent.
From 1808 to 1812,	2,713	299	11
„ 1813 to 1817,	4,360	450	$10\frac{3.2}{100}$
„ 1818 to 1822,	6,425	657	$10\frac{2.2}{100}$
„ 1823 to 1827,	9,560	1039	$10\frac{7.6}{100}$
„ 1828 to 1832,	6,315	585	$9\frac{2.6}{100}$
„ 1833 to 1837,	5,746	577	$10\frac{5}{100}$
Mean,	$5.853\frac{1}{2}$	$684\frac{2}{5}$	$10\frac{2.7}{100}$

This is all that the General Hospital can now be got to yield; for it was only in 1808 that any records were used even of admissions and deaths.

It only now remains to trace the general influence of season in producing sickness and mortality:—for this purpose I have prepared several Tables, and the first, exhibiting this influence on native mortality, was got up at my request, by Dr. Duncan Stewart; the period is for seven years, viz. from 1831 to 1837, inclusive:—

Influence of season in producing sickness and mortality; —native deaths.

MONTHS.	Of 1000 Deaths there occurred in different months.	Of 1000 living Hindoos there died in different months.	Of 1000 living Musslemans there died in different months.	Total Natives:—Of 1000 living, there died in different months.
In 7 Januarys,	92½	27½	9½	22½
„ 7 Februarys,	67½	12½	8½	16½
„ 7 Marchs,	65½	18½	8½	15½
„ 7 Aprils,	69½	19½	8½	16½
„ 7 Mays,	63½	17½	9	15½
„ 7 Junes,	54½	14½	8½	13
„ 7 Julys,	70¼	18	11½	16½
„ 7 Augusts,	90½	26	10½	21½
„ 7 Septembers,	98½	28	12½	23½
„ 7 Octobers,	104½	30	12½	25½
„ 7 Novembers,	116½	34½	11½	28
„ 7 Decembers,	106½	31½	11½	25½

This Table exhibits in a remarkable manner the fatal influence of the months from September to January inclusive, and which would be even more striking if we possessed the means of deducting the deaths by Cholera in the months of March, April, May and June, so as to shew only the ordinary endemic influence:—as it is, however, the Table is highly interesting and instructive.

The influence of season continued;—protestant deaths.

The following Table I have had collated from the records of the Vestry: it exhibits burials in the Protestant burial ground for twenty years, from 1819 to 1838 inclusive, and arranged in months:—

MONTHS.	Under five years of age.	Above five years of age.	Total.
In 20 Januarys,	53	257	310
„ 20 Februarys,	41	165	206
„ 20 Marchs,	70	260	330
„ 20 Aprils,	105	307	412
„ 20 Mays,	104	421	525
„ 20 Junes,	99	298	397
„ 20 Julys,	104	285	389
„ 20 Augusts,	87	389	476
„ 20 Septembers,	74	379	453
„ 20 Octobers,	84	368	452
„ 20 Novembers,	60	379	439
„ 20 Decembers,	53	349	402
Total,	934	3857	4791

Thus it appears, that though the greatest number of deaths occurred in the Mays—the worst of the Cholera months—the period by far the most fatal has been from August to January inclusive; and if the deaths by Cholera during the hot months could be excluded, this result would appear very striking.

With a view to exhibit the simple endemic influence in the fairest manner, I again had recourse to the Vestry records, from which the following Table of Protestant burials has been framed for the twenty years just previously to the appearance of Cholera as an epidemic, namely, from 1796 to 1815, inclusive.

Protestant deaths previously to the existence of Epidemic Cholera.

MONTHS.	Under five years.	Above five years.	Total.
In 20 Januarys,	28	216	244
„ 20 Februarys,	26	153	179
„ 20 Marchs,	31	164	195
„ 20 Aprils,	33	178	211
„ 20 Mays,	25	235	260
„ 20 Junes,	22	209	231
„ 20 Julys,	34	219	253
„ 20 Augusts,	44	288	332
„ 20 Septembers,	42	296	338
„ 20 Octobers,	32	293	325
„ 20 Novembers,	32	331	363
„ 20 Decembers,	23	311	334
Total,.....	372	2893	3265

Thus it appears, that in twenty years, Novembers were the most fatal months, and that the five months from August to December inclusive, were more fatal than the whole seven months besides.

European deaths
in the General Hos-
pital in each month
during 12 years.

With a view further to ascertain the influence of season on the health and mortality of the European soldiers and seamen, I have prepared the following Table from a document furnished by the Medical Board:—it exhibits the Totals of admissions and deaths in the Presidency General Hospital in each month during twelve years; the item “other diseases,” has some awkwardness in it, but that I cannot help:—

Range of observations in months.	TOTAL ADMISSIONS.					TOTAL DEATHS.				
	By acute diseases.	By chronic diseases.	By surgical diseases.	By “other diseases.”	By all diseases.	By acute diseases.	By chronic diseases.	By surgical diseases.	By “other diseases.”	By all diseases.
In 12 Januarys,	899	64	261	245	1469	89	10	5	8	112
„ 12 Februarys, ...	557	46	185	150	938	67	6	2	13	88
„ 12 Marchs,	456	38	163	132	789	55	5	5	7	72
„ 12 Aprils,	619	42	138	175	974	50	6	6	12	74
„ 12 Mays,	722	70	161	178	1131	67	11	7	12	97
„ 12 Junes,	791	63	184	186	1224	64	4	4	11	83
„ 12 Julys,	843	38	176	127	1184	104	6	11	24	145
„ 12 Augusts,	732	42	180	146	1100	88	9	9	8	114
„ 12 Septembers, ...	683	69	148	174	1074	112	8	11	13	144
„ 12 Octobers,	764	48	229	182	1223	114	4	10	8	136
„ 12 Novembers, ...	1142	120	282	325	1869	97	4	5	10	116
„ 12 Decembers, ...	948	87	247	233	1515	109	8	7	27	151
Total,	9156	727	2354	2253	14490	1016	81	82	153	1332

REMARKS.—It appears from the Medical Board's Table, from which the above is framed, that, out of 1,704 Europeans who died in the twelve years, 372 died of Cholera; 304 of Dysentery; 58 of Diarrhœa; 465 of Remittent Fever; 66 of Intermittent; 50 of Hepatitis; 88 of Phthisis, so called, but more than half were probably Bronchitis; 19 of Rheumatism; 6 only of Spleen; 8 of Apoplexy; 9 of Delirium Tremens; 6 of Small Pox, leaving 270 deaths from “other diseases.”

The total admissions in twelve years are 15,293, and the deaths 1,704.

The proportions of deaths to cases treated are as follows:—

Of Remittent Fever, 5,116 admissions and 465 deaths, or one in 11.

Of Dysentery, 1,877 admissions and 304 deaths, or one in 6½.

Of Cholera, 803 admissions and 372 deaths, or one in	$2\frac{1}{8}$
Of Diarrhœa, 608 admissions and 58 deaths, or one in	$10\frac{1}{2}$
Of Intermittent Fever, 501 admissions and 66 deaths, or one in	$7\frac{1}{4}$
Of Hepatitis, 446 admissions and 50 deaths, or one in	$8\frac{2}{10}$
Of Spleen diseases, 58 admissions and 6 deaths, or one in	$9\frac{2}{3}$
Of Delirium Tremens, 124 admissions and 9 deaths, or one in	$13\frac{1}{3}$
Of Apoplexy, 27 admissions and 8 deaths, or one in	$3\frac{3}{8}$
Of other diseases, 2,253 admissions and 153 deaths, or one in	$14\frac{2}{3}$
Average of all the diseases, nearly one in nine.	

From the Table of Seasons, as above arranged, it appears that the most healthy months comparatively, are February, March, April and May; that from June to January, the admissions range high, these also being by far the most fatal months. These results correspond nearly with observations on the climate of Jamaica, and others of the West Indian Colonies, wherein the most unhealthy as well as fatal months of the year extend from August to December inclusive; the only months comparatively healthy, being from January to June. These observations would seem to apply to most parts of the Northern Hemisphere, which generally possess the same character of climate. They also accord with the ancient maxim that held, "the summer and autumnal to be the most sickly seasons:" —

Saluberrimum ver est; proxime deinde ab hoc, hyems; periculosior ætas; autumnus longe periculosissimus.*

From the Researches of Statistical writers, it appears that all over Europe the maximum of deaths occur towards the close of Winter, and the minimum towards the close of Summer.

In order that the table should express only the result of ordinary season and endemic influence, I have not included Cholera, which epidemic is found to prevail chiefly in the months of April, May and June.

* *Cels.*

October, November, December and January are the months in which there occurred the largest proportions of remittent fever cases, and the same applies to dysentery, diarrhœa and acute hepatitis; while Septembers alone give more intermittents than the whole of the months besides.

In order to account for the unusual mortality under all heads of disease, it is proper to mention that the descriptions of persons treated in the General Hospital, are as follows;—European soldiers belonging to detachments from Her Majesty's and the Hon'ble Company's regiments; recruits for ditto; the sick of all Regiments returning from service, as for instance during the late Burmese war, &c.; European and American seamen from the shipping; townsmen, paupers, generally seamen; invalid soldiers on their way to England, &c. &c.:—in short, a class of persons away from that salutary control which leads to prompt measures both for the prevention and cure of disease. It thus happens that the earlier stages of acute illness are neglected;—an irrecoverable loss, and which must frequently imply the necessary loss of life.

It will be observed that however interesting the results here obtained, they are of no value in the real statistics of disease. We have nowhere the mean duration of illness; nor the relation of sick time to death; nor any means of comparing the mortality of the sick with that of the total population; nor the influence of age, sex and acclimatization in the production of or immunity from disease, or on its treatment.—These and many subjects, second in importance only to the cure of disease, are altogether wanting, and will continue so, until a better system of record is introduced into our hospitals, military and civil.

The following Table exhibits the admissions and deaths, in each month, during the period included between 1827 and 1838, in the Hospital of Her Majesty's Corps in the Garrison of Fort William.

	TOTAL ADMISSIONS.					TOTAL DEATHS.				
	By Fevers.	By Hepatitis.	By Bowel Complaints.	By other Diseases.	Total by all Diseases.	By Fevers.	By Hepatitis.	By Bowel Complaints.	By other Diseases.	Total by all Diseases.
In 12 Januarys, ...	231	24	249	539	1043	7	3	20	10	40
„ 12 Februarys, ...	266	51	263	627	1207	1	2	16	5	24
„ 12 Marchs,	323	64	286	606	1279	9	1	16	10	36
„ 12 Aprils,	303	66	318	708	1395	6	2	19	9	86
„ 12 Mays,	418	53	330	726	1527	8	2	22	12	44
„ 12 Junes,	488	57	253	698	1496	5	2	18	13	38
„ 12 Julys,	403	68	314	586	1371	16	5	28	10	59
„ 12 Augusts,	427	38	321	609	1395	18	4	25	8	55
„ 12 Septembers, ...	446	42	256	557	1301	18	4	30	10	62
„ 12 Octobers,	404	33	250	541	1228	23	0	21	6	50
„ 12 Novembers, ...	423	39	203	574	1239	19	4	25	9	57
„ 12 Decembers, ...	311	20	202	550	1083	16	1	16	10	43
Total,	4443	555	3245	7321	15564	146	30	256	112	544

REMARKS.—It thus appears that in the 12 years there were 15,564 admissions by all diseases, and 544 deaths, or one death in every 28 $\frac{2}{3}$ patients treated, being less by two-thirds than the general average afforded by the General Hospital returns for the same period—an emphatic example of the value of that internal discipline and economy in corps to which so much preventive and curative result is ascribed by all Military and Medical authorities. Out of 544 deaths, 256 are by bowel complaints—146 by fever, and 30 by liver disease, leaving 112 deaths by other diseases. If, from the column of deaths, we abstract, for the hot months, those by Cholera, the comparative fatality of the months from September to January inclusive, will be rendered very remarkable.

The proportions of deaths to cases treated are as follows:—

By fever 4,443 admissions and 146 deaths, or one in 30 and $\frac{2}{3}$ ds, nearly:
by bowel complaints 3,245 admissions and 256 deaths, or one in 12 $\frac{1}{2}$,

nearly: by Hepatitis, the very large proportion of 555 admissions and 30 deaths, or one in $18\frac{1}{2}$: by other diseases, 7,321 admissions and 112 deaths, or one in 65 and $\frac{1}{2}$ d, nearly.

In order to exhibit the difference of result in the two Hospitals, I subjoin the following Table:—

Diseases.	Ratio of Deaths in the Regimental Hospital.	Ratio of Deaths in the General Hospital.	Difference.
Fevers,	One in $30\frac{2}{3}$	One in $10\frac{3}{4}$	Of 20 nearly.
Bowel Complaints, ...	" " $12\frac{1}{2}$	" " $6\frac{2}{10}$	" 6 " " $5\frac{1}{2}$ "
Hepatitis,	" " $18\frac{1}{2}$	" " $8\frac{2}{10}$	" $9\frac{1}{2}$ "
Other Diseases,	" " $65\frac{1}{2}$	" " $14\frac{2}{3}$	" $50\frac{2}{3}$ "

Under the head bowel complaints it is not known whether cholera, dysentery and diarrhœa are all comprehended. This laxity in framing the table, and the lumping of 7,000 odd cases under the vague designation of "other diseases," goes considerably to vitiate the regimental return; but both errors arose from misapprehension on the part of the compiler, who is at the distant station of Meerut.

The table, with all its faults, is not without value as bearing on the three grand divisions of tropical disease,—viz. Fevers, bowel diseases, and those of the liver:—but comparison cannot of course be made, to any just or useful purpose, between the two Hospitals, as the one treats only a selected class of men whose mean age is 26; while the other treats the broken down and miserable of all ages, and in all the stages of their diseases.

I am told that a comparison of results, where alone comparison can be made, viz. in treating soldiers, is considerably in favor of the General Hospital.

To conclude:—As to the constantly recurring questions, do we not live under an improved climate, and is not the mortality of Europeans greatly diminished of late years, it is not very easy to speak satisfactorily, owing to the total absence of statistical record. That the climate of the actual site of Calcutta is improved to a certain extent, there can be no doubt; and that European general mortality is likewise diminished, amongst the better classes especially, I believe to be true; but the chief cause will be found in the improved habits of the latter class; for, with the troops in Garrison, notwithstanding the improved discipline and interior economy of modern times, it would not appear that mortality is much, if at all diminished, and the same may be said of the nearest military station of former times—Berhampore.*

The decrease in the proportional mortality of British troops in our various colonies, is stated by Dr. Robert Jackson to be only of recent date; and he adds, that it would not be safe to pronounce positively whether it is owing to improvement in medical management, with improvement in military economy, or to contingent and temporary change in the nature of morbid causes, producing a less aggravated form of disease than belonged to other times. The soldiers did not die in greater numbers in Germany and Holland in the war of 1793, 94 and 95, than they did in the war of 1803: Further, he says, that the mortality was not greater, *cœteris paribus*, in North America in the war of 1756, than in the revolutionary war of 1775,—or in the late war of 1813. It is in the Navy, he might have added, that a great and progressive reduction in mortality has been effected by the measures of preventive medicine instituted in 1779.

Mortality has been nearly equal at all times in the West Indies, *viz.* in the war of 1756, in the war of 1778, the war of 1793, and the war of 1803.

Of the health history of the European troops in Bengal, we have little or no information. I must therefore content myself with the following tables for Fort William and Berhampore, made up from scattered records

* Making the corrections stated at page 145, the Table for Fort William will give 88.40, and that for Berhampore 102.69, as the ratio of deaths per 1000. All the Tables of the military have been framed from four official sources—*viz.* the Adjutant and Auditor General's Office, that of the Inspector General and the Medical Board; and where they differed, I took the estimates of the Audit Office. More deaths were recorded in the Adjutant General's returns than in any of the others. Slight errors have been made by the writer in calculating some of the Tables, but they in no manner affect the general accuracy of the whole.

procured with much trouble, from the offices of the Auditor and Adjutant General. After what has already been said, they require no comment.

Table shewing the deaths amongst the European troops in Fort William during the years specified :—

Years.	Strength.	Death.	Ratio of deaths per 1000 of strength.	Remarks.
1790	967	88	91.00	11 Months in Garrison. 7 Months in Garrison.
1791	316	26	82.34	
1797	867	117	134.2	
1800	848	108	127.35	
1801	916	65	70.96	
1802	1020	94	92.15	
1805	927	53	57.17	
1806	1122	55	49.02	
1807	1198	49	40.90	
1808	1319	107	81.12	
1809	1182	71	60.06	
1810	1106	33	22.83	
Total,...	11788	866	...	
Average,...	$982\frac{4}{7}$	$72\frac{2}{7}$	76.40	

Table shewing the deaths amongst the European troops at the Station of Berhampore during the years specified :—

Years.	Strength.	Deaths.	Ratio of deaths per 1000 of strength.	Remarks.
1788	497	47	94.56	11 Months at the Station.
1791	230	19	82.60	
1792	157	18	114.64	
1793	183	23	125.68	10 Months at the Station.
1794	290	29	100.	
1796	245	35	138.77	
1797	383	44	114.88	9 Months at the Station.
1798	403	46	114.14	5 Months at the Station.
1806	835	53	63.47	
1807	848	39	45.99	
1808	726	46	63.36	
1809	721	45	62.41	
1810	512	30	58.59	
Total, ...	6030	473	...	
Average,...	$463\frac{1}{3}$	$36\frac{2}{3}$	90.69	

EPIDEMIC DISEASES.

I know no branch of medical inquiry more interesting than the history of epidemics, or one that would prove more useful to practitioners in whatever climate. How true it was, as declared by Sydenham, and it unhappily continues so to this day, that no one has treated this great question "in proportion to the dignity of the subject."

A history of our local epidemics would be of great value, as enabling us to trace their connexion with changes of climate and condition of the surrounding localities, or with the social condition of the people, both European and native; and had such a history existed, it would have helped to an earlier establishment of general principles, and a rational plan of treating our fevers especially; for, though all the epidemics within my personal recollection (and there is scarcely a year we have not one in some form) differ essentially from the ordinary endemics of the country, still, there will be found in most of them, so much of the savour of the soil, if I may be allowed the expression, as to render a knowledge of their history and treatment an object of no mean importance.

Under a system of local improvement calculated to diminish the endemic sources of disease, I am satisfied that the value of European life in this city could be brought very near to a par with that of more favoured climates.

It is these sweeping epidemics, even more than such diseases as are endemial, that swell out our bills of mortality, and that did so in former times especially, to such a frightful extent.

From what is here said, it must not be supposed that we are without help in the case of epidemics, or that our means of prevention apply only to such diseases as are peculiar to the climate; far otherwise is the fact: even epidemics are greatly modified by states of locality; and, as stated in another place, they are found to fasten with *peculiar severity, and remain*

longest, in such localities as are neglected :—in truth, endemics are very often the parent stock upon which epidemics are engrafted. Why is it we have not now, as formerly, those terrible epidemic fevers which swept off “800 Europeans, and 50,000 blacks” ? The cause is obvious enough to the most ordinary understanding: it is the same that has banished the former endemic intermittents of our City, to which we owe our present comparative exemption :—in short, when want and misery are removed, epidemics will have lost their chief power. The impure state of London during the 73 years from 1592 to 1666 was such, that the average death in each year, from the plagues, amounted to about a fourth part of the whole population; or what would, for the present population, amount to the fearful sum of 375,000 persons per annum! Owing to the modern improvements of London again, only one person died of cholera out of 250 inhabitants, or little more than six thousand in the worst year of cholera, the severest plague which has visited London since 1666.

In the absence of any formal record of our epidemics, I shall here insert, in the order of dates, a brief sketch of such as have occurred within my personal recollection.

CHOLERA.

Historical and
Miscellaneous No-
tices of the Asiatic
Cholera.

It is impossible to say any thing satisfactory on a disease, which would seem every year to become a greater source of difficulty to medicine. In the stage of collapse it has too often proved to Physicians what Traumatic Tetanus is to Surgeons, a disease, according to Hennen, which once fully formed, tended more to shew him what he could not trust to, than what he could place the smallest reliance on. My notices of Cholera then, will comprise merely such desultory observations respecting the local history of the disease and its treatment, as my personal experience in various parts of India and Ava enables me to offer; for, as to its remote cause, little or nothing is known :—like the pestilences of the fifth century before the Christian Æra,* it has in a manner travelled up and down over the habitable world; returning often to the same place after a certain interval; pausing sometimes in its fury

* Described in Dr. Arnold's History of Rome.

and appearing to sleep, but again breaking out on some point or other within its range, till, at the end of its appointed period, it disappears—I fear we cannot yet say—altogether. The first impression of the morbid causes would appear to be made on the system of organic nerves and their functions; for almost immediately, we have the vital actions of circulation, respiration, the generation of heat, and secretion, conspicuously disordered, and that probably, through some unknown changes the electric condition of the atmosphere.

Impression of the morbid cause on the organic nerves.

When first I entered on military practice, in 1818, the disease had some marked points of difference in the symptoms and in the means used to combat them, from those of more recent visitations of the epidemic. Formerly, simple venous congestion (of the most aggravated nature to be sure) seemed to form the more essential feature in the disease; and the spasm, which was of a chlonic character, could be referred to the oppression of the nervous energy following on concentrated cerebral and spinal congestion. It is on the supposition of the condition stated forming the leading feature of the disease in former times, and of the organic nervous function being less involved, that I would account for the efficacy of blood-letting then; for latterly, there seems a depression of the vital actions, which has greatly embarrassed our treatment, and deprived us altogether of the former great resource, blood-letting.

The author's first experience in the disease.

The first man I treated was a stout young Soldier of Her Majesty's 59th Regt. in Fort William. There was incessant vomiting and purging, with spasms so violent that it required four men to hold him in his cot. I bled him profusely, and in a few hours he recovered. What a simple matter did the treatment of Cholera then appear to my sanguine and youthful inexperience, and in how few years had I to think and act differently! The efficacy of blood-letting, even on the approach of collapse, was great and remarkable, and we practised it as if instructed by the great Physician of congestive disease—Dr. Robert Jackson. Another case in point, out of many that I could relate, occurred to me in 1822, in the Governor General's Body Guard:—on visiting my Hospital in the morning, the European Farrier Major was reported to be dying of Cholera:—I found that, during the night, he had been drained of all the fluid portion of his blood:—his appearance was surprisingly altered; his respiration was oppressed, the countenance sunk and

Blood-letting formerly very efficacious.

livid, the circulation flagging in the extremities. I opened a vein in each arm; but it was long ere I could obtain anything but a trickling of dark treacly matter: at length the blood flowed, and by degrees its darkness was exchanged for more of the hue of nature.

The Farrier was not of robust habit, but I bled him largely; when he, whom but a moment before I thought a dying man, stood up, and exclaimed, "*Sir, you have made a new man of me.*" He is still alive and well.

Change in the nature of the disease of late years.

How surprising to find that a few years more, and the same treatment would, within the same time, have proved as certainly fatal. To appearance, we have the same symptoms, in the same order; but these signs are fallacious; and the treatment which proved most successful if used early in the disease, during 1818-22, no man will now dare to put in practice:—why is this? Is it that in the more recent visitations of the epidemic, we have, from its very onset, a greater depression of the organic nervous energy than was observable during its earlier history: I think so, and that such depression constitutes the chief, if not the entire difference now-a-days.

Epidemic visitation of 1827.

Mr. Twining, in his article on Cholera, would seem to think that virulence on the first visitation is exclusively characteristic of this disease, whereas in this particular, it differs not from the character of all acute epidemics; and it was not the first brush that caused the mortality he speaks of in 1827, so much as the utter neglect of every precautionary measure usual on landing fresh troops in all inter-tropical countries. After what I have said at the commencement of this note, I shall not be suspected of boasting our success; but the circumstances oblige me to say that a neglect of all internal discipline, and not the violence of epidemic seizure, caused the excessive mortality of the young soldiers spoken of. The consequences were what might be expected from their characteristic heedlessness and ignorance: they frequently lay on the cold flags violently ill during the whole night, and were sent only to die in Hospital in the morning. These facts are personally known to me as the colleague of Mr. Twining on the occasion he refers to. No wonder that Sir John Moore should attach so much importance to "interior discipline and economy in regiments." Here we had an example of the effects of want of both; and wretched must ever be the condition of the troops where such is the case: not all the skill or numbers of the medical profession can

compensate for the absence of those rules of discipline which lead to rigorous preventive measures, and the speedy detection and treatment of disease.

Since the first outbreak of the epidemic in Bengal, it has spread westward, and over the nations of Europe and of America; yet, on a careful review of its history in all these countries, it does not appear that any additions whatever have been made, either to the Indian pathology or treatment of Cholera. I do not make this assertion in disparagement; far from it, but to shew the great difficulties of these questions.

Pathology.

Of the pathological state which actually constitutes the disease we shall probably never know much.

There is, in rapidly fatal cases, a great exhaustion of the power of generating heat; the air expired from the lungs becomes progressively colder; and so do all parts of the body, until they are merged in that of death; but these and the other destroying states already mentioned leave no traces behind.

In protracted cases again, congestions, and even inflammations of various organs are frequently discernible after death; but these form only consecutive, or superadded events in the morbid chain, like the final oppression of the cerebral system of nerves, which occasionally become obtunded through the stagnation of the circulation, and consequent want of red blood. In the last stage of acute seizures, however, it is surprising how some retain their mental integrity to within a few minutes of dissolution, while others are for hours narcotized by the disease.

Here, as in all epidemics, it may be laid down as certain, that whatever tends to disturb the balance of health may lead to an attack of the prevailing disease. Hence, it is to the observance of preventive rules that communities will always owe most.

Prevention and treatment.

The avoidance of day and night exposure, and, in short, all those rules applicable to ordinary prevention should here be rigorously attended to. The diet at such seasons should be nutritious, dry, and moderately stimulant, and all food should be easy of digestion. I

Rules to be attended to in diet and medicine.

have known several instances wherein the use of the shell and sable fishes of this river have led to an attack of Cholera, apparently through their difficulty of being well digested. Cold acescent fruits and vegetables ought likewise to be avoided. An empty state of the vessels, hunger, thirst, fatigue and debility, give rise to activity in the process of absorption ; and this would appear to explain how persons enfeebled by debauchery and loss of natural rest are more liable to be affected by diseases, whether epidemic or contagious. It is thus also that fear would seem to act. Another caution applies to the use of purgatives, and especially those of a cold saline nature :—Many cases have occurred within my recollection of the disease being thus insinuated and mistaken for the action of salts, until the speedy approach of the stage of collapse made the real nature of the case but too apparent. When purgatives must be used in such seasons, they should be of a warm aromatic nature, and it ought to be a fixed rule never to exhibit them over night—that being the ordinary time of invasion. It must not be forgotten too, that fevers, and bowel complaints especially, are very apt, under the epidemic influence, to merge in Cholera.

Influence of the mind—of high hope and its opposite, depression.

If the most undaunted moral resolution could avail in warding off such an enemy, I have seen instances wherein it was not wanting, and in which it appeared, through the absence of other remedial means at the time, to have exerted a wonderfully tonic power :—they were the cases of officers on the march from Prome to Ava ; and certainly, the tonic power of *hope* and a high moral courage never appeared to me so influential in the restoration of health as in the cases alluded to. But, in general, what can moral and physical energy effect against such fearful odds as are here brought to bear on prostrate humanity ! I know no disease on the other hand, in which the influence of the depressing passions is so fatal as in Cholera. Soon after my arrival in Bengal, I remember the death of a staff officer in Fort William, of pure panic. He had mild and obscure symptoms of Cholera, it is certain ; but I had it from the first practitioner of the day that, but for the influence of terror, there was nothing in his case to occasion the least anxiety for his fate. The fear of Cholera, and not the disease, killed him.

Confidence, as I have said, is both a means of prevention and cure. At the time here spoken of, 1818, I had charge of a large detachment

of Her Majesty's 67th Regiment, in the Fort, consisting of invalids, women and children—a class of persons but ill calculated to resist the violence of attack. Cholera raked the barracks occupied by these unfortunate people, and, for about a fortnight, I was all night administering to the sick and removing them to hospital. During that time I was carried out thrice, quite faint, and with the prevailing symptoms strongly marked; yet it so happened that the notion of being seized never once entered my mind; and thus, I believe, I escaped on each occasion, even without the aid of medicine. I may mention as a very remarkable instance of the influence of hope in repelling disease, that during the epidemic yellow fever at Up-Park Camp, Jamaica, among the 91st Regiment in 1822, when the order was issued for their removal to another station, the fever ceased, and *though the corps was unexpectedly detained for three or four days after the order was issued, not one case was admitted into hospital in the whole course of that period.*

Details of medical management can have no place in a work of this description; but this much must be evident, viz. that in a disease, acute beyond all others, treatment to be successful ought to be applied at the onset: life may then be saved in a very large proportion; but, if unhappily the first few hours are lost, it too often follows that unavailing regrets take the place of hope, and that the best efforts of the physician are set at nought. Treatment.

I have stated that the plan by copious blood-letting, followed by full doses of calomel and opium, was that found most successful on my arrival in the country, in resisting the onset of the disease; and when re-action took place, topical bleeding, was used to relieve local affections, and repeated mercurial purgatives completed the cure.

When, however, no such happy condition was present, but the opposite one of collapse of all the vital powers occurred, we were then, as now, very much wanting in available resource, notwithstanding the free use of every mode of stimulation.

It is very true that we occasionally see surprising instances of recovery from apparently hopeless sinking of the nervous and vascular

Recoveries from the stage of collapse uncertain and infrequent.

energies ; but candour will oblige all men to avow that, though such cases are saved by the assiduous exhibition of stimuli, yet it is equally true that the majority of them die now, as they did in our earlier experience ; and I repeat that our European and Transatlantic brethren have not helped us through any of our difficulties in the management of this stage of the disease.

Calomel with large doses of opium at the onset of the disease.

A full dose of calomel with opium will save life in a large majority of cases if used early ;—and this fact ought to prove a great encouragement to all who will think on the subject as it deserves.

Treatment first adopted in India, but little changed since.

It will be seen then, that excepting the blood-letting, which we have been obliged latterly to abandon as deadly, our practice remains very much the same it was at the commencement of the disease in 1817 ;—that is, the stimulating plan of treatment, first adopted here, seems to have now become the general one in all countries. The natives, who do not bear the depletory plans, have always appeared to me more susceptible of cure in the stage of collapse than Europeans, probably from being comparatively unused to stimuli. In the army, and at the Native Hospital, I have seen persons in whom nothing seemed to live but the respiratory apparatus, and yet, under the unceasing exhibition of ammonia—*always a safe stimulus*—they recovered in a proportion that often excited my surprise. To vivify the blood and arouse the power of generating heat, I made an European patient inhale pure oxygen. The effect for half an hour was extraordinarily promising ; but, from want of proper apparatus, I was unable to continue the experiment. This was in 1827, in the Presidency General Hospital ; and I find the experiment has not been more successful in other countries.

Comparative Statistics of Cholera.

In the Calcutta General Hospital, out of 803 Europeans treated in twelve years, there died 372 ; and in the Madras Presidency, taking a mean of four years, there died of Europeans, 23 per cent. and 45 per cent. of the native troops.

In England, 38.5 of the patients died ; in Prussia 58.6 ; in France 100, 1000 persons died of Cholera, out of a population of 32,560,934.

In England, half the deaths occurred in the first 24 hours, shewing the urgent necessity of early treatment in this disease; for, what is to be done must be on the instant. In the epidemic visitation of 1838 in Calcutta, the deaths that I witnessed took place from two to twelve hours from my first seeing the sufferers. Here there was time—every thing in Cholera—irrevocably lost.

It is worthy of notice, as marking the influence of the epidemic condition on the lower animals, that two horses died in March 1838 of vomiting—a most unusual symptom with this animal; and a third belonging to Mr. W. H. Frith vomited large quantities of serous fluid, sweating profusely at the same time. This was communicated to me by note from Mr. Frith.

To conclude;—I subjoin two Tables exhibiting the influence of season on mortality from Cholera:—

Table of Deaths by Cholera amongst the Native inhabitants of Calcutta for 7 Years, from 1832 to 1838 inclusive.

	Hindoos.	Mussulmans.	Total.
In 7 Januarys,	572	124	696
„ 7 Februarys,	620	196	816
„ 7 Marchs,	1873	439	2312
„ 7 Aprils,	2707	482	3189
„ 7 Mays,	2170	464	2634
„ 7 Junes,	615	217	832
„ 7 Julys,	914	133	1047
„ 7 Augusts,	806	146	952
„ 7 Septembers,	785	121	906
„ 7 Octobers,	1030	198	1228
„ 7 Novembers,	1687	230	1917
„ 7 Decembers,	1425	161	1586
Total	15204	2911	18115

The above Table, which I have obtained from Mr. McCann, the Deputy Superintendent of Police, is interesting on several accounts, but especially as shewing that, while the proportion between the Hindoo and

Mahomedan population is but as $2\frac{1}{2}$ to 1, yet the ratio of mortality amongst the Hindoos is, to the Mahomedans, as $5\frac{1}{3}$ to 1.

The following Table exhibits the totals of Admissions and Deaths from Cholera in each month during 12 years within the Presidency General Hospital :

Range of Observation.	Total Admissions.	Total Deaths.
In 12 Januarys,	28	11
„ 12 Februarys,	8	5
„ 12 Marchs,	56	34
„ 12 Aprils,	86	57
„ 12 Mays,	268	125
„ 12 Junes,	138	38
„ 12 Julys,	32	6
„ 12 Augusts,	37	18
„ 12 Septembers,	10	5
„ 12 Octobers,	49	27
„ 12 Novembers,	59	32
„ 12 Decembers,	32	14
Grand Total,	803	372

EPIDEMIC FEVER OF 1824.

In 1824 there prevailed universally in Calcutta during June, July and August, a fever that “ spared none of either sex or of any age: The new-born infant, the aged, the weak, and the robust ;—the rich and the poor ; those reduced by disease to the lowest state of existence, as well as those under the influence of medicine and unusual discharges from the system—all were alike the objects of its attack : for no condition nor circumstances of any sort seemed to have availed in preventing it.”*

This fever prevailed at Calcutta, Rangoon and Baroda about the same time ; and in the former city it was estimated that not five per cent. of the

* From the Calcutta Transactions, which are here freely used.

European population escaped it. The causes were here, as in the epidemics of all other times and places, but obscurely indicated by states of the weather ; and those of the profession, who cannot perceive the complex nature of the phenomena which regulate climate, or who would take refuge in a favourite asylum ignorantia, and view climate as nothing more than the varying degrees of the thermometer, must have been much disappointed to find that, the "grand average" of temperature during the four months of sickness in 1824, only differed from that of the year preceding by, "not half a degree"!! The epidemic commenced in the end of May, and by the last week in July, scarcely an inhabitant, European or native, had escaped ; yet there was no evidence in any instance that disease had been communicated by contagion.

Causes.

The fever was ushered in suddenly, by slight sense of cold in the back and lower extremities, accompanied by intense headache, flushed face, and watering of the eyes, as in measles. The pulse then became frequent, but neither full nor hard, except in the very robust. If not relieved by treatment, this state continued with increasing pain of the head, back and lower extremities for twenty-four hours, when, on the appearance of a general efflorescence, the symptoms abated, leaving however, a degree of debility, altogether disproportionate to the nature and duration of the previous fever, and a pain of the thighs, legs, feet and toes, so distressing as to deprive many of the power of walking for a whole fortnight of tedious convalescence. Relapses were very common ; but even with these, and the universal prevalence of the disease for two months or more, very few deaths occurred. It was, in short, a disease of unusual mildness in so far as it implicated life, though productive of extraordinary suffering, as I well remember in my own person.

Symptoms and progress of the fever.

The severity of the headache, pain in the back and limbs, together with the other febrile symptoms above stated, seemed to indicate the propriety of general blood-letting ; but this was found to be productive of excessive depression of the vital powers, and a consequently tedious convalescence. After some little experience, leeches to the head, calomel with antimony, followed by smart and repeated purgatives, became the settled treatment ; and this plan, together with the occasional use of the

Treatment.

warm bath, seldom failed in effecting a cure in three or four days. I remember hearing that but two deaths occurred in the European portion of the community from this epidemic.

EPIDEMIC BRONCHITIS OF INFANTS IN 1828.

This was likewise a disease of almost universal prevalence in the months of June, July and August 1828; and unlike the last mentioned epidemic, it proved extensively fatal. It was generally preceded by symptoms of common cold, which after a day or two terminated in acute fever, with oppressed breathing; pallor of the countenance and occasional drowsiness. The danger was in proportion to the tender age of the sufferers—those under 12 months affording the greatest number of deaths.

The disease prevailed at many stations in lower Bengal. Examination after death shewed a congested state of the lungs, with serous effusion into the cells, and considerable inflammation of the bronchial ramifications, which contained purulent secretion.

The treatment consisted in the early application of leeches—the exhibition of calomel with antimonial powder, followed by purgatives and warm baths—and in the severe cases, sinapisms and blistering to the chest, after the free and repeated use of the above means.

EPIDEMIC GASTRIC REMITTENT FEVER OF 1833.

Remarkable epidemic of 1833.

This was a remarkable fever, both from the attendant danger, and the numbers that were attacked by it. It was remarkable also as illustrating the effects of palpable physical agents on climate, and consequently on public health; and the events of that year ought to go far to impress on the Government and the inhabitants the value of local improvements. The epidemic raged among the natives to the south and east of Calcutta from the middle of June to the end of October, by which time it is said, and I believe with truth, that more than half of them died. Early in July it began to seize the European inhabitants of Calcutta, but those of Garden Reach, from its nearer approach to the sites of inundation, suffered in greater numbers and with more severity. Khidderpore, Allipore and Bhowaneepore were the quarters of the native suburbs most severely

visited. The character of the fever was that of pure gastric remittent, complicated occasionally with determinations to the head and liver. There was always an oppression and intolerance of pressure of the epigastric region, a loaded white tongue, and tendency to collapse on the decline of the daily paroxysm.

In the imperfect sketches here offered of our recent epidemics, I have not touched on the causes of any of them, and I have been led to this omission from a recollection of the unprofitable fatigue that a narrative of seasons, tables of the winds, and the degrees of the thermometer has always occasioned to myself; for in truth, this is the sum total of what many persons consider essential to form climate. Here we may with much advantage abandon such airy speculations; for the irruption of the sea, described at page 49, was the sole cause; and I must, for once, do justice to the common sense of the people,—a moral entity too often doubted by medical philosophers:—the people—the Bengalees, actually anticipated the doctors in their discovery of the cause of the existing pestilence; for, to a man, they, from the first, ascribed it to the right cause, while to the last, there were amongst us some sturdy philosophers who held fast by the thermometer, barometer, and table of the winds!

Its cause.

The morbid appearances on dissection bore exact proportion to the violence and complication of disease during life; but the principal seat of disease was the stomach, which exhibited in one case, treated by a friend of mine, marks of the most acute inflammation. The case terminated fatally in less than twenty-four hours; and though the mucous membrane was found of the colour of a new brick, with softening of the entire substance of the organ, there was no vomiting, nor indeed acute suffering of any kind. The powers of life lay prostrate under the concentration of disease in the stomach.

Appearances on dissection.

In some cases there were found also serous effusions between the cerebral tunics, and varied degrees of inflammation in the mucous intestinal surface.

When the patient was of sufficient vigour, and seen early, blood-letting, general and local, was found necessary: then full doses of calomel

Treatment.

and antimony, followed by purgatives, apportioned in quantity and nature to the condition of the stomach ; for when that organ was severely implicated, the very milder aperients were preferred.

The safety and efficacy of quinine in this form of fever supports in a remarkable manner the etiology and practical correctness of what I shall have presently to state when treating of its use in the common Bengal remittent.

Here there was in every case, conclusive sign of inflammation or acute congestion of the stomach itself—unmixed gastric remittent as evidenced by all the post-mortem examinations ; yet quinine in the latter stage was quite as necessary to the cure, as the bleeding was in the first ;—in fact, neither would do without the other, except in the cases of old Indians, or very enfeebled subjects, in whom depletion could not be used in any form, and for whose cure mercurial purgatives, sudorifics, and quinine during the remission, were found sufficient.

But on this subject, there existed differences of opinion, some advocating exclusive plans, and laying down unqualified rules for treatment. Two examples will suffice.

Mr. Corbyn.

“ I found that blood-letting or topical bleeding were both nugatory, superfluous and injurious.” After some details respecting the use of calomel with colocynth, followed by “ seven to eight grains of sulphate of quinine every four hours,” Mr. C. concludes—“ when such was the treatment the result was that in upwards of two hundred patients, consisting of European families, not one of my patients died.”

Mr. Twining.

“ Those cases of fever which came under treatment at an early period of the disease, and for which V. S. was promptly and freely used, recovered quickly.

In several instances of patients admitted on the eighth and ninth day, and in one instance so late as the fifteenth day of the fever, the lancet was used with most decided benefit.

I would only remark on this lamentable discrepancy in medical opinion and practice, that it is unhappily but still too characteristic of medicine every where. Here we have two persons, claiming equal attention on the score of opportunity for observation—practising at the same place, at the same time, and treating the same disease ; yet do they arrive at principles and practice, in the all-important subject of treatment, diametrically opposed to each other ; and, still more wonderful to all but medical men, each speaks with the most perfect confidence, and lays claim to unlimited success !

Discrepancies in opinion and practice.

The truth would seem to be, in this as in other questions, that we are most in the wrong when we think one effect is always produced by one cause. Exclusiveness always leads to this, both in theory or practice ; but the most extended observation teaches us that it is impossible to lay down fixed rules for the management of every diversity of habit, or of the ever varying types of fever, whether endemic or epidemic.

THE CHOLERIC FEVER OF 1834.

1834 had its epidemic fever. Its character was peculiar, and different from any I have yet seen. It arose in May, and continued through that and the following month, disappearing only on the full establishment of the rainy season. Its symptoms were, heat and dryness of skin, with soft frequent pulse, and clammy white tongue : there was also present in most persons, a slight diarrhea.

Choleric fever of 1834.

So mild a disease in its features I have seldom seen ; yet, it was most dangerous to treat : the irritable state of the bowels, which formed a prominent symptom of the epidemic, was aggravated into fatal cholera whenever purgatives of a saline or drastic nature were exhibited ; and I have heard that death occurred in several cases where such means had been used *overnight* ; indeed, one such case came under my personal observation. It was that of a gentleman, the patient of a professional friend, into whose house I was called on passing at 6 A. M. : his countenance and voice at once testified to his approaching fate. He had taken a drachm of compound jalap powder at 9 o'clock of the night previously,

Its great danger if incautiously managed.

and the result was, a continued and copious discharge of the conjee-like secretion from the bowels, terminating by morning in fatal collapse. Others fell victims to the hasty exhibition of purgatives; in short, this was an epidemic that ought for ever to impress on the minds of those who treated it, the incomparable lesson of Sydenham:—"Under so much darkness and ignorance, therefore, my chief care, as soon as any new fever arises, is to wait a little, and proceed very slowly especially in the use of powerful remedies; in the mean time carefully observing its nature and procedure, by what means the patient was either relieved or injured; so as soon to embrace the one, and reject the other." His other caution as to the "more spiritual or subtile nature of epidemics, at their first appearance, than in their advanced state," ought also to be held in recollection in the management of this class of diseases.

A mercantile gentleman of robust habit, whom I treated with a moderate dose of castor oil at 8 in the morning, had 15 stools by 11 in the forenoon; and the latter of these were of a character to demand the instant use of opium. The cure was simple and easy, when once the character of the epidemic became known, and was effected by a few doses of calomel and antimony, overnight, sometimes conjoined with half a grain of opium, and followed by the mildest aperients—administered during the early part of the day; such as castor oil, or rhubarb with magnesia:—the warm bath was both serviceable and grateful.

Conclusion.

To conclude:—It will be seen, that of the epidemics here noticed—not to speak of Cholera, each and all prevailed in the hot months and commencement of the rains, and thus corresponded in their period of prevalence with all the known European epidemics. According to Andral, of fifty epidemics described in Europe, thirty-six occurred in summer, twelve in autumn, one in winter and one in spring.

INTERMITTENT FEVER.

“The worst of all to strangers is the air.”—OLD WRITER ON CALCUTTA.

While we find dysentery, scurvy, ague, and several other diseases yielding entirely to the improvements of modern London, it will be satisfactory to know that, through the hitherto gradual and almost imperceptible improvements of our ill-chosen locality, intermittent fever has become a mild and infrequent form of disease in modern Calcutta.

Surprising efficacy of preventive measures.

I do not know that I could mention any other fact so strongly illustrative of the beneficial effects resulting from local improvements as this particular one, or that offers to the public so strong an inducement to proceed in the same career that has already secured so great an exemption from disease ;* for who can look back without horror to the agues of this city,—“the obstinate putrid intermitting fevers,” described by the older writers, with their cold stage of “*twelve hours*,” and their long list of sequelæ, in the form of tumid spleen, liver, diarrhœa, dropsy, &c. &c. Dr. Bogue, who practised here about 1757, speaks of this form of fever “as the most fatal” of that time. It began with the rainy season, and continued with excessive violence during the whole of it, and “for some time after.” The paroxysm recurred daily, so that “the patients had not above four or five hours respite from it.”

Former malignancy of the intermittents of Calcutta.

Thus, he says, “we had sick at the same time, in this place, one half of the men in the squadron under the command of the Admirals Watson and Pococke.” The fevers here mentioned would seem to have possessed the malignant character of the *febres intermittentes algidæ*, described by Torti, in which the power of generating heat was so

* In England, the malignant agues of the olden times seem to have entirely given way to measures of local improvement ; and the most unhealthy seasons in modern times are actually productive of less disease than the most healthy seasons were a hundred years ago—so much for the value of preventive measures.

Infrequency of
this form of fever
now-a-days.

impaired, that the patient died in the cold stage, at the end of two or three accessions. I have said that ague is an "infrequent" disease in Calcutta, and strangers will read with surprise that, amongst the better classes of society, I do not think I see above three or four cases of this disease in a year, and these occur chiefly amongst parties who go into the neighbouring country on hog-hunting, or other excursions. While writing this note, I am attending a mercantile gentleman, who contracted his illness in the Sunderbuns, where he was exposed during the Doorgah-Poojah holidays, (15th October.) On his return, about the 25th of the month, he experienced a good deal of malaise, and took medicine from his apothecary, with partial relief. Towards the end of October, the native servants who accompanied him fell ill of ague, one after another; and on the 20th of November, the master was seized with a violent paroxysm of the same disease.

Case, and circumstances attending it.

One circumstance is here worthy of remark, namely, the superior power of resistance to the morbid influence exhibited by the European over Natives, as shewn by the difference in the period of incubation of fever in each; for, in the latter, disease commenced on the tenth and fifteenth day from the date of exposure, while in the European, it took more than thirty days to declare itself openly. It is proper to mention that the European was both temperate in habits and inured to the climate. Both the master and servants quitted Calcutta in good health, and neither had been afflicted with ague before going into the Sunderbuns.

There is reason to suppose that in the climate of England, intermittent fever can alone be produced by exposure to marsh exhalations, and a very remarkable instance is given in a recent very able memoir by Dr. John Forbes, on the Medical Topography of Land's End in Cornwall, wherein it is shewn "that neither impure air simply, nor wet, nor the alternations of cold and heat, nor all these combined, can give rise to fevers of this type." I believe this to be true of climates generally, in respect to a *first seizure*; but, *after that*, and when a disposition to relapse is once established, such a combination as Dr. Forbes describes will certainly in most climates (and ours is one of them), prove an efficiently existing cause; and in support of this view I will quote a passage, important to all Military Surgeons, from Sir James Macgrigor.

“After the effluvia from marshes or the exhalations raised by a powerful sun acting on a humid or luxuriant soil, we found that in those who were convalescent or lately recovered from agues, the causes next in power to reproduce the disease, were exposure to a shower of rain or wetting the feet, exposure to the direct solar rays, or to cold, with intemperance and irregularity, or great fatigue. Many other causes would excite the disease in the predisposed, but these never failed to do it. In marching troops in a country where this disease is endemic, particularly if they have been lately discharged from hospitals, the above causes should by all means be avoided, since the whole of our experience in the Peninsula shewed, that relapsed cases seldom or never got completely well, in the country in which they were contracted, under all the circumstances of a soldier's life. In making calculations of efficient force, this description of men could not be depended on for operations long continued in the field.”

Important observation of Sir Jas McGregor.

The father of British Military Medicine, Sir John Pringle, writes to much the same effect; for he says that, “after the frosts in November the intermittents never appeared, unless upon catching cold, and even then, such only as had been ill of them in autumn were seized in that manner.” The important observation is continually repeated also by the same great author, as to the excessive liability to attack of those who occupied the lower floors of houses and barracks; and this happened all over Flanders.

The same by Sir John Pringle.

TREATMENT.

With exception to the cases of some delicate females, I do not recollect any that resisted the ordinary management by general or local blood-letting, according to the severity of complication; purgatives and sudorifics, with quinine during the intermissions.

Treatment.

I do not here mean bleeding in the *cold* stage, as recommended by Dr. Mackintosh of Edinburgh, a practice of which my personal experience will not allow me to speak in any favourable terms; neither will

Opinions and practice in respect to V. S. in the cold stage.

a reference to authority prove more encouraging, as the following comparative quotations shew :

Dr. Mackintosh.

“ The practice prevents debility in a direct manner by saving the vital fluid.”

Dr. Mackintosh.

“ I believe bleeding in the cold stage, conjoined with the occasional use of sulphate of quinine and laxatives to be as certain a mode of treating intermittents as any other set of medicines can be said to be certain in the treatment of any other class of diseases.”

Dr. Mackintosh.

“ The practice may be adopted in the first stage of all fevers.”

Dr. Elliotson.

“ It is not at all right to take away blood, and thus impare the power of the patient,” when, as he adds, he “ never saw a case which he could not cure by the sulphate of quinine.”

Dr. Stokes.

“ Bled in the cold stage and found it ‘ useless and injurious, and after all, was compelled to give quinine sooner or later.’”

Dr. Elliotson.

“ The quinine which cures it best, interferes with no other measures.”

The celebrated Dr. Gregory.

“ Blood-letting, which at another period of the disease might have been proper, if employed in the *first stage* never fails to be attended with the most dangerous consequences; or it is, to use the words of Celsus, ‘ hominem jugulare.’”

Dr. Copeland.

“ In a case where I directed blood-letting before reaction supervened, the loss of three or four ounces caused profound and prolonged syncope, yet within four hours, when reaction had come on, fifty ounces were taken before any effect was produced upon the pulse ; and before the sun of the same day had gone down, forty more were abstracted at one time, in all ninety-four ounces, within twelve hours.”

Dr. Denmark, Physician to the Fleet, one of the most able advocates for early and decisive bleeding, speaking of the Mediterranean fever, as it prevailed amongst the robust men of the ship's companies says—“ In these instances, venesection was never had recourse to, till the vascular system had fairly emerged from the depressed state incident to that stage of the fever, and reaction had clearly manifested itself by the returning glow of the skin, the filling of the previously shrunk and dejected features, and the firm though frequently oppressed beat of the pulse.

Former experience not only taught me, that an earlier abstraction of blood was never borne to

an extent productive of ultimate benefit ; but on the contrary, seemed to be injurious, by tending to protract the first stage of the paroxysm.

I am afraid that due regard has not been paid to this circumstance, and that, in the recent rage for phlebotomy it has been too much overlooked."

Dr. Mackintosh.

"Bark has been long in use, and although I never denied that it had virtues, yet when given in substance in the large doses which are admitted to be necessary, I have so frequently seen it do mischief that the question has often suggested itself to me, whether it was not more injurious than beneficial? It seems to be injurious in many cases by overloading the stomach and bowels with indigestible ligneous fibre, and I have seen it cause serious intestinal irritation, as displayed by gripping pains in the bowels, diarrhoea and painful tenesmus. On examining the stools in these cases they seemed chiefly to consist of bark, with a considerable quantity of mucus occasionally tinged with a little blood.

The preparation of bark which is known by name of the sulphate

Dr. Stokes.

"Having now described the effects of the practice on the paroxysm, and on the local symptoms, I must next mention some very untoward circumstances which appeared to follow the bleeding in the cold stage—these were *the occurrence of new local inflammatory symptoms, and the supervention of a low irritative fever.*"

Then follows a list of cases the very opposite as to result from Dr. Mackintosh's. "From the examination of these cases, I apprehend that an impression will be received against the indiscriminate or even frequent use of bleeding in the cold stage of ague. It may be remarked that in the great majority quinine had to be administered before the disease was eradicated; that many of them

Dr. Mackintosh.

of quinine is the greatest improvement in modern pharmacy, and the knowledge of its beneficial effects in simple intermittents affords sufficient proof of the virtues of the substance from which it is extracted, yet this remedy all-powerful as it is, is useless in the cold stage, and must also fail in cases complicated with organic disease."*** My youthful readers may rest assured, that the same observations are generally applicable to the sulphate quinine; yet they will meet probably with many practitioners, who will assure them that they have never seen a case in which bark, exhibited in substance, or in any other form, has failed in their hands. When they hear such statements, they may be satisfied that such practitioners never met with a severe case, or that there is some subterfuge.

Some medical men it is but charity to suppose are in the habit of deceiving themselves, &c.

In the instances which fell under my own observation, and to which I have already alluded, fever and violent cerebral symptoms succeeded, and in *two* or *three* instances, local inflammations."

Dr. Stokes.

had an extremely slow and dangerous convalescence; that in several instances the disease, so far from being relieved, appeared exasperated by the practice; that local inflammatory affections occurred several times after the operation; and lastly, that the bleeding appears to have a tendency to convert intermittent into continued fever. In one case that of Casely, death from pneumonia and softening of the brain occurred. In none of my cases did any bad effects from sinking of the powers of life follow the practice immediately. But I am informed that in the practice of a highly respectable individual, there occurred two cases in which the patients did not recover from the collapse produced by bleeding in the cold stage. These facts should make us very cautious how we interfere with nature by means of the lancet in simple intermittent, where we have so certain, and as far as I have seen, so infallible a remedy as the sulphate of quinine. I do not deny that cases may often occur where venesection may be proper, such as intermittent complicated with severe internal inflammation; but shall only remark, as these cases have not come under my

own immediate observation, that to offer my opinion on a purely practical point connected with them would be wholly useless.

I may mention that I have been informed by my friends Drs. Townsend and Law of this city, that they have given the practice a trial, and have found it to fail in the majority of cases."

Mr. Twining.

"In the early stages of intermittent fever, or to speak with more precision, within *two or three weeks* of their commencement, in persons of robust habit, there is very often disorder of the functions and secretions of the digestive organs, and particularly of the stomach, co-existent with congestion of the brain, and attended in some cases with *tolerably* distinct evidence of *inflammatory* condition either in the cerebral membranes *or* in the brain itself."*

* The italics in the two last quotations are mine, and I have added them to shew the remarkable vagueness and want of precision in both writers, when speaking of *inflammation*, whether as affording an explanation of the *physiology* of this disease, as some writers would have it, or as applicable to mere complication.

It is to the former notion that Dr. Johnson's observations apply.

Dr. James Johnson.

"What kind of inflammation must that be which explodes, as it were, the moment the clock strikes a particular hour, and vanishes the moment the clock strikes another hour, and this for days and weeks together? What kind of inflammation is that which, every second day, terminates in profuse *perspiration* from head to foot, and yet is renewed after an interval of forty-eight hours with the symptoms as before, and so on? Do we see real and unequivocal *inflammations* pursue this course? Never. Are the causes of these *intermittent* phlegmasiæ (if such an expression be not a solecism in medical language) of a periodical or intermittent nature? No.

They do not accommodate themselves to any particular theory?"

Persons accustomed to sift evidence may well stare at declarations such as are here given, and wonder how that which was death in Dublin became a cure in Edinburgh ; yet such do we too frequently find medical testimony, and such it has been for two thousand years and upwards.

When general blood-letting is had recourse to in the treatment of intermittent fever, whether simple or complicated, it should, as in the case of all other fevers, be performed at the very onset of the stage of reaction. Treatment warranted by experience.

Practised at this period, it will lessen arterial action, relieve venous congestion, usher in the sweating stage, and thereby pave the way for quinine, purgatives and sudorifics, on which the prevention of recurrence must depend.

In feeble habits, or with persons who have resided long in India local depletion, by leeches, will answer every purpose.

CURSORY REMARKS ON THE REMITTENT FEVERS OF
EUROPEANS, AS CONNECTED WITH THE TOPOGRA-
PHY, AND WITH THEIR PREVALENT TREATMENT.

“The result of the whole is : wherever the greatest causes of moisture and putrefaction in the air exist, there also will be seen the greatest number and the worst kinds of the remitting and intermitting fevers.”—*Observations on the Diseases of the Army.*—By SIR JOHN PRINGLE.

“I have always considered the number of insects and reptiles, with which a place abounds, as more indicative of its insalubrity, than almost any other circumstance.”—DR. JAMES COPELAND.

A lengthened detail of disease not compatible with this memoir.

A memoir like the present is not consistent with any lengthened detail of the nature, causes and treatment of disease ; but there are certain prominent features in tropical fever and dysentery which, with reference to the great importance of the subject, require to be touched upon.

Great difference between the former fevers of Calcutta and those of later times.

In noticing the more ordinary fevers of Calcutta, whether endemic or epidemic, the first observations that force themselves are, their great differences as to intensity, in the present, as compared to former times, and secondly, the causes of this difference.

The earliest account we have of the state of public health, and of the period of greatest mortality, in Calcutta, is that already quoted from Captain Hamilton, wherein he mentions 460 burials out of 1200 British inhabitants, from August till the ensuing January : this was between the years 1688-1723.

Terrible epidemics of former times.

In Calcutta we have no longer such terrible epidemics as that of 1770, with its *cold stage of twelve hours*, which carried off, according to Clark, 80,000 natives and 1,500 Europeans. These pestilences seem to have in a great measure gone from us ; and we happily find that here, as in the Western hemisphere, the malignant fevers of former days, if they have not disappeared, are greatly mitigated. Even in Jamaica,

although severe fevers sometimes recur, they do not, as formerly, destroy "to the amount of the whole number of its white inhabitants once in five years."

Stavorinus, speaking of the "sort of sickness or fever," which prevailed amongst the inhabitants of Calcutta during his visits (1766-71) says, that it "generally sweeps away those who are attacked by it in the space of three days."

Notice of Fever
by Stavorinus.

Of Major Kilpatrick's force of 240 men stationed at Fultah, "not thirty of the whole detachment," (according to Mr. Ives) "were left alive between August and December, 1756, by one of these epidemics." The same authority adds, that "the number of men buried in Bengal amounted to more than half of all who died in the several hospitals in India during the whole term of Admiral Watson's command, a period of three years and one month."

Major Kilpatrick's
detachment at Ful-
tah.

Dr. Bogue, who also served in Watson's fleet, says, that, "out of three ships of the line and a twenty gun ship, and those not fully manned, we lost in six months upwards of two hundred men, most of whom died of these fevers;"—so much worse was the climate of Calcutta in those times than that of any other port in our Eastern possessions.

Dr. Bogue's ac-
count of the sickness
in Admiral Wat-
son's fleet.

Dr. John Clark, who visited Calcutta between the years 1768 and 1771, states, that the "fever and flux" were very fatal in the former year. Of the first named disease he says, that "it frequently carries off the patients in twelve hours." "During the sickly season at Bengal," he adds, "the uncertainty of life is so great, that it frequently happens that one may leave a friend at night in perfect health who shall not survive the following day. There have been several melancholy instances of persons who have returned home in a state of perfect health from performing the last duties to a deceased friend, and have next day been numbered with the dead."

Dr. John Clark
on the diseases of
Calcutta in 1768-71.

From the Medical Journals of the Surgeons of ships trading to the various ports in the East Indies, Dr. Clark obtained the following general result; namely, that out of 189 cases of fever, "105 recovered, and 84 died:" again—"out of 876, the complement of men belonging to eight ships, 78 died at Bengal, and 55 at sea; or nearly *one* in *six*."

Statistics of for-
mer fevers.

Mr. Curtis on the diseases of the troops outward bound.

In the year 1784, Mr. Magennis states that, out of the crew of his ship, the *Valentine*, and six others stationed off *Kedgerree*, there died of fever and dysentery, 170 men, the usual period of their stay in the *Hooghly* river being from August to January. Mr. Curtis of *Madras* writes, that in 1781, out of two companies of the 98th and 100th regiments, embarked in England for India, there died during a "suffering and tedious passage of exactly eleven months, 75 men—viz. forty from fever; eighteen from dysenteric flux; and the remainder from scurvy and cachexy." It would appear that these unfortunate companies had "some occasional fillings up from the other ships as the numbers decreased;" but, even making the necessary allowance for this circumstance, the loss of life is horrible to think of; especially when we reflect that each ship in a large fleet shared a like mortality.

Causes of sickness—want of due ventilation.

The chief cause would appear to have been crowding—the most unfavorable of all circumstances, whether in health or sickness—and the consequent want of "a pure and free air."

Scurvy general in those times both with soldiers and seamen.

That a scorbutic taint* was universal in those times may, I believe, be admitted; and this circumstance will readily account for the general term "putrid," as applied by the older writers to the endemic fevers and dysenteries: this unfavorable complication will likewise go far to account for the mortality.

State of the sick in the Military hospital, Madras, in 1782.

Of just or useful comparison therefore, between the results of former and recent general hospital management, there can be little or none; but, I think, this much may be allowed in favor of the modern plan; that in consequence of our greater freedom of depletory means, by blood-letting especially, we have fewer of the sequelæ of fevers, viz. enlarged liver and spleen, than existed formerly; for, in the Military hospital at *Madras*, in 1782, we find by a monthly report of Mr. Paisley, the Surgeon, that there were then in the house—

" Venereals,	50
Quotidian remittents,	2

* In the open well ventilated Naval hospital at *Madras*, containing between 4 and 500 men, Mr. Curtis states "the great bulk of the cases to have been *ulcers*;" indeed, he constantly refers to the scorbutic taint as prevalent amongst both soldiers and seamen.

Simple bilious fevers,	30
Bilious fevers, with visceral obstructions,	15
Simple fluxes,	20
Liver fluxes, and fluxes from visceral obstructions,	98
Chronic visceral obstructions from impaired habits,	69

Total, 284"

Thus it appears, that out of 284 cases in hospital, 182 laboured under some form of visceral obstruction ; that is, organic disease of the liver or spleen, or both, in a more or less acute form, and in either case rendering death more or less remote, a necessary result.

It is here then, and not in the comparison of actual mortality within the wards, that our hospital management contrasts favorably with that of the olden times.

The causes of the present superiority in public health, from what it was formerly, must also be of the highest interest and importance, especially to communities living within the tropics ; and, with all the just confidence in modern medicine, guided by the lights of an improved physiology and those of pathology, I cannot yet agree with those who would ascribe the whole of the difference here spoken of, to superior modes of medical management, great as these confessedly are. It is not through the advantages of modern improvements in the treatment of mere disease, as contrasted with the more ancient modes, that public health has been so much amended, as through the great measures of *prevention of disease*, consequent on the progress of the public mind, and of Governments, in *general knowledge*, leading directly to improved habits of life in communities, improved localities, institutions of police, &c. : it is to these reciprocal actions of the social state and of political events upon each other, and upon medical science, that the advancement of public health is most indebted, and that it will continue to be so, although the circumstances are not sufficiently weighed by some of us, when, in our hurry to praise ourselves, we forget what is due to our predecessors, and that these last had frequently to treat a form of disease which we have never seen, and with whose fatal severity we are, consequently, unacquainted.

The causes of difference in public health.

Consideration of the difference in disease necessary, ere we venture to censure those who have gone before us.

This much I think due to the older practitioners of India, many of whom were evidently men of talent and correct observation.* Their position also, was one of great individual danger and difficulty.

I am satisfied we are never so wrong—perhaps we are seldom so ignorant of the truth and of circumstances—as when we indiscriminately censure those who have gone before us, and who, as in the case here spoken of, had to treat a fever with the very type and aspect of which we are at present unacquainted. It should not be said of us that we are only able to see the defects of the older writers by the lights which they have afforded us.

Dr. Southwood Smith, one of the most able writers on fever of this or any other age, has the following observation on this head. “It is remarkable how entirely the most distinguished physicians of all ages, who have treated of this subject,” (fever) “coincide in the feeling, that with regard to this important class of disease, it is impossible, in the short life allotted to the most aged, to do any thing more than add a little knowledge to the common stock.” If this be true,—and who that knows any thing of medicine can doubt it,—we need be in no haste to praise ourselves, and we should be slow to censure others; because, according to Sir John Pringle, as natural knowledge is daily improving, those who write last on subjects connected with it are most likely to be in the right; and that, he might have added, certainly without any other merit on their parts than happening to live in later times—or, in the words of a celebrated reviewer, they were behind us. It could not be otherwise.

This subject illustrated from the writings of Sir James Macgrigor.

It was here, as in the diseases of the peninsular army so admirably described by Sir James Macgrigor, “not only had fever very different forms in different seasons, and in different quarters of the same seasons, but they required very different, nay opposite kinds of practices, the knowledge of this strongly impresses on us the necessity of becoming

* That acute observer, the Revd. Dr. Tennant, speaks of the treatment of the fevers of his time, 1796, as being “simple and decisive, and more efficacious than that of any set of diseases equally malignant in Britain.” Whether our predecessors boasted of the great success here spoken of, he does not say; but this much is certain, namely, that the public was satisfied with the results of their treatment.

acquainted with every attending circumstance before we venture to censure any particular practice."

If we would desire a further lesson of professional moderation, let us take it from the acute observer Hennen, who, in speaking of the severer remittent fevers of the Mediterranean, makes the following remarkable observation, and which nothing but the precise results derivable from medical statistics can invalidate.

Dr. Hennen's remarkable opinion on the fevers of the Mediterranean.

"I have not had access to the returns of the French and Russian Army, but I have been made acquainted with the general result, which speaks strongly in favor of those medical philosophers, who assume that on an average of years, mortality by fever is nearly the same whatever the mode of treatment adopted may be. For I have every reason to suppose, that among the French troops, where the "medicine expectante," was generally the order of the day, there occurred, upon the whole, no greater proportion of deaths than among the English, who met the fevers of the country with mercury and the lancet in all the activity, and all the orthodoxy of the schools. And among the Russians whose practice was as rude and barbarous, and their apathy as to the event, as impenetrable as that of their Turkish neighbours, the results were similar." Now, if these had been the observations of an ignorant or desponding physician, I should consider them unworthy of notice; but who is there that recollects the talent, energy and moral courage, together with the experience of Dr. Hennen, that will not read in these remarks a lesson of moderation. It was not that Dr. Hennen despised the means, or that he considered it indifferent which was chosen; for in his own experience he well knew how to practise with energy and effect: it was that in all his writings he viewed boasting as something worse than bad taste. Had Mr. Wade, in his *four hundred* cases, shewn more of this candid spirit, and more also of Dr. Hennen's other qualities, they would have been longer remembered, and his wonderful cures, as well as those pretended to by others, might have been some example to us.

So far as I can learn, the fevers of this place have for a length of time been treated according to the symptoms, and not by any exclusive plan: bleeding has been had recourse to, to moderate the force and

Modern treatment of the Bengal remittent fever.

frequency of arterial action, and to relieve complications ; free purgation, by means of mercurials conjoined with brisk cathartics, to remove accumulations or vitiated secretions, and to aid in correcting the latter ; mercury with sudorifics, to equalize the circulation, and to act on all the secretions and excretions ; bark or quinine, during the remissions, and to arrest the coming paroxysm, &c. &c.—these seem to have been long in use.

Blood-letting the standard remedy.

If tropical fever and dysentery were always simple morbid actions, no doubt, as recommended by some, bleeding and purging might in general prove adequate to the cure ; but unfortunately in both cases, we seldom find this unmixed condition to hold in actual practice in Bengal, where we have in our fevers continually to combat dangerous abdominal complications, with the addition, in the hot season, of the cerebro-spinal—all demanding a more or less complex and careful treatment—a speedy unlocking of all the secretions and excretions, which the most ample experience proves that bleeding and purging *alone* will not effect. Yet bleeding, here as in dysentery, is the standard remedy, subject to age, constitution and length of residence in India. It precedes all other management in the order of time, and in point of importance. I believe this to be the general view of it taken by the practitioners of this city ; and it is but common justice to say that the value of this most powerful of all means was first emphatically urged on the Indian Surgeon by Dr. James Johnson : it is to him we owe that blood-letting has become a systematic part of our treatment. Of the several valuable authors besides, who have since followed him, and helped to fix the professional attention, I need say nothing.

First impressed on the Indian practitioners by Dr. James Johnson.

Copious bleeding generally necessary in the fever of Bengal.

Subject only to the limitations already stated, bleeding,—early and copious bleeding, and practised at the very onset of the stage of re-action—is very generally necessary in the severer forms of Bengal remittent fever ; then, full doses of calomel with sudorifics, short of producing salivation, with saline purgatives in the intervals. If the disease does not now yield, but on the contrary, if the paroxysms recur at shorter intervals, and with increased severity, leaving but imperfect remissions—then there is imminent danger, and inflammation, or acute congestion in some important abdominal or other organ, may be more than suspected. For this, in addition to topical bleeding and cold to the head,

when the seat of disease, mercury in small repeated doses, with antimonials, must be given so as mildly to affect the system: it is the only known means of saving the patient by anticipating the destruction of some organ essential to life: it here becomes, in the apt words of Dr. Robert Jackson, a remedy of necessity.

Where the remissions, on the other hand, are well marked, quinine should be given in full doses, without waiting for every thing. Some practitioners recommend that before this drug is used, we obtain previously a clean tongue, natural secretions, and the absence of all heat of skin or local affection. I believe this to be a very dangerous practice: if we are to wait for every thing, we shall often wait too long, or till it is too late. I have always administered quinine in the more favorable cases now stated, in disregard of certain local abdominal complications (those of the head should in general exclude it) believing that if I arrest the paroxysm, I do greatly more towards the cure at large, than quinine can possibly do of harm to the local affection—the treatment of which by local depletion and counter-irritants is not interfered with by this means: again, all tenderness on pressure or local pain, does not, in the case here stated, necessarily constitute inflammation. In administering quinine I frequently add to it minute doses of the potassio-tartrate of antimony, and I think with advantage.

Administration of quinine.

In the more favorable cases last spoken of, it rarely happens that topical bleeding, purgatives, and mild mercurials, &c.—with quinine during the remissions, fail in conducting the patient to safety, the general measures already stated having been premised. I have also seldom had occasion to urge mercury to the degree of salivation, during the whole period of my service in India.

Almost all our complications in the fevers of Bengal are abdominal, whether these be of an inflammatory nature, congestive, or of mere irritation; and this would seem to be the cause of the apparent prostration, with tendency to collapse, so common especially during the rainy season with us; for even within a few hours, as contrasted with similar affections of the head and chest, there exists here an oppression of the vital functions, alarming to the stranger physician.

Complications in Bengal generally abdominal.

The prostration produced by a violent blow on the abdomen more nearly resembles the febrile collapse than any other morbid condition with which I am acquainted ; it is probable that both depend on the disturbed function of the great sympathetic—the powerful though silent source of many symptoms known to us only by their effects.

Caution as to the right time for remedies.

This tendency to sinking is the reason why our measures of cure must be so guarded as to the time of using them ;—for there is no country in the fevers of which more regard must be paid to the stage of disease for applying remedies, especially blood-letting, than in those of Bengal: what was a saving means at the commencement of the paroxysm is as surely destructive at the end of it. Dr. Robert Jackson's earliest works even, abound in valuable injunctions on this head, and such as ought to be present to the recollection of every man who undertakes the onerous and responsible duty of treating tropical fever. After some admirable rules as to the "just point of time" for using the more powerful remedies, and especially blood-letting, he concludes that "the same remedy, after the delay of a few hours, not only ceases to be useful, but the application of it even sometimes becomes unsafe:"—further, he adds with truth that, "it requires much discernment in many cases to discover the cause, a very correct judgment to measure the means, and even no small degree of knowledge to be able to ascertain that the end is attained."

On the subject of active treatment, I must once more bear witness to the general efficacy of blood-letting, when practised at the proper time ; and I cannot more forcibly do so than by stating that, to the best of my recollection and experience, I do not remember a single case in twenty years wherein judicious depletion did not appear to afford relief, even where it could not cure.

That cases of fever both endemic and epidemic occur, in which it is injurious or unnecessary, the pages of this work sufficiently attest; and instances of death from its ill-timed use have come under the writer's observation; yet, the fact remains untouched, that blood-letting practised at the proper time and apportioned to circumstances of age, sex, season and length of residence in India, forms the principal means of cure in our endemic fevers, and of preventing organic lesions.

I cannot conclude these cursory remarks without adverting to the importance of the management of convalescence from fever—not the least serious of the duties imposed on the Indian physician. In all cases of recovery from fever, but especially in those wherein the complications have been severe, or where important organs have been affected in the course of the fever, or as a sequel to it, it is impossible to be too careful in the diet, and in attention to the nature and activity of the secretions;—and this vigilance must not be relaxed until perfect health is re-established. How often do we see patients who have been well enough treated during the acute disease, but on whom the neglect of this rule of practise entails enlargement of the liver or spleen, or other visceral engorgements, requiring a protracted sea voyage, or even a return to Europe at great inconvenience. This is a subject that should always be present to the mind of those who have the management of military hospitals, wherein the perfect re-establishment of the soldier's health, before his return to barracks, should be a maxim never to be swerved from.

Importance of the management of convalescence.

This is not the place for reviewing medical books, or laying down general rules of practise; but it cannot be too much or too often impressed on the Indian surgeon, that it is on his careful attention to the phenomena of fever that nine-tenths of his usefulness depend. I have here attempted an outline of the treatment of the endemic fever of Calcutta, and of Bengal generally: it will be found to correspond in principle with that of the endemic fevers—the bilious remittents of the world—whether east or west: they are all fevers of locality, and do not by any means differ so much as medical writers of partial views and partial experience would have us believe:—their supposed differences, or nosological divisions, are more frequently the work of man than of nature: they may, and do differ in degree of intensity; but their essential phenomena, and the organs affected in their progress, so as to endanger, or ultimately destroy life, are the same; and so likewise are the essential parts of their treatment.

Conclusion.

It may now prove useful to take a glance at the prominent parts of the treatment of fever by the following authors, in their order of dates:—

1629. Bontius:—purgings—bleeding, general and topical, repeated as occasion requires—opiates—extract of saffron, &c.

1751. Cleghorn :—bleeding, repeated according to occasion—cathartics—bark.
1757. Dr. Bogue, formerly of Bengal :—bleeding—emetics—purgatives—mercury—bark—camphor in the cold stage.
1757. Huxham :—bleeding—purgatives—diluents.
1760. Huck :—blood-letting, repeated according to occasion—ipecacuanha and Tartar emetic, so as to vomit and purge—bark during the remission.
1768. Pringle :—bleeding repeated according to occasion—active purges—antimonials—bark occasionally.
1790. Balfour :—vomits—calomel and purgatives, frequently repeated—bark and opium.
1795. Chisholm :—calomel and opium—to salivation.
1797. Clark :—mercurial purgatives—bark—anodynes.
1799. Blane :—bleeding—vomiting and purging—sudorifics—bark—anodynes.
1803. Dr. Robert Jackson :—copious bleeding, and practised always in the recumbent posture—emetics and purgatives—cold bath—mercury only as a “remedy of necessity”—change of air.
1807. Curtis :—evacuants and diluents in the first stage—calomel, ipecacuanha and purgatives, in protracted cases.
1808. Lind :—cautious bleeding—vomiting—purging—antimonials—bark.
1810. W. Fergusson, Inspector General :—early and copious bleeding—mercury to affect the system—sudorifics—purgatives.
1811. Bancroft :—bleeding—cold affusion—calomel—purgatives—bark.

1813. Dr. James Johnson :—bleeding, general and local—calomel with purgatives—mercurial treatment, according to severity of disease—diaphoretics.

1816. Burnet :—bleeding, general and topical, according to occasion—purgatives.

1818. Ballingal :—blood-letting, general and local—purgatives—cold affusion—moderate use of mercury—occasional emetics, and the use of bark.

1819. Dickenson :—vomits—bleeding—active purging—cold ablution—diluent.

1827. Geddes :—blood-letting—mercurial and other purgatives—antimonials—diluent—opiates before the paroxysms—quinine.

1828. Annesley :—blood-letting, general and local—emetics—full doses of calomel—purgatives—diaphoretics—cold affusion and cold applications to the head—enemas—bark during the remission.

1832. Mr. Twining :—bleeding general and local—two or three full doses of calomel, followed by active purgatives—mercury so as to affect the system “in some cases”—quinine during the remissions.

1833. Dr. Joseph Brown, Cyclopædia of Practical Medicine :—bleeding, general and local, aided by the warm bath—mercurial purgatives—cold affusion—cold to the head—acidulated cold drinks. In the advanced stage, opium—change of air.

1835. Dr. Copeland, Dictionary Practical Medicine :—an emetic—blood-letting, general and local—“full doses of calomel followed by purgatives”—evaporating lotions to the head—cooling diaphoretics—enemas—quinine, during the remission.

Out of a hundred deaths amongst the European soldiers in Bengal Proper, it is stated by Dr. Burke that 26.8 are from fever; 7.3 from hepatitis; 30.5 from dysentery and other bowel complaints; 19.5 from cholera; 4.6 from pulmonic diseases, 1.9 of which was phthisis pulmonalis; leaving only 11 produced by other diseases.

Dr. Burke's proportions of various diseases out of every 100 deaths in Bengal.

CURSORY REMARKS ON THE ACUTE DYSENTERY
OF EUROPEANS.

“ In the treatment of no other disease, perhaps has the baneful influence of exclusive medical doctrine been more fully exerted than in that of Dysentery.”—COPELAND.

The dysentery of Bengal, like that of most other countries, a complicated disease.

If dysentery were a disease of uniform character, and having an uniform *cause* and *seat*, then it might, perhaps, always be treated after an uniform plan; but a very slender experience of this disease, especially as it prevails within the tropics, or even within the British Islands, shews this not to be very generally the case; for although some portion of the larger bowel is universally implicated, yet, either from the first, or during the progress of the disease,—for we cannot often say which—the lesser bowel, the liver, the spleen, the pancreas and mesentery, become also the frequent seats of morbid action, so as to modify the disease, and likewise its right treatment.

In the dysentery of Ireland, Dr. O'Brien found “the liver diseased in one-half of the dissections, the spleen in one-fourth, the small intestines in two-thirds, and the colon and rectum in all.” The pathology of our dysenteries, whether in Southern or Northern India, and as given by the best authors, sufficiently establishes that morbid action in this formidable disease is not confined here, any more than in Europe, to the course of the large intestine, but that all or most of the associated organs are found after death to be more or less deeply implicated, just in proportion to the extent and severity of the symptoms during life.

Necessity of attention to all the complications of disease before deducing a right treatment.

It appears to me that to a want of just consideration of these inevitable pathological complications must we ascribe the system of exclusive treatment so much reprehended by the author quoted at the head of this article, and the successive abandonment also, by the surgeons of fleets and armies, of every exclusive plan hitherto proposed, almost as soon as it has been tried.

A catalogue-raisonné of the treatment of dysentery, at different times and places, will best illustrate this part of the subject ; and here is a short one :—

Catalogue-raisonné
of the treatment of
dysentery.

1622. Bontius :—bleeding—vomit of ipecacuanha and purge—the extract of saffron, “ the anchor of hope ”—fruit diet—emollient fomentation and enemas.

1760. Dr. Huck :—bleeding repeated according to occasion—purgatives—ipecacuanha and tartar emetic in repeated and full doses.

1768. Sir John Pringle :—bleeding—vomiting—calomel purges—ipecacuanha and opium.

1773. Dr. John Clark :—full emetic of ipecacuanha and tartar emetic, followed by mild purgatives ;—then ipecacuanha and opium in small doses.

1782. Mr. Curtis :—chiefly purgatives ; in the advanced stage—small doses of ipecacuanha powder—astringents, &c.

1787-9. Dr. Mosely :—bleeding—antimonials—revulsion.

1791. Mr. Wade of Chunar :—solution of tartar emetic and salts—anodyne and sudorific draughts.

1799. Sir Gilbert Blane :—blood-letting—vomit and purgative at the beginning ; then ipecacuanha, opium and salts, followed by small doses of ipecacuanha.

1799. Lemprier :—acute dysentery—vomiting—mercurial and common purgatives throughout the disease—warm bath and fomentation ; chronic dysentery—calomel and ipecacuanha.

1799. Dr. Whyte :—extreme blood-letting—flannel roller—careful confinement to bed, the body being anointed with oil—no internal medicine.

1814. Dr. James Johnson :—bleeding—mercury in full doses—sudorifics, with occasional mild purgatives and anodynes—strict attention to diet, clothing, &c.

1817. Dr. Robert Jackson :—during immersion in the warm bath, copious bleeding—“the sovereign remedy”—emetic of ipecacuanha and tartar emetic—mercury with mild purgatives—antimonials—charcoal rhubarb and ipecacuanha in repeated doses—enemas of solution of acetate of lead and of charcoal.

1817. Dr. W. Fergusson :—bleeding—small doses of calomel and ipecacuanha until the gums become affected—inunction.

1818. Sir George Balingal :—acute dysentery—topical bleeding—purgatives—sudorifics by infusion of ipecacuanha—opium—warm bath and fomentations—enemata—blisters : chronic dysentery—calomel and opium.

1818, 1822. The Dublin Physicians—Epidemic Dysentery :—bleeding, general and local—calomel, antimony and opium combined—emetics—enemas—counter irritation—warm bath.

1819. Mr. Bamfield :—bleeding—cathartics—diaphoretics with mercurials.

1823. Dr. Latham :—after the failure of all the remedies common to European practice, including ipecacuanha, “calomel and opium became the settled practice.”

1822. Mr. Annesley :—emetic of ipecacuanha, followed by full doses of calomel, smart purges, and warm bath—general and topical bleeding according to constitution and length of service in India—calomel and opium alternating with purgatives and enemas—ipecacuanha or antimony with opium, as a sudorific.

1832. Mr. Twining :—general and local blood-letting—simple ipecacuanha, with extract of gentian—mild purgatives.

1832-3. Dr. J. Smith, Edinburgh,—Epidemic Dysentery :—scruple doses of calomel given short of salivation, “the more common measures having failed.”

1833. Dr. Jos. Brown,—Cyclopædia of Practical Medicine :—bleeding, general and local, repeated according to urgency and aided by hot

bath and fomentation—gentle laxatives—mercury as a subsidiary to general and local bleeding, and combined with simple or compound ipecacuanha powder—sudorifics—opiates—enemas.

1835. Dr. Copeland, Dictionary Practical Medicine:—bleeding, general and local—mild aperients—cooling diaphoretics—opiates “after depletion”—blisters—ipecacuanha and opium.

Of the above list, the authors who speak most of their success are Bontius, Dr. Moseley of the West Indies, and Mr. Wade of Chunar; and on that account, a brief inquiry into their respective modes of treatment may prove of some interest.

Authors who have been most confident in their specifics.

Bontius' treatment is already mentioned, with his extract of saffron, “than which (I dare to say) a more excellent remedy was never discovered by mankind; and I am fully persuaded that it is the most perfect antidote against this disease, even when of a malignant kind.” Dr. Moseley bled; but the operation appeared to him secondary to other measures. “Bleeding,” he says, “being an operation of great consequence in the flux, the cure is generally begun with it, repeating it as symptoms authorize, observing only ‘*non quæ ætas sit sed quæ vires sint.*’ After bleeding, a vomit of ipecacuanha is to be given, and then an opiate after its operation is necessary. This is to be followed by a careful, continued course of them (antimonial wine and laudanum combined) to keep up a sweat in extent proportioned to the violence of the disease and not the trifling way of giving them in small doses, whilst the patient is exposed and their operation neglected.” The Doctor goes on to relate that the eminent success of this plan was exhibited when the soldier had been suffering under “the worst condition of disease, with blood running from him, as in a hæmorrhage,” and that before “several of the officers of different regiments in the West Indies who were desirous to be spectators of a fact so interesting to the Army.” He concludes this triumphant account by exclaiming—“such is the power of *revulsion.*”

The power of revulsion is no doubt great, whether effected by agents exhibited internally or externally. I remember, when in Ava, hearing of a British merchant, who being detained prisoner in Amerapoorā under circumstances of barbarous severity, was seized with dysentery. After several days of unmitigated suffering, and when death

Singular example of the power of revulsion.

appeared to him near and certain, an order arrived for the removal of the prisoners, to a place of closer confinement, where they were literally packed together. This state, which at first appeared so dreadful, threw him into a violent *perspiration*, and from that moment all symptoms of disease left him.

Mr. Wade of Chunar.

Mr. Wade is still more to the satisfaction of such as would follow exclusive plans of treatment, for he claims a degree of success—a chain of success, unbroken except by “two cases of unfortunate termination in the treatment of about four hundred cases of fever and dysentery.”

The treatment for both diseases was alike by solution of salts and tartar emetic, with anodyne and sudorific night draughts. Mr. Wade says, “that the medical world may draw their own comments on the cases which are submitted to their examination. The person who has treated and compiled them shall defer his, until the public may have formed some unbiassed opinion of them, he shall only venture at present to vouch for their authenticity.” Dr. John Clark merely wishes to “present facts; but he must add that he has given bark to 150 fever patients in Bengal and other places in the East Indies; and of that number lost only one who took the medicine with perseverance.”

He was equally successful in dysentery; for out of “a number of patients,” he “lost four.”

Such authors never constitute a permanent authority in medicine.

Now, this is just what has been related by every mere writer of cases and pretender to extraordinary cures, from the dawn of medical science to the present day; and it is a curious fact, well deserving consideration how it happens, and happen it always does, that those who in their day claim the greatest and most exclusive success in the practice of medicine, should, in after times, be the least followed in their modes of treatment. The common causes of error in reasoning and practice, as respects this disease, are so well described by Sir James Macgrigor, that I cannot do better than present them in his own words:

Causes of error well described by Sir James Macgrigor.

“My opportunities of seeing this disease have been no common ones. Rarely, I believe has it fallen to the lot of an individual to see so very many cases of one disease in such a diversity of climate and situation.

In the 88th Regiment during the course of upwards of ten years, I saw the same man the subject of this disease on the continent of Europe, in America, in both extremities of Africa, and in India. Of late, it has afforded me not a little amusement to review my notes as well as my journals of practise in this disease, in all these quarters."

* * * * *

"I became convinced, in Alexandria, that, with change of country and climate, we had a different disease. This is one proof how improper, and how unsafe, it is for the practitioner of one climate to set down and describe the diseases of another. They only who have studied the same diseases, in various opposite climates, can fully comprehend the extreme absurdity as well as fallacy of this. From reasoning of any kind, we are incompetent to decide on the identity of disease. Reasoning from analogy here always deceives. In many of the symptoms diseases may agree; but, from thence to infer their identity is taking a very narrow view." *Medical Sketches.*

It only remains to notice the prevailing treatment of the dysentery of Bengal, amongst the more experienced practitioners at the Presidency, and this I shall insert in the order of importance. Blood-letting, general and local, as first practically urged in the dysentery of India by Dr. James Johnson, takes the lead, and has done so for many years: it is the standard remedy; and I believe that when the subject comes early and freely under this treatment, and that the case is not complicated with hepatic congestion or other actual disease, little else than a few aperients and sudorifics will be required for the cure; but as in most cases of this formidable disease, as it appears within the tropics, the diseased state of the large intestines is essentially mixed up with general abdominal complications, other and important means immediately follow the bleeding; and of the first are those which act powerfully on all the secreting organs, internal and external,—such as calomel in full doses with antimony, or with ipecacuanha, followed by laxatives, sudorifics, warm baths, enemata and other minor adjuvantia. I believe this to be the general course here, and I have seldom seen calomel carried the length of salivation, neither do I consider this degree of effect necessary to the cure.

Outline of the treatment of dysentery as common to the practitioners at the presidency.

Mr. Twining's mode of treatment by simple ipecacuanha.

The late Mr. Twining, in his clinical work, advocates the use of simple ipecacuanha powder, combined with the bitter extracts, which plan he described as very successful. I am not aware that this system has been followed by any of the other practitioners of the General Hospital, where Mr. Twining officiated for several years; neither would it appear to be successfully imitated in the provinces.

Dr. Macnab, in a very judicious and practical report on the dysentery of the native soldiery of Hindustan, when serving in Bengal, says, that "blue pill with ipecacuanha and gentian proved a complete failure, as has generally been the case in my trials of it. Indeed, I much suspect that Mr. Twining overrated the value of this favorite remedy, and that he may have also miscalculated the anti-emetic properties of the gentian."

Dr. Whitelaw Ainslie on the treatment by ipecacuanha long a favorite plan in the south of India.

Ipecacuanha has been a favorite remedy in the south of India for upwards of forty years past. Dr. Whitelaw Ainslie, after an experience of thirty years, and an extensive practice amongst all classes of Europeans, says of this drug, that it "has no equal in simple dysentery, that is, dysentery not accompanied with hepatic derangement; in such cases, given so as even to produce daily a little vomiting, it has the happiest effects." This is an observation of great practical importance, and, I think, impresses a just discrimination in the use of this valuable remedy. In speaking of an experience now of twenty years, and an extensive range of observation of the disease as it occurs in hospitals and private practice in this city, also as it appeared amongst the troops serving in the unhealthy provinces of Orissa and Gundwanah, and in the army at Rangoon and Upper Ava, I should say with Dr. Ainslie, that it is alone in *simple uncomplicated* dysentery that ipecacuanha shows its best effects, administered as an *exclusive* remedy; that is, after bleeding and moderate purging.

The author's experience of this plan.

Hepatic dysentery.

In the hepatic form of dysentery—no uncommon complication in Bengal, especially during the cold season,—calomel is absolutely necessary to the cure. I lately treated for this form of the disease a gentleman who had suffered much from the Batavian fever contracted at the capture of Java: he was bled generally and by leeches, followed by purgatives and sudorifics; but no amendment took place, and nothing

was voided but mucus and blood. Two full doses of calomel and antimony were then given, which produced copious biliary discharges and immediate relief: a few doses of blue pill with ipecacuanha, and purgatives, concluded the treatment. There existed in this case no enlargement of the liver, nor uneasiness on pressure; but there was a total absence of biliary secretion; and until that was restored, the other treatment afforded no relief. Another case of very severe hepatic dysentery requiring measures of great activity, was marred in convalescence by soup taken contrary to my directions: the liver became painful as ever, and the dysentery returned, requiring a repetition of general and local blood-letting, mercury, &c., and that under circumstances of greatly reduced strength. I have seen many cases in which morbid action seemed co-existent in the liver and cæcum, and I would beg to call attention to the subject.

I believe that cases of hepatic complication, treated without mercury, frequently terminate in inflammation and chronic abscess of this organ.

When ipecacuanha is preferred, it is proper to ascertain the following circumstances:

Important considerations relative to the use of ipecacuanha.

1st. Whether the bitter extracts have any and what effect in preventing vomiting under the use of this drug; for in extensive trials made by me, they have not appeared to have had any. It is true, that after a few days use, a comparative tolerance of the drug seems to be established, as in the case of the antimonial preparations; but this is altogether unconnected with the use or disuse of the bitter extracts.

2nd. Whether four grains occasion as much sickness as twelve; and if so, whether the larger dose should not be preferred in the cure of dysentery. If the action of ipecacuanha be purely revulsive, or, if according to Paris, it be to abate both the velocity and force of the heart's action, so as to affect "the whole series of blood vessels from their origin to their most minute ramifications," we should perhaps do wrong, in such a formidable disease as dysentery, to be sparing of our dose, if the stomach can be made to bear the larger quantity. The subject is important, and worthy the further consideration of the profession.

Deserving the careful consideration of the profession.

ON THE
SUPPURATIVE INFLAMMATION OF THE LIVER.

This is the most dangerous disease I am acquainted with, because of its insidiousness, and the total absence of urgent symptoms : the process which leads to destruction is here silent and rapid. It has not been sufficiently dwelt on by writers on the diseases of our climate. It chiefly attacks the feeble of constitution, the lax of fibre and fair of complexion : it often terminates the career of the old Indian.

Causes.

Whether existing in the older resident in Bengal or the new-comer, it is generally a disease of the cold season, and caused by night exposure ;—in short, by any means that determine powerfully from the surface to the internal organs. I have seen cases where it was caused by the chilling thorough-draughts of our northern entrances to the Calcutta houses, after leaving a crowded room ; and others, where it was occasioned by exposure before daylight for the purpose of hunting.

Symptoms.

The disease is sometimes preceded by a perceptible falling off in the general health, such as, some degree of emaciation, dry cough and embarrassed respiration, loss of appetite, and sallowness of complexion ; but it more generally comes on in the midst of apparent health. There is a general feeling of abdominal uneasiness, but more particularly of the epigastric region and that of the liver, with some degree of fever, preceded by slight rigor or ague ; but all these are so trifling as too often to attract but little of the patient's attention. Perhaps he applies to his physician on account of slight *diarrhœa*, supposed to be the result of error in diet : medicine affords some relief, and he proceeds in his ordinary occupations for days, and when the action is more chronic, for weeks, though under great depression of the mental and corporeal energies ; till at length, his altered appearance, hacking cough, permanently dry skin, invincibly rough furred tongue, and morbid taste, attract some more serious notice on his own part, or that of his family. The real nature of the disease may still remain a secret to both patient and physician ;

and it may not be till a marked succession of rigors, or profuse and clammy perspiration announce in audible terms the formation of abscess, that either party becomes awake to the actual danger. A sense of uneasy feeling may or may not exist in the region of the liver, according as the disease is centred more or less deep in its substance, or in its upper convex surface: when the former exists, the symptoms are more than usually obscure and insidious: in the latter case, they are very acute.

When on the other hand, the left lobe is the seat of morbid action, it is easy of detection to a physician, though not so to the patient.

I should say that diarrhœa, followed by slight fever; the peculiar state of the skin; the tongue having the roughness of a coarse file, with adherent coating, together with the local uneasiness already described; cough, and high coloured urine, ought immediately to warn the physician of the suppurative inflammation which leads to liver abscess. The diagnosis will receive material assistance from the external examination of the chest, especially when the upper convex surface of the liver is the seat of disease.

Such are the symptoms and most uniform succession of events: they should always meet with the strictest attention, and the most prompt and decided treatment.

I will give a case in illustration. Last cold season a medical friend called at my house, and just as he was quitting, he said, incidentally, that he had a pain "*in his back,*" like lumbago. On examination, I found his liver seriously involved in disease, and that it had been so for three days, during which he had been going about as usual, living in his ordinary manner, and using the *cold* bath daily. All he had noticed was a slight shivering three nights previously, followed by feverishness and pain of the back; but he considered his symptoms of so little moment that his mention of them was obtained only through interrogation.

Cases in illustration.

He was young and robust of habit, so that with the loss of about eighty ounces of blood within 24 hours, his symptoms yielded;—but I think he recovered with difficulty: a few hours more, and it would have been too late. The above is an extreme case in point, the inflammation having been of a very acute character; but it is important,

as shewing how very insidious are the symptoms, and how little they possess of the urgency to cause a salutary alarm in the patient's mind. It is always thus when the inflammation is centred in the parenchymatous structure of the liver; and hence the absence of acute pain, and those urgent symptoms which characterise inflammatory states of the peritoneal covering of the gland, which always give ample warning.

Treatment.

However long the disease may have existed, provided there be no symptoms indicative of suppuration, general bleeding, copious in relation to age, health, and length of residence in India, must be instantly had recourse to, and the measure of depletion should be the sense of general relief, *with softening of the skin*. These are the only safe criterions of adequate loss of blood, and it should be continually held in recollection, that suppurative inflammation of the most deadly character is present, and that consequently there is no time to be lost. After the bleeding, calomel and antimony should be exhibited every 4 hours, with occasional smart purgatives in the intervals, until the system is brought mildly under the influence of mercury:—leeches and blisters are of course useful, but the latter ought not to be applied till a powerful impression has been made on the disease. The diet during the progress of treatment, and for a long time after, should be of the very sparest, such as thin sago or arrow-root. On a plan of cure such as this, I have seen cases of a very unpromising appearance end in health. Occasionally this has been finally effected by the steady use of the nitro-muriatic acid bath, persisted in for a month or six weeks.

Frequency of the disease.

One error seems very general respecting this disease, namely, its supposed infrequency in Bengal; but so much am I satisfied of the contrary that, taking the idiopathic cases of it, and those that form the complications with, or sequelæ to fevers and dysentery, the sum total would form a respectable item in our bills of mortality; indeed the statistical tables furnished in this work prove it.

Cases.

During the cold weather of 1837, I was called in consultation in four cases of suppurated liver, in which no such condition had previously been suspected. A case occurred also in which slight hepatic tenderness appeared in August, as a complication of dysentery. From this the patient recovered; and to restore his strength, he was sent to the Sand-heads, where,

having exceeded in diet, the liver again became slightly enlarged. A second time he recovered ; but being of a weakly habit, and much reduced by treatment, I recommended a voyage to sea. Here, a third time, despite the most carefully written instructions, he betook himself to habits of excess in eating, and to the use of wine. In course of three months from leaving Calcutta, an abscess discharged itself through the stomach, soon after which he died. I mention this case as affording an illustration of the necessity for abstinence, and to shew that, even when the hepatic affection is but secondary, it may yet prove the ultimate cause of death.

I recollect the case of a sporting Magistrate of this City, who returned from a hog-hunting party because of some feeling of indisposition. His death, which took place ten days afterwards, caused much surprise to his friends, and the medical attendant requested my presence at the post mortem examination. In the substance of the liver we found several distinct abscesses, averaging from the size of an orange to that of a common nut. The case made a deep impression on my mind, on account of the utter absence of any symptoms indicating so much lesion ; for I was then very young, and devoid of experience in this fatal disease. Three years ago, a young Staff Officer called upon me, believing himself to be consumptive: his respiration and pulse were very rapid, with profuse night sweats ; in short, he was dying of suppurated liver. The account he gave me was, that about six weeks previously, while driving to Barrackpore in a cold night from a Calcutta ball-room, he was seized with shivering followed by feverishness. He continued to perform the duties of his office up to the day of my seeing him, and the real nature of his disease had never been suspected. He died in a fortnight, and the entire substance of the liver was found dissolved in pus.

Another singular case.

Cases such as these could be cited in great numbers ; but it is hoped that enough has been stated to shew the uncommonly dangerous tendency of the disease, and its unsuspected frequency in Bengal.

ON THE TREATMENT OF THE CHRONIC LIVER ENLARGEMENT.

The disease not uncommon in Bengal.

This disease is by no means uncommon in Bengal, as a sequel to fevers both remittent and intermittent. The function of the organ is greatly impaired; there is frequently a hacking dry cough—dyspepsia in various forms, and general ill health, with a sallow pasty complexion and emaciation. The treatment of this disease is not well understood: mercury I believe to be injurious: it injures the stomach and bowels, already over-drugged, without exciting any secretion from the organ chiefly affected, and on which this mineral, from repeated use, has lost its effect: purgatives of an irritating or drastic nature are equally injurious: in fact, it is often an unmanageable disease,—not readily amenable to treatment or change of climate.

Mercury generally injurious.

Plan generally adopted by the author.

The plan of treatment I have generally had recourse to in such cases is, the nitro-muriatic acid bath, steadily persisted in for a month or six weeks at a time: it seems like mercury, to act powerfully on all the secretions and excretions, and in the cases here spoken of, I do not know a better remedy. If we admit the absorption by the capillary veins and the absorbent vessels, and their conveyance of substances, rejected by the lacteals, directly into the vena portæ, to be transmitted to the liver, “where they undergo a true and proper digestion;” if we admit this “hepatic digestion, which is as real as that effected in the stomach and duodenum,” we shall be at no loss to account for the powerful influence of medicinal agents exhibited in the manner of the nitro-muriatic acid bath.

When from morbid dryness of the skin, the absorbents will not readily take up the acid, I direct the occasional use of the vapour, or warm water bath, with powerful friction of the whole surface, in order to stimulate the due functions of the skin.

A severe case given in the patient's own words—reason why this mode is preferred.

Out of many cases that I have treated with advantage after this manner, I will only particularise the following: it was that of a gentleman of the civil service. The details are in his words; and when the patient is

a person of education, I conceive this to be in all cases the preferable mode of describing a case, because we daily observe that "such is the nature of the human mind that cases *for* a preconceived opinion are retained" (and related too) "easier than those *against* it"—(Gooch). Were the example of Sir A. Cooper and others followed in this particular, medical cases would stand better with the profession as authentic evidence. "In November 1829, I arrived in Calcutta, suffering from the consequences of a jungle fever contracted at Chittagong, my liver and spleen were perceptibly enlarged, and my limbs were much swollen and so stiff that I could with difficulty walk, and the least exercise occasioned vomiting. Before my arrival at the presidency, I had for months taken medicine—this plan was altered, and I was put through a course of the nitric acid bath, taking a vapour bath every other day. The nitric acid bath acted in a few days very powerfully immediately on using it, and in about three weeks both the liver and spleen could no longer be felt, nor did pressure give me much uneasiness: the stiffness too disappeared, and my skin became less tense and dry—I took an aperient draught once or twice a week, and nothing else but the bath.—I left Calcutta towards the end of December for Simlah, and had little or no occasion for medicine for two years afterwards, my general health being completely restored."

I shall add nothing to the above case, beyond remarking that it was one of the worst I have seen. There was general anasarca from visceral enlargement; and altogether, the danger appeared imminent. The result was as stated; and I am disposed to think, after an extensive trial of it, that the nitro-muriatic acid bath is not used so often here in these chronic cases as it deserves, and that when had recourse to, it is often abandoned without just reason, and fails only from the imperfect or desultory mode of using it.

In the cold season of 1838 the same gentleman again visited Calcutta, in a singular state of disease:—there was an unnatural *dryness*, or suspended function of the surface of the body and of the mucous intestinal surface, with doughy enlargement of the abdomen, swelling of the hands and feet, and obstinate constipation—the excretions being deficient in bile, pasty and dry. The following detail is from the Surgeon of his station.—"Arrived at his station in January 1836, in tolerable health.

Continuation of
the case.

“ During the first hot season the digestive organs were much deranged, with loss of appetite, obstinate constipation, distension and hardness of the epigastre, particularly after meals—acidity and flatulence. The complexion was sallow and pale, and, and occasionally he complained of a dull heavy pain in the right hypochondrium. These symptoms continued till the cold season of 1837, when some improvement took place; but on the return of the hot season all the former symptoms recurred with increased violence, accompanied by excruciating headache, which for the time utterly deprived him of capacity to attend to the important duties of his office. Towards the termination of the rains the hands and feet began to assume a dropsical appearance. For many months he was compelled to take drastic purgatives almost every day, without which no movement of the bowels could be effected.”

The bath again
had recourse to
with effect.

I put the patient again through a course of the nitro-muriatic acid and vapour baths, administering every morning a table spoonful of saturated solution of Epsom salts containing a large proportion of dilute sulphuric acid. This at first had no effect, and he was obliged to have recourse to enormous draughts of castor oil, such as he had been using at his station for months previously.

Presently, however, the tumidness of the abdomen began to subside, the function of the skin to re-appear, and with it, a more ready action of the bowels from medicine, till in about a month a dessert spoonful of the saline solution moved him; and before quitting the presidency, the bowels were, for the first time during twelve months, or more, moved without purgatives and through the use of the bath alone, the excretions being copious, dark and pitchy. In short, he found his health and spirits so improved that he wished to resume his duties, and return to his station; but, taking the severity of his illnesses, past and present into account, I urged his proceeding to the Cape—the purpose for which he visited the presidency. I have dwelt thus long on the present case, because I consider it one of peculiar interest, from its severity; from the entire suspension of the excretions, internal and external, and their restoration by the bath on both occasions, after the failure, in his latter illness, of “calomel, alterative courses of blue pill, combined with purgatives, ipecacuanha, strong irritating medicines, &c. ;” these are the words of the Surgeon.

In the indolent enlargement with torpid action of the liver, I have seldom found mercury of use. The following has often appeared to do good in such cases, and is well suited to the abdominal fulness and torpor of the bowels induced by our cold season :

Rx. Extract. Taraxaci,gr. xxxvj.

————— Aloes Pur. Pulv. Ipecac. aa, gr. xii.

Ft. pil. xii., quarum capiat duas omni nocte, vel nocte manequ.

When I prescribe the bath, I put the following directions in the patient's hands, and I have seen it reduce enlargements both of liver and spleen when other treatment had, as in the above case, utterly failed of doing any good. Cases will occur, however, where the bath proves useless, and that I believe to arise from general debility, and a consequent inaptitude of the absorbents in particular.

Mode of preparing and use of the nitro-muriatic acid bath.

The natives seem aware of the beneficial effects of acid treatment for the common tumid spleen, for which their doctors prescribe the undiluted sulphuric acid in doses of one drop given inside a plantain, or more generally, five drops in some cold water morning and evening.

Another plan of treatment is by a mixture of aloes, vinegar and garlic, with a small portion of the bazar sulphate of iron (Kusees): the latter is said to be very successful. I have cured large spleens at the Native Hospital, by a mixture of the tinctures of muriate of iron and of iodine; and the largest tumid spleen I ever saw I cured by the Indide of lead alone.

The proportions of acid I use, are as follows, viz :

Muriatic acid, 3 oz.

Nitric, 2 oz.

Water, 5 oz.

Directions for preparing and using the Nitro-muriatic Acid Bath.

1st. Two gallons of water (about ten bottlesful) may suffice for a bath.

Directions.

2nd. To each gallon of water add 3 oz. of the dilute nitro-muriatic acid by measure.

3rd. The bath thus prepared will keep in use for three days, by adding half an ounce of dilute acid and a pint of water, morning and evening, in order to make up for the waste by evaporation.

4th. A portion only of the bath to be heated for use, after which it is to be added to the remainder, so as to make the whole of a comfortable warmth.

5th. Let both feet be placed in the bath, while the inside of the legs and thighs, the right side (over the liver) and the inside of both arms are sponged alternately: this should be continued for ten or fifteen minutes morning and evening.

6th. While using the bath, a gentle aperient, such as Cheltenham salts, or Epsom salts in some bitter infusion, should be taken every other morning.

7th. Earthen or wooden vessels should be preferred as foot-baths, and all the sponges and towels to be kept in cold water, as the acid corrodes them.

Having briefly noticed the three grand divisions of tropical disease—namely fever, dysentery, and hepatic affections, it may prove interesting now to exhibit in a tabular form, the ratios of sickness and death to strength at our four lower stations, together with the ratios of death to cases, of the three principal endemic diseases named :

Table of Admission into Hospital, and Deaths during 12 Years, of the European Troops in Garrison of Fort William.

Years.	Strength.	Admissions.	Deaths.	Ratio per 1000 of Strength.	
				Admitted.	Died.
1822,.....	866	1303	75	1,594.62	86.60
1823,.....	828	1687	51	2,037.44	61.59
1824,.....	736	2268	103	3,082.32	139.94
1825,.....	902	2542	110	2,818.18	121.95
1826,.....	863	1826	96	2,115.87	111.23
1827,.....	893	1336	56	1,496.08	62.71
1828,.....	913	1776	42	1,945.23	45.00
1829,.....	885	1995	58	2,253.67	62.14
1830,.....	808	1722	59	2,131.78	73.02
1831,.....	831	1061	57	1,276.77	68.59
1832,.....	771	1024	59	1,728.14	76.52
1833,.....	687	1387	64	2,018.92	93.15
1834,.....	608	1166	57	1,917.76	93.15
1835,.....	743	1211	33	1,629.87	44.41
1836,.....	734	1245	25	1,696.18	34.06
1837,.....	709	899	26	1,267.98	36.07
1838,.....	633	694	22	1,096.36	34.75
Total,	13,410	25,142	497	.....	.....
Average, ...	788 $\frac{1}{7}$	1478 $\frac{6}{17}$	29 $\frac{4}{17}$	1,883.33	73.26

The ratio of deaths to cases treated, was, during 10 years, as follows :—

- In Fever, one in 28 $\frac{46}{193}$
- „ Dysentery, one in 12 $\frac{14}{13}$
- „ Hepatitis, Acute and Chronic,..... one in 22 $\frac{5}{10}$

Table of Admission into Hospital, and Deaths during 12 Years, of the European Troops at Chinsurah (Depôt.)

Years.	Strength.	Admissions.	Deaths.	Ratio per 1000 of Strength.	
				Admitted.	Died.
1826,.....	1,083	818	86	755.31	79.40
1827,.....	814	1,329	80	1,632.67	98.28
1828,.....	200	542	20	2,710.00	100.00
1829,.....	132	571	24	4,325.75	181.81
1830,.....	366	822	24	2,245.95	65.57
1831,.....	927	1,412	51	1,523.19	55.01
1832,.....	737	1,182	41	1,603.79	55.63
1833,.....	577	1,155	54	2,001.73	93.58
1834,.....	784	1,308	32	1,668.36	40.81
1835,.....	832	872	17	1,048.07	20.43
1836,.....	743	1,428	39	1,921.93	52.35
1837,.....	765	1,322	32	1,728.10	41.83
Total,	7,960	12,761	500	.....	.....
Average, ...	663 $\frac{1}{2}$	1,063 $\frac{5}{12}$	41 $\frac{2}{3}$	1,930.40	73.72

The ratio of deaths to cases treated, was, during 3 years, as follows:—

In Fever, one in 25 $\frac{7}{18}$
 „ Dysentery, one in 7 $\frac{2}{6}$
 „ Hepatitis, Acute and Chronic, one in 8 $\frac{8}{10}$

Table of Admissions into Hospital, and Deaths during 13 Years, of the European Troops at Berhampore.

Years.	Strength.	Admissions.	Deaths.	Ratio per 1000 of Strength.	
				Admitted.	Died.
1822,.....	693	1,559	78	2,249.64	112.55
1823,.....	1033	1,979	84	1,915.78	71.63
1824,.....	484	148	58	305.78	119.83
1825,.....	636	319	55	501.57	86.47
1826,.....	527	3,035	136	5,759.01	258.06
1827,.....	878	3,510	61	3,997.72	69.47
1828,.....	897	2,539	105	2,830.54	117.06
1829,.....	799	1,743	131	2,181.47	163.95
1830,.....	708	1,440	50	2,033.89	70.62
1831,.....	752	1,807	67	2,402.92	89.09
1832,.....	710	1,141	67	1,607.04	94.36
1833,.....	712	885	36	1,242.97	50.56
1834,.....	850	1,297	31	1,525.88	36.47
Total,	9,679	21,402	959	.....	.....
Average, ...	744 $\frac{7}{13}$	1,646 $\frac{4}{13}$	73 $\frac{10}{13}$	2,196.47	103.83

The ratio of deaths to cases treated, was, during 5 years, as follows :—

In Fever, one in 21 $\frac{14}{136}$
 „ Dysentery,..... one in 10 $\frac{11}{6}$
 „ Hepatitis, Acute and Chronic, one in 9 $\frac{9}{26}$

Table of Admissions into Hospital, and Deaths during 16 Years, of the European Troops at Dinapore.

Years.	Strength.	Admissions.	Deaths.	Ratio per 1000 of Strength.	
				Admitted.	Died.
1822,.....	867	1,482	41	1,709.34	47.29
1823,.....	387	2,468	122	6,377.26	315.24
1824,.....	311	1,868	105	6,006.43	337.62
1825,.....	279	1,158	50	4,150.53	179.21
1826,.....	879	2,574	112	2,928.32	127.41
1827,.....	990	2,010	60	2,030.30	60.60
1828,.....	888	2,073	96	2,334.45	108.10
1829,.....	823	1,849	109	2,246.65	132.44
1830,.....	840	1,172	26	1,395.23	30.95
1831,.....	800	981	39	1,226.25	48.75
1832,.....	1,132	2,046	73	1,807.42	64.48
1833,.....	918	1,338	52	1,457.51	56.64
1834,.....	868	1,142	36	1,315.66	41.47
1835,.....	838	1,205	45	1,437.94	53.69
1836,.....	858	757	44	882.28	51.86
1837,.....	790	850	41	1,075.95	51.89
Total,	12,468	24,973	1,051	.....	.....
Average, ...	$779\frac{3}{16}$	$1,560\frac{7}{16}$	$65\frac{1}{16}$	2,398.84	106.35

The ratio of deaths to cases treated, was, during 6 years, as follows :—

In Fever, one in $34\frac{6}{8}$
 „ Dysentery, one in $8\frac{5}{16}$
 „ Hepatitis, Acute and Chronic, one in $6\frac{5}{8}$

NEURALGIA.

Neuralgic affections, and especially the Tic Douloureux, prevail endemically in Bengal.

Tic Douloureux
common to Bengal.

We have here "the true tic"—a terrible disease, that strikes with the violence and suddenness of lightning—the torture of which no language can describe.

In such a disease no man can remain an unconcerned spectator; and with all our sympathies aroused, we have often to regret the inertness of remedies the most powerful in repute such as tonics of all kinds, narcotics, occasional purgatives, as general measures, and veratria, ice, and acupuncture, as local means.

Its severity, and
difficulty of cure.

Dr. Elliotson assures us, that he has never seen one case of Neuralgia referrible to disorder of the digestive organs, and it may be so in England; but I must say that till my attention was drawn forcibly to this subject by Sir Charles Bell, I had no great reason to congratulate myself on my success against the Tic of Bengal. The notice I refer to is in a clinical lecture of Sir Charles's. He describes a miserable object, with a face pale and wasted with incessant pain, who presented himself at the Middlesex Hospital. Sir Charles wished him to remain in the house, but the poor man, though grateful, dared not; for he could not bear the restraint even of lying in bed, and had no relief from pain but in continual work at his business.

Sir Charles Bell's
plan of treatment.

"I exhausted my little store of remedies, and still he returned, not weekly, but daily, a miserable object—a study for the painter, if he desired to design the "last man," a man despairing."

Case of great
severity.

Well might Sir Charles declare that there is an indescribable pleasure in reflecting on the successful treatment of diseases attended with pain amounting to agony.

"After some weeks of attendance, one morning (whilst I was surrounded with the out-patients) this man, not waiting his turn, burst through the crowd, calling out he was cured!

Its cure.

“The following was the prescription on his card :

Rj. massæ pil Colocynth Comp.,..... ʒi.
 ℞i : Croton Tiglū, mj. misce et
 Fiant pil. xü. Mitte pil. Galbani Comp. xü.

One of the purgative pills and two of the gum pills to be taken on going to bed.”

“The pills operated quickly, and rather violently, upon him ; but he continued them ; the pain leaving him, and a remarkable change taking place for the better in his countenance, no doubt from his obtaining sleep as well as a freedom from pain ;—in short, as stated in another part of the lecture, he was no longer the same man who “ appeared suddenly among us, like him who drew Priam’s Curtain.”

Pathology of Sir
 Charles Bell,

On the pathology of this terrible disease Sir Charles Bell is pre-eminently entitled to a hearing ; and the following observations, though given in the form of extempore clinical lecture, contain much both of the mind and manner of that celebrated author and teacher :—“ It has appeared to me surprising, he says, that authors have omitted to found on the anatomy of the nerves, which leads so directly to the satisfactory explanation of the symptoms in this disease.

“The sympathetic nerve we have seen to be a whole system of nerves spreading every where, possessed neither of sensibility nor power over the voluntary muscles ; it is nevertheless acknowledged to have important offices in controlling and combining the whole economy of the system, and to have its centre in the abdominal viscera. The very circumstance of its affording no phenomena like all other nerves, should lead us to conjecture that, as this system resembles in structure the nerves of sensibility and motion, it must have powerful, though secret, influence.”

“I was careful to point out to you, that the connexions of this system, or (if you will) of this nerve, are universal ; but that the habit or mode of demonstrating it, leads us to pay more attention to the branches which extend into the head, though neither larger, nor probably more important, than those which extend into the plexus of the axilla, or into the sacro-ischiatic nerve.”

“ Are we to admit or to deny this influence of deranged bowels—of visceral irritation—in producing external pains, local paralysis, or partial spasms? No man who attends to disease can deny the existence of this influence. Taking this as admitted, the line of connexion is clearly laid down in the anatomy.

Pathology of Sir
C. Bell continued.

“ Nor can we deny, I think, the effect of the confluence and mixing of internal nerves with such as go to parts external and exquisitely sensible; and that, through this connexion, external pains become significant of internal disease, or more commonly of irritation and disordered function.

“ One step further in this inquiry. The fifth nerve is the most exquisitely sensitive of all the nerves of the frame: the sensibilities it bestows are enjoyed in a higher degree than those produced through any other nerve of the system. It is also the seat of most severe pain.

“ Impressed with these facts, the moment that we see the map of the relations of the sympathetic nerve with the second division of the fifth, by a large and direct branch, and lesser connexions of the same nerve with all the branches of the fifth, we surely need look no further in explanation of the frequent and intimate dependence of a painful affection of the face upon the state of the digestive organs.

“ It is rather remarkable that Mr. Abernethy, who did so much to direct the attention of the profession to the influence of the stomach and bowels on local affections, should have abandoned his ground on the occasion of the triumph of the principle. I allude to that passage of his work when he writes, “ I shall only say, that to me *tic douloureux* appears, in general, to be as much a constitutional affection as gout, or rheumatism; and that constitutional treatment is that which seems most likely to be of advantage in this as well as in nervous affections generally.

“ Most certainly the mere exhibition of blue pill and the bitter draught (though they will alleviate) will not cure the painful affection of the great nerve of the face. But consider the length of the intestinal canal; above all consider how strangely distinct portions of that canal are affected by different medicines. Does not this imply a distinction in portions of the tube, which may, in their disturbed condition, affect

remote parts, and with various effects? This, I confess, has long been my opinion; and that although the common means of relieving a headache, or a megrim or clavus, may fail in this, yet that we ought not to despair of finding a purgative which, peculiar in its properties and effects, may reach the seat of this irritation, and may consequently influence the tic douloureux; and what more likely than the croton, in proper combination? I was acting under this conviction when I prescribed the croton oil."

Conclusion of Sir
C. Bell.

After relating several cases successfully treated by this means, and on the failure of all others, Sir Charles sums up as follows:—"I feel authorized to say, that the tic douloureux is of that class of pains where the irritation of internal parts affects an external and sensitive nerve; where the disease is not actually seated in the nerve, but results from a remote irritation. I feel confident that the source of the disease is in the abdominal viscera—not arising from disease otherwise formidable, but rather from disordered function."

Plan of treatment
pursued by the
author.

That such is a common source in the neuralgic affections of this climate, there can be no doubt; and acting on that impression, I have cured a great number of cases of the severest forms (tic especially) in which all other remedies, general and local, had failed. I allude to one case especially, that of a lady who had suffered for years, and used a variety of means under direction of the late Mr. Twining, who at last directed the removal of all the teeth of the side affected; but which was not done. Her agony used to last for a fortnight together, so as nearly to deprive her of reason. The purgative plan pursued for two months removed the pain; and for three years she has had no return. I could add many similar cases to prove the general influence of intestinal irritation in the disease in question. No doubt cases may occasionally occur where the plan here recommended, and all others, will fail of doing good; but such should not discourage us. I have succeeded by combining the purgative and tonic plans; indeed the first, pursued in the moderate way stated, interferes with no other measures of cure.

The periodic form
and its treatment.

The regularly periodic facial neuralgia is also common to this climate, and may be considered as vicarious of ague, and treated accordingly; only that the quinine and purgatives must be administered more liberally during the few days of treatment required for this form of the disease, than in cases of intermittent fever.

APPENDIX No. 1.

NOTE ON GARDEN REACH.

Though overlooked amongst the topographic descriptions of the Suburbs, I must not altogether omit a brief notice of Garden Reach—the favorite place of resort to the modern inhabitants of Calcutta—and a position scarcely less unfortunate than that of the parent city, of which it may be said, indeed, to possess even now, all the original defects ascribed to the former by Orme, Lind and others; for, a little beyond the mere bank on which the houses are erected, all is marsh and rice ground. It is very strange, but nevertheless true, that all directions but this would have led to more salubrious positions:—the old ones of Allipore, Russeepuglah, Kossipore, Howrah; in short, any locality but that of Garden Reach, would have in some measure secured the objects in contemplation; whereas, it is probable that here, as elsewhere, the original faulty selection will lead to a total abandonment at no distant period, at an enormous sacrifice of property, health having, as usual, gone before. The bank occupied by the houses is lower than that of either Calcutta, Kossipore or Howrah, and the ground in every direction, to the very sea, is jungly, retaining much of the character given it by Orme—“sinking as it does about ten feet below the level of the place.”

Rice forms the entire cultivation, and the drainage is every where defective. Garden Reach, then, is necessarily malarious; and the concentrated effects of the salt water inundation of 1833, demonstrate the serious natural defects of the position, even as compared to the surrounding bad ones. Dr. Lind's mention of Barasette, Ghyruttee, &c. as places of resort to the inhabitants of his time, shews a better tact in those days, and that the buildings which look so inviting from the river, are of modern construction.

There are fifty-one houses at Garden Reach; which estimated at the moderate average of 40,000 rupees each, makes the very large sum of 20,40,000 Rs. or £204,000 Sterling. They are magnificent looking exteriorly, and generally commodious within; but they have all the faults

already detailed as belonging to the houses of Chowringhee ; viz. want of sufficient elevation, or arches, to the basements, a questionable aspect, and want of western verandahs.

APPENDIX No. 2.

It may appear to some persons that in what is stated at page 215 I have over-rated the influence on public health, of general knowledge and improved habits of life. I therefore quote the following observations by Tennant, made about 40 years ago, on the spot, with ample means of knowing the truth, and without any personal bias, or theory to support. They accord remarkably with those of Fodere, when he says—“ J’ai voyage, j’ai habité a dessein differens pays ; j’ai medite sur la condition des hommes dans les diverses circonstances de la vie ; j’ai vu qu’il etoit au pouvoir des gouvernmens de leur faire infiniment plus de bien que tous les livres de medicine ensemble.” “ In the wealthy departments of France, life is, on the average, protracted twelve and a half years beyond its course in those which are poor.”—HAWKINS :—*So much for the influence of habits of life.*

“ MODE OF LIVING AMONG THE MILITARY AND CIVIL OFFICERS.

“ *Cawnpore, Jan. 1798.*

“ The mode of living in this part of India has, within the last ten or fifteen years, undergone a very great alteration. Before that period the civil and military servants of the Company of the first rank were lodged in bungalows worse than those of a Subaltern of the present day : as the practice of feeding beef, mutton, pork, and poultry, was not then introduced, their tables were poorly supplied ; even vegetables were not to be had ; though an article indispensably necessary in this climate. These inconveniences were aggravated by a constant routine of irregularity. After dinner it was the usual custom to go to sleep, in the hottest time of the day ; from this every party was awakened in the evening, to partake of a supper, which protracted a drunken sederunt till a late hour of the next morning.

“ Amidst continued repletion, and frequent irregularity, the climate operated with fatal influence ; for trying as Bengal still is to almost

every European constitution, there was a time when it was deemed far more hostile. A reformation highly commendable has been effected, partly from necessity ; but *more* by the example of a late Governor General, whose elevated rank and noble birth gave him in a great measure the guidance of fashion. Regular hours and sobriety of conduct became as decidedly the test of a man of fashion, as they were formerly of irregularity. *Thousands owe their lives, and many more their health, to this change, which had neither been reckoned upon, nor even foreseen by those who introduced it.*

“ One species of dissipation often leads to others ; the late hours and hard drinking induced gaming, which prevailed to a degree ruinous to many individuals : the same nobleman, above alluded to, by giving this practice his decided disapprobation, and promoting such as refrained from it, has in a great degree lessened the habit, by bringing it into disgrace. Much dissipation, however, still remains.”

APPENDIX No. 3.

What has been said at pages 149-55 on the influence of habits on the health of the soldiery, has equal reference to the condition of the European invalids all over India, who are now, too often, cooped up in mouldering fortresses, released from all discipline, and allowed to spend the remainder of their lives in a condition discreditable alike to the European character, and that of the Government.

In Bombay, these men are allowed to reside wherever they please ; and the consequence is, that many of them become useful in agricultural pursuits, and in various trades.

Surely this is, on every account, the more desirable arrangement.

It has always been too much the habit with us to treat the soldier as if he were irrational, allowing him to do nothing for himself ; and there can be no doubt that this system has tended greatly to his injury, especially within the tropics. Even in matters affecting the moral and physical welfare of the soldier, orders should be framed so as that, in the words of Sir John Pringle, “ he himself shall not think them unreasonable, and such as he must necessarily obey.”

F I N I S.

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NOTICE OF MR. MARTIN'S "NOTES ON THE MEDICAL
TOPOGRAPHY OF CALCUTTA."

" Upon the moral, physical, and political condition of the inhabitants of Calcutta, European, native and foreign, Mr. Martin makes numerous and sensible remarks, which must be very interesting to our oriental countrymen, but which we cannot dwell upon here. The work must have cost the Author immense pains, as it goes most minutely into all the details and ramifications of medical topography—and not only so, but into the nature and treatment of the endemic diseases of the place.

The code of hygienic maxims for the guidance of European sojourners concludes the work, which is constructed with great labour, talent and judgment.

It presents an admirable specimen of what a treatise on medical topography ought to be."—*London Medico-Chirurgical Review*, No. 57, for July 1838.

