

Memoir of the life and medical opinions of John Armstrong, ... To which is added an inquiry into the facts connected with those forms of fever attributed to malaria or marsh effluvium / by Francis Boott.

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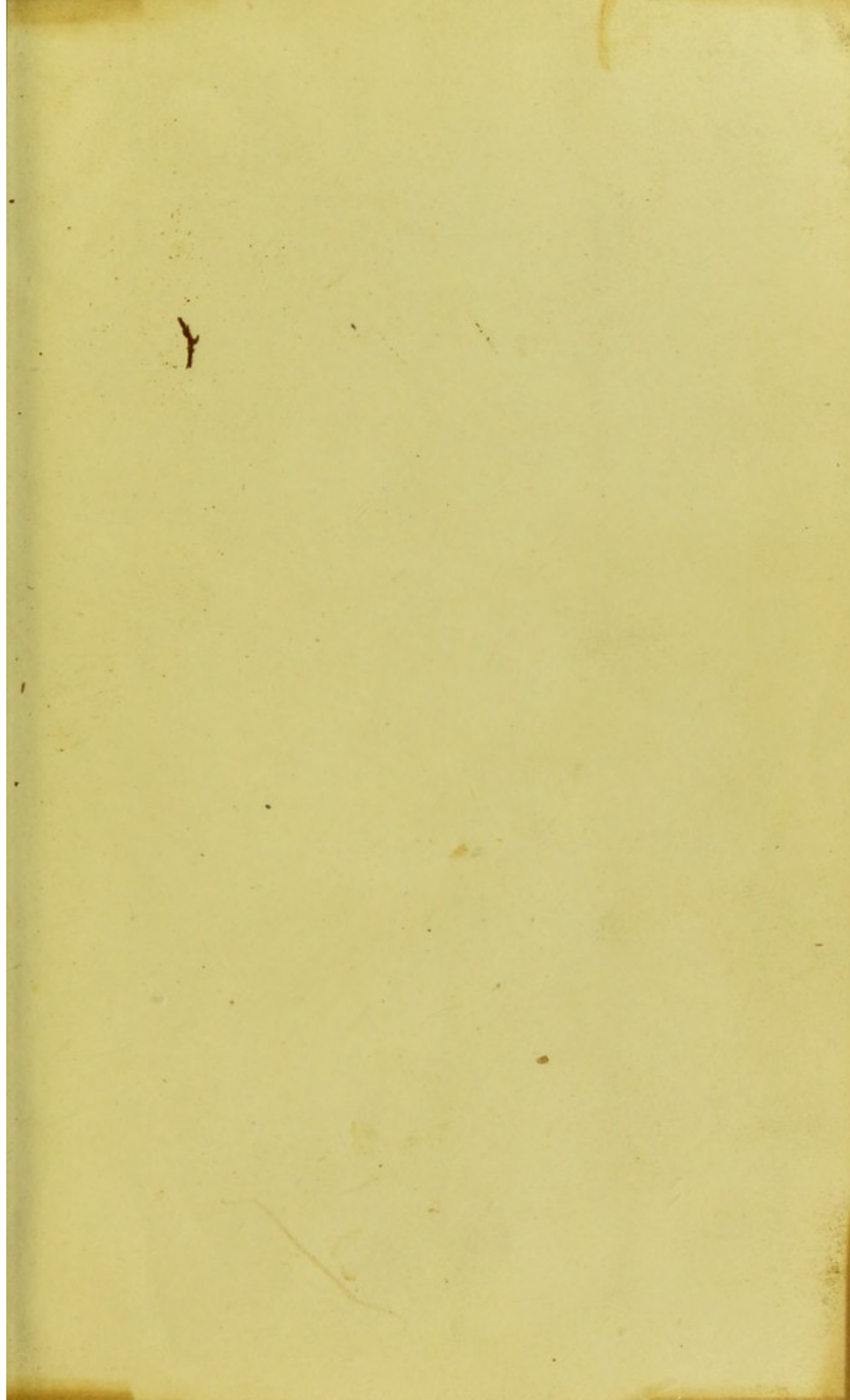
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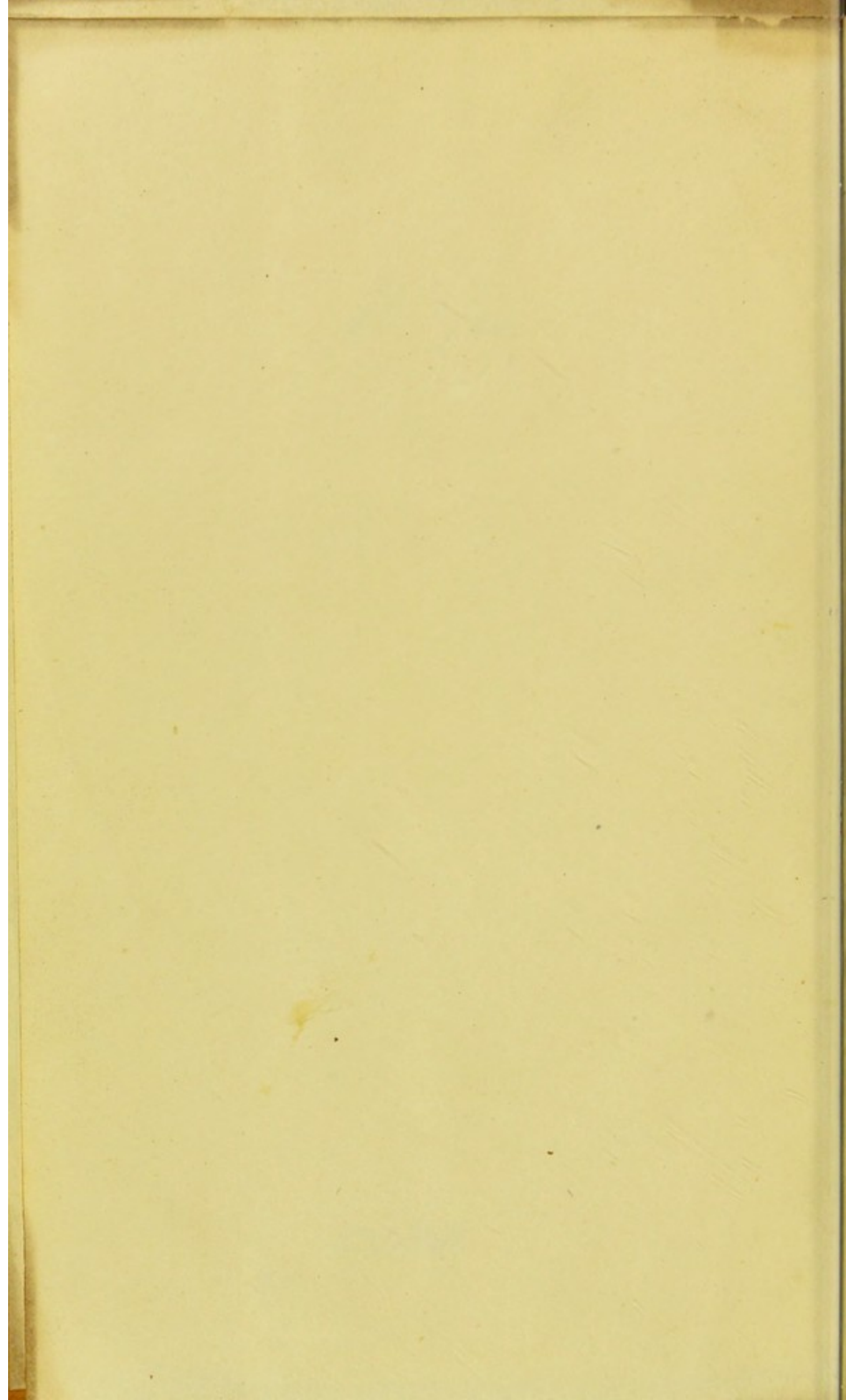


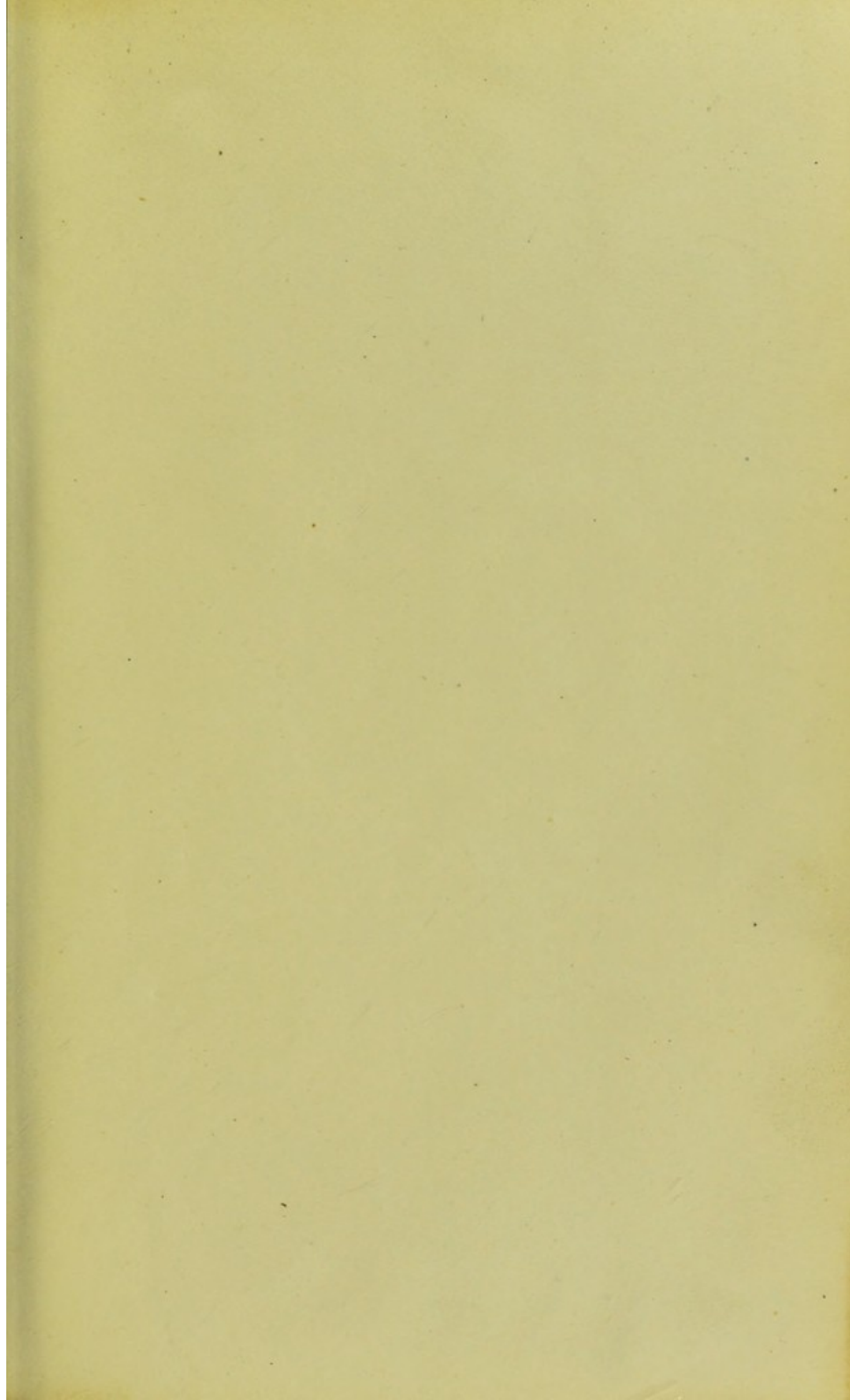
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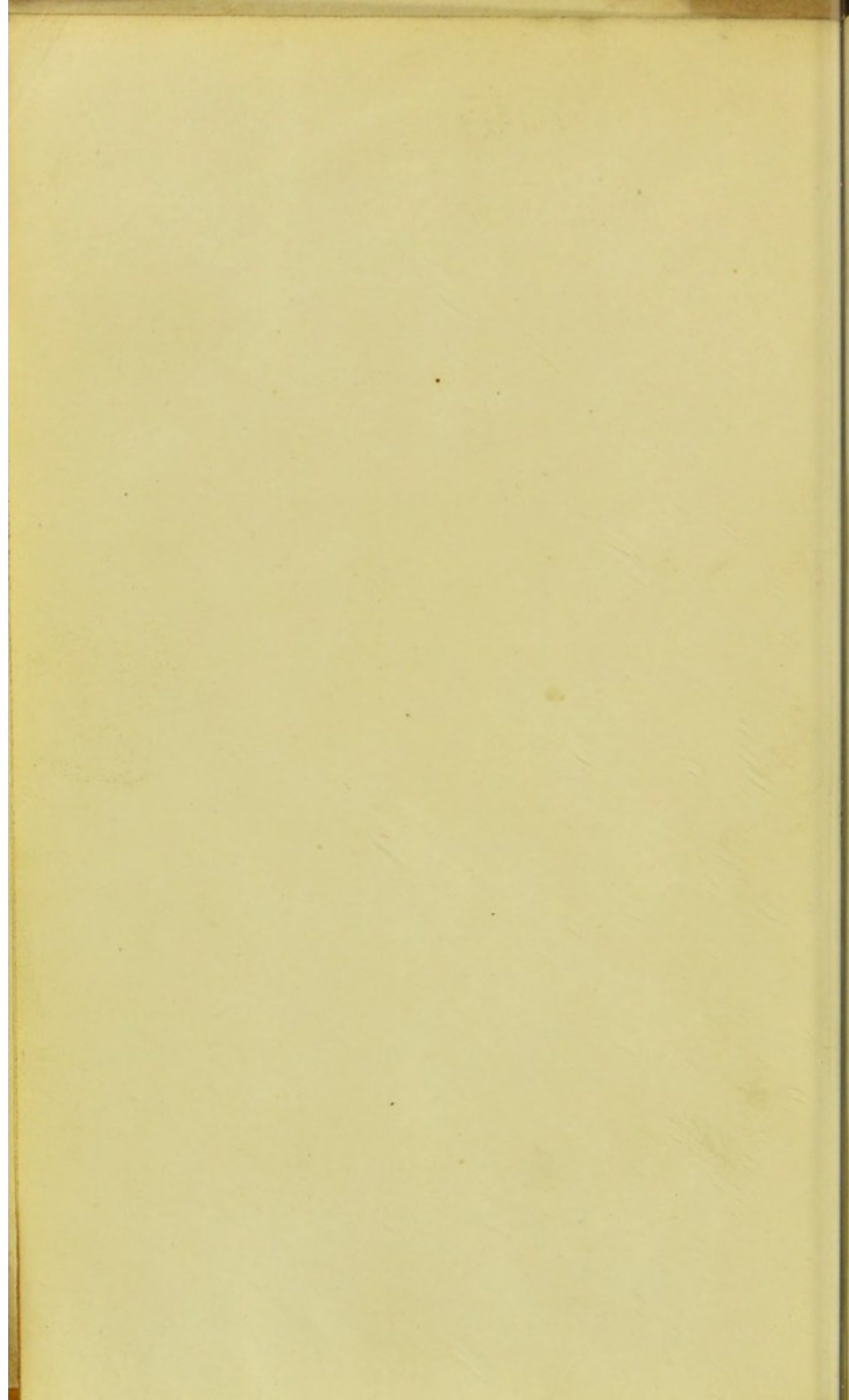
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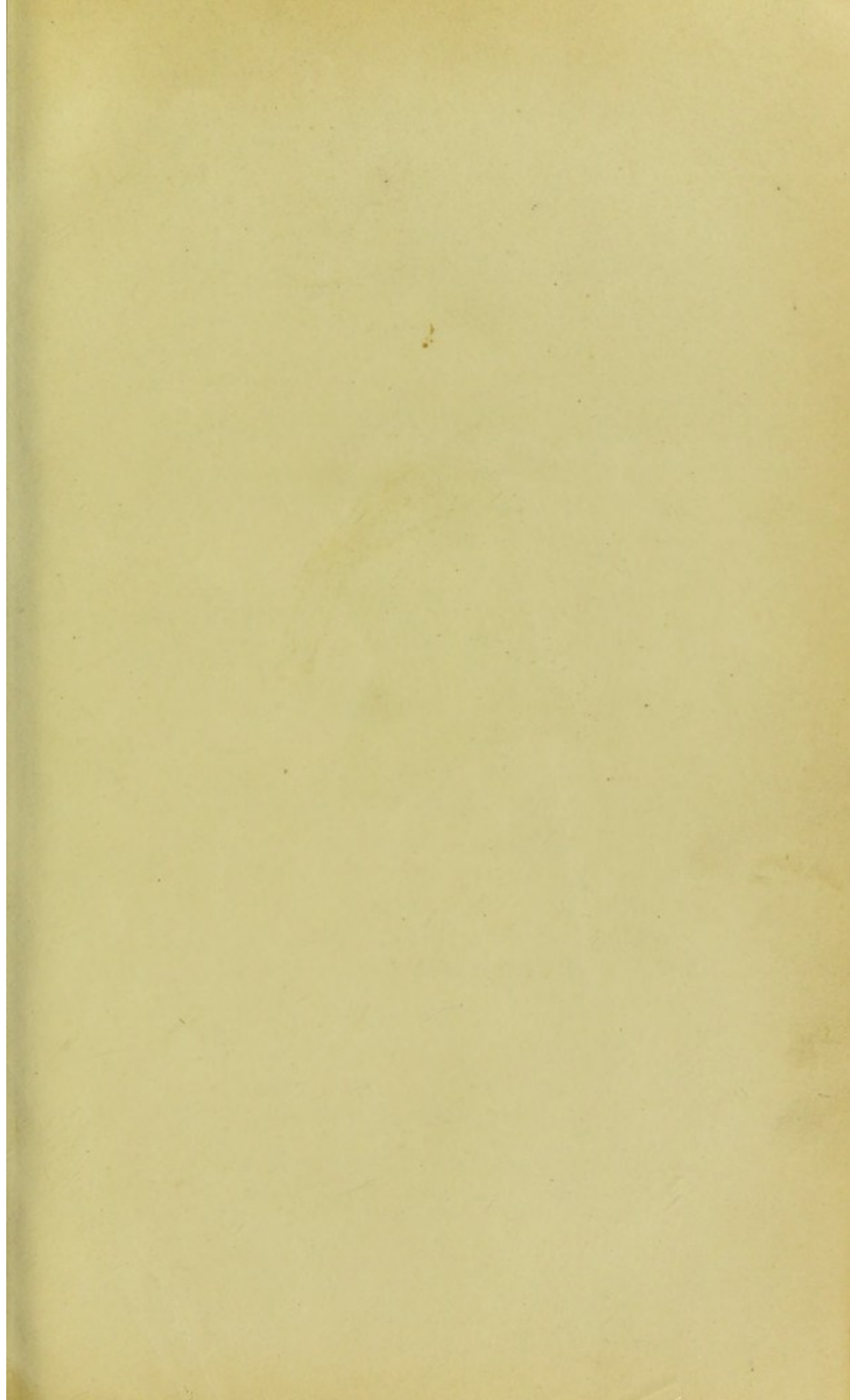
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John Armstrong

MEMOIR
OF THE
LIFE AND MEDICAL OPINIONS

OF
JOHN ARMSTRONG, M.D.

FORMERLY PHYSICIAN TO THE FEVER INSTITUTION OF LONDON;
AUTHOR OF "PRACTICAL ILLUSTRATIONS OF TYPHUS AND SCARLET FEVER;"
&c. &c.

TO WHICH IS ADDED
AN INQUIRY INTO THE FACTS CONNECTED WITH
THOSE FORMS OF FEVER ATTRIBUTED TO
MALARIA OR MARSH EFFLUVIUM.

BY
FRANCIS BOOTT, M.D.

SECRETARY OF THE LINNEAN SOCIETY;
HONORARY MEMBER OF THE MEDICAL SOCIETY OF MASSACHUSETTS.

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IN TWO VOLUMES.

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1833.

THE NEW

THE NEW

JOHN ALBERT

THE NEW

PRINTED BY RICHARD TAYLOR,
RED LION COURT, FLEET STREET.

TO
JOHN HODGSON, Esq.,
OF LINCOLN'S INN.

MY DEAR HODGSON,

PERMIT me to dedicate to you this attempt to do such honour as I can pay to the memory of our mutual and lamented Friend. No one knew him better, more justly admired his high powers of mind, and the goodness of his heart, than yourself.

To him I first owed your invaluable friendship. That I have maintained it unimpaired since his death, I owe to your respect for his memory, and to your generous affections.

For it, and for all the animating recollections of past time,

I am,

My dear Hodgson,

Your grateful and affectionate Friend,

F. BOOTT.

24, Gower Street, Bedford Square,
January 25th, 1833.

P R E F A C E.

THE subject of Marsh Fever having occupied, perhaps, the mind of Dr. Armstrong more than any other connected with his profession, I have been led, from a statement of his opinions as to its unity, to a general inquiry into its nature in America and Europe. I am well aware that little can be said upon it that has not been repeatedly urged by writers in all countries ; but I have thought a statement of facts would best elucidate its variable character, and contribute something towards the settlement of the question, whether its remote cause is simple or complex.

In the present volume I have offered a view of the fevers of America, from the latitudes 32° to 45° ; and have made use of such

sources of information as I possess to show that their types are probably connected with temperature.

In the second volume I shall examine the fevers of Europe, from the time of Sydenham.

The fevers of North America are peculiar in one respect. They attack a people living under the same laws, and with similar customs, from an almost tropical to an almost arctic region. I have traced them progressively from South Carolina to the borders of Canada, as they prevail in the interior and along the sea-coast.

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MEMOIR

OF

JOHN ARMSTRONG, M.D.

FEW incidents capable of exciting a lively interest can be expected in the life of a medical philosopher. That of the eminent physician whose worth is to be recorded in the following pages, presents little to gratify the curiosity of those to whom his professional opinions are matters of indifference. But, however barren of those eventful circumstances which give a charm to the biography of many men, it will be admitted that some record is due of one whose labours were directed to the promotion of the common good of mankind, and whose sagacity has thrown light on the nature and treatment of human maladies.

The author of the following notice of the life and opinions of Dr. Armstrong, is incompetent to do justice to his memory; and he unaffectedly laments that the duty imposed upon him has not fallen to abler hands. He sees in it an additional evidence of the designs of an inscrutable Providence, which in so many ways exhibits to us the nothingness of

the honours of this world ; for how many great and good men pass away, and leave their fame to be ineffectually recorded by those who in no respects were participators of their thoughts and actions, and who, though animated by the fondest recollections of their excellence, could not conceive of those high motives, nor perceive those far-reaching views which belong exclusively to genius.

When a man of commanding intellect dies, there perishes with him much which can never be recorded ; for we cannot see by the light which illumined his mind alone. It is only a few partial reflections from it, of which we can avail ourselves ; and these are wholly inadequate to convey, to those who have never known him, the full effulgence of that intelligence which shone by its own un-borrowed light.

John Armstrong, the author of the celebrated works on Fever, was born on the 8th of May, 1784, at Ayres Quay, in the parish of Bishopwearmouth, in the county of Durham.

His parents were of humble origin. His father Mr. George Armstrong was the son of an husband man, who lived at Blacker Mills, on the Derwent, about twelve miles above Newcastle-on-Tyne, and who removed, when his son George was eight years of age, to Ayres Quay.

The father of the subject of this memoir was bound to the proprietors of the Ayres Quay glass-works, and after the expiration of his apprenticeship, remained in the same employment, as manager of the concern. He afterwards became superintendent to the glass-works of Mr. Marmaduke Featherstonhaugh,

at Deptford, near Sunderland, in whose employment he died, in 1815. He appears to have been a man of superior natural abilities, and of so much ingenuity and integrity, as to have been highly valued by his employers, though he had received no education.

He married a Miss Anne Robson, of Sunderland; and it is to the maternal tenderness and sagacity of this excellent woman, that the world is indebted for the advantages derived from the labours of her son.

Several children were the fruits of this marriage, but the only one who survived was the subject of this memoir. He was sent at an early age to a school on Bishopwearmouth Green, kept by a Mr. George Wharton, but removed, when eight years old, to the care of the Reverend Mr. Mason, a minister of the United Secession Church of Scotland, who kept a small school in Queen Street.

It would seem that the education of the son had hitherto been as much neglected as that of the father, for he had failed to acquire with Mr. Wharton even the humblest rudiments of knowledge. The relict of Mr. Mason informs me that "when John first attended their school, he was considered by his friends as incapable of learning anything, for he could not read; but that his backwardness appeared to be from improper teaching, as his progress under Mr. Mason in six months was very great. He could by that time read distinctly; and after he found that he could learn, he studied the English language, Latin, Greek, and mathematics; and having acquired a confidence in himself, his delight seemed to be to excel in everything to which he turned his attention. He left

school about the age of 16; but during his vacations at Edinburgh, he constantly attended Mr. Mason, that he might have his assistance in his studies, except those which related to his profession."

On leaving Mr. Mason he was placed with a Mr. Watson, a surgeon and apothecary, at Monkwearmouth, on trial, having shown an early inclination for the medical profession; but not liking his situation, he left it, contrary to the wishes of his parents, and remained at home for two or three years.

This desultory mode of life was, however, as distasteful to him as that he had abandoned; and having given proofs of superior abilities, and exhibited a taste for literature, it was determined that he should go to Edinburgh, and study medicine, as offering to his parents the readiest prospect of establishing him in the world.

During the interval of his leaving Mr. Mason's school and his entering as a student at Edinburgh, he formed many visionary schemes for his future life; and one which he often told me had fixed itself most strongly on his mind, was to go to London and seek employment in some literary occupation. He early showed a taste for poetical composition, and wrote several fugitive pieces which attracted the notice of his companions. He frequently mentioned to me that, while he was uncertain of his future career, he meditated writing a tragedy on the story of Boethius, whose character and fate, as recorded by Gibbon, had made a strong impression on his mind, and that he had entered so far upon this ambitious attempt as to sketch out a

plan of the work, and an outline of the principal characters. This idea I think never entirely deserted him, for he often spoke of it, and seemed to wish for some relaxation from the anxious duties of his profession, that he might indulge in literary pursuits.

Mr. Armstrong was not insensible to the promising abilities of his son; but it was to the prudent management and œconomy of his wife that they were indebted for means to defray the expense of a professional education: and for this instance of his mother's tender solicitude, Dr. Armstrong was ever most grateful. He often assured me that he owed everything to her, and he never spoke of his mother without betraying a deep sense of the obligations which her self-denial had imposed upon him. So much did he impress me, in our early intercourse, with an admiration for the character of this amiable woman, that I visited her grave some years ago, from the respect which her maternal worth had excited in my mind. He had placed, before he left the North of England, a simple tablet to her memory and to that of his father, on a tomb belonging to the Robson family, in Sunderland church-yard.

It must have been at the age of 18 or 19 that Dr. Armstrong left home to enter as a medical student in the University of Edinburgh, where he resided three years. He had previously had no advantages of education but those which he enjoyed under the care of Mr. Mason, and the circumstances of his family were too limited to allow of his even now unnecessarily extending the range of his studies.

He practised the most rigid œconomy while in Edinburgh, absorbed in his professional pursuits; passing his vacations at home, where he again sought the assistance of his early instructor, in the prosecution of his general studies.

He took the degree of Doctor of Medicine in June 1807, having written a thesis "*De Causis Morborum Hydropicorum, Rationeque iis medendi,*" which was dedicated to John Anderson, Esq. He had previously, on the 5th of May, passed an examination at the Royal College of Surgeons in Edinburgh, and is consequently termed "*Chirurgus*" in the official entry in the University books. His health, previous to his leaving Edinburgh, or soon after, gave rise to much solicitude in his own mind and to his friends, but I am not aware of the precise nature of his malady. I believe, even at this early period, that it indicated a tendency to consumption; and if so, his case would appear in some respects analogous to that of the celebrated Dr. Currie, except that the recovery of Dr. Armstrong was perfect, for he enjoyed very vigorous health till within three or four years of his death.

In the same year he settled in lodgings at Bishopwearmouth. He removed in a short time to Sunderland, where he continued to practise for some years, till he was finally enabled to take a large house in the former parish, which immediately adjoins Sunderland.

He was now in a situation favourable for the development of those powers of observation and correct reasoning on medical subjects for which

he afterwards became so distinguished. He was established in practice as a physician in his native town, and had all those powerful inducements to industry which the condition of his parents and his own wants supplied. His early education had been of the humblest kind, and conducted under every disadvantage, from the necessity of his practising the strictest œconomy. But, however limited his opportunities of improvement had been, I cannot but consider that his education was eminently calculated to bring forth the original powers of his mind. It certainly had a very sensible influence on the development of his character, which was remarkable for a peculiar simplicity and almost diffidence of manner in general society, even to the period of his full success and reputation in London.

His example may be added to those of other distinguished men, who have received a private education, which is so well calculated to preserve the mind in its original simplicity, and to afford it the freest opportunity of exercising its powers unshackled by the influence of established modes of thought. He had been educated under the direction of a Scotch clergyman; and after some years of desultory study, during which he appears not to have formed any fixed plans for the future, he entered as a medical student at Edinburgh, under circumstances which required that he should pass through the usual routine of study as speedily as possible, that he might relieve his parents from the pressure which his education and support imposed upon them.

At the time of his entering the University of Edinburgh, the chief ornament of that celebrated

school of medicine was Dr. Gregory, the author of the classical "*Conspectus Medicinæ Theoreticæ*," a man perhaps more distinguished for elegance of mind than for any originality as a teacher. Dr. Armstrong always retained a very grateful sense of the urbanity and benevolence of this amiable and eloquent Professor; but he considered his mode of instruction as too scholastic, and too much devoted to those views which the celebrity of his predecessor, Dr. Cullen, had established in the University.

The Professors at that time belonging to the medical department of the University, were:—

Dr. Gregory, Prof. of the Practice of Physic.

Dr. Duncan, sen., Prof. of the Theory of Physic.

Dr. Munro, Prof. of Anatomy and Surgery.

Dr. Home, Prof. of Materia Medica.

Dr. Hope, Prof. of Chemistry.

Dr. J. Hamilton, Prof. of Midwifery.

Dr. Rutherford, Prof. of Botany.

Besides these distinguished men connected with the University, the medical student was enabled to profit by the practice and long experience of the celebrated Dr. Hamilton, the author of the work on Purgative Medicines, and by the lectures of Dr. John Murray on Chemistry, a man whom Dr. Armstrong considered as the most eminent, for talent, of all whom he had known in Scotland. He always cherished a very high degree of respect for Dr. Hamilton, whose practice in the Edinburgh Infirmary he regularly attended, independent of the clinical lectures delivered by the medical professors of the University; and I have always thought that

the example of Dr. Hamilton's independence of mind, in bursting the shackles imposed upon the profession by speculative authority, and in striking out a new and bold practice in many diseases, operated very powerfully upon the opening mind of Dr. Armstrong, and led him to follow in the steps of that distinguished physician, and to rely upon his own resources.

An anecdote connected with Dr. Hamilton, which I have frequently heard related by my late friend, is so highly honourable to that eminent man, and so illustrative of the advantage which his precepts and practice had produced on the mind of his pupil,—then in the outset of that independent career which he afterwards ran so successfully,—that I cannot omit mentioning it here.

During the time of Dr. Armstrong's residence in Edinburgh, he had formed an intimacy with a young gentleman of Sunderland, about his own age, who had resorted to the University for general education. The father of this gentleman had laboured for a period of nearly two years under an occasional, and what had been considered an anomalous, attack of diarrhœa, which had resisted all the skill of his medical advisers. On Dr. Armstrong's settling at Bishopwearmouth, this person, who was affluent and much esteemed in the town, was earnestly solicited to consult the young physician, in whose talents the son had expressed an implicit confidence. After some persuasion, Dr. Armstrong was called in; and conceiving from the history of the case that it was one of overloaded bowels, and that the occasional diarrhœa was the effect of an

irritation thus established, and an effort of nature to throw off the offending cause, he advised a mild course of laxatives to be steadily persevered in, until the motions were of a natural character. His advice was followed. In a day or two, Dr. Hamilton stopped at Sunderland on his way into England, and Dr. Armstrong hearing of his arrival, waited on him to explain the case, earnestly soliciting him to see the patient. Dr. Hamilton firmly resisted the proposal, and gave as his reason that the practice recommended was undoubtedly correct, and that the issue of it would be fortunate. "It will gain you credit," he said; "but if I am consulted, the recovery will be attributed to my counsel and longer experience, when all the merit in reality will be due to your own sagacity. You have ascertained the cause, and you see its effects, and have only to wait the sure operation of the only means of relief that can be recommended under the existing circumstances. Take the advice of an old man, and avoid consultations in all cases where you feel satisfied that you understand the nature of a malady, and that this at once suggests a simple and effectual remedy."

In a short time the patient was restored to health, and, by following the counsel of his young medical adviser, he had no relapse afterwards. He was in the habit of riding about the town on a pony, and was so sensible of the relief which he had obtained, that the praises of Dr. Armstrong were ever on his tongue; and my friend has often assured me, that the recommendations of this gentleman alone established him, at once, in a practice of about 200*l.* a

year. From the period of his settling in Bishopwearmouth to 1812, I have little to detail of his mode of life, which, no doubt, presented the usual uniformity of the medical career.

In January, 1811, he was elected physician to the Sunderland Dispensary, and he continued to discharge the duties of that office during his residence in the North of England. His success in his profession had enabled him to set up a carriage, and to remove to a large house in Bishopwearmouth; and soon after, in the year 1811, he married Sarah, the eldest daughter of Charles Spearman, Esq., of Thornley, near Durham, a magistrate of the county,—a connexion which was productive of the most perfect happiness to him.

In the following year he first began to make his name known beyond the limits of his own circle, and to enter upon the æra of that high reputation which his writings have secured to him among the profession in this country and in America.

His first publication was a short paper on the Brain Fever produced by Intoxication, communicated to the Edinburgh Medical and Surgical Journal, then edited by the late learned and excellent Dr. Duncan, jun. It bears date November 13, 1812, and was published in the Number for January, 1813. This was followed by another paper on the same subject, in the succeeding Number for April in the same year, in which a case is fully detailed, with some very judicious observations on the nature of the malady, which, in the example referred to, invariably arose in the collapse succeeding to the excitement of spirituous liquors.

Dr. Armstrong remarks, that the disorder is always preceded by watchfulness and fever, and that the subsequent delirium, in its rise and progress, appeared to him more like that which proceeds from hunger, in persons previously healthy, as sometimes happens in mariners, than any other kind he had seen.

Having once ventured before the public as an author, he appears to have suddenly felt the ambition of arriving at distinction in his profession; for in this year, besides the papers alluded to, he contributed another to the same Journal, on Cases of Diseased Cervical Vertebrae; and in December he completed his "Facts and Observations relative to the Fever commonly called Puerperal," a work which was dedicated to his friend Dr. John Ramsay, of Newcastle-upon-Tyne, a gentleman whose talents and character he much admired, whose gentleness of nature and elegance of mind were in every respect congenial to his own, and whose distinguished reputation as a physician rendered him the fittest patron of his work.

The occasion which led Dr. Armstrong to the consideration of this formidable disease, was its unusual prevalence in the practice of his friend Mr. Gregson, surgeon of Sunderland, who, from January to October, 1813, met with many cases in his private practice. Some unfair insinuations had, I believe, been thrown out against Mr. Gregson, from the disease occurring so frequently in his practice, as compared with that of his associates; and it was to rescue his friend from the injurious effects of these remarks that Dr. Armstrong was

originally induced to pay particular attention to the subject. The work which ensued from his attendance upon a majority of these cases was the first of that important series which he successively published on Fever. He always expressed, to the close of his life, a partiality for this performance, probably from the agreeable associations connected with it, as that which first efficiently brought his name into public notice, and procured for him the approbation of his professional brethren.

In this admirable essay he remarks, "From accurate documents now before me, it appears, that from the 1st of January to the 1st of October, 1813, forty-three distinctly marked cases of puerperal fever have occurred to five practitioners residing in Sunderland and the adjacent parishes of Bishopwearmouth and Monkwearmouth. Four of these gentlemen I met in consultation on different occasions; and I can assert, upon the testimony of them all, united to my own, that only five cases out of the whole number terminated fatally. By comparing these facts with the reports as to the general fatality of puerperal fever, and by examining the evidences contained in the Appendix, the superior advantages of the practice pursued will be fully apparent."

A critic in the *Edinburgh Medical and Surgical Journal* remarks: "This extraordinary success we would willingly attribute to the active and well-timed practice of Dr. Armstrong and his brethren of Sunderland, though we are aware that some may be disposed to suspect, that the greater number of the cases were not examples of the low child-bed

malignant puerperal fever. It must be recollected, that Dr. Armstrong acknowledges the disease to have been, in the beginning, more inflammatory; and that he considered the ordinary cases of puerperal peritonitis to differ not in kind, but in degree only, from the low puerperal fever. In both, he considers the inflammation of the peritoneal covering as the essential part of the disease; and his object is to show, that the same depletory and antiphlogistic method is applicable to both,—that, indeed, from the more rapid course and more fatal tendency of the low puerperal fever, these powerful remedies became the more indispensable; and that it is only by an early and vigorous use of blood-letting and purging, in the first stage, that the disease can be cut short before passing into the second and destructive stage, from which few or none can be recovered by any method. In this stage, indeed, blood-letting could only hasten the fate of the patient.”

Dr. Armstrong's views of the nature of this formidable disease remained essentially unchanged to the close of his life; for he considered it to be one of a highly inflammatory kind, modified only by the nature of the exciting cause, as this was common or specific. In the essay alluded to, he remarks, that “the first stage is marked by highly inflammatory, the second by highly typhoid characters, and it has always appeared to me that the tendency to putridity, in the latter, was proportionate to the degree of inflammation in the former.”

He made, afterwards, no distinction between

puerperal peritonitis and what is called in the above extract from the Edinburgh Journal, the "low malignant puerperal fever," but that which depended upon the nature of the exciting cause. He considered that in all cases of parturient women there was a predisposition to peritoneal inflammation, and that this might be developed by the common, or the peculiar exciting causes of fever. If the disease arose from a local contamination of air, as in the crowded wards of a hospital; or from a general distemperature of atmosphere, as in examples of its epidemic prevalence in private practice, especially among the poor of cities,—he looked upon it as a specific fever, as typhus, in fact, combined with the local inflammation to which the patient was peculiarly predisposed: and those cases in which from the first the pulse was soft and compressible, and the heat on the surface not above the natural standard, he considered as almost inevitably fatal. But when the pulse was strong, and the heat high, he believed that the case was generally as much under the controul of decisive venesection, when it arose from a peculiar, as from a common cause. His practice in this, as in most inflammatory diseases, was modified eventually by his discovery of the advantages arising from the free use of opium after full depletion; so that towards the close of his life he did not exhibit calomel as freely as formerly, though he always used it in the specific form of the disease.

The critic I have already quoted, in speaking of the work on puerperal fever, says "This essay is well written and well arranged. It contains much

important observation, and many judicious remarks; and though we think there is still something wanting to complete our knowledge of the pathology of puerperal fever, we give to Dr. Armstrong the praise of having disencumbered the subject from much of its rubbish."

In the following year he communicated a paper to the Edinburgh Journal on a case of "Cynanche Laryngea successfully treated" in a girl ten years of age; and also one containing "Additional facts and observations relative to the Puerperal fever," in which he notices some communications made to him on the subject in consequence of the publication of his work.

In 1815 the last contribution which he made to that valuable Journal appeared in an essay containing "Brief hints relative to the improvement of the pathology and treatment of those chronic diseases usually termed nervous," which he thinks are generally secondary affections, inseparably connected with disordered circulation; and that if fixed principles as to their treatment are ever to be attained, it must be accomplished by extending our views beyond the nervous system to other textures; for that it will be found on examination they depend upon venous congestion or inflammation, and their consequences, or upon some disorder of function or structure in the viscera of the three great cavities; an idea which has since been fully verified in many cases by the researches of later pathologists.

His mind was now fully engrossed on the subject of fever, the correct views of the nature and

treatment of which had been forced upon him during his attendance on the cases of puerperal fever, considered as one of a common inflammatory type, or as a specific disease: and certainly no form could have presented itself to his discerning mind more calculated to shake his faith in the received doctrines of the schools as to the inherent debility of what were called low and malignant fevers. The urgency and the number of these cases must have awakened all his energies, and suggested the application of the sagacious doctrines of Sydenham, which are, in all forms of fever, so conformable to the instincts of nature and the dictates of common sense. The intensity of the symptoms and the urgent necessity of immediate means of relief, must have roused him to a full consciousness of the inefficiency and hopelessness of the usual practice; and the success which followed the depleting plan, in what he considered the most formidable of malignant fevers, must at once have confirmed him in the conviction of its being the only one that in similar cases promised either safety to the patient or satisfaction to his own mind.

The favourable reception which his work on Puerperal Fever met with, encouraged him to extend his views further; and in 1816 his celebrated work on Typhus appeared, which he dedicated to his friend Dr. J. R. Fenwick of Durham, a gentleman for whose high powers of mind he ever entertained a most profound respect. This admirable work at once raised him to a very high eminence in his profession. It passed through three large editions in three years, and was received almost with accla-

mation by the medical public, not only in this country, but throughout America, where it obtained for him, from some of the most eminent professional men, the name of "the modern Sydenham."

It was characterized as a work abounding "in judicious reflections, refined distinctions, and practical illustrations of the highest importance*".

In this treatise he fully demonstrated the efficacy of bloodletting in the early stage of typhus, and proved that the signs of debility and malignancy towards its close were, as in puerperal fever, in proportion to the degree and duration of the previous inflammation. He distinguished with admirable precision the different forms and stages of the disease, and established principles of practice on a rational and philosophical basis, which have for ever banished the doctrine of debility being from the first inherent in typhus fever. He substituted facts in the place of theory; restored observation to its just preeminence over preconception and conjecture; and by his clear discrimination of the different pathological characters of the varieties of the same disease†, and of their distinct and appropriate treatment, has given a confidence to the mind of the practitioner which the specious simplicity of nosological definition, the false doctrine of inherent debility, and the consequent necessity of resorting to the use of stimulants, had and must ever have failed to produce. He instituted a precise but variable, for an indiscriminate and exclusive practice; made

* Edinb. Med. and Surg. Journ. vol. xiii. p. 108.

† See Bateman's Succinct Account of Typhus; 2nd edit. 1820, sect. 3.

opposite agents under different circumstances contribute to the removal of the same malady ; marked with distinctness the symptoms of its varieties, the indications of their origin, progress, and termination ; showed when and how far the active resources of art against venous congestion or inflammation may be safely applied ; in what manner they must be proportioned to the existing state, and when safety alone depended upon a reliance on the unassisted resources of nature.

“ We have,” says the Edinburgh Journal, “ the highest opinion of Dr. Armstrong’s talents, and of the practical value of his writings. His admirable work on Typhus, now stamped by the broad seal of public favour, has doubtless contributed very essentially to diffuse those improved and enlightened views of the pathology of fever which have gradually been obtaining for a number of years past, but which, until very lately, have been confined to the higher and better informed classes of the profession : indeed, we have observed with pleasure that there is scarcely a practitioner even in our most sequestered villages who has not read Dr. Armstrong, or who does not profess to act upon his maxims. When an author of such judgement becomes popular, the circumstance is as creditable to the discernment of the great body of the profession as it must be useful to the well-being of the public at large.”

The situation of Dr. Armstrong at this period of his life, as compared with its opening prospects, affords one of the most animating encouragements to the pursuits of a laudable ambition that this

world can offer. From a lowly origin, and what would generally be considered a very humble education, he had attained to an enviable preeminence in the profession he had chosen ; and by a sagacious observation of the phænomena of disease, had educated himself to a degree of knowledge which no existing institution, with all its promise of literature or science, could have bestowed upon him. He had appealed from human testimony on the subject of fever to the operations of nature ; and from a patient observation of her laws had acquired some perception of the principles which regulated them, by which he had created within himself the power of instructing others in the truths he had discovered, and of reflecting abroad the light which had dawned upon his own mind. From an unpromising station in society, in which he at first doubtingly aspired to the confidence and support of the public, unsupported by affluent family connexions, and unaided by those powerful friendships which many men of humble origin form with their superiors in rank and fortune at the large English schools and universities, he had raised himself, by the buoyant energies of his own mind, to a high intellectual rank of life, which not only conferred dignity upon himself, but reflected honour on those who had gone down with unconscious distinction to the grave.

Dr. Armstrong's father alone survived to see the acknowledged merits of his son ; and it may be said that he lived only to see them, for he died a short time before the publication of the volume on Typhus fever. She to whom so much was due, an

who, if the rewards of virtue were to be expected in this world, should have survived to witness the maturity of those talents she had fostered with maternal tenderness and hope in the lowliness of their early nurture, had long been at rest. Mrs. Armstrong died in 1812, before her son had published anything, but certainly not before a mother's sagacity had blessed her with the assurance that she had not lived in vain.

The success which his volume on Typhus met with from the public organs of criticism soon prompted Dr. Armstrong to wish for a more extended field of practice, and he determined to remove to London. This hazardous step, however, was not taken hastily. He had met with success in his provincial practice, but the expenses attending a physician's life had not enabled him to save means sufficient for the support of his family in so expensive a place as London before his name should have become known in that vast metropolis. Still the prophetic promises of hope urged him to make the trial; and notwithstanding the doubts and apprehensions of many of his friends, he finally determined to remove from Sunderland.

In October 1817 he resigned his situation as physician to the Sunderland Dispensary; and in February 1818, after placing his wife and his two children in lodgings at Durham, he repaired to London, with no other recommendation than that which his works and reputation afforded him.

He took lodgings at No. 38 Great James Street, Bedford Row, where he resided several months alone. This was the most trying period of his life.

All those domestic sympathies upon which he so much depended for happiness were far removed from him, and he felt as it were alone in the world, anxious about his present and uncertain of his future fortunes. He never, to the close of his life, courted general society, and had few inducements to mix in public amusements; for his tastes centered in his professional pursuits, and his enjoyments in the bosom of his family, and in the familiar society of a few personal friends. His sensibilities were acute, and his mind simple and discerning in its instincts and desires. He had left a society to which he was attached by the ties of gratitude; and in the oppressive solitude of his present situation he keenly felt the loss of his early friends, and became fully sensible of the hazard to which he had exposed the interests of his family. He has often told me that the loneliness of his situation at times overpowered him; and that so oppressive was the busy scene around him in which he stood a stranger, uncared for and unknown, that he sometimes found relief in tears, and tried to drown the consciousness of sorrow, by seeking sleep in his darkened chamber at noon.

The energies of his mind however sustained him, and he soon rose elastic from this temporary pressure. A short time after his arrival in London he published his "Practical Illustrations of the Scarlet Fever, Measles, Pulmonary Consumption, and Chronic Diseases, with Remarks on Sulphureous Waters." The Dedication of this volume to his friend Dr. Wightman bears date December 15th, 1817; but the Preface is dated from his lodgings in

Great James Street, February 26th, 1818; and it passed through a second edition in the same year.

This volume had less of novelty than that on Typhus, but it fully maintained the reputation which he had previously acquired. "We are at no loss to discover in it traces of the same master-hand, of the same talent for observation,—the same fidelity and liveliness in the delineation of disease,—the same ingenuous modesty in the reprobation of old, or the exposition of new doctrines and practices."

"Though our analysis," says a writer in the *Edinburgh Journal* *, from whom the above extract is taken, "has run to so considerable an extent, we can assure our readers that we have given a most inadequate view of this valuable volume. Everywhere crowds of important observations have been unavoidably passed over. It is an excellent and a practical work. Our opinions in regard to it were derived from a diligent perusal of the first edition; and although a second has appeared before they could be laid before our readers, we do not find any considerable improvement, nor could we expect it. We trust, however, that this almost unprecedented success will stimulate our author carefully to revise it." He had thus within four years, from December 1813 to December 1817, published his views of the nature and treatment of some of the most important varieties of fever.

His volume on Typhus was not confined to that disease, but contained some very valuable essays upon other subjects. In one of these he endeavours to show an analogy between it and the Plague, as

* Vol. xix, pp. 265 and 281.

both appear under the modifications of a congestive, an inflammatory, and a simple fever, requiring the same principles of treatment as those which he had proved to be applicable in typhus. He believed at this time that these diseases, which bore so close an affinity to each other, owed their origin equally to contagion,—an opinion which he afterwards abandoned, or rather modified; for towards the close of his life he felt convinced that malaria was the primary source of typhus, while its contagious nature was very questionable; and he adopted similar opinions with respect to the plague.

In another essay on “Common Continued Fever and its various modifications,” he treats of what he afterwards termed *common* as distinct from *specific* fever, and shows, “by a legitimate generalization, that it may be made to embrace most of those disorders marshalled under the phlegmasiæ of modern nosology.”

In a separate treatise on “External and Internal Inflammations,” he points out the necessity of attending to their degree, as “in the common systems of nosology, and works on the practice of physic, no notice has been taken of the subacute forms of visceral inflammation;” and he afterwards particularly considers dysentery, inflammation of the larynx, erysipelas, rheumatism, ophthalmia, and tic douloureux.

His observations on “Insanity” are to show that it is occasionally a primary disorder of the brain, or secondary to some remote irritation; and that, like apoplexy, it is sometimes acute or chronic,—the acute forms being ushered in with the symptoms of

congestion or excitement,—and consequently are to be treated on the principles appropriate to these modifications of the febrile condition. In the chronic forms it is most important to attend to local irritations, which may exist in the brain, or may affect it indirectly. “When an affection of the liver, or indeed of any other remote organ, operates on the brain, so as to produce ultimate madness, this operation is not direct, but indirect; for the affection of the remote organ proves an irritant to the heart, the increased action of which excites the mania, by propelling the blood too powerfully towards the brain. Or the return of venous blood being interrupted through the remote organ, as may happen in cases of congestion of the liver, the circulation of the brain is thereby mechanically affected, and madness succeeds.” He considered that this ultimate effect depended upon an antecedent predisposition in the brain, as, “the more we inquire,” he says, “into the history and pathology of diseases, the more we shall be convinced that latent and local predispositions determine the seat and character of the symptoms; for though these predispositions may exist under ordinary states without producing disturbance, yet when the system receives any shock, the effects of that shock will be concentrated in the weakest part.”

In a paper on the “Brain Fever of Drunkenness,” he enlarges on the observations which he published in the *Edinburgh Journal*, in 1812. He considers the disorder to form a connecting link between mania and fever, and to be accompanied with partial congestions of the brain and liver, from which,

together with nervous irritation, it perhaps derives most of its peculiar characters.

In this, as in all his other writings, he displays those fine powers of observation, and that nice discrimination, for which he is so justly admired, and which render his opinions, however little in accordance with those of other eminent men, entitled to respect and an impartial consideration, as those of a candid and, at the same time, of a very powerful and original mind. He had been indebted to Dr. Pearson's publication in 1801 for a knowledge of this singular disorder, which "has not yet obtained a place in our systems of physic." That gentleman, in a second edition of his tract, spoke highly of the use of opium, but Dr. Armstrong had not found it indiscriminately applicable. He remarks, that "the peculiarly irritable state of the nerves induced by previous habits, the collapse of the system at the time of sickening, the venous congestions, and the subsequent efforts of arterial excitement, all tend to produce and modify the phænomena of this disease. In very confirmed, old, or enervated drunkards, the general collapse of the system, at the time of the attack, seems to prevent the development of anything like an equable excitement; and we find the heat of the surface in that fluctuating or partial state which often attends congestive fevers of the irregular kind. But in young or vigorous men, who have not been long or regularly accustomed to inebriation, sometimes a stage of general though imperfect excitement follows that of oppression; and these different characters of the disease, as modified by peculiarity of constitution, should always be

borne in mind, for they require corresponding variations in the treatment."

The volume on Typhus closes with "A Recapitulation of some Points," the object of which is to express more concisely, than he had been enabled to do in the body of the work, in what manner the doctrine of a congestive, a simple and inflammatory variety of fever will satisfactorily explain the pathology of all febrile diseases, which are attributable to the action of common and peculiar causes.

His volume on Scarlet Fever equally embraces a variety of topics. The masterly views of a congestive form of fever, which he had so admirably developed on the subject of Typhus, he equally extends to scarlet fever; and his account of its malignant variety is especially valuable, as throwing new light upon this most formidable modification of the disease.

His observations on Measles abound in judicious remarks. He insists on the propriety of a mild treatment in the common forms, and upon our early guarding against the effects of acute or sub-acute inflammation, by timely measures of depletion, which must be proportioned to the existing circumstances of the commencement or the decline of the malady.

"When there are sufficient grounds for inferring the existence of inflammation in the measles," he remarks, "general venesection should mostly be employed as early as possible; and in those obscure cases, where the symptoms rather indicate than reveal inflammation, the best general rule will be to try local bleeding, as this cautious procedure may

do good in the beginning, and cannot do any harm. We shall hardly ever have occasion to regret when we bleed at the onset of inflammatory diseases; but when we venture upon general venesection late, we most frequently risk whatever chances of recovery remain. In the commencement of inflammatory diseases we operate on vantage ground, and may proceed boldly; but our position is reversed in the last stage, and great caution is then necessary at every step. The strength is unsubdued in the first stage; it is exhausted in the last. General bleeding arrests the topical disorder in the first stage, without weakening the system further than is necessary for its removal; and the general debility resulting from the loss of blood is much less than that which the unimpeded disease would have caused,—not to mention the tendency of inflammation to derange the structure or to destroy the functions of the affected viscus. But towards the close of inflammatory diseases, the energy of the heart and arteries, with that of the whole body, is wasted from the local and universal excitement; and general venesection, at that time, exerts little or no influence on the topical disorder, while it has an inverse one on the system at large, which it immediately and mortally overpowers. Yet between the first and the last stage, and particularly in subacute inflammations, there is a middle one, in which moderate venesection is often very useful. It is, moreover, a principle of physic, that whenever any just reason exists for hesitating about the employment of general bloodletting, local should always be preferred."

The remainder of the volume is taken up with the subject of "Pulmonary Consumption;" the "Efficacy of the Balsam of Copaiva, in treating Inflammations of the Mucous Membranes"; and on "Chronic Diseases;" and the "Virtues of the Harrogate and Dimsdale Sulphureous Waters."

His observations on Consumption were written a year before the publication of Laennec's admirable work, which did not appear in an English form till 1821, two years after the original French edition. His object was partly to point out those disorders with which it might be confounded, especially chronic inflammation of the bronchia, of the pleura, and of some portion of the lungs, and ulcerations in the trachea; and partly to indicate those causes which predispose to consumption, by breaking up the general strength and impairing the functions of the skin. This essay is valuable, in a preventive point of view, and as a contribution from him to our knowledge of the symptoms of pectoral diseases, now made much more easy of diagnosis by the ingenious invention of the great French pathologist, who, like our lamented author, and both at about the same period of life, was fated to perish of a disease which he had laboured so assiduously to make better known, and the improved means of detecting which will ever remain an imperishable monument to his memory.

In the spring or summer of 1818, Dr. Armstrong presented himself for examination at the London College of Physicians, conformably to its regulations, which require that the graduate in

medicine of any other University than Oxford or Cambridge should pass the ordeal of its favour, and obtain its license before entering upon practice in London, or within a given distance of the metropolis. He had, perhaps, undervalued the estimate which the Board of Examiners place on classical diction, and the alphabet of the profession ; for this distinguished physician, who had received a diploma from the most efficient and most celebrated school of medicine in Great Britain,—who had been in successful practice eleven years, and was the author of three of the most popular works which the medical press of this country had ever put forth, the fame of which was still sounding in the periodical journals of the day,—was rejected as incompetent to continue in the practice of his profession in London, and as undeserving the honour of having his name enrolled among the members of the College.

This public stigma, of the justice and motives of which I leave others to judge, was not without its natural and perhaps salutary effects upon the sensitive mind of Dr. Armstrong. His nature was mild, but too dignified to submit to insult and unmerited wrong, which threatened injury to his own reputation, and ruin to the welfare of his family. He did not admit the necessity of any particular attention to his profession to qualify him for passing the usual examination the next year, as he was aware that the first rejection was generally the only one. But he felt roused to the due assertion of his own claims to respect ; and from the impressions which this act of wanton power made upon

him are to be ascribed much of that indignant tone which afterwards sounded in his lectures on scholastic institutions.

Soon after this event had happened he was elected, in conjunction with the late Dr. Cleverly, Physician to the Fever Hospital of St. Pancras, on the occasion of the retirement of Dr. Bateman from the practice of that institution.

This appointment was highly honourable to him, and affords a pleasing contrast to the decision of the College of Physicians; for while a committee of gentlemen, presiding over a charitable institution, and actuated solely by a regard to its usefulness, had selected him, on the strength of his public reputation and private worth, to take charge of the poor patients who sought the relief of their charity, he was condemned by a few members of his own profession as unfit to practise in the metropolis, though he had raised himself to eminence out of it by the distinguished success with which he had exerted his professional talents.

During his residence in the North of England Dr. Armstrong had practised extensively among the Society of Friends, and he owed to the recommendations of some of its members the distinguished favour which he met with from the Board of Trustees of the Fever Hospital. There was one gentleman, I believe of this religious persuasion, who, though personally unknown to Dr. Armstrong, particularly favoured his claims. His appointment, as Physician to the Hospital, was made known to him. On his introduction to the trustees, he expressed his grateful sense of their

kindness, but at the same time regretted he could not avail himself of it, as their laws required that their physician should be a Fellow or Licentiate of the College of Physicians, and that he was not a member of that body. On their inquiring the cause, he told them that he had offered himself for examination as a Licentiate, and been rejected,—that no cause had been expressly assigned, but that the sufficient one undoubtedly was, the opinion of the Board of Examiners of his incompetency to practise his profession. On his announcing this fact, he was desired to withdraw, and the gentleman above alluded to, in his absence, spoke of the estimation in which he had been held in the North of England, of the high reputation which he had obtained from his writings, and it was proposed that the Bye Law, which made it necessary for their Physician to be a member of the College should be immediately suspended. This was assented to, and Dr. Armstrong entered at once upon the duties of the important office thus honourably conferred upon him.

He was now encouraged to indulge in favourable views of his future prospects. His family had joined him from the country, and he removed to a house in Southampton Row. The celebrity of his writings had introduced him into some practice among a few members of the profession who had been impressed through them with a confidence in his talents; and the reputation he had acquired on the subject of Fever, together with his early appointment to the Hospital of St. Pancras, soon led him to be considered as the highest authority

upon typhus, a pre-eminence which he maintained to the close of his life. This general confidence in his experience and abilities was one of the most honourable and prolific sources of his prosperity, and it was shown in the frequency of his being consulted by his medical brethren, in their own illness, or in that of the members of their family. It has been said, and I believe with truth, that during the eleven years he resided in London, he was called upon to attend more medical men than any other member of the profession. He owed his success in London to two causes, for no one had ever fewer adventitious aids to success, and the one reflected as much honour upon his talents as the other did upon his disposition. Those members of the general profession who had once experienced the benefit of his counsel and assistance, could seldom be induced to recommend any other physician, so strongly impressed were they with the simplicity, the originality and success of his views and practice: and those families who had once had an opportunity of feeling the effects of the gentleness and delicacy of his manner, could think of no other adviser. There are many persons in and out of the profession who will admit the truth of these remarks, and who will confess that the loss of this eminent man appeared to them irreparable. He had the faculty of communicating his ideas to others, in the most easy and intelligible manner, and from the fertile resources of his own mind, of throwing light upon the most obscure and involved cases. Those difficulties which embarrassed common minds, seemed at once charmed away by the magic influence of his

own ; and his opinions were delivered with so much candour and perspicuity, that while others bowed before the superiority of his intelligence, they were instinctively impelled to place the fullest confidence in his skill and integrity, and to feel an irresistible affection for his character as the man blending with their admiration of his talents as the physician. His manners were simple almost to a fault, and were at first forbidding, from the absence of everything like an attempt at effect ; but no sooner did he enter upon the consideration of a case, than it was apparent he was completely absorbed by it. His seeming reserve at once gave way to a visible feeling of deep and tender interest in the welfare of his patient, who felt satisfied that he was in the hands of an amiable and a sagacious man, to whom he might confidently entrust himself.

I have hazarded these observations to point briefly to the causes which led Dr. Armstrong to the eminent success which he eventually attained in London.

One of the first instances of his introduction to practice, soon after he settled in town, was in the family of the late Mr. C. T. Haden, a distinguished practitioner in Sloane Street ; and the circumstances attending it, which must be familiar to many of our mutual friends, I have often heard related by Mr. Haden. They emphatically prove the impression which Dr. Armstrong's writings had made upon his mind, and how entirely he had lost confidence in the prevailing treatment of at least one form of fever. Mr. Haden was a man of considerable talents and attainments, who had been educated for

the profession in London and Edinburgh, and who is known by his various publications. He was intimately connected with the late very distinguished Dr. John Clarke, of London, who had indeed induced him, by his advice and liberality, to remove from Derby, and settle in Sloane Street.

The wife of Mr. Haden had been seized with the symptoms of puerperal fever. Knowing the fatality of this disease, in the opinion of his friend Dr. Clarke, who was then living, he from the first despaired of her recovery. In his distress he recollected having heard that Dr. Armstrong had settled in London, and though ignorant of his address, and unknown to any one to whom he could with certainty apply for it, he instantly determined to go in search of him. In a state of the most distressing anxiety, he hurried from home, inquiring at every druggist's shop that he passed in Piccadilly, and, fortunately, he at last met with a gentleman who had resided in the North of England, and who directed him to Great James Street. Mr. Haden found the object of his search, and returned with him to the scene of his affliction. Dr. Armstrong instantly ordered a large depletion, which was repeated a second and third time; and within eight or ten hours from the time of Mr. Haden's leaving home in a state of despair at the condition of his wife, he saw her in his own opinion out of danger; and her rapid recovery impressed him with feelings of profound gratitude towards the stranger whose assistance he had so urgently sought.

I mention this case because it serves to illustrate the opinion of at least one intelligent member of the profession, upon the generally unsuccessful

treatment of puerperal fever at the time of Dr. Armstrong's settling in London, and also to show the impressions which his writings had produced on one competent to judge between them and the sentiments of other medical men. I mention it also with additional pleasure because it was the occasion of a friendship, which was mutually productive of happiness to both of my friends, who are now no more.

To Mr. Haden I owe the intimacy which I enjoyed with Dr. Armstrong, and I refer to his various writings for the evidence of the estimation in which he held that great man's opinions. Mr. Haden died at Malta in the year 1824. He was the son of Thomas Haden, Esq., an eminent surgeon at Derby, and was the author of "Practical Observations on the Colchicum Autumnale, as a general remedy of great power in the treatment of Inflammatory Diseases," and of "A Monthly Journal of Popular Medicine." He was for some time editor of the "Medical Intelligencer," and one of the principal promoters of "The Transactions of the Associated Apothecaries of England and Wales," to which he contributed several papers. He also translated Magendie's "Formulaire pour la Preparation et l'Emploi de plusieurs nouveaux Medicaments."—At the time of his death he was Surgeon to the Chelsea and Brompton Dispensary, having, previous to his settling in Sloane Street, been one of the surgeons to the Derbyshire General Infirmary. His amiable character, and his unwearied zeal in the prosecution of his profession, have been recorded by his intimate friend, Mr. Allcock, who published, a few years ago, a memoir of his life.

A case of the same kind as that which I have just mentioned, occurred soon afterwards in the family of the late Mr. Hornidge, surgeon, of Great Ormond Street. The patient was, I believe, a sister-in-law of Mr. Hornidge, and this gentleman was so much impressed with the decision and success of Dr. Armstrong's practice, that he drew up an account of the case for publication. I could mention other instances of the same powerful impression made upon the minds of several members of the profession, who had occasion to consult Dr. Armstrong at this early period of his residence in town.

It was about this period of his life that I first became acquainted with him. I had seen him once in the year 1818, when I had occasion to consult him upon the state of my health; and I was so much struck with his sagacity in explaining the disorder under which I then laboured, that I wrote to him the next year to request he would superintend my medical education. My first interview with him after this solicitation took place in the wards of the Fever Hospital; and from that moment till his death I enjoyed the advantages of his unreserved friendship, though our personal intercourse was interrupted during the four years of my residence in Edinburgh and Paris.

In 1820 and 1821 I attended his practice at the Fever Hospital, taking notes of all the cases at his dictation, which filled several volumes of his journal; and thus had the most ample opportunity of witnessing his treatment of fever, and his manners at the bed-side of the sick. I can conceive of no-

thing more tender and considerate than his attention to the poor patients. He was always punctual to the accustomed hour of his visit; for he considered this punctuality of great importance in the treatment of fever, as it prevented that anxiety and impatience of mind which the appearances of neglect or delay were sure to excite, to the prejudice of the recovery. I do not recollect an instance of his allowing any engagement to interfere with this duty. Amid all the anxiety and distress which is inseparable from attending fever patients, who are often brought in late, and in a state which precludes the active interference of art, and amid all the capriciousness of feeling, and those eager solicitations for indulgences which are so trying to the temper of a medical man alive to the responsibilities of his situation, I never observed in Dr. Armstrong's tone or manner to his poor patients anything which differed from the tenderness, delicacy and forbearance of his conduct in private practice. His visits occupied from one to three hours daily, during the time in which I acted as his assistant; and in urgent cases he would repeat them two or three times. His powers of minute observation, which formed one of the most distinguishing traits of his mind, were often directed to the discernment of the different characters of his patients; and he was always peculiarly alive to the effects of that strong and emphatic expression of feeling which suffering and danger often elicit from the untutored minds of the lower classes. His acute sensibilities were often painfully excited by the distressing scenes around him; so that I frequently lost for the mo-

ment the connexion of his reports, from his voice faltering through deep emotion.

One of the most anxious of his endeavours was to obtain good nurses at the hospital, upon whose kindness of nature and fidelity he could implicitly rely; and he took great pains to educate them to his will. He was always respectful and indulgent in his manners to them, but inflexibly firm in pointing out and censuring every instance of their error or neglect. His greatest solicitude was to impress them with the necessity of watching closely the cases of remittent fever, as the time for successful practice in urgent examples of this type was at an early hour of the morning; and his own anxiety in these interesting cases was so apparent that it communicated itself to his nurses, who were ambitious of his confidence and esteem. The promptness of his approbation on occasions which called for it was such as to make a lasting impression on the mind of these humble friends, several of whom cherished a lasting attachment to him; and one, on his retirement from the hospital, left it, at her own solicitation, to act as a nurse to his patients in private practice.

In the year 1821 a new field was opened for the exertion of his talents, in which perhaps he exhibited the finest display of them. He had previously become acquainted with the late Mr. Edward Grainger, who had been lecturing on Anatomy for some time, with distinguished success, in small apartments in St. Saviour's Church-yard. This gentleman, whose energy of character and high qualifications as a teacher will long be remembered

by those who knew him, had already raised himself to distinction in his profession. His success had induced him to erect the commodious building in Webb Street, Maze Pond, and he solicited Dr. Armstrong to join him in the school as the lecturer on the Practice of Physic.

This medical institution was opened in October 1821, and the success it has met with has arisen from the reputation and exertions of these two eminent men. Mr. Grainger fell a victim in two or three years afterwards to his incessant application to the duties of his situation, but not before he had infused a spirit of emulation into the medical establishments of the Borough, which has contributed to their improvement and usefulness.

I was present at the first lecture which Dr. Armstrong delivered, on the 3rd of October; the only one he ever gave from an entire manuscript; for his habit was to lecture from notes. I have in my possession all his note-books, which are generally wholly unintelligible to me, as they consist of words without any immediate connexion. Many of his lectures are comprised in a few pages, written in a neat hand, the lines commencing with a capital letter, and placed wide apart, for the facility of catching the thread of his discourse; and the names of persons frequently occur, whose cases he detailed in illustration of his views, and treatment of disease. It is much to be regretted that the valuable practical information with which his lectures abounded is thus in a great measure lost; for, though there is a report of some of them in the "Lancet," and a valuable manuscript copy taken

in the lecture room, by a very intelligent pupil, Mr. Rix of St. Neots, we have lost much of that eloquent style, and that copious reference to particular facts, which made them so attractive and instructive to his hearers.

From the autumn of 1821 to that of the year 1825 I was engaged in the study of my profession, in Edinburgh and Paris; and the only intercourse that took place between Dr. Armstrong and myself was through the means of letters. He was at all times averse to letter-writing; and from his correspondence there are but few letters I can offer to illustrate through them his character and opinions, from the strain of partial feeling which runs through them towards myself and family. I have been unsuccessful in my search after other examples of his correspondence; and I insert the following letters with considerable hesitation, as the purport of them is generally of so personal a nature.

Dr. Armstrong to F. Boott, Esq. Derby.

My Dear Friend,

London, March 21st, 1821.

I do not think that you are doing a wise thing in going out so early in the morning, and before breakfast too. It would be better for you to sit quietly at home till about eleven o'clock, and then to take a moderate ramble through the fields, where I wish I was with all my heart, for I am sick almost of the perpetual noise which is here, and long for the calm contemplation of nature again. But that cannot be, and I must toil on, and endeavour to do

all the good I can ; for both you and I must now never forget that utility is the great object and end of a medical man's life. It is certainly a dreadful thing to have so much dealing with the dead. Anatomy is an appalling pursuit, but we must go on with it on account of its illustrious purpose, for nothing is more illustrious than the science of physic.

I get on well with my lectures, but your Examiner stopped me an hour the other day. I admired his remarks on Italy, and out came the following bad verses, which I send you, that you may make better on the subject, now that you are surrounded by the inspiring objects which a fine country presents.

TO ITALY.

Italia ! from the gather'd clouds of war
Thy genius bursts, and rolls and blazes far,
A thunderbolt appalling tyrants round,
But to thy sons a glorious light and sound ;
Which lead them where a standard, all unfurl'd,
Waves, 'mid the hopes of freedom to the world.
And thou shalt triumph o'er the slaves who tread
Thy soil, so hallow'd with the mighty dead ;
And scatter them, in thy proud storm of mind,
As autumn leaves before the mountain wind ;
Till nations rising, emulous of thee,
Shall burst the bonds of ages, and be free.

I hope that Mrs. Boott and Mrs. Hardcastle remain well, to whom remember me kindly. We are going on well at the Institution. I believe that I shall not lose a patient this month, though several cases have been severe. Remember the 1st of April, and believe me,

Yours affectionately, J. A.

From the same.

My Dear Boott,

London, Nov. 11th, 1821.

We have been very sorry indeed to hear of your indisposition: I trust, however, that you are now quite recovered. If any pain should remain, I would certainly repeat the leeches till it be entirely gone, observing absolute rest and abstinence. But I will not think that you have any pain left; so pray tell me so truly by return of post.

We are glad to hear that the baby and Mrs. Boott are well. I suppose the former is much grown, and I dare say very beautiful. Charlie has not forgotten you; and when your little girl can talk, pray let her know that I am a very particular friend of hers, and will be glad to have a little chat with her in her own pretty little broken English, which is better than any other, whatever grammarians may say to the contrary.

I have been doing a great deal of practice since you left, and my lectures take surprisingly; so you see I am a *made* man.

I find that you can matriculate any time before the 31st of December, and I have formed the following plan for you, which you must promise me faithfully and fully to pursue. You must remain quietly at Derby till the middle of December, and then you must go down to Edinburgh and enter to two classes,—quietly return to your family, and pass the winter. In Sunderland they often lay up the ships for the winter; so I mean to lay you up snugly and quietly, that you may be refitted for the

spring, for you really want a few months' repose ; or if you are determined to stay in Edinburgh, I trust your determination will be formed on the certainty of your health being fully restored, and then I will not say nay. But let me advise you to be cautious as to diet and clothing, and especially not to be over-anxious about attending the hospital and classes for this winter. Nothing is worse for weak persons than close attention to large hospitals crowded with patients. You have plenty of time on your hands. Get your strength confirmed before you work hard again.

Believe me, yours affectionately, J. A.

From the same.

My Dear Boott, Southampton Row, Russell Square,
April 15th, 1822.

I was very glad indeed to hear so gratifying an account of your dear little babe. I would by all means recommend you to persevere in the use of her natural food, without any admixture whatever, for two months longer, provided Mrs. Boott's health should not suffer. As she has some irritation from approaching teeth, I should be very much afraid of any change of diet at present.

I am sorry to hear of poor Boswell's death ; but he formed an integral part of a body of men that I have always disliked much. I do not like the account you give of Scotch practice. I never did admire their practice, except old Dr. Hamilton's. I recollect very well, when I began to take notes, I

thought that either some extraordinary efficacy really was attached to medicine, or that it was of little consequence; and the practice of the Infirmary led me to the conclusion that there was much "humbug," or, in more delicate parlance, much pretension, in physic. Without principles the practice of physic is mere empiricism. A man should have a satisfactory reason for every medicine he prescribes.

I am going to try to establish a Clinical Hospital here. If I succeed, you shall go halves with me in managing it, for I am still fixed on your coming to London. I mean to set about this in the autumn; my book will be out then,—“A general view of the nature and treatment of acute and chronic diseases.” Pray write oftener, and do not think that we have forgotten you, because we are such bad correspondents. With kindest regards to Mrs. B.,

Believe me, yours affectionately, J. A.

From the same.

My Dear Boott,

London, Aug. 8th, 1822.

I am happy to inform you that we got a little girl last night, and that Sarah and this little thing are both remarkably well. I have heard a great deal of the beauty of your baby, and mean that mine shall be a rival queen. It is most mysterious that such things should be,—that such beings should spring up about us, and twine sensitively round one's heart,—twine and bloom, and at last wither like the stock which supported them. But we must not

think of these sweet flowers of ours yet withering, which are long, long to shed a sweetness and a freshness over our bosoms. What a thought it is that a little being just entering upon life is to live on for ever! Would it were so that it might never die!

I have been much gratified by the newspaper (The Scotsman,) which you sent me. I like it better than any I have seen for a long time. I am glad that the editor is calling the public attention to the Church. We shall not live to see it separated from the State; but the progress of knowledge will effect that, for no state has a right, in the first instance, to dictate a form of religion; and in the next, to take from the pockets of the people to support it.

Little Charlie is imploring me to play with him; so I must abruptly say farewell to you and Mrs. B. and baby.

Yours affectionately, J. A.

Be so good as to inform Mrs. Keith of our good fortune.

From the same.

39 Southampton Row, Russell Square,

My Dear Boott,

Aug. 16th, 1822.

You and Mrs. B. will be glad to hear that Sarah and the baby have gone on uniformly well. Little Charlie is fond of his new sister, who will be of great benefit to him, as he has been perhaps too great a pet. I imagine that he grows very beautiful, and that he displays a fine intellect. I shall be

proud to introduce him to your little sweet babe some day,—I wish I could add soon, but the time will come. I have sent you some lines which I promised to write to little Mary long ago. She must keep them for my sake hereafter.

You no doubt have heard of Londonderry's death. He appears to have been decidedly insane. B—— appears to have failed in three points,—first, in not drawing a sufficient quantity of blood and using evacuations by the bowels; secondly, in not having had proper attendants about him, so that he might never have been a moment alone; and thirdly, in not attempting at the instant to put his finger upon the artery. Jones said that one must lament the man, but cannot the minister;—this is my view. He seems to have had more private virtues than he had credit for; but why did he not carry his better principles into public life?

Believe me always yours, J. A.

From the same.

My dear Boott, London, Feb. 18th, 1823.

It would be difficult to give a correct opinion respecting your brother's case, as the history of it transmitted is so very imperfect. I hope, however, that there is no organic disease. It has not the permanent and progressive course which organic diseases usually have. It rather seems to me to be connected with over-fulness of the vascular system, either arising from too much nutriment, or too little evacuation by the bowels. If he were regularly purged, he would, I think, be better, especially

if he were put upon a diet which would support without exciting him. If there be local obstruction anywhere, it is probably about the lungs, liver, or head. Such obstructions are often connected with and relieved by spontaneous hæmorrhage, which, in such cases, seldom diminishes the strength. Pray let me hear about him as soon as you receive the next letter from him or his attendant.

Poor Haden has, I am afraid, some serious disease about the lungs, and large vessels adjacent to the heart. He has sold his practice. His only chance is rest and a spare diet ; but his mind is so irritable, as every now and then to undo all that the former have done. Poor fellow, he has missed the path of peace.

I hope Mrs. Boott, by this time, is better. You must take care of her. You are in a nasty cold climate. Come here, in the spring, for a little time—only a little time, that we may see you all again. Jones as well as we expect you all.

You must choose some subject for a thesis. The rise, progress, and present state of Physic would be a fine subject for you. It affords a glorious contrast, and many points for philosophy and eloquence.

Philosophy and eloquence remind me of the Holy Allies. If a breath of mine could wither and consume them, it should pass over them like lightning, and reduce them to ashes. The war, once begun, will lead, I hope, to the destruction of despotism.

My class still increases. It is now about 150. I am making many innovations, and have thrown

Cullen off entirely. I have begun a course of lectures on *Materia Medica*. We are all well. Bless you all!

J. A.

From the same.

My Dear Boott,

London, April, 1824.

We regret very much that we have not seen more of your northern friends. But I am at the wheel from an early hour in the morning till late at night, and dull and tired as any dog can be before sunset. We were glad to hear so good an account of you all, and hope that dear little Mary will continue to thrive as your hearts could desire.

You know that Sir Astley Cooper's lectures have been published in the "*Lancet*." Mine are, I understand, to be the next. There is no protection in the law, except the lectures be in manuscript, and delivered accordingly to the letter. This is hard upon lecturers, as a man does not wish to see in print anything that must, in some respects, be inaccurate; besides, in the warmth of certain moments, he may say things which, published, might give pain to others, and therefore to himself also. But we must submit. Public utility requires it.

Kiss little Mary for me. Give my love to your mother, brother, and wife. God bless you all!

Yours, in haste, affectionately, J. A.

From the same.

My Dear Boott,

London, May 6th, 1824.

I am much concerned that you should have occasion to be anxious about your little girl's health.

From what you stated, it appears to me that she has either a constitutional or an acquired torpor of the liver or colon, apparently not proceeding from any affection of the head, at least I cannot detect any evidences of such an affection from your account. You never mention that your little girl rolls or runs about much. What is the cause of this? Is your servant a sleepy one? Is Mrs. B. too much afraid of letting her, like a lamb, have her gambols? May not the want of sufficient exercise be connected with the torpor of the colon or liver? Pray look to this attentively. Another point to which I would direct your attention is the skin. Is that sufficiently warm? If it be kept too cool, torpor of the colon or liver may be the consequence. I should like to have some more information on these two suggestions.

Abernethy has been instrumental, with some others, of converting the College of Surgeons into a society of monks. Bye laws have been passed which will prevent you or any other person from lecturing on Anatomy. No certificates will be in future received by that College, except from those attached to the recognised hospitals and their schools. I shall send you a copy of their rules. Nothing has excited my indignation so much, for a long time; and I believe that I shall address the profession at large, publicly, on the subject. Who would have expected Cline would have made one of such a confederacy? Their measures invade private rights, obstruct the course of medical science, and deeply wound the public welfare; and shall they be endured?

Believe me, yours affectionately, J. A.

From the same.

My Dear Boott,

London, May 22nd, 1824.

I do believe that the diet of your child is too uniform. I would advise you to change it often, still making it simple. There are two extremes,—too uniform and simple a diet, and too varied and mixed: adopt the middle one, and depend upon it the liver will act; giving up all mercurials, and using a little friction daily over the abdomen with the hand.

The College of Surgeons have had another meeting, or rather its Court of Inquisitors, at which it was finally agreed, that no certificates would in future be received by that body, except they were from some person or persons attached to the recognised hospitals and schools. It is generally believed that the measures originated in a determination to crush the school to which I am now attached, because it was the most prosperous. After a strong debate, however, *it* was sanctioned, and therefore Grainger's certificates stand good as before. Public opinion had deterred them from an act of wickedness to which they were, I believe, prone enough.

My friend G—— thinks differently from you about T——'s lectures. He says they are so full of the opinions and practices of other persons, as to leave vague impressions on the mind. He excepts those on syphilis, which he thinks very valuable. How difficult it is to please!—My plan is the opposite, and some say my lectures are not learned enough: but I shall adhere to my own observation

and experience mainly ; for that gives a singleness of opinion and a unity of practice which students require. They may read when they become practitioners. But then, perhaps, the less the better, except matters of fact. I have never yet met with a learned physician who was a good practitioner. At the bed-side such men are lost in the conflict with authorities.

Yours affectionately, J. A.

From the same.

My Dear Boott, London, May 26th, 1824.

Your mother tells me you are labouring under a periodical intermittent pain on one side the head. It generally arises from mental worry, which you *must* remove. I have found about five grains of the sulphate of quinine, taken thrice during the interval, almost always succeed, the bowels being kept regular by some mild aperient. When that fails, about ʒj of pulv. valerian, once in four or six hours, has answered ; or if that fails, the arsenical solution generally stops the return of the affection. But keep your mind at ease, and make the best of everything. We are going to remove to Russell Square this summer. Give my love to Mrs. B., and a kiss to little Mary.

Believe me, yours affectionately, J. A.

From the same.

My Dear Boott, Southampton Row, July 9th, 1824.

I have said a great deal about your settling in

London, but God knows have written very little. I have become so lazy about writing, as almost to approach to torpidity ; and if this disposition, or rather indisposition, should increase, my pen will sleep, like certain animals, six months at least out of the twelve. I begin many a scrawl with "I regret that an unavoidable absence has prevented me from sooner answering your letter." In truth, it has become unavoidable. I mean an absence of mind, a turning away from all correspondence, except to such eclectics as you ; so pray do be very proud of my attentions as a correspondent ; for, since the force of my eloquence has been displayed through my tongue, as a lecturer, I have written more to you than to any other person in or out of existence.

Poor Byron ! he is gone ! "He should have died hereafter"—should have died in the last victory of Greece over her oppressors. But he has consecrated Greece a second time, in his poetry and in his patriotism.—I must, however, quit this melancholy theme.

Your defence of your friend Thomson is triumphant ; I shall send him as many pupils as I can, for his sake and yours. But both he and you are most grievously mistaken about Cullen.

We have fixed upon a dispensary, in the hope that it will shortly be converted into a hospital. A place shall be kept vacant for you twelve months to come.

Give my love to your wife, and kisses to your little girl.

Believe me, yours affectionately, J. A.

Dr. Armstrong to Dr. Boott, Paris.

My Dear Boott,

London, January, 1825.

I have written several letters to you. If you ask, Where are they? I answer, In the fire and in the air. I burnt them all, for on reading them afterwards I found that they were filled with nothing but self.

Last summer I became hipped. I had an attack of dysentery, which left me very exhausted. Since then I have had the daily dread of a sudden death hanging over me; I say a dread, because my life is so valuable to my family. This anticipation I still believe will be realized, for within the last three weeks I have had two sudden and severe attacks of giddiness, attended with the loss of power in the lower extremities, and a feeling as if I were then about to expire: the first lasted about half an hour, the last a less time. I have had two or three slighter attacks of the same kind.

The truth is, I have been in so wretched a state of mind as not to be able to write to you as I could have wished, though a single day has not passed in which you and yours have been forgotten by me. Do not mention what I have stated to anybody except Jones, to whom I reported some of the circumstances the other day: he will be in Paris soon.

How is your little son going on? Give him a dozen kisses for me. How is little Mary? Give her the same number, and one over for *auld lang syne*, for she and I are very old friends.

Let me hear from you on professional topics. I

mean to rouse myself from this torpor if possible, revise my lectures, and put them into manuscript, so that your communications might be useful as materials for thinking.

I have retired from the Hospital. Poor Cleverly is dead, and his family left in great distress.

As my brain begins to turn round like a wheel, I can only add, God bless you all ! J. A.

From the same.

My Dear Boott, Russell Square, Feb. 3rd, 1825.

A pupil of mine, Mr. Lovell, is about to visit Paris, and you would do me a great favour by giving him your advice in the direction of his studies.

Though I was much shocked at seeing you in London, yet the pleasure afterwards was inexpressible. I have been much better since, but still have attacks of giddiness which make me afraid of walking ; but I dare say they will leave me soon. I shall throw off the harness, and get into the green fields in summer.

We were happy to hear that you found all your household so well. Pray attend to your mother's diet.

Are you right in keeping little Frank's head bare while he has the stuffing in his nose ? Much perspiration takes place from the scalp of infants. I suspect that the American mode of wearing no caps is not so good as the English.

Give our love to your mother and wife, and all, and believe me,

Yours affectionately, J. A.

From the same.

My Dear Boott,

London, June 24th, 1825.

If you do not come to town, send me some letters of introduction directly for L——, who is now in Edinburgh; for I promised him some from you, and, as usual, have forgotten to fulfil my promise for some days. The current of my thoughts sets so in one direction as to sweep all other things away, except the recollection of a few good-for-nothing people at Derby and elsewhere.

You and Mrs. Boott I am sure would deeply sympathize in the sufferings of my poor wife, who never left her father's bed-side till he died. What gaps death makes in our existence! a part of which is taken away in the loss of every friend. Well! it is in vain to moralize; for you and I must undergo the same fate, and our children too shall mourn over us; and as to the future, it is best to beautify its shadowy canopy with the hues of the fairest hopes, which make it more attractive than the lights along an evening sky, when this earth of ours is dim and indistinct to our view.

I trust that your anxiety about your mother is abated. Be sure to give her precise directions about the quantity and quality of her diets and drinks. My love to all your party, and kisses for your children.

Yours affectionately, J. A.

As a lecturer, Dr. Armstrong was preeminently successful: he always spoke from the fulness of a

mind, rich in a store of facts which he had collected from his sagacious observations of disease. He was not so deeply read in the learning of his profession as many teachers have been, and seldom quoted the opinions of others. He had attentively perused the modern medical literature of his country; but did not often allude to it, except in the case of the illustrious Sydenham, whom he considered the first of physicians, equal to Hippocrates in powers of observation, and superior to him in practical skill. His mind had originally imbibed its impressions of disease from others, and traces of these engrafted opinions are visible in his earlier publications. But when he entered on the practice of his profession, he soon saw the discrepancy between scholastic axioms and the phænomena of nature; and endowed with admirable powers of discernment, he soon abandoned the beaten track; and with that instinctive confidence which genius bestows upon its possessors, he opened to himself a new path to usefulness and distinction, which he triumphantly followed to the close of his short and brilliant career.

One of the most striking characteristics of his mind was a power of generalization, which enabled him to grasp at once a complicated subject, and to view it from an intellectual elevation unattainable by men of ordinary powers. He had at the same time an extreme simplicity, and as it were modesty of judgement, combined with a keenness of mental vision, which made him sensible of things too familiar to arrest the observation of others; so that while they were often lost in the misty atmosphere

of their own minds, which obscured some points and distorted others, his calm and clear intellect, in the equable light it diffused around, perceived and noted all existing phænomena, without undervaluing what was minute, or exaggerating what might be of more prominent proportions.

These were the sources of his superior sagacity, and they eminently characterize the man of genius. He united in his mind, with the elements of a sound judgement, two opposite and often irreconcilable powers ; that of discerning particulars and of combining them together, so as to see in one glance their origin, connexion, and effects. He thus acquired practical knowledge from his observation of the phænomena of disease, which he freely communicated to others from the learned and well-arranged volume of his memory, and he was possessed of an intrepidity of character which made him fearlessly assert whatever he felt to be true. Though of a mild and pliant nature in the hallowed seclusion of domestic society, he was, as a public teacher, loud in his denunciations of what he considered to be erroneous in the maxims and practice of his profession ; and if at times he seemed to sound too indignant a tone of remonstrance against the prejudices of the schools, much of the fervour of his language and feelings is to be ascribed to the indignation which he felt at the conduct of one of these bodies towards himself.

The effect his lectures produced was electric. The energy of his manner, the fine intonations of his voice, the facility and correctness of his diction, the strain of impassioned eloquence which often

burst from him, riveted the attention, and made even those who could not entirely adopt or appreciate his opinions, sensible that he was uttering the deep convictions of his mind; and there was so much of chaste and often of pathetic feeling, so much of the refined sensibilities of his nature blended with his discourse, that those who were compelled to admire his talents felt confidence in his virtues; and while they revered the Professor, they loved the man.

His lectures were attended by many members of the profession, who were powerfully impressed with the originality and boldness of many of his views. He at all times showed himself complete master of his subject, and he had the most admirable faculty of conveying knowledge in the garb of the most seducing simplicity. No one could retire from his presence without the consciousness of a new and sudden light diffused over his mind; and it came heightened in its effect, and rendered durable in its impression, because warmed by the kindling glow of the liveliest and most fertile imagination. His lectures were not pronounced in the formal diction of arbitrary and systematic terms; they were the views of a master-mind, which borrowed no aid from without, but which freely ranged amid the fruitful store of its own intellectual wealth, not derived from books, but from the sagacious interpretations of the lessons of nature. He divested the science of medicine of the meretricious allurements it had long worn, and dressed it in artless guise. He was deeply impressed with the defects of the scholastic mode of education which he had

early acquired ; and conscious of the relief he experienced when he threw off its trammels, he determined that those who repaired to him for knowledge should have its impediments fully exposed, that they might learn at once from him what he had been long acquiring.

Besides his lectures on the Practice of Physic, he delivered a course on the *Materia Medica* ; and I regret that, with the exception of his disconnected notes from which he lectured, I have no report of these lectures, nor am I aware that any exists. He had not paid any particular attention to the practical details of pharmacy, and his lectures were very general on this subject. He fitted up an extensive cabinet of drugs, to which he added the best works on *materia medica* and pharmaceutical chemistry ; and he directed his pupils to make themselves familiar with the physical characters and general properties of medicines, by studying them with these manuals in their hands. The lectures he delivered were principally upon the practical application and effects of remedies in disease ; and the same powers of minute observation which were so conspicuous in his course on physic were equally displayed on this interesting and difficult subject. He had paid particular attention to it in his practice, and was always judicious and discriminating in the means he employed.

He abandoned this course of lectures in 1825, though he continued the more valuable part of it in the detail of his lectures on Physic, devoting a portion of that course to the explanation of the uses and effects of some of the more important articles

of the *Materia Medica*, in the treatment of acute diseases.

The effect his lectures produced on his pupils, and eventually on the profession and the public, led to a rapid extension of his practice; and his time was too fully occupied to admit of his devoting himself to the labours of composition. I had left him in 1821, struggling into notice, but still in some degree doubtful of the propriety of the step he had taken in removing to London; and on my return from Paris in the summer of 1825, I found him in the full enjoyment of fame and prosperity.

An anecdote, connected with the period of his greatest difficulties, in the year 1820, when his funds were nearly exhausted, is too honourable to himself and to the late Mrs. Oliphant, of Gask in Scotland, to be omitted.

He had naturally been led to take an unfavourable view of his prospects, from the prejudices excited against him by the conduct of the College of Physicians, and from an experience of the unavoidable expense attending a physician's opening career in London, which appeared the more formidable to him from the injury that he imagined had been done to his reputation. His mind was at one time so much a prey to anxiety, that he entertained serious thoughts of removing from town. This idea was communicated to Mrs. Oliphant, in whose family he had practised for several years, and to whom his worth was fully known. She immediately remonstrated against it. With a delicacy which added to the extent of her kindness, she advised him to set up his carriage, and insisted that he should draw upon her banker

for any sums he might require, till his income should prove equal to his wants. This noble act of devotion to a pure and exalted friendship, was honoured as it deserved to be; for Dr. Armstrong availed himself of the liberal offer, and the fruits of this beautiful instance of mutual confidence were to remove at once the apprehensions he laboured under, and to fortify his mind with a confiding hope of ultimate success. He never spoke of this disinterested act of friendship without emotion, and he always attributed his subsequent prosperity to it, as it reconciled him to the difficulties he had to encounter, and enabled him to employ his mind, unfettered by anxiety, to the discharge of the responsible duties of his situation as Physician to the Fever Hospital.

Mrs. Oliphant lived to see and to feel the happy effects of her benevolence; and when sorrow visited her, as it successively did in the untimely fate of several of her children, she found the truest sympathy in the gratitude and devotion of the object of her patronage. After a life of purity and widely spread beneficence, this admirable woman eventually fell a victim to consumption, which had robbed her of several members of her family. I do not affect to record her worth, for it was of that unostentatious kind which is felt rather than seen, and displayed through a spirit of so much gentleness and such unaffected piety, that the active virtues of her character may be said to have been shrouded in the meekness and modesty of her nature.

The labour of private, and the anxious duties of public practice at the Fever Hospital, with the ex-

ertion and the time necessarily occupied in lecturing daily at a distance of three miles from his residence, were too much for a sensitive frame like that of Dr. Armstrong to bear ; and having fully satisfied himself on the subject of Fever, he resigned, in the year 1824, his office of Physician to the Hospital, and in the spring of the succeeding year abandoned his course on the *Materia Medica*.

His work on Typhus had, as early as 1819, passed through three editions, and two editions had appeared of his other volumes. His attention was now principally directed to the improvement of his lectures, through which he felt that he could communicate more impressively the enlarged views he had acquired of disease.

In May 1822 he communicated "Some Observations on the Origin, Nature, and Prevention of Typhus Fever" to the *Medical Intelligencer*, then conducted by his friend Mr. Haden ; and, at the request of the same gentleman, he furnished, in July 1823, "Some Observations on the Utility of Opium in certain Inflammatory Disorders," to the *Transactions of the Associated Apothecaries of England and Wales*. These were the only productions of his pen since his work on Scarlet Fever, (which appeared in 1818,) with the exception of the *Annual Reports to the Fever Hospital*, which he wrote alternately with his colleague Dr. Cleverly.

The two papers alluded to contained the germ of those opinions which led to some important modifications of his views of typhus, and of his practice in inflammatory diseases. He had originally believed that typhus arose solely from contagion. He

was afterwards convinced, from his own observations, that its primary source was malaria, and that its contagious nature was very questionable, though in the paper alluded to he mentions some instances in which it appeared to be propagated from one person to another. But these cases he was, at a later period of his life, inclined to think might be explained by a local contamination of air, in the districts in which they occurred, operating on persons predisposed to its effects. But he nowhere denies the possibility of the disease being, under peculiar circumstances, contagious, however unfavourable the state of his mind was to the belief of its ever being so. He thought its primary source, and its subsequent diffusion by a contagious quality, were two distinct subjects of inquiry; and that as the large majority of cases could be traced to malaria, under circumstances which admitted of no other explanation of its origin, it was open to impartial observation to determine whether so arising it could spread by any other than its known original cause.

His object in the paper on the utility of Opium is to show how beneficial its free exhibition is after venesection, in acute and subacute inflammatory diseases, in preventing the subsequent increase of the heart's action, and the consequent renewal of the inflammation.

“About four years ago,” he says, “I attended a lady who died of an acute attack of abdominal inflammation. While reflecting on the circumstances of this and of some similar cases, it occurred to me that there was a chasm, a defect in the common treatment of such violent affections which could not

be supplied by any routine remedy, for in all these bleeding and purging had a fair and full trial; and though the former temporarily suspended the inflammation, yet it was soon urgently renewed with an increase of the heart's action, which followed each copious bloodletting. Many years previously, as my writings testify, I had been accustomed to prescribe opium in certain acute inflammations, especially in those in which large quantities of blood had been abstracted, and a careful review of the events of such showed that they terminated favourably where opium had been given in full doses immediately after the operation. In comparing the successful issue of these cases with the unsuccessful issue of those which had given me so much anxiety, I could not but conclude, that the latter unfortunately had been mortal through my own ignorance, from my not having, in fact, used the opium after venesection in the full doses, which in other examples had been so decidedly beneficial. Under this impression, I determined to administer opium in future more boldly, in those cases which appeared most promising for its favourable effects. Within the last four years I have prescribed large doses of opium conjointly with bloodletting, in at least a hundred cases of acute and subacute abdominal inflammation proceeding from common causes; and as its efficacy has considerably exceeded that of any other remedy tried under similar circumstances, I shall endeavour to point out in this paper, first those circumstances, and secondly, the most efficacious doses."

The acute diseases which he particularly enu-

merates, are, inflammation of the peritoneum, uterus, kidney, liver, pericardium, pleura, and lungs; and his practice was to bleed in the early stage to complete relaxation, or to approaching syncope, and as soon as the faintness was recovered from, to exhibit from three to five grains of opium, which prevents the renewal of the excitement and pain, and induces sleep and perspiration. He relied on these remedies for the removal of the inflammation. If it was removed after their first employment, he bled the patient as before, and repeated the opium, in smaller doses. If a third bleeding was requisite, he combined small doses of calomel with the opium; a combination which, from the first, he advises in acute hepatitis. He points out some conditions in which the use of opium is contraindicated, as in cerebral irritation, and when the tongue is dry, unless the dryness proceeds from profuse spontaneous hæmorrhage. He recommends in some cases, where frequent depletions are required to subdue the inflammation, that the calomel and opium should be continued in small doses every four hours, till they produce sleep and perspiration; and the only secondary expedients he advises are enemata and laxatives,—unless the presence of a low degree of pain should render the application of leeches necessary, or require the calomel to be given till its specific effect on the system is produced. To render this practice efficient, the active measures must be employed in the early stage of these inflammatory diseases, and comprised in a short space of time, so as to crush the inflammation at once.

In speaking of acute peritonitis, he says, ‘ I always make a point of seeing the patient bled, in the first stage to complete relaxation, to approaching syncope, whatever may be the quantity of blood necessary to produce that effect ; for it is to the effect, and not to the quantity, which we must look for relief in such formidable cases. As soon as the patient recovers from the faintness, three grains of opium in a soft pill are given, and quietness strictly enjoined, that, if possible, sleep may be obtained. In some instances I have ordered a less quantity of the opium in a solid form, but have added sufficient of the tincture to make the dose equal. This method is preferable in highly irritable habits, because the sedative influence of the opium is thus more speedily procured. The effects of opium thus administered are to prevent a subsequent increase in the force or frequency of the heart’s action, and a return of the abdominal pain, while it induces a tendency to quiet sleep and a copious perspiration over the whole surface. In many instances this simple procedure will remove the inflammation at once, nothing being afterwards necessary, when the patient wakes, but spare diet, absolute rest, and quietness, with an occasional mild laxative. But on all occasions I visit the patient about three or four hours after the administration of the opium ; and if there be pain on pressure in any part of the abdomen, with a hot skin and quick jerky pulse, I order the patient in my presence to be promptly bled again in the same decisive manner as before. After this second abstraction of blood, carried again to complete relax-

ation, I generally prescribe about two grains of opium with three or four grains of calomel, in the form of pill, as the faintness disappears. The patient is again left in perfect quietness; and refreshing sleep with free perspiration most frequently succeeds. A third venesection is rarely requisite; but if after the expiration of five or six hours from the second, pain and fever still exist, the operation should again be performed as before, and one grain of opium with two or three grains of calomel given almost immediately afterwards; while half a grain of the former with two grains of the latter may be repeated every four hours till sleep and general perspiration be induced. When the cure has been left to my own management, I have never found it necessary to order bloodletting more than a third time, in the most severe examples of acute inflammation; though now and then it has been deemed expedient to apply some leeches to the abdomen, in order to remove slight vestiges of inflammatory action."

In the year 1826 Dr. Armstrong formed a new school of medicine in Little Dean Street, Soho, in conjunction with the late Mr. Bennett and myself; and a commodious building was erected for the purpose. He had long contemplated this undertaking, partly from the wish of lecturing at the west end of the metropolis. There had existed for some time an uncertainty of Mr. Bennett's certificates being received by the College of Surgeons, in consequence of certain regulations having been passed, restricting the number of schools; and in the autumn of the previous year Dr. Armstrong

published "An Address to the Members of the Royal College of Surgeons, on the injurious conduct and defective state of that Corporation with reference to professional rights, medical science, and the public health."

His object in this Address was to promote the interests of those who were excluded from the opportunity of employing their talents as public teachers; and the strong opposition which the conduct of the College met with from the profession, eventually led to a more liberal policy. His interference on this subject exposed him to some animadversions from those who were interested in the system of exclusion; but his motives and zeal were equally honourable to him.

His lectures in Little Dean Street were delivered in the evening, and attracted many members of the profession. But he abandoned them in 1827, as he found that the exertion necessary for delivering two courses and discharging his duties as a practitioner was too much for his strength.

He was now wholly occupied in practice, and in lecturing at the Borough. The celebrity of his name had gone abroad, and his talents had been deliberately tried and approved at the bar of public opinion, not only as displayed in his published writings, but in his admirable lectures, through which his mind came into more immediate contact with his medical brethren: and in the estimation of many of them he stood unrivalled for ability and sagacity as a practical physician. Unsupported by anything beyond the powers of his own mind, he had in a few years raised himself both in fame and

affluence to the highest distinction in his profession, to which he devoted himself with an exclusiveness of zeal that admitted of no abatement. His life was one of incessant occupation; and the only relief from its labours and anxieties that he either sought or was susceptible of, was in the bosom of his family. The evening found him worn and exhausted by the energies of the day; incapable of appreciating any enjoyment but that which his social circle imparted, and wholly incapacitated for the labours of the closet. He had long formed a plan for revising his works, and putting them into a more condensed and improved form; but he never found leisure for the task. For some years he had been collecting materials for a work on Chronic Diseases; and in 1828 he published the first fasciculus of "The Morbid Anatomy of the Stomach, Bowels, and Liver; illustrated by a series of Plates, with explanatory letter-press, and a summary of the symptoms of the acute and chronic affections of the above-named organs." He intended that this work should have been followed by a volume descriptive of the nature and treatment of chronic affections; but he did not live to put his design in operation. His Morbid Anatomy was only extended to the fourth Number; for the interruptions which he constantly met with from his practice, and ultimately from the state of his health, precluded him from attending to it with that energy and promptitude which characterized the execution of his other works. His mind had, in fact, exhausted his physical powers; and the first visible encroachments of the fatal malady which

put a period to his existence soon began to undermine his strength, and to disqualify him for all unnecessary exertion.

It was not until December 1828 that he manifested anything like the confirmed effects of disease, or that he complained of weakness, and thought a temporary intermission of his labours as a lecturer necessary. He had for some time previously been affected with a cough, which he attributed to the effects of public speaking, and which his family thought had arisen from his imprudence in leaving off flannel, and riding in all weathers with his carriage windows down, exposed to draughts of air. He had never expressed to me the least solicitude about his health; and I had been so accustomed to see him exhausted from his arduous labours, especially after his lectures, which were delivered at a late hour in the afternoon, and always with a remarkable energy of manner, that I was thrown off my guard, and had no suspicion that he was threatened with consumption. His health generally had been good since I had known him, though subject to slight deviations, which were referable to the ordinary accidents of life. I had always considered him more liable to disorders of the mucous membranes of the alimentary canal than to any serious affection of the lungs; for he ate irregularly, often fasted long, was naturally of a pale and spare habit of body, and frequently affected with a temporary congestion of the conjunctiva. He had an attack of dysentery a few years before, which weakened him for some time; and this, with a

fever which he laboured under soon after he settled in London, are the only occasions within my own knowledge of his ever having been taken, through indisposition, from his duties.

Though the disease of which he died had undoubtedly given manifestations of its encroachments before, it was not until his October course of 1828 that he found it necessary to intermit lecturing. He abruptly closed it in December, owing to the difficulty he experienced in speaking, from the increased urgency of his cough. He spoke of it as a faucial cough, and remarked that public speakers at the bar or senate were often affected in the same way. He still continued his practice, and opened his January course of lectures as usual. As the spring advanced his health appeared to improve; and though his cough never entirely left him, he spoke lightly of it, and certainly felt no anxiety about it or his loss of strength. He felt confident that country air would completely restore him; and he was not only deceived by the immediate benefit which he derived from repose, but his family and friends were lulled into security. I strongly advised him to desist from lecturing in the summer of 1829, and to go into the country and recruit himself; but he could not be induced to quit the field of his activity and usefulness. He was at all times impatient of advice, and would seldom permit his medical friends to counsel him, which arose partly from the conviction upon his mind that his state of health was to be attributed to the fatigue he was exposed to in the practice of

his profession, and that his constitution, though worn perhaps by time, was on the whole unimpaired.

It is a subject of mournful regret to me, that our suspicions of the real state of his health were not sooner roused; for, on a retrospection of his condition through the winter of 1828 and 1829, it is now easy to trace the unequivocal and even rapid progress of his disease. In January his cough was very troublesome; and at times he was restless and impatient at the restraints which it imposed upon him. On the 22nd I dined at his table, where I met several of his medical friends, Mr. Langstaff, Mr. Guthrie, Dr. Lemann, and Mr. Earle. He was in good spirits, and had the day before opened his spring course of lectures. But in February he was obliged to suspend them for a short time, as the effort was too great for him. On the 15th he was prevailed upon to go into the country, and he removed with a part of his family to Sevenoaks in Kent. The beneficial effect of a change of scene, and of a complete abstraction from the labours and anxieties of his profession was immediate. His cough almost entirely left him, and he got refreshing sleep. He drove out in his carriage a great part of every day; visited Tunbridge Wells, and was cheered with the appearances of the country in that beautiful neighbourhood, even at this early period of the year. But his mind could not long be diverted from his duties, and on the 21st he returned to town. He was in high spirits when I called upon him in the evening, and expressed a ready confidence of his health being fully restored

in the summer, a portion of which season he contemplated passing as usual in the country, with his family, in the immediate neighbourhood of London.

On the 3rd of March he met the pupils of the Webb Street School, at their anniversary dinner at the Freemasons' Tavern; and though he was visibly suffering from the shock of the sudden death of one of Mrs. Armstrong's relations, he appeared in other respects to enjoy the scene.

He continued for some time to be sensible of the benefit which he had derived from his short excursion into the country; and during the month of April he was enabled to continue his labours without interruption: but the fatigue and exposure to which he was inevitably subjected soon brought on a relapse of his worst symptoms.

Early in May he was so much indisposed that it was deemed indispensable he should go into the country again, as much for the repose of his mind as the hoped-for relief to his general health; and on the 10th he yielded with reluctance to the strong solicitations of his family, and went to Burford Bridge, near Dorking. I saw him a short time previous to his leaving town with Mrs. Armstrong and several of his children, the younger part of his family being on a visit to some relations in Durham. He was out of spirits, and for the first time expressed an apprehension to me that he was consumptive. He seemed to expect little benefit from his excursion; and when I tried to rally him to better hopes, he shook his head, and said that he feared the nature of his malady precluded the possibility of his rationally indulging any.

He returned to town on the 17th. I had on that day attended a patient for him in Lincoln's Inn Fields ; and hearing of his arrival, I sent to say that I would call, to go with him to the appointment I had made with the gentleman who was in charge of the case. He had left home a few minutes before I called, and I overtook him as he was walking in Bloomsbury Square. He met me very cheerfully, and spoke in a very animated manner of the immediate effect which the country air had had upon his spirits and health ; said he had found all his unfavourable symptoms rapidly decline, and his cough so much abated that he had slept well and rose refreshed. I passed the remainder of the evening with him, and he described with a lively interest the beauties of the place he had left, and was animated by the delusive prospects of an assured recovery. But the illusion, at least in my own mind, was over. Though he had evidently improved in looks and strength, and his mind retained for a while the cheering impressions which it had received amid the beautiful scenery of Box Hill, he complained again in a short time of weakness, and his spirits flagged. He became irritable from the effects of his physical suffering, and seemed at times to look hopelessly around him for relief. He sent for me on the 26th, and said that he must relinquish his night practice, as the want of sleep wholly incapacitated him from supporting the labours of the day. He was so rapidly declining in strength, that early in June I entreated him to omit his summer course of lectures, and to leave

London for several months, that the benefit which he had found in the country might be rendered more durable by an entire seclusion from the harassing occupations of his life. He appeared at some moments inclined to do so ; but the interests of his family recurred to his mind, and he felt that it was his duty to use every possible exertion for their welfare. He thought that their residence in the vicinity of London would afford him the usual opportunities of his enjoying fresh air and quiet,—that he should be more satisfied by uniting an attention to his duties with occasional relaxation ; and as he had become attached to the neighbourhood of Croydon, where his family had passed several months in former years, he expressed a desire to take the house which they had previously occupied at Stroud Green. While this plan was in contemplation, he opened his summer course of lectures ; for though he reaped little profit from them at this season, from the few pupils who remain in town after the winter session, he always felt it was his duty to be at his post, for the sake of those who had entered to him perpetually, and that the interests of the school were best promoted by there being an uninterrupted course of tuition in it. But he soon found that he had undertaken a task he was unable to perform, and he sent to me to request I would finish his course for him. I tried to escape from this formidable proposal, as there was no time for my making adequate preparation to supply his place ; but he would listen to no remonstrance, and he silenced me at once by alluding to

his wrecked condition, and intimating that I could do nothing so effectually to relieve him as by taking this public duty wholly off his mind.

He was now at last fully convinced of the necessity of making the state of his health his only consideration ; and he left town on the 7th, with his eldest son, for Richmond. He remained there a few days, and on the 23rd removed with his family to Worthing. I had advised his trying the effect of absolute rest in a recumbent posture, and a strict regulation of his diet ; and during the few days which intervened between his return from Richmond and his going to Worthing, he put it in practice. On the morning of his leaving town I received a short note from him, in which he says, " The repose and spare diet of two days have done me much good, so that now a ray of hope has shot across the gloom which has so long hung about me."

He had been induced to select Worthing, from the hope that sea air would prove beneficial to him, for he had suffered much from the oppressive heat of the weather during the few days he staid at Richmond, and had returned in consequence, in a state of great exhaustion. It was hoped that the sea-coast would afford him variety, and interest his mind by awakening early associations, and that the warmth of summer would be more endurable to him there than in any inland situation. He took a house in the Marine Parade ; and such was the invigorating influence of every change of scene upon him, that on the evening of his arrival at Worthing, he walked several miles on the beach, and seemed to have found a sudden accession of strength and

spirits. The sight of the British Channel, chequered with vessels in the distance, and with fishing-boats near the shore, quite absorbed him, and he sat till a late hour on a stone, upon the sands opposite his residence, enjoying the freshness of the air. This became his favourite resort, and he often sought it in the day and evening when he felt most feverish, and would try to cool the hectic glow that was upon him. Those about him were conscious of a favourable change in his looks and feelings; and his own mind was so susceptible of that hope which smiles but to deceive in this fatal malady, that his own representations of improvement, joined to their anxious solicitude for his recovery, led them to indulge expectations which were never to be realized.

On the 30th I received the following intelligence of him from Mrs. Armstrong, who in a letter to me says, "I think I may venture to say that our patient is decidedly better since he came here. He says the pain in his side is nearly gone, and he coughs much less. His appetite is good, and he sleeps well, but does not feel refreshed by it, and he complains very much of weakness. He is, however, generally in better spirits about himself, though occasionally low. His spirits have been bad to-day, and he was afraid he was living too low. The weather has been much against him, but he has sat and driven out a great deal, and always feels better for it."

The improvement in his health and spirits was but transient; yet the good effects he had so uniformly though transiently experienced from change of scene, led him to indulge in sanguine hopes of the

future, and to take at times a different view of the nature of his disorder from that which he expressed to me on the morning of his leaving town for Box Hill. He would seldom admit to those about him that there was anything serious in his case, and he seemed occasionally to have almost convinced himself that he laboured under chronic pleurisy. He complained of the excitement which the visit of his medical friends produced, and would not allow them to see him. When pressed upon this point, he constantly urged the necessity of complete seclusion, so that I had no opportunity of seeing him for several weeks after he left London.

At length he expressed a desire to see me, and I went to Worthing with Mrs. Boott on the 25th of July, and passed two days with him. I found him much changed, and so weak that he could not walk across the room without panting. His friend Dr. James Clark met me by appointment the next day, and was convinced that there was no room for hope. The weather had been very unfavourable, and on the day of Dr. Clark's visit it was unusually cold. Dr. Armstrong complained of the bleak and exposed situation of his house, and that in cold days he could find no shelter from the keen blasts which blew from the sea. Notwithstanding his reduced condition, he was cheered by our presence, and insisted on our riding in his carriage to see some of his favourite scenes, but was not well enough to accompany us. He lay on the sofa, with his watch frequently in his hand, counting the rapidity of his pulse. That peculiar subdued cheerfulness of tone and manner which he displayed in moments of

pleasurable excitement in health had not deserted him; and though his own wasted form and the faded bloom of his youngest child, who was slowly sinking into the grave, presented a scene of distress which weighed heavily on the heart, there were moments when he made successful efforts to rally those about him, and to recall happier days, by throwing much of his wonted humour into the tones of his voice and expression. He had sent out for some gooseberries while we were riding, and we found him eating them on our return. Mrs. Armstrong gently entreated him to send them away, expressing a fear that they would disorder him. He turned to her with a playful smile upon his countenance, and said, "Make yourself perfectly easy, my love, they must be right, for a doctor ordered them."

We left him on the 27th. I took leave of him as he was breakfasting in bed. He put out his arm, and desired for the first time since his illness that I would feel his pulse and see how calm it was. He told me he had passed a restless night, and that I must not visit him again, for that he could not control the injurious effects which the sight of his friends had upon his excitable frame. It was determined that he should leave Worthing; but he was undecided whether to journey leisurely along the coast, or to seek some sheltered spot in the interior. An attempt was made at the former plan, and he passed a day or two at Brighton.

On the 31st I received the following letter from his brother-in-law Mr. Spearman, who had watched him with all the tender assiduity of the most de-

voted friendship, and who exercised more influence over him than any one, except Mrs. Armstrong. It was written just after the Brighton excursion, and was in answer to one I had sent to Mr. S. expressing my apprehension of the short time our beloved friend would be with us, and leaving it to his discretion to prepare his sister's mind for the event of the impending calamity.

H. J. Spearman, Esq. to Dr. Boott.

My Dear Boott,

19 Steyne, Worthing,
July 30th, 1829.

Many thanks for your very kind letter. I know not what to say or think of Armstrong. Though my apprehensions have been, or indeed yet really are, as lively as your own with regard to him, and though I have almost forbidden myself to hope, he has yet certainly gained ground in some respects since you were here. His night perspirations have left him—his fits of excitement are very much abated—his cough less frequent, and we all think he improves in appearance and flesh. He is also much more comfortable and happy in mind, though I know not whether to think the improvement of his spirits a favourable symptom as regards his disorder, of which he speaks in more sanguine terms than he has done since he came here. He told me, after you were gone, that he was quite satisfied both yourself and Clark thought his case hopeless, and that he saw through your evasions of his questions on this point, but that such a conclusion was by no

means warranted by the symptoms and circumstances of it. In short, he seems determined to recover, in order to confute you both. Pray God he may! but I know not whether we may rationally indulge a hope.

We have been tolerably successful in keeping him at rest. He has taken little but carriage exercise. With regard to diet, too, he has been moderate. He applied some leeches and a blister the night before last, and says he has had less pain in his chest and side during the last few days.

We removed here on Monday, but he continues to think the general climate of the place much too cold for him, though this situation may be more sheltered. We heard to-day that Miss H. has unfortunately let her house at Stroud Green for the rest of the summer, which is a great disappointment to him. In order to avoid the loss of time occasioned by letter-writing and circuitous posts, I am going tomorrow to inquire after a house which was to let at Westerham in Kent. The Waltons occupied it last year, and he appears to like the description given of it by Sarah-Anne and myself. It is in a sheltered valley and beautiful country, not far from town—the distance from London I think twenty-two miles. I only fear it should have been let. The baby is rather better. All the rest of the party as well as can be expected. You will hear from some of us before we leave here. I hope to be back on Sunday morning.

Very affectionately yours,

H. J. SPEARMAN.

On Dr. Armstrong setting out for Brighton he gave up his house on the Marine Parade, and when he returned to Worthing hired one for a short time on the Steyne, as being less immediately exposed to the sea air. He had complained that his former bed-room, which looked upon the sea, was cold, and he attributed his nightly fever to the reaction which followed the chill he was sensible of on going to bed.

But he soon felt the urgent necessity of leaving the sea coast altogether, and on the 4th of August he removed to Burford Bridge near Dorking, as the house in Kent, which Mr. Spearman inquired after, was let. A part of his family came to town for a short time, as there was not accommodation for them in the cottage he had taken as a temporary residence. On the 8th, his eldest daughter received a letter from her father, in which he spoke of his being better, and she returned the next day to him. He had removed to Springfield Lodge, at the foot of Box Hill, which he took for two months, and he seemed rapidly to improve under the influence of the more genial atmosphere of that beautiful situation.

On the 12th he wrote to me; and to show the dread he entertained of the visits of his friends, I extract the following passage from his letter: "I shall say something about your health, connected with lecturing, when I see you. But you and Clark must defer your visit for two or three weeks, for that at Worthing shook me dreadfully, and I have not yet fully recovered from the depression and collapse induced by Clark's visit the other

night. Thus my extreme excitability converts the kindness of my friends into a cause of aggravating my malady. If I recover, I shall give you and him a lecture for your want of *tact*, in not having taken this excitability into account. When I get over my depression and collapse completely,—and they are much lessened to-day,—I shall be better, I trust. Pray tell Clark to defer his visit awhile. But I have been scolding you when I should say ‘God bless you!’ ”

He sent me a particular message, the next day, about some tar which he was desirous of trying, as he thought that he had observed it facilitated expectoration in some cases, and that by inhaling it he probably might obtain more rest during the night. It seemed fully to answer his expectations; and the desire of life for the sake of those dependant upon him, rekindled by the transient effect of this remedy, again infused hope into his mind.

The weather had become much more genial, and in the shelter of the beautiful valley in which he lived he was able to be out in the air with greater comfort for most part of the day; and at all times the beauties of nature, which were here lavishly displayed, produced a powerful effect upon his feelings. He began to take exercise again in walking; for during the latter part of his residence at Worthing, he was not able to make much bodily exertion. But he always found himself refreshed and invigorated in the open air, and he now passed nearly the whole of the day in walking and riding. I had long wished to see him, but knowing that I could do nothing effectually for his relief, I had

not pressed my suit. In a note which I received from him on the 3rd of September, he says: "On the whole, I am better, and determined to be quite well this day five weeks." He had so strongly persuaded himself that the presence of others was hurtful to him, that when Mrs. Armstrong came to town for a few days, that her babe might be placed under the care of Mr. Earle, he persuaded his daughter and Miss Spearman to leave him too, that he might be more alone; and he was left for a while under the care of his son and Mr. Spearman. At length I obtained permission to see him, and went down to Burford Bridge on the afternoon of the 15th. I stopped at the inn, and sent him notice of my arrival by a parcel with which I had been entrusted; but he begged me not to visit him till eleven the next morning. I rose early on the 16th, and walked on Box Hill to enjoy the view of the surrounding country, and had just descended in time to keep my appointment, when I met him walking with his eldest son, on his way to call upon me. His feelings were for a moment overpowered, and we turned in silence towards his house. The impression his looks made upon my mind was such as to convince me that no essential change for the better had taken place in his health, and the emotion he betrayed was a proof that he was fully aware of his situation, however desirous he might be of availing himself of every favourable change in his feelings to fortify himself and others with hope. We took a very long walk, and I was astonished at the contrast which, with respect to energy, he presented, to the state in which I had

left him a few weeks before at Worthing. His mind was generally inclined to look favourably towards the future, though at some moments he took a correct view of his disorder, and particularly adverted to one symptom from which he inferred that his lungs were extensively diseased. I tried to divert his attention from it, and in a few minutes afterwards he was indulging in a seemingly confident expectation of ultimate recovery. He remarked that strong exercise in the air always stopped his cough, and that he had been for some time daily sensible of his strength gradually increasing. He had adopted a more generous diet, and took ale, intimating that his only chance for improvement was in the few weeks of fine weather which remained. "I have determined," he said, "to try the full influence of seclusion, of exercise, and strengthening food; for if anything can restore me, they will. I have therefore done violence to my feelings in separating myself from my family, for whom alone I wish to live." I left him soon after our return to the Lodge, and he ordered his carriage for his usual drive. He accompanied me to the gate, and as we parted, said with visible emotion, "God bless you! Do not think me unkind in urging your return. We will soon meet again."

On the 22nd I had the following letter from him.

Dr. Armstrong to Dr. Boott.

My dear Boott,

Springfield Lodge.

Though your presence was most delightful to

me for the time, yet your visit produced some injurious effects. The announcement of your arrival, at the excitable hour of nine, at Burford Bridge, at once gave rise to great excitement. My pulse ran up to 140 instantly. I became very feverish—walked out into the cold air, but that did no good—went to bed—rose restless and excessively hot. Knowing that malt liquor removed or lessened this state, I drank some ale, which put me to sleep, and next morning I rose refreshed *unusually*. So far well; but after you left me, I again became highly excited, and having promised Henry to take no ale, I passed a night without sleep, was exhausted the next day, and coughed incessantly. Yet these effects have passed away already, which shows I am stronger.

Now, the state which leads to this excitement is entirely physical, and I have no more control over it than I have over the motion of the moon; and when you have had as much experience as I have had, you will be fully satisfied that the views which you now entertain on this subject are wholly speculative and erroneous; for this state is not so very uncommon, though often overlooked, and treated as mental. Study the physical and moral nature of man, without the intervention of preconceived notions. You talk of philosophy. I have exerted a great deal of it. I exert it now to a great extent, in prohibiting any further visits from you, in placing you beside my wife and family, from whom I have torn myself, because I felt that privacy and quiet were essential to my recovery; and I only wish for that recovery that I may make

them and my friends happy if possible, and do all the good I can to mankind at large. But enough of this. Love to Mrs. Boott, and kisses to the children.

Yours affectionately, J. A.

On the 24th he again wrote to me, and asked me to visit him. I went down in the afternoon, and took my wife and children with me to the inn at Burford Bridge. I found him certainly in the possession of increased strength, but in the same variable state of mind as to his condition. On the 25th we walked together for several hours. I was apprehensive of his trying his strength too far, from the idea that much fatigue would weaken and discourage him; but he seemed unconscious of the hazard of incurring any. He very seldom coughed, and was frequently very animated in conversation. Though aware of my family being at the inn, he made excuses for not calling. He sent them some fruit from his garden, with a message to Mrs. Boott that he was forbidden all society. I thought the sight of them would awaken too painful associations in his mind, and I made no allusion to their being in his neighbourhood. His exertion this day was very great: we walked in the morning through Dorking. After dinner he took me to the beautiful grounds of Mr. Denison, talking all the time we ascended the hill; and in the evening, till as late as eleven o'clock, we walked to Leatherhead and back. On our return we observed some glow-worms on a bank by the road-side, and he caught several and desired I would take them to the chil-

dren. He did not complain of cold, though the night air was chill, and a dense fog hung over the bottom of the valley. I repeatedly urged him to shorten our walk; but he remarked that he had generally been out as late, and that he slept the better for it. He again alluded to the symptom of which he spoke before on my last visit, and said that it was a death-watch forewarning him of his doom. This was the *metallic tinkling* of Laennec, which he compared to the faint vibrations of air, caused by the gentle stroke of the hammer of a silver bell. He spoke of it as always present to his ear, and that it was a fatal indication.

While this subject was present to his mind, he spoke of his death as inevitable, and with great composure directed me to attend to several things after his decease; and one subject, which particularly occupied him this evening, was the task I am now engaged in.

On the 26th I took leave of him. He had nearly completed the term for which he had engaged his house, and had formed a plan of a visit to Durham, in the hope that he might find further benefit from travelling, and be able to shake off that morbid sensibility which rendered the sight of his friends so painful to him. He looked forwards with pleasure to the idea of his returning to practice, and believed that he should in a few weeks be able to encounter its anxieties and fatigue. A sudden return to it in his present irritable condition, he thought, would throw him back, and he was induced to fix upon a visit to the early scenes of his youth, as an experiment of his capacity to bear the society of his friends.

On the 2nd of October he returned to London, certainly very greatly changed for the better. He had become hardy in his looks, but was not sensibly stouter. The emaciation which appeared in his form and features on my visit to him at Worthing was nearly as perceptible now, and the only difference was in the renovation of his bodily powers. He had experienced one of those deceitful pauses in the progress of consumption, which are familiar to medical observers, and which are more frequent in cases of the adult victims to this destructive malady than in persons of an earlier age. It is but seldom that its rapid progress is long arrested in those upon whom it has once become actively developed, and the truth of this remark was soon to be verified in the case of Dr. Armstrong.

The few days he passed in London were devoted to the necessary preparations for his journey to the North. He twice called upon me, and in his last visit he expressed to Mrs. Boott his conviction that he should never recover.

On the 8th of October he left town for Durham, with Mr. Spearman, and I received the following note from him on the morning of his departure. He had been very kindly solicitous about my health, as I had suffered from an attack of hemicrania, which I attributed in a great degree to the distress I felt at witnessing his hopeless condition.

My Dear Boott,

Thursday Morning,
Oct. 8th, 1829.

The horrible weather of yesterday prevented me from calling on you in the morning and afternoon.

In the evening I was too much exhausted, and now I am going to Durham, confident that the journey will be useful. I hope that you have quite recovered. Be quiet in act as you have been in thought; in short, follow my example. If you are well, pray see at eleven o'clock the patient whose address is inclosed. I hope I shall hear good accounts of you all. In the mean time God be with you all!

Yours affectionately, J. A.

It was a very cold day, and he travelled in his open carriage, as he said he wished to feel the freshness of the air. He arrived at Durham on the third day, without having complained of fatigue; but he soon suffered a relapse, and his visit was productive of no benefit to him. He found there one of his early friends, whom he tenderly loved, sinking gradually, from a very protracted illness, into the grave; and their meeting, under such painful circumstances, was naturally calculated to shake the fortitude of his mind. He received intelligence also of the death of his youngest child, who expired on the 21st of October, after long suffering; and he returned to London on the 1st of November, broken in spirit and fast fading away.

It was most affecting to witness the persevering but ineffectual efforts he made to rally his sinking energies, and to enter once more upon practice. His mind seemed to infuse vigour into his wasted and enfeebled frame, and for two or three weeks he was much occupied in visiting patients, in and for a distance of several miles from town. But he came

home always in a state of great exhaustion, and it was painful to observe his instinctive promptness to attend to the calls of duty, blended with the incapacity of exerting himself without greatly aggravating his sufferings. He could not be persuaded to abandon all thoughts of his profession; and it seemed a relief to him to feel that he was yet capable in some degree of being useful to his family.

On the 19th he sent an urgent message to me in the evening. I found him sitting in a corner of his drawing-room, remote from the fire. He told me that he had taken a warm bath, and that he had discovered while in it a fracture of one of his ribs; and he seemed wholly absorbed with the idea that this neglected injury was the origin of his sufferings. The suspicion of this injury, which was entirely groundless, prevailed for a short time; so that he became fearful of making any unnecessary exertion. A few days after this he declined seeing more patients; and after some feeble attempts to rally himself by exercise in his carriage, and taking short walks on Highgate Hill, he took to bed.

The last day he rose from it was the 1st of December. I visited him the next morning in his chamber, and he said that he should never leave it. He was in a state of perfect composure of mind, and fully resigned to his fate. On the 3rd he told me he might live ten days; that he had done all he could to combat successfully against the disease under which he laboured, but that it had been in vain, and there now remained but one duty more, and that was "to rally all life's energies to die." He spoke upon many subjects with a most impres-

sive earnestness. The irritability of feeling which had so long distressed himself and those about him had subsided, and he exhibited a calmness and gentleness of manner, and a cheerful readiness to acquiesce in every wish that was expressed. He spoke particularly of his medical works and opinions, and regretted that his life could not be prolonged, to enable him to republish them in a more satisfactory form. He interested himself especially about the Plates of his fourth fasciculus of Morbid Anatomy; and made some brief notes as they recalled facts to his mind, to guide him in the composition of the letter-press, which he still hoped to complete. So much interested was he on this subject, that even so late as the 6th he wrote to his friend Mr. Langstaff, desiring to see him about some preparations from his museum, that gentleman having always shown the utmost readiness to promote his views, and aid him in the illustrations of his work.

Mr. Langstaff called upon him, and was deeply affected at the sight of his dying friend. He expressed a wish that Dr. Thomas Davies of Broad Street might be called in; and I met that gentleman and Mr. Langstaff in consultation on the 7th. It did not require the formality of an examination with the stethoscope to convince us of the nature of his disease. Dr. Armstrong was so weak that he could not be turned without putting him to unnecessary suffering, to admit of the instrument being applied to the back; and an appointment was made for the next day. He never made any allusion in the interval to the subject of the consultation, though

on Dr. Davies taking leave of him he expressed a wish that the examination should be complete. On the 8th it was completed; and Dr. Davies gave it as his opinion that there was a large cavity in the upper lobe of the left lung, with thin anterior parietes adherent to the ribs; the precise accuracy of which was fully verified after death.

On the 9th, Dr. Armstrong asked me at what hour the consultation was to be held. We had not intended to disturb him again, and no arrangement had been made for another visit. But I wrote to Mr. Langstaff to desire he would meet me with Dr. Davies the next day. On their arrival he was unwilling to see them, as he felt disposed to sleep; but I persuaded him to do so, as a satisfaction to his family. He at once consented; but he was so exhausted that no questions were put to him. He shook hands with them, and faintly expressed his acknowledgements for their kindness. I saw at this visit that his end was rapidly approaching,—for his extremities were cold, and his pulse scarcely perceptible,—and determined not to leave him till the last duties of friendship were discharged.

The scene which followed on Thursday night, on Friday, and Saturday, will never be effaced from my memory. He was perfectly sensible to the last; and in an equable serenity of mind cheerfully resigned to his fate; full of gratitude to God for the blessings he had bestowed, and of thankfulness and affection to those around him for their attentions.

I urged him to let me give him some hot brandy and water, as his fits of coughing were protracted

from the difficulty, occasioned by his extreme weakness, of freely expectorating. I never knew at any period of our acquaintance his mind more distinct or unclouded, or his expressions more free from all embarrassment. There was not at any moment a murmur of regret, nor did he display any signs of impatience, or make the least allusion to his sufferings. He seemed to be animated solely by the wish to lighten the distress of those around him, and to forget his own condition in the solicitude which he felt for their comfort and welfare. So deeply impressed was I with the composure of his mind, and the triumphant exercise of his noblest affections, that I was often taken from the consciousness of his real situation; and the trial, which I had so long dreaded, of witnessing his last moments, was, by the dominion of his refined and powerful mind, converted into an ennobling scene of the most admirable fortitude and resignation on his part, and of expressions and feelings which were more like those that had ever animated him in the hours of our social enjoyments, than such as might have been expected on the bed of death.

He frequently dozed, and sometimes for two or three hours at a time. His friend Mr. Spearman had arrived from Durham on the 10th, and in the evening I informed him of it, urging him to see him, as he might wish to leave some directions about his affairs. "No," he said, "they are arranged; I have but to say, God bless him!" He sustained the interview with firmness, alluded to a hasty expression which he had used in Durham, and asked his friend's forgiveness. He soon after

expressed himself happy to me, in the thoughts of leaving his wife and children under the protection of so near and dear a relative, and spoke of the happiness which he had invariably enjoyed from Mr. Spearman's society and friendship.

He often called me to his bed-side to give me some directions respecting his Works, and on one occasion he recollected an error of the press which he desired I would note down immediately in his presence for correction.

The effort of speaking at times exhausted him, and when he ceased he sunk for a few moments into a quiet slumber, which was soon however disturbed by his cough. On waking, he generally called to me and spoke on some subject present to his mind, and I was always deeply impressed with the force and clearness of his thoughts and expressions. He frequently conversed upon the duties of a physician, and gave me many directions for my future guidance. "Remember," he once said, "to be cheerful in your intercourse with the sick. You take a load from the mind, and infuse into it the balm of hope."

A short time after he said, "There is an observation of Lord Bacon's which you must remember. He says it is the duty of a medical man to attend to those things which may render death easy. I conceive that he means those remedies should be administered which are suited to the occasion, without regard to the nature of the malady. That is out of the question,—it is triumphant, and may be allowed to run its course, for it is beyond human efforts to arrest it. You have judged correctly in

giving me hot drinks, for they have removed that death-like coldness and sickness which I felt before. I have always found that wine or brandy are the best stimulants, for they are the most grateful. Other substances are often objectionable from their medicinal flavour, and frequently offend the stomach."

After a short pause he added, "What a mind that great man had! It was like a meteor throwing its expanding radiance over the dark ocean of truth."

He continued to doze at intervals, but was apprehensive of sleeping long, and desired to be roused, if he did not waken in a short time; apparently from the apprehension that his cough would be more distressing to him, if it ceased for any considerable length of time. But we did not disturb him; and occasionally he slept for an hour or two, and on waking he seemed wholly unconscious of the interval that had elapsed. After one of these undisturbed slumbers he requested me to give him something to moisten his mouth; and on my mixing a teaspoon-ful of brandy in a wine-glass of exceedingly hot water, which he preferred, he said, "What a strange condition is mine! I have taken nothing for many hours but these sips of brandy and water, and yet I feel no thirst." As he returned the glass to me, he held it for a moment aside, and looking first at it and then at me, he smiled, and said, "I may be truly said to be leading a life of dissolution."

This was not the only instance of his throwing some of his wonted cheerfulness and even humour into his expressions.—He spoke deliberately, but

often with animation, and on a variety of subjects, except that of his children. He once, in the momentary absence of Mrs. Armstrong from his bedside, said, "I am content to die, but when I think of my family I wish to live; it is hopeless now." He was deeply affected, and only once again briefly alluded to the subject.

I had left him for half an hour on Friday night to go home, and on my return was surprised as I entered his house to hear the sound of music. He had sent a request to his eldest daughter, that she would go to the piano and sing the German Hymn; and I found him listening to it attentively, and deeply affected by the impressions it made upon him. It was a moment of solemn and most affecting interest, to hear at midnight from below the broken voice of his child, endeavouring to express the language and feeling of that beautiful piece of music, and to mark the effect which it produced upon her dying parent.

About one o'clock in the afternoon of Saturday the 12th of December I gave him some jelly at his own request, and he looked up and said, "Have I left anything undone for you? Are your children and Mrs. Boott well? I must keep my promise, and see her. Take them my blessing. I have all the consolations I can have: I am very happy. I feel all the comforts of religion: I have a full reliance upon the mercy and goodness of God. If I have done wrong, he will forgive me. He can deceive no one."

Soon after he said, "Gloomy views of religion are false. God is all mercy, justice, goodness, and

benevolence. I am most grateful for this happy tone of mind:" and looking at Mrs. Armstrong, Mr. Spearman, and myself, who were standing round his bed, he added, "I have all the comforts possible in my situation: I am surrounded by an atmosphere of the affections. Bless you all!"

About four o'clock he called me, and repeated the summons before I could reach his bed-side; and when I did so, he said, "I am too impatient, and grieve to give so much trouble. In writing my Life, which can only be useful as a history of my opinions, enter into no controversy about me, or my cause of offence against the College. And if you are censured, say it was my last request, that I might die in the consciousness of being at peace in the grave. I die at peace with all mankind."

He continued in this admirable tone of mind to the last,—full of sympathy and concern for the distress of those around him, which he tried to soften by repeated assurances that he suffered nothing. A few hours before he expired, he said, "I am most grateful to the goodness of God for keeping me so composed and happy." I told him it was a great consolation to us to see him so resigned; and that we should meet again, never to part. "Yes," he said, emphatically, "or there is no foundation for human happiness; we shall all meet in heaven."

About eight o'clock on Saturday evening he became restless and uneasy, and desired frequently to be moved. He spoke of the increasing oppression of his breathing, and sought relief in change of position. He desired that the servant who had usually attended upon him might be called to assist

in raising him ; and he expressed in the kindest manner his thanks for his aid. In about half an hour he became more tranquil, and apparently easy. I had thought it was the last struggle of expiring energy, and with difficulty prevailed on Mrs. Armstrong to leave the room, that she might be spared the agony of witnessing his distress. She had supported herself with astonishing firmness, and so unremittingly watched by his bed-side night and day, that I had become apprehensive of her sinking exhausted from distress and want of sleep.

He had fallen into an apparent slumber, and had ceased to cough. At times he wandered in his thoughts, and it was deeply affecting to note their tenour. It was not delirium ; but as if in the weakness and embarrassment of expiring consciousness, the most durable impressions only were perceived and expressed without reference to existing circumstances. He seemed to take no notice of anything about him, nor did he appear to see those who were standing by his bed-side. He lay perfectly still, breathing quickly, with his eyes generally closed ; and at intervals he spoke exclusively of his wife and his profession, in a very hurried tone of voice, as if apprehensive that every moment might be his last. He would use the tenderest epithet in speaking to the former, and then address himself to one of his patients. At one time in speaking to Mrs. Armstrong, as if she were present, he said, "Quick, quick, dearest Sarah,—some filtered water to wash my mouth." Then, after a brief pause, he said, as if advising a patient, "It is not amaurosis ; the pupil of that eye is as regular as the other."

Again he said, "Live by strict rule. Do not eat too much. These conditions form rapidly, and must be prevented. Purge them freely."

I bent over him, expecting every moment would be his last, without indulging a hope that he would notice us again. But about twenty minutes after eleven o'clock he looked up, and seeing me by his bed-side, he faintly said, "Turn me, Boott." I got upon his bed and did so. He said, "More forward." I raised him again, and placed his head more forward. I asked him if he lay easy. "Yes," he feebly answered, "bless you!"

He never moved from the position in which I placed him, but lay still and silent till a quarter to twelve, when, without a struggle or apparent suffering, he ceased to breathe.

Thus died this eminent physician and excellent man.

I have dwelt long on the particulars of his last illness and death, because they deeply impressed me with an increased admiration of his character; and that which so powerfully affected my own feelings, I have thought likely to interest those of others. I have discharged imperfectly, but to the best of my ability, a sacred duty to my deceased friend; and if in doing so I have made allusions to the friendship with which he honoured me, there are few of our mutual friends who will misinterpret my motives. Certainly the love I bore him was not of that trifling nature that, in endeavouring to draw an outline of his life, I could wish to blend unnecessarily with it any part of my own. No one can have a deeper conviction than myself of the un-

worthiness of my name being in any way associated with his ; and I would wish it in no other manner to be remembered than that of the very humblest of his admirers.

On the 14th of December I met Mr. Langstaff and Dr. Davies, in Russell Square, at eight o'clock, and we proceeded to examine the body, which was opened by Mr. Pilcher, one of the most highly esteemed of Dr. Armstrong's friends, and his colleague at the Webb-street School.

The appearances it presented are detailed in the following report, which was drawn up, at my request, by Dr. Davies :—

“The body presented the appearance of extreme emaciation : the adipose substance was totally absorbed, the muscles unusually red, and their texture of moderate firmness.

“On opening the chest, the upper third of the left lung was seen firmly adhering anteriorly to the costal pleura ; a large tubercular excavation corresponded in extent to that portion of the lung, capable of containing from twelve to sixteen ounces of fluid. The whole of the anterior parietes of this cavity were not above two or three lines in thickness, formed of condensed pulmonary structure, and firmly adherent in the whole of its extent to the pleura costalis. The posterior parietes of the excavation were considerably thicker, and traversed by a number of bands of pulmonary structure, studded with tubercles, constituting what are called ‘*columns*’ by Bayle. The cavity was partially lined with a false membrane of various consistency, in some parts soft and easily scraped off

by the scalpel, in others of a cartilaginous density. Various bronchial openings existed in the right and upper portion of the excavation. The remaining portion of the left lung was filled with tubercles in all their stages,—the grey, the crude, the softening.

“The upper half of the right lung was filled with tubercles accumulated in rounded masses, the interval between these masses being tolerably healthy. There was also in the apex of the same lung an excavation capable of holding a small-sized walnut. This was lined with a firm membrane. The inferior half of the right lung presented a few disseminated tubercles, but its structure was not materially different from the healthy state.

“There were but few adhesions; the heart was small, its texture soft, but not diseased.

“The direction of the stomach was more perpendicular than usual; its mucous membrane was generally softened and reddened.

“The intestines were healthy, except near the ileo-colic valve, where a mass of the glandulæ aggregatæ were in a state of hypertrophy.

“The rest of the viscera were in their natural state, with the exception of the gall-bladder, which contained a stone of an oval form, about the size of a hazel-nut.

Thomas Davies, M.D.

George Langstaff.

George Pilcher.

Francis Boott, M.D.”

On the 19th the remains were deposited in the north-east corner of the large vault of St. George's

church, Bloomsbury. They were followed by his eldest son, his brother-in-law H. J. Spearman, Esq., and a few friends.

Dr. Armstrong's age was forty-five years, seven months, and four days. He left six children—three sons and three daughters. His youngest son died about seven weeks before him, and lies by his side. This was the only loss he had experienced in his family.

In person Dr. Armstrong was tall and thin. His manners were gentle and unassuming, almost diffident in the presence of strangers, exclusively domestic and retired from the world, when the calls of duty did not require his intercourse with it. His nature was candid, confiding, unsuspicious; his sensibilities lively and acute; his tastes discriminating and refined. There was a simplicity and innocence of mind and disposition about him which endeared him to all who knew him intimately, and which won for him especially the confidence and attachment of the young. When released from the cares of his profession, he entered with unmixed delight into the sports and occupations of his children, and appeared to derive as much liveliness of enjoyment from them as they did. It was entirely foreign to his nature to speak to them, for a moment, harshly. There seemed to him something essentially pure and angelic in childhood, as if its delicacy forbade reproof, even for its occasional waywardness. As a father, he was always most tender and indulgent; and when occasion required from him "the sterner countenance of love," it was an effort above his

powers, and the tone of admonition melted into the soft persuasions of the most tender and confiding affection. I never knew any one who required or who sought so instinctively to promote the affections as he did ; and nothing so soon overpowered his self-possession as the evidence of the confidence and the love he inspired in children. Their unreserved recourse to him at all times, and their frank appeals to his kindness, invariably brought tears to his eyes ; and there was a smile upon his countenance, a struggling emotion in the tones of his voice as he addressed them, with his hand gently patting them on the head, which forms in my memory one of the most frequent and familiar of my recollections of him.

He was a deep and enthusiastic admirer of woman. There was a tenderness, blended with a dignity in his manner towards her, of which the most intimate friendship never made him forgetful ; and a delicacy in his conduct, which, united with the characteristic firmness and persuasion of his manners as the physician, contributed largely to his success in life. He spoke of many he had known with an almost poetical enthusiasm,—their purity, the devotion, the fortitude, the self-denial, the submission under suffering and privations, displayed in their lives, having inspired him with the profoundest admiration of their character.

He carried the sagacity which he displayed in his profession into his observations of life, and none of its more delicate and evanescent beauties seemed to escape his notice. It formed one of the peculiar charms of his conversation to observe from it how

quickly and sensitively he perceived and felt those instinctive actions and expressions which give individuality to character. That exquisite simplicity and truth of observation, which constitutes the charm of the Natural Historian of Selborne, was equally observable in Dr. Armstrong's remarks upon mankind. His dislikes were as transient as the shadows over a sunny landscape. He was one of those who believe in the essential excellence of human nature; and if ever forced to doubt of it, the slightest manifestations of kindly feeling were sufficient to restore his faith in its propensity to natural and increasing good.

Though susceptible of a playful humour and an occasional gaiety of feeling, he was naturally of a serious cast of character; and from the absorbing interest he took in his profession, the distressing scenes he moved in, and the thoughtful bent of his mind, he often wore a look of abstraction and concern. He was wholly unsuited to mix in the pursuits of fashionable life. He had no community of taste with its admirers, nor capacity to appreciate the trifling objects of momentary interest which the fluctuating surface of society presents to those who are content with its fleeting novelties. His only sources of happiness were in the contemplation and practice of his profession, in the hallowed seclusion of home, and in the society of a few intimate friends.

He was more exclusively and anxiously devoted to the duties of his profession than any man I ever knew. Nothing it required ever appeared to him an encroachment upon his time, or an invasion of

his ease. He never refused to attend to the calls of distress, and was always most liberal of his time and advice to the poor.

His pupils were warmly attached to him, from the interest he took in their improvement and their comforts. He watched over them in sickness with paternal solicitude. He blended so much of the generosity of his nature, the sensibility of his feelings, and the purity of his tastes in his lectures, that no public teacher was ever held in higher admiration or respect. No one who was unable to incur the expense of taking his tickets was ever dismissed as an unsuccessful applicant. Such, indeed, always found in him the friend in need; for he obtained for them free admission to the lectures of his colleagues, and assisted them in other ways to complete their medical education.

He was fond of literature, and especially poetry. The following lines, to a lady dying of consumption, he wrote many years ago. The thought in the first verse is beautiful for its truth and originality:—

Sweet Margaret ! again the hectic glows,
Enamour'd, o'er thy cheek of loveliest bloom ;—
So pass the sun-beams o'er a withering rose,
And faster fade its beauty, and consume.

Sweet Margaret ! awhile the grave's dread gloom
Shall deepen round thy last oblivious rest,
Then bursting forth, an angel, from the tomb,
Pure thou shalt rise, and mingle with the blest."

I shall add one or two other specimens of his poetical effusions : but though characteristic of the

refinement of his mind, they but imperfectly give an idea of its poetry. He never deliberately yielded to the solicitations of the muse. Several of his momentary essays, like the two last affecting stanzas of Kirke White's devotional muse, are written on the back, not of mathematical, but medical papers. Lord Byron truly says,—

“ Many are poets who have never penn'd
Their inspiration, and perchance the best :
They felt, and loved, and died ; but would not lend
Their thoughts to meaner beings : they compress'd
The God within them, and rejoin'd the stars
Unlaurel'd upon earth.”

Dr. Armstrong did not disdain to lend his thoughts to others, but he forbore to take them from the one great object of his life, and the all-absorbing subject of his contemplation. The following short poems he gave me many years ago.

THE MOTHER.

See ! from her couch the care-worn mother creeps,
Where, stilly deep, a hectic daughter sleeps :
Awhile, with palpitating heart, she stands,
Then, forward leaning, feels her dewy hands,
And, shuddering at a sight so full of death,
Long listens, anxious for the coming breath,
Till gentle murmurs every fear remove,
And waken all the sympathies of love :
Warm kindling in her breast such raptures rise,
As when that daughter first did meet her eyes
An infant—looking cherub-like the while,
And claiming many a tear and many a smile.—
Imprinting on her lip one trembling kiss,
Now dreams the mother of ideal bliss,
And round her sees her daughter's offspring rise,
Health on their cheek, and pleasure in their eyes.

Pale sufferer!—enjoy the only hour
Of happiness that is within thy power :—
Thy daughter in her grave-clothes soon will sleep,
And thou shalt lonely wake, and watch, and weep.

ON A MOONLIGHT NIGHT.

Yon moon and stars have shed as sweet a light
On ages gone as o'er this calm of night,
And millions of men, with an admiring eye,
Have traced them through as bright and blue a sky.
Those men are nothing now—their names have past
Like sands which rose, and sunk upon the blast.
Thus shall succeeding generations gaze,
And mingle with the dust of other days ;
While the same moon and stars will still remain,
Through countless ages rise and set again,
In glory undiminish'd as they first began.—
Ah ! how unlike the changeful race of man !
Yet is a hope to the lone bosom given,
That Mind survives, an attribute of Heaven,
When disencumber'd of the mortal shroud
Which veils the future, like an ambient cloud ;
And I'll indulge that vision of delight,
Rapt in the spell of this most heavenly night,
And soothe me with the thought that yet again,
When purged by suffering from all earthly stain,
My spirit shall the loved and pure embrace,
In some sweet region of yon starry space.

1819.

LINES WRITTEN IN A BEAUTIFUL AND SOLITARY PLACE.

In shades of solitude like these reclined,
What mortal but would cast his cares behind,
Forget ingratitude, and grief, and pain,
And breathe and live in blessedness again ?
This spot I love—this lonely silent scene,
With fragrant air and banks of varied green ;
The mountain ash bright in her fruit ascends,
And lightly with the yew her branches blends.

The stream with an unceasing current flows,
 And back, like lightning, oft the sun-beam throws
 Among the changeful shadow of the trees
 Which wave, and seem to court the passing breeze.
 In such a spot, where inspiration dwells,
 The pensive heart with conscious pleasure swells,
 And feels, no longer with the world at strife,
 That there is balm for every care of life.
 How little vain parade and pomp appear,
 For nature reigns alone triumphant here!
 No trace of tyrant man o'er all is found,
 Eternal quiet sanctifies the ground.
 Oh! blest retreat—when life shall calm require,
 And all extinct be youth's awakening fire,
 When from my fellow men with anxious eye
 In age I turn, and all their tumults fly;
 Receive me, wearied of the world, once more,
 With purer breast—though colder than before.
 Oh! then, as now, a holy power impart
 To heal the wounds that rankle in the heart.

THE WISH.

Obscurely let me live and die—
 But not unknown, unhonour'd lie;
 Oh! may the poor and wretched trace
 My grave in some sequester'd place,
 Where nameless streams my requiem sound,
 And nature breathes in beauty round.
 There, ardent, may their blessings rise,
 Like incense offer'd to the skies.

1808.

The pensiveness that breathes in these verses was habitual with him. Though surrounded with every thing which could give happiness to life, there was often a sadness in his turn of thought that touched deeply the inmost feelings of those about him. It was not called forth by any passing circumstance,

nor associated particularly with his own condition, but the expression of the sensibilities and the reflections of an acute mind which, glancing at the condition of human nature, aspired to something beyond its present destinies.

I know of no defects in his moral nature. If he had not the industry as an author which many gifted men possess, it did not arise from indolence but from exhaustion,—at least at the end of the active labours of the day; and that several of the last years of his life were passed under the secret undermining influence of the malady which destroyed him, is but too evident from its close.

There are others far more capable than myself of doing justice to his talents. If the voice of many who knew him well could be heard, it would be found that few men had superior powers of inspiring attachment; and that the friendships which others formed with him were tributes to his moral as well as his intellectual preeminence.

MEDICAL OPINIONS
OF
JOHN ARMSTRONG, M.D.

CHAPTER I.

GENERAL VIEW OF FEVER.

THE opinions upon which Dr. Armstrong's fame will principally rest with posterity, are those connected with the subject of Fever, upon which he entertained views more comprehensive, and at the same time more definite, than those generally held by the medical authorities in this country.

It has been objected to him, that he is inconsistent with himself; that the opinions he expressed towards the close of his life are opposed to those which he published in the outset of his career. I admit the fact without dispute; and claim from it an acknowledgement from candid minds, of the integrity of his own*. He always wrote from con-

* "The candour of Dr. Sydenham," says Rush, in his Lecture on the character of this illustrious man, "discovers itself by the readiness with which he acknowledges his having mistaken a nervous fever for a bastard peripneumony. Such instances of magnanimity are very rare in all sciences; and from the influence

viction; but the opinions of his youth, engrafted from a foreign stock on the observations which his limited opportunities of judging for himself had furnished, were not those of his adult age. When these opportunities had extended, and become multiplied by time, he perceived what he believed to be the errors of his own and of the generally received doctrines, and was not deterred from exposing them, though in so doing he displayed the weakness of the ground upon which he first aspired to distinction.

His volumes on Fever were originally written at Sunderland, where his experience was very limited compared to what it became after his residence in London, and his appointment to the Fever Hospital; and I can trace three periods of his life in which he entertained different views upon the subject of the origin of Typhus. He had been taught at Edinburgh that it arose from contagion,—and he adopted the faith. Like all believers who take a creed without due examination, he asserted the truth of that which he had received, and in his early writings brought facts in its support. In his paper on the Origin, Nature, and Prevention of Typhus, communicated in 1822 to the Medical Intelligencer, he says that in 1819 he first began to doubt at least the exclusiveness of this cause, and to associate with it that of malaria: and in his ce-

which they have upon both interest and reputation, are less common among physicians than men of other professions." Rush himself nobly acknowledged his error respecting the contagiousness of yellow fever; and Andral as nobly confessed he had mistaken the seat of inflammation in peripneumony.

lebrated Lecture on Typhus, which is his last publication on the subject, and which appeared in the "Lancet" in the spring of 1825, he rejects the influence of contagion entirely, and insists upon its arising from malaria alone.

I shall proceed to give a general outline of his views of Fever, confining myself principally to those which he entertained at the close of his life; for it had long been his wish to publish them; and in the hope that he should find time to do so, he always declined to remodel the elaborate volumes he had printed on the subject.

He divided Fever into Common and Specific, as it arose from what he called common or occasional, and specific causes.

The common causes are those ordinary agents to which mankind in every situation and under all circumstances are exposed. These are classed according to their primary effects: their ultimate effects upon the body when these amount to a powerful impression disturbing the functions and affecting the structure, constituting what he denominated Common Fever; which not only included the acute inflammatory affections comprised in the Phlegmasiæ of Dr. Cullen, but diseases of a similar nature scattered in different parts of his artificial arrangement. It also comprised other disorders not inflammatory, the symptoms and pathology of which, by a legitimate generalization, were shown to depend upon the different stages or degrees of action arising from the exciting causes of fever.

These causes he termed Common Depressants, Stimulants, and Irritants.

Common Depressants,—such as a low and variable temperature, severe accidents, or surgical operations, pain, fear, &c., are those common agents which enfeeble the energy of the vital powers, diminish the animal heat, the action of the heart and of the muscular system. They produce internal venous congestion; and when fever ensues, it has three stages, viz. that of oppression, excitement, and collapse.

Common Stimulants,—as a high temperature, strong bodily exertion, powerful exciting emotions of the mind, &c.,—affect the whole body, augmenting the energy of the vital powers, increasing the animal heat, the heart's action, and the muscular power; so that the blood under their influence is rapidly diffused over all parts of the system; and the fever which is the consequence has but two stages, viz. of excitement and collapse.

Common Irritants, such as fermented liquors, indigestible food, irritating medicines, mechanical impediments to the course of the fluids, &c., primarily affect particular parts of the body, increasing their sensibility, but ultimately operate through the local impression upon the whole system; sometimes acting as depressants or stimulants, according to the condition of the patient, or other circumstances.

These causes, when they produce acute affections, give rise to common fever, which appears under three forms, each depending upon a peculiar pathological condition; viz. to—

Common Congestive Fever; the indications of which are, an oppression of some organ or organs,

attended with a sensible diminution of the vital powers from venous congestion.

Common Simple Fever; which is indicated by an increase of the vital powers, from a state of general excitement, in which no part is particularly affected.

Common Inflammatory Fever; the indications of which are the phænomena of inflammation in some part or parts,—succeeding to the indications of the two former modifications of fever, or of the second only; or in some instances, perhaps, preceded by neither of them.

The specific causes of Fever are those occasional agents to which mankind are not universally or equally exposed. They operate generally as depressants, and differ from common causes in invariably giving rise to fixed and peculiar, as well as occasionally to variable and common effects; the specific cause itself always operating on particular structures, probably through the blood, and thus giving rise to a fever of a peculiar or specific kind.

Specific Fever appears equally under a congestive a simple, or inflammatory form; but the peculiarities which characterize its different varieties depend upon the nature of the exciting cause.

These causes are certain states of the atmosphere, specific contagions, and poisons.

Dr. Armstrong applied the term *infections* to those general or partial contaminations of atmosphere which arise from agents external to the human body; as malaria, and local taints of air: and *contagions*, to those emanations from the body in which they are formed; as those of small-pox,

measles, and scarlet fever. It was a questionable subject with him, whether diseases arising from infection are communicable by contagion; but those which arise from contagion are readily communicable from one person to another. Thus typhus, arising in his opinion from malaria, is probably not a contagious disease; but small-pox, measles, and scarlet fever, which proceed from contagion, are indefinitely propagated in this way.

These specific causes, when their influence is such as to excite an acute disease, produce fever, which appears under one or all of the three forms above enumerated; but attended by effects which, depending on the cause, will of course vary with it. These are the internal condition or pathology of typhus, which, arising from malaria, appears under the form of an intermittent, a remittent, or continued fever, in which particular parts are always more or less affected. The other peculiar effects are the pustules and internal condition of small-pox; the rash, &c. of scarlet fever and measles; and lastly, the peculiar impressions arising from the different poisons.

The difference between Common and Specific Fever is, that in the first there is nothing fixed as to the locality of the ultimate pathological effects; while in the second there are some of these which are always uniform in their seat. The reason of this is, that in common fever there is nothing specific in its exciting causes. The functions are disturbed by external agents which do not affect the qualities of the blood; and when fever arises from their influence, it is always unattended by inflam-

mation, at least to any appreciable degree, in a sound subject; and when it occurs in an unsound one, the seat and degree of the inflammation will depend upon individual predisposition, which varies indefinitely in different persons.

But in Specific Fevers it is different; for these arise from causes which do affect the qualities of the blood, and are of a nature to act injuriously upon particular parts of the body; so that one and the same cause produces similar effects in any number of persons exposed to their influence. In these cases, however, individual conditions affect the liability to the reception of the virus; and local predispositions lead to the phænomena of inflammation in parts which, under the action of the common causes of fever, would equally have become inflamed; so that, in many cases, common effects are mixed up with the specific effects of the peculiar exciting cause.

To render this more intelligible.—If many persons are at the same time exposed to the common causes of fever, and it were to result from their action, and be of the inflammatory type, the seat of the inflammation would vary according to the individual predisposition of each person. They would all exhibit the symptoms of fever, but different organs and structures would be affected in different cases; so that the only thing common to all would be the inflammation itself. In one, the mucous membrane of the pharynx or bronchia might be attacked; in another, the substance of the lungs; in a third, the pleura, or the mucous or serous membrane of the intestines,—or the brain,

the liver, or the kidneys, &c. In common inflammatory fever, therefore, there is nothing determinate but the inflammation itself; because the disturbing cause, having nothing peculiar in it, has no direct tendency of itself to affect any particular part of the body. A general shock has taken place from without, and the evil falls on the weak part. If no such local predisposition exists, then no part is particularly affected, and the fever is one of simple excitement, which, when arising from common causes, is never serious or durable, though very frequent in its occurrence. It may be excitement of a low or high degree, but still no trace of inflammation can be detected; and the only caution necessary is to reduce the excitement, lest some obscure latent defect should exist, and the part so predisposed ultimately become inflamed. The danger of this occurring is indicated by the degree and duration of the excitement; and, however trifling the case may appear, it should be watched, lest the fever change its character.

But when several persons are exposed to the exciting causes of specific fever, they are all in some respects similarly affected, because the disturbance is occasioned by the introduction of a virus, the nature of which is to affect particular parts of the body. If we suppose that they have been exposed to the contagion of scarlet fever, those who sicken with it will manifest the symptoms of that disease. It may vary in degree, but the disease will in essentials be the same in all, so far as the peculiar effects of the exciting cause go. But, besides these, others may arise out of the pre-

dispositions of the individual. In all there will be the rash on the skin, and the inflammation more or less acute of the throat: but other parts may be inflamed, not from the direct influence of the peculiar cause of the fever, but from the excitement to which it has given rise. The brain, for instance, might in one person become inflamed, owing to that organ being predisposed; and had the person so affected been the victim of fever from common causes, he would, in the stage of excitement, from the local defect have manifested the symptoms of inflammation in the same part, but of course without those of scarlet fever. Yet, in the case I am supposing, he has both: the peculiar symptoms have arisen from a specific cause; and the other, from the excitement it produced, in consequence of the impression made upon the brain, which, from its latent weakness, was unable to bear the increased afflux of blood, and at the same time maintain the integrity of its functions. So that Specific fever has occasionally common mixed up with peculiar effects; the last of which are invariable in character, though differing in degree; while the first have nothing determinate as to their locality, because they arise out of the mere excitement, as in common fever, and thus form complications in specific cases, which will vary with individual predispositions.

Fever, therefore, is an abstract term. Whether it arises from common or specific causes, it appears under three forms, depending upon as many different conditions. It may successively appear under the congestive, the simple, or the inflammatory

form, or may consist of one of these only. The congestive and the inflammatory are more fully developed in weak subjects, or those in whom latent defects exist; and the simple form, in sound ones, who are capable of enduring excitement, without injury to any particular part, because none is predisposed to inflammation.

The conditions, therefore, of venous congestion, of simple excitement, and of inflammation, are all comprised in the term *Fever*, taken in its most comprehensive sense. In its onset the exciting cause has produced congestion or excitement. If the congestion be not overwhelming, reaction sooner or later follows; and the case then, as when excitement is primarily induced, is one of simple or inflammatory fever, depending upon the absence or presence of inflammation. Inflammation, therefore, is the ultimate effect. If the cause be a common one, the case is one of common inflammation in some organs or structures that were predisposed;—if peculiar, there are then, invariably, specific effects in determinate parts, though the excitement, independent of the nature of the cause, may operate upon existing predispositions, and kindle up inflammation according to their seat or degree. In common fever, therefore, in its fullest development, there is inflammation somewhere, and the symptoms will vary indefinitely according to its seat and complications; but in the complete development of specific fever there is always a determinate inflammation in particular parts, limited by the nature of the exciting cause; and though inflammation may appear in other structures which lie beyond the in-

fluence of the peculiar cause, this is not fixed as to its locality, but has a wide range over all parts of the body, because it is dependent upon the influence of excitement acting on topical defects, which vary in different persons.

These views, which are admirable for the facility of their practical application, have led the mind of the Profession more distinctly to the consideration of venous congestion, as a part of fever; and the strong opposition which Dr. Armstrong's sentiments upon this subject first encountered, has in a great degree ceased;—I may say entirely so, with those who listened to his arguments, or who have candidly considered them. He laid no claims to originality upon this point; for he has referred to other authors upon the subject, and to a case reported by Sydenham, in which venous congestion was the prominent condition. But he has the merit of more elaborately tracing its connexion with the phænomena of fever, and of describing its symptoms more precisely than had been done before. He has shown that, like inflammation, it varies in its seat and degree; that debility is its great predisposing cause, and that while it generally precedes the development of excitement in the commencement of fever, it also frequently occurs in its decline, from the operation of any depressing cause. His explanation of its seat, symptoms and degree, and the discrimination observable in his remarks upon these points, and upon the different modifications of treatment, afford one of the finest examples of the character and capacity of his mind.

From the preceding observations, it will appear

that Dr. Armstrong's views of Fever are more precise, and at the same time more comprehensive, than those generally entertained in this country previous to the publication of his opinions. It was commonly supposed, on the prevalent authority of Dr. Cullen, that the stage of oppression always attended fever, and that this was uniformly succeeded by that of reaction ; fever, in fact, being made to consist in an increase of the heart's action and of the animal heat, excluding therefore the unmixed congestive form entirely. But Dr. Armstrong has proved that in many cases there is no congestion, and in others that there is no reaction : and he has more explicitly shown how the state of excitement arises ; that it is sometimes direct or indirect in its origin, as well as the cause, and occasionally the effect, of inflammation.

Having briefly explained the leading distinctions of these two varieties of fever, I shall now proceed to consider each more particularly in detail.

CHAPTER II.

COMMON FEVER.

THE nature of Common, is more simple than that of Specific Fever, because its exciting causes are general and not partial in their effects, which are determined by the condition of the individual upon whom they operate. In sound subjects they produce mere excitement, unattended either by inflam-

mation or any marked degree of congestion, while in weak ones they commonly produce both these latter effects, the locality of which is determined by the existing predisposition; so that different persons, under the operation of the same exciting cause, manifest topical congestions and inflammations in different parts. The reason of this is, that there is nothing peculiar in the character of the disturbing cause: it operates from without, and nothing of a noxious quality is introduced within. The nervous and vascular systems have received a shock, which is generally felt for a short time without any local symptoms of consequence; or these become ultimately apparent in parts which were previously in a state of liability to disorder.

In Common Simple fever there is a temporary excitement of the whole system, without any marked disturbance of particular parts. The circulation and respiration are more hurried than natural; the animal temperature is transiently raised above its natural standard, with a proportionate increase of the sensibility and irritability; there is more or less disturbance in particular functions, indicated by thirst, a morbid state of the secretions and excretions, and a loss of appetite, with a variable degree of restlessness, lassitude, and languor.

In this mild form of fever the different organs are excited; the blood circulates more rapidly through all parts of the body, attended perhaps by some obscure partial determinations to particular parts; but not to the extent or in the mode which constitutes inflammation. The type of the fever, however, may change at any moment; and this, even in an

apparently sound subject, may be dreaded in those cases where the excitement is high or protracted; for perhaps no organization is free from latent defects, though they may be difficult to detect in strong and healthy subjects; but in weak ones the change is always to be apprehended, and, consequently, no case of simple fever is to be judged prospectively from its present state.

The indications for the removal of this simple form of fever are to diminish the excitement and restore the secretions to a healthy state. Rest, in the recumbent posture, quiet, a regulated temperature with ventilation, a simple farinaceous diet, cool drinks, and sponging the body with tepid or cold water, will often cure mild cases without the necessity of resorting to the aid of medicines; though some gentle aperients are generally advisable to expedite recovery. In those cases where the excitement is high and protracted, and where there is reason to apprehend, in consequence, the supervention of inflammation, a small abstraction of blood may be requisite, to guard against its occurrence.

This form of fever may be preceded by the stage of congestion, or may arise directly from the immediate influence of stimulating or irritating causes. It may also precede or follow inflammation: and though the indications for its removal are in all cases the same, because they are derived from its own inherent condition, which is that of excitement, unaccompanied by inflammation, yet some attention to the stage and peculiarities of each case is necessary, as they will naturally suggest some modifications of treatment. This is observable

when an irritating cause is continuing to act, the detection and removal of which is the first step in the treatment ;—as in the case of fever arising in infants from the irritation of dentition, and in those cases where too full a diet, or the presence of indigestible food, or of acidity in the stomach, requires our attention to the cause as well as to the effect it has produced.

In those cases where a simple fever succeeds to the inflammatory, there is, especially with young practitioners, a necessity for discrimination in distinguishing the one condition from the other ; for errors are often committed in supposing that the continuance of excitement necessarily implies that of inflammation, and therefore justifies a perseverance in the use of active remedies. If the inflammation has been subdued, the excitement which remains will generally subside under the influence of the usual negative means of treatment. It is partly the effect of the original disturbing cause, and of the means which have been employed to control its effects ; and what is most important is to distinguish it from the inflammatory condition which preceded it. If this distinction be clearly made, the mind of the practitioner is satisfied as to the nature of the existing state, and he treats it with reference to its degree, to the condition of the patient, and to the probabilities of the occurrence of the inflammation. Dr. Armstrong was led, by judicious reasoning on this state of simple fever succeeding to the removal of inflammation, to institute a mode of allaying the irritability of the nervous system, upon which it depended, by the exhibition of opium,—a

mode of practice which is one of the strongest claims he has upon the gratitude of the profession and the public.

Congestive Fever, that is, fever consisting exclusively of venous congestion, unattended subsequently by excitement, is a deviation from the usual law of nature. It is fever limited to its first stage, either from the intensity of the depressing cause, or from the extreme predisposing debility upon which it operates.

It arises from the shock of any common depressing cause, as sudden exposure to cold, intense pain, severe accidents or surgical operations, great exhaustion proceeding from violent exertion, from hæmorrhage, profuse evacuations, or deficient nourishment, food which offends the stomach, mental shocks, &c. The effect of these causes is at once to overpower the system, and they are more prompt and energetic in their action, in proportion to the weakness of the person on whom they operate. This debility may be general or local: general, when all the functions are languidly performed, as in a state of disorder or disease, in convalescence, or when the body, from infancy or age, is incapable of opposing a prompt and efficient energy to rise elastic from the pressure of any sudden debilitating cause;—and local, when particular parts are enfeebled, from hereditary or acquired defects*.

* This stage or form of fever more frequently arises from the operation of specific causes, and is then the most formidable of all the varieties of fever.

The *general* symptoms of congestive fever are; the marked diminution or oppression of the heart's action, the more or less sensible reduction of the animal heat and of the general sensibility, the prostration of muscular power, and a disturbance in the functions, especially of the skin and those parts which are more immediately connected with the largest development of the venous system, as the brain and spinal cord, the right side of the heart, the venæ cavæ, the lungs, the liver, and its associated veins.

The *particular* symptoms, like those of inflammation, depend upon the *locality* and functions of the parts more particularly affected; and upon the *degree* of the congestion, which modifies the general or local effects, and requires a corresponding modification of treatment.

If the congestion take place in the *brain*, it is indicated by a sense of weight, numbness, giddiness or pain in the head, by confusion of mind or stupor, a dull intoxicated look, blanched conjunctiva, dimness of sight, weakness of the muscular power, attended by an unsteadiness of gait or inability to stand or move, weakness or oppression of the pulse, and by slow, laborious respiration. In the *spinal cord*, it is denoted by pain or spasms in the trunk and extremities; and as the brain and spinal cord are often simultaneously affected, there is frequently a combination of these symptoms of the two affections. In the *heart and large vessels*, it may be known by an urgent sensation of weight, oppression or pain in the præcordial region, by a very irregular, intermittent, slow, oppressed, or

feeble pulse, and by an inability to breathe freely. When the *lungs and mucous membrane of the bronchia* are affected, there is a sense of uneasiness and oppression in the chest, a laboured, weak respiration, attended by a strong action of the *alæ nasi*, and sometimes by cough, which in severe cases is short, weak, and ineffectual, and in slighter ones accompanied by a copious serous expectoration: there is also a very anxious expression of the countenance, and a leaden or violet hue of the lips and cheeks. The heart and brain may become consecutively affected from this condition of the lungs, which presents an impediment to the ingress of blood propelled towards them by the heart. It consequently accumulates in the right auricle and ventricle, and is impeded in its descent from the brain, which thus becomes in its turn congested. The brain is also affected by the condition of the blood itself, which, not undergoing the usual changes in the lungs, operates, from its imperfectly oxygenated state, less energetically on the nervous system, leading to a general loss of tone in the whole body.

When congestion takes place in the *liver and its associated veins*, it is indicated by a sense of weight, distention or pain in the hypochondriac region; by a short, irregular, anxious, but not difficult respiration; by nausea, or vomiting of a colourless or bilious matter; by diarrhœa, the stools watery or sanguineous; sometimes there is constipation, the motions, when elicited, being light-coloured.

The symptoms vary in proportion to the *degree* of venous congestion. In its *extreme* form, there

is a deadly coldness over the whole surface, a small indistinct pulse, a weak respiration, complete prostration of strength and of sensibility, and a general oppression in the functions of the parts implicated. In an *intermediate* form, the animal heat is only sensibly diminished at the extremities; the pulse is slow, heavy, and oppressed; the respiration anxious and laborious; the muscular power weakened, but not prostrate, and the functions generally less disturbed. In the *milder* form, there is merely a sense of languor and lassitude; the patient is fatigued by exertion, complains of a sensation of chilliness, of a weight and uneasiness about the head and præcordia: the pulse is languid, and the countenance pale and dejected. These different modifications depend on different degrees of the same pathological condition*, which is proved to exist by the concurring testimony of symptoms, of the effect of remedies, and by an appeal to morbid anatomy. The appearances, on examination after death, are simple and conclusive; for more or less distinct traces of congestion are observable in those parts which are the most intimately connected with the fullest development of the venous system; and it

* Bateman, in his "Succinct Account of Typhus," published in 1818, considers the congestive fever as "hypothetical." I have elsewhere, when speaking of the views and practice of the American physicians, given them credit for an earlier insight into the nature of fever than is to be found in the works of English authors. I would refer to Rush particularly, and to Gallup's "Sketches of Epidemic Diseases in Vermont." This last work was published in 1815; and the 1st section of his 5th chapter will show that his views of congestion were precise, and his treatment admirable.

is generally found attended by effusions of mucus, serum, or of blood ; but without those concomitant effects which denote the existence of inflammation. In many cases, however, the traces of congestion after death are not observable, from the blood retiring from the capillaries into the larger vessels, as occurs often in cases of common inflammation ; and this may be expected in proportion to the degree and duration of the congestion.

Like inflammatory fever, which is known under such a great variety of names, from the mere locality of the inflammation,—the congestive form, from the modification of symptoms to which its local effects give rise, includes various affections, having different abstract denominations. Yet each class of diseases depends upon one primitive condition : for while fever, combined with inflammation, makes up the simple pathological state of all the varieties of inflammation, so venous congestion is the simple condition which forms the essential characteristic of different diseases scattered arbitrarily and disconnected in the works on systematic nosology. If we attend to the predisposing and exciting causes of congestion ; to the general or partial effects to which it gives rise ; to the symptoms by which these are indicated,—we can understand and explain the nature of one form of apoplexy and of hydrocephalus, of some catarrhs, especially in old persons, of one of the varieties of diarrhœa, of the worst form of cholera, and of several chronic diseases ; and can account for those effusions which are observed in different cavities after death, when no symptoms had indicated their existence during life. The term

Congestive Fever, however, is not strictly applicable to all of these cases, because local congestions may occur without being followed by the consequences of a more general condition. Yet in all its forms it is naturally allied; and I claim for my deceased friend the merit of having elucidated this important subject more distinctly than had been done before. He has enlarged, and at the same time simplified and condensed our views of fever, and has more satisfactorily explained its nature: and though he has laid no claims to the prize of originality as to the discovery of facts, he has the merit of having reasoned upon those previously known, more sagaciously than his predecessors had done, and of more clearly developing and arranging, by his masterly powers of analysis and generalization, the intricacies of an involved and difficult subject.

The exciting causes of common congestive fever, acting through the blood or the nervous system, produce effects which, in extreme cases, are more formidable than those of inflammation, because it is only on weak subjects that they exert their full power, and in them they often suddenly sink the energies of the body to an almost hopeless condition.

The body has experienced an overwhelming shock; the animal heat is so suddenly reduced that the blood immediately retires from the surface to the central parts; the heart is so much oppressed by its accumulation in the right cavities and the two cavæ, that it is of itself wholly unable to overcome the impediment to the freedom of the circulation; the venous system becomes generally over-

loaded, while the energies of the arterial are prostrate; the respiration is weak and embarrassed, and the blood imperfectly decarbonized,—so that the brain and nervous system are thus deprived of their natural stimulus; whence the muscular power fails for want of excitation, and all the functions languish.

The predisposition to this series of morbid effects is debility, however induced; for in vigorous persons, the power of maintaining the balance of animal heat against opposing circumstances, and a healthy elasticity of the vessels which enables them to overcome a temporary degree of congestion, render such persons capable of withstanding a shock that overwhelms at once a debilitated frame. Even in predisposed persons, there are circumstances which naturally favour a return to a due balance in the system, when particular parts are affected; and these are the liberal anastomosis of the veins, and an increased secretion from the lungs, liver, intestines or kidneys. If these means fail, the last natural resource is in the action of the heart, which is roused by the increasing influx of blood to its right side; and the stage of reaction or excitement, proportionate to the force with which the heart recovers or increases its power, is thus produced. When all these resources are inefficient, the object is to restore, by artificial means, the balance of the animal heat, and the equilibrium of the blood in the two systems of vessels.

To effect this we must have regard to the degree of the congestion, and to the nature of the exciting cause itself, which in some cases may still be ex-

erting its debilitating influence. In the extreme form, the hot air or steam bath, with the use of powerful internal diffusible stimuli, will operate most speedily. In the intermediate form, where the shock has been less severe, and the pulse is merely oppressed, as if the heart was ineffectually labouring to throw off a superincumbent weight, blood may be abstracted, while the patient is in a recumbent posture, to the relief of the existing symptoms, stopping short however always of syncope; and, in the milder form, where the patient complains of languor and chilliness, a warm bath, rest afterwards in bed, or an emetic followed by a dose of calomel, will avert the severer forms of congestion, and the probable supervention of an attack of inflammatory fever.

In those cases where an offending article of food has disturbed the stomach, and produced, as is often the case, in a very short space of time the worst forms of the disease, brandy immediately administered will rouse the failing state of the heart's action, or an emetic given with the diffusible stimulant will contribute essentially to the recovery, by removing the debilitating cause. Even the slighter cases demand immediate attention, from the liability of the congestion to increase in intensity or extent, and from the hazard of inflammation supervening to the subsequent reaction, which is generally proportionate to the degree and duration of the congestive stage; and the simple rule to follow in these cases, is to restore as soon as possible the animal heat. It is often advisable also to act by calomel on the liver and bowels, preceding its ope-

ration by an emetic, which so powerfully induces to the surface, and at the same time removes food from the stomach, which, from the previous existence of the chain of morbid action, has probably remained undigested, and would become an additional source of oppression or irritation.

Common Inflammatory fever is the ultimate effect of the exciting causes that have been enumerated; and however numerous its varieties, or diversified its symptoms and nomenclature,—from the seat of the inflammation, it is essentially, with regard to its pathology at least, the same disease, as it consists of common fever combined with inflammation.

This form of fever may arise out of the two preceding stages, or of that of excitement only; or the inflammation may be the first in the series of morbid effects, and the excitement consecutive to it.

When it arises from a depressing cause, it has three distinct stages, which it is important to discriminate with reference to the treatment; viz. of oppression, of excitement, and of collapse: but the stage of oppression is absent in those cases where a stimulant or irritant has directly induced an increase of the heart's action and of the animal heat.

We have seen that, in the two preceding modifications, fever may exist without inflammation, and inflammation may equally exist without the general symptoms of fever, when it is limited either in its degree or extent.—The peculiarity of this form of fever consists in the circumstance of the inflammation being determined by those local defects which constitute individual predisposition; that is, that the same disturbing causes operating upon different

persons do not produce a determinate locality of inflammation, but one which is varied in its seat, by the variable liability to disorder in the different organs and structures of the persons attacked. They are all the subjects of common inflammatory fever; but the character of the disease and its symptoms may vary in each, and require a corresponding modification of treatment.

The subject of predisposition therefore is one of great interest and importance with relation to this form of fever; for by understanding it, we may have it in our power to avert an impending inflammation, as our attention is early awakened to the state of those organs which we apprehend are most likely to be affected by it. It also affords us a prospective glance into futurity, and enables us not only to anticipate probable contingencies, but to account readily and satisfactorily for those occasional complications, which are so often obscure and embarrassing to those who judge of diseases by a reference exclusively to their present appearances. However insidious and latent many of the acquired predispositions are, there are natural ones which do not present much difficulty to an attentive observer: and as Dr. Armstrong's views with relation to them are naturally connected with those which he entertained on the subject of common fever, I feel it incumbent on me to allude to them, though they may present no novelty to reflecting minds.

Predisposition or the liability to disorder in different organs, he considered as natural or acquired. We have examples of the former in the different ages and sexes.

In infancy the delicacy and irritability are such, that all stimulating and irritating substances operate very powerfully on the body : and the contractility of the muscular is in proportion to the prompt susceptibility of the nervous system ; whence fever is very easily induced in young children by the transient operation of its usual exciting causes ; and when produced, the brain, from its disproportionately large size, or the skin and mucous membranes, from their extreme delicacy and vascularity, are the parts most liable to inflammation.

In old age there is an increasing languor in all the functions ; the circulation is slow and feeble, and those parts which are connected with the largest development of the venous system are naturally prone to congestion. Both it and infancy are peculiarly susceptible to the operation of depressing causes, from the difficulty of maintaining a balance of the circulation and of the animal heat. The child has not acquired the vigour necessary to withstand their shock, and in age it is lost ; so that on exposure to their influence, excitement indirectly arises in both extremes of life ; and while in the one the inflammation, which often ensues, falls commonly on the brain, the skin, or mucous membranes, it is determined in the other by those local defects which have been acquired by time, by the accidents and habits of life.

In manhood, from the matured strength of the body, those predispositions which are inseparable from infancy and age are absent in the healthy subject, because the adult enjoys an inherent power of resisting the effects of depressing causes ; and the

attacks of inflammation from which he occasionally suffers are determined, in a state of temporary debility, by those defects which are hereditary in their nature, or acquired from the influence of habits or previous disorders and diseases.

A natural predisposition is also connected with sex, from the marked difference in the organization and functions of the male and female. This is more perceptible in woman, from the greater complexity of her structure, and the peculiar functions of her uterine system, as well as from the much higher degree of her sensibility and delicacy. She partakes more of the character of childhood, even in her adult state, than man; and the natural vicissitudes of ease and suffering to which she is exposed, from the alternate state of repose and action of the uterine system, predispose her to disorders peculiarly her own.

There is another predisposition, probably hereditary, which is not so obvious as those above alluded to, and it depends undoubtedly upon some intricate peculiarities of conformation which elude our perception; and to this we ascribe the occasional prevalence of certain diseases in members of the same family.

Predisposition is also acquired in a variety of ways; as from the influence of the artificial habits of society, and from the moral and physical shocks of life, which produce subtle impressions on the whole body, or parts of it, which are thus changed and left in some degree defective as compared with their original condition. In this way the diseases to which mankind are unavoidably exposed in in-

fancy and childhood leave impressions behind them which predispose different organs to derangements of function or structure on future attacks of indisposition.

It is also induced by a temporary increase of sensibility and contractility,—that is, by the exaltation of the sensibility of the nervous over the energy of the muscular system. This is effected by the heat of summer, of hot rooms, by sedentary occupations, mental anxiety, hard study, want of sleep, &c.; by irritants which disturb the digestive organs; by certain medicines and fermented liquors, which act upon the nervous system; and by indulging a morbid sensibility of mind, in the perusal of works of fiction and romance. It arises also from debility, which is one of its most fertile sources, whence weak persons are peculiarly liable to all the effects of the common exciting causes of fever. The adult in a state of debility approaches in some degree to the natural condition of infancy or age, and consequently the state of convalescence is one of predisposition, and requires great caution against the agency of moral or physical disturbing causes.

Plethora, either general or local, is another common acquired predisposition. Vigorous persons are more often affected by general, and weak ones by local overfulness of blood. An habitual full diet induces the one in robust subjects who are florid and of a firm fibre, and these resist its pressure longest and bear depletion best. Less robust ones, equally plethoric, have, partly from indolence, a lax fibre, sooner yield to the pressure, and often sink under copious venesection. Yet the blood in both

abounds in the red particles, and its stimulating properties render them equally susceptible to the influence of exciting causes. Those who are spare and pale, and in whom the red particles are comparatively deficient, are most frequently the subjects of local plethora. In their general condition they are the opposite to the plethoric, yet they have in some parts an over-accumulation of blood, from its irregular distribution in the capillaries, depending perhaps upon an unequal direction or distribution of energy in the nervous system.

These, and other various circumstances which equally favour the operation of the common exciting causes of fever, predispose particular parts of the body to that derangement of structure and of function which is implied in the term inflammation; and wherever the inflammation may be excited, or however diversified its symptoms or effects may be in different cases, still there is in the abstract but one pathological condition to be attended to, though this requires very important modifications of treatment, according to the different circumstances attending it.

The detection of this condition is of course the first requisite in the progress of inquiry; and having just conceptions of all that is known of the nature of inflammation, its different stages and degrees, the means by which it is to be controled in its various states, localities and complications, we are in possession not only of the nature but the principle of treatment of all the varieties of this very extensive class of diseases.

These desiderata however are to be acquired only

by habits of accurate observation and very extensive experience ; for they comprise a wide range of facts, embracing the produce of the larger portion of the field of medical inquiry. We are arrested in the very onset with the difficulty of comprehending what precise changes are implied in the morbid state which we term Inflammation ; and though its immediate effects are more apparent, its remote ones, or that extensive and complicated influence which it has upon the general system, is a subject in itself often intricate and obscure.

Inflammation, abstractedly considered, is said to be indicated by the symptoms of heat, redness, pain and swelling ; but though these are apparent in external examples of it, we do not always derive assistance from them in the detection of internal inflammation ; for they are all in some cases absent, at least to our perceptions, and hence the necessity of our discovering other indications of its existence. How it is originally induced we know not. We can only observe that its seat appears to be in the capillary system, and that vessels which carry colourless fluid in health, convey red blood in inflammation. Their capacity not only is increased, but that of the large vessels which go to or depart from an inflamed part ; probably from the combined effect of the increased heat which is developed there, and the turgescence arising from some impediment to the freedom of the circulation.

The heat, redness, &c., which are the common symptoms of inflammation, are all perhaps dependent upon the condition of the blood and of the state of the nervous system in the disordered part. But

they are not always equally apparent and uniform; because the inflammation itself is remarkably modified by its character, its degree, its stage, and the complications attending it.

Dr. Armstrong distinguished three degrees of inflammation,—the Acute, Subacute, and Chronic.

Acute, or the highest degree of inflammation, is sudden in its invasion, rapid in its progress and termination. The Subacute is a subdued form, less sudden and more protracted. Both are accompanied by fever and local disturbance of function; but these are much more urgent in the one than in the other. Chronic inflammation is slow and insidious in its accession and progress, and for a long time is not attended by perceptible or at least continued fever. Its origin and end are indeterminate, often passing into the subacute or acute form, by standing itself in the relation of a predisposing condition to them,—a change which, by being suddenly ushered in with fever, is often mistaken for the supervention of a new disease, though it is merely an aggravation of an old one. The acute and subacute forms of inflammation are occasionally very much modified in character; and one of these modifications, more frequent in specific than in common fevers, appears to depend upon some change in the condition of the blood, and upon the effects which this change produces on the nervous and muscular systems. We observe this in what is called *passive*, as distinguished from *active* inflammation. In the latter all the energies of the disease are apparent; the excitement is fully developed; the heat high; the pulse quick, hard, expanded or contracted; the pain urgent, and

for a time the strength of the patient unsubdued. But in the former the fever is masked, the heat smothered, the pulse soft and compressible, the pain indistinct or absent, and the strength often prostrate from the first invasion of the disease. In many cases, however, the passive succeeds to the active form; and though inflammation is present in both, the associated conditions must necessarily lead to an appropriate modification of treatment; for what is urgently demanded in the active, would be fatal in the passive form of inflammation, and the cautious measures adapted to relieve the latter would be wholly inefficient in the former.

The effects of inflammation, involving the external and internal pathology, are *immediate* and *remote*. The first are those manifested in and about the inflamed part; as the increased secretion of mucus, serum, fibrin, pus, &c., the effusion of blood, ulceration, gangrene. Some of these effects are transient, or give rise to adventitious structures; or they are permanent, and occasion the thickening, contraction, induration or softening of parts.

The remote effects are observable in the condition of the nervous and vascular systems, and in the changes which ensue from their disturbance; for where an accumulation of blood amounting to inflammation takes place in the capillary vessels of any part of the body, there would seem to be a change equally induced in the nerves of that part, and subsequently in the centre of the nervous system, which affecting the heart's action, successively disturbs the whole vascular system. In this manner a local disorder implicates these systems, which we

express by the term sympathy; the nervous system, like an electric chain of communication, connecting remote parts together. A change then occurs in the momentum and distribution of the blood, and in the secretions. The blood itself is affected, as is shown, when it is drawn, by the buffy coat,—a change apparently connected with the state of the animal heat, and consequently not observable equally in all inflammations.

It matters not where the original seat of the disturbance may be; for, if external, as in the case of accidents or operations, first general excitement, and subsequently inflammation of some internal organs, on the doctrine of predisposition, may follow.

The further changes which result from the combined impression on the nervous and vascular systems are observable in the muscular and respiratory. The strength, from the general state of disorder, is diminished; the respiration, at first quickened, is eventually lessened and embarrassed; the action of the heart becomes weak and faltering, the blood accumulating in its right cavities and the general venous system, till life is extinguished from the increasing influence of the remote rather than from the immediate effects of inflammation.

Common Inflammatory fever, therefore, is the denomination of a general disorder which includes many varieties; and though we may institute a general principle of treatment, we must establish particular applications of it in practice adapted to each case. The inflammation which constitutes its essential condition is so modified in character by its degree, its seat, its duration and other circumstances,

that no general rule can be made so comprehensive as to be applicable to all the shades of difference. Though a common pathological condition, it is so different in its effects, according to the organs or structures it attacks, that each case must be judged of by itself; for it comprises the slightest and most manageable diseases, with others which are most urgent and threatening in their nature, and as hazardous in themselves to the principle of life as the means requisite to arrest them are formidable in their immediate effects upon the constitution. Nor are we to limit ourselves to the consideration of the inflammation alone, for the general condition of the patient equally demands attention, so that the same disease must be managed with reference to the circumstances associated with it in different individual cases. Our diagnosis is to be derived from the combined symptoms of each variety, recollecting what are the signs expressive of simple inflammation when confined to particular parts, and how these are liable to be affected or varied in expression by complications of the same condition in different regions of the body. Though these signs are generally definite in their character, they are liable to present, from these and other circumstances, anomalies which occasionally render our diagnosis obscure and unsatisfactory.

To pursue this subject further would necessarily lead me into a detailed consideration of the particular symptoms and treatment of the varieties of common inflammatory fever; and though I should be enabled to point out, in many of these cases, examples of the nice discrimination, the sound judge-

ment, the decision and caution, for which Dr. Armstrong was so eminent, I shall content myself with referring to his Works for his opinions and practice in the different inflammatory diseases of which he has treated, and proceed to consider his views upon the subject of specific fever.

CHAPTER III.

SPECIFIC FEVER—TYPHUS.

I HAVE already explained, generally, in what respects Dr. Armstrong considered Specific fever to differ from Common fever. In the one, there is a special character, arising from the operation of a peculiar cause; while in the other, there is a common character, proceeding from a variety of causes, which produce excitement, out of which inflammation incidentally arises, depending upon a state of predisposition in different organs in different persons; so that while Specific fever, in its fullest development, has a determinate inflammation, the product of a peculiar cause, in Common fever there is, at first, a general disturbance of the functions, without any very evident local effect, and a subsequent inflammation, which is not the product of an external exciting cause, but the result of an internal predisposing one. In the one, external causes operate from without, and in the other they operate within, each in the latter case affecting particular parts, probably through the blood, so that the cause being

known, its effects may be conceived *à priori*. But, besides these, there are others which may arise out of the excitement, as in common fever, so that specific fever has common as well as specific effects; but the former depend upon contingent predispositions, and vary with them, while the latter are uniform, and constitute the essential characteristics of the disease. The former are accidental complications, which vary in different persons, and consequently cannot be supposed to proceed from the fixed exciting cause, but from the general disturbance to which it has given rise.

In illustrating the views of Dr. Armstrong upon the subject of specific fever, I shall principally confine myself to Typhus, a disease to which he had applied all the energies of his mind. He at different times entertained opposite sentiments with respect to its contagious nature, and it has been thought that he has generalized too far in connecting it with Ague and Remittent fever, from which he thought it differed only in degree. I shall offer an illustration of his opinions, which must stand or fall by the test of time and experience. Whatever may be the fate of those respecting its origin, connexions, and contagious quality, nothing can deprive him of the merit of having admirably illustrated the subject of Typhus itself; and it may be pardonable for the partiality of friendship to say, that he seems to me to have dissipated by the light of his luminous mind much of the obscurity which has so long hung round this formidable disease. He has broken and scattered the fragments of that fantastic superstructure which the inventive genius

of Dr. Cullen erected, and has unwound the charm which so long fettered the minds of the disciples of Dr. John Brown. The advocates of positive debility in specific fevers can never again prevail. It is indeed a reproach upon the judgement of the profession of the last generation, that the precepts and examples of Sydenham had made so feeble an impression on their minds. What that great man failed to do, has been, in part at least, accomplished by the equally simple but more comprehensive views of Dr. Armstrong; and the honours which have so justly been paid to the memory of the one, will hereafter be proportionably awarded to the other.

In the "Observations on the Origin, Nature and Prevention of Typhus Fever," which Dr. Armstrong communicated to the Medical Intelligencer in May 1822, he first publicly expresses a doubt of the correctness of the early opinions he had entertained of the primary origin of this disease, which he had ascribed to contagion. The passage is so illustrative of the candour and integrity of his mind, that I quote it for the consideration of those who are inclined to undervalue his opinions, because he did not blindly adhere, in despite of increasing knowledge from extending experience, to a consistency with what he was obliged to consider his early erroneous impressions. He says: "In 1819 I attended a patient labouring under an intermittent fever, which, in its progress, put on a remittent character, and that again assumed the continued character, but with all the most malignant signs of what is usually denominated typhus fever. This case made

a very deep impression on my mind; and it then occurred to me, for the first time, that intermittent, remittent, and typhus fever might possibly be modifications of one and the same disease, and that possibly the strong prejudice of education and my own inherent pride, might have hitherto prevented me from investigating the primary source of this disease, with that simplicity and purity of mind which the science of medicine requires. Up to this period I had firmly believed, that human contagion was the sole cause of genuine typhus fever; but a doubt having been thus excited, I determined, if possible, to leave my mind free from all bias for the future; and then endeavoured to commence my inquiries respecting the origin of typhus fever, as if I had previously known nothing of the subject.

“ Nearly three years have now elapsed, and within that term a very great number of cases of typhus fever have fallen under my observation, and I have spent much time in accurately recording their symptoms, and in endeavouring to deduce legitimate conclusions, not only from them, but from the various circumstances with which they were connected in their rise and progress. This investigation has most decidedly led me to the conclusion that what the Italians vaguely call *mal aria*, and the English as vaguely *marsh effluvium*, is the primary source of typhus fever.”

In this paper, Dr. Armstrong briefly states “ the substance of the facts upon which this proposition is so confidently advanced;” and I shall make a liberal use of it, as his opinions at this period were not so confidently relied upon by himself as they

were towards the close of his life. He alluded to this publication on his death-bed, and spoke of it as written at a time when he had reached to an intermediate point between his early belief of the exclusive contagious character of typhus, and his later convictions of its arising, primarily at least, from malaria. From the time of his appointment to the Fever Hospital, his mind was constantly occupied upon this subject, and he was compelled to arrange and publicly express his thoughts upon it, at least three times every year, in his different courses of lectures in the winter, spring, and summer. There are many persons who will recollect the lively interest which his two lectures on typhus excited, not only among his own pupils, but those of other schools, and among many members of the profession. His class-room was so crowded on these occasions, that he could with difficulty find room to stand in, and I mention these circumstances merely to show that his opinions upon this subject were not carelessly formed and committed silently to the press, but, on the contrary, were repeatedly reviewed by himself, and publicly advocated in his lectures during the last nine years of his life.

The principal facts upon which Dr. Armstrong rests his opinion of the origin and forms of typhus, are :

1st, That the intermittent, remittent, and continued typhus pass and repass into each other.

2nd, That the remittent fever, from *malaria*, has a combination of symptoms exactly similar to those which occur in continued typhus, and which, *as a*

combination, occur in no two other affections whatever.

The intermittent fever has successively a cold, hot, and sweating stage, followed by an intermission; the paroxysm of fever recurring after a certain interval. The remittent is allowed to be a modification of the intermittent, though in the former the cold stage is absent. The relation between these two forms is not more intimate than that between the remittent and the continued, so that a chain of connexion appears to exist from the one to the other; for, in tracing cases of remittent fever backwards, they are often found to have commenced as intermittents; and cases of continued typhus to have commenced either as intermittents or remittents, and the two last occasionally to assume the continued type; so that a common nature appears to belong to all of them, and the epithet Typhus to be as applicable to the milder as to the severer forms; and malaria, which is admitted to be the origin of the two former, to belong equally to the latter.

The remittent form of fever, therefore, is the connecting link between ague and continued typhus. It is not necessary to adduce arguments to prove the affinity between the two former, because it is generally admitted that they are nearly allied; but the affinity between remittent fever and typhus has not been so commonly maintained, for while the one is ascribed to the influence of marsh effluvium, the other is attributed to that of human contagion, and consequently they have been considered as two

distinct diseases. Dr. Armstrong, however, was of opinion that they are as much modifications of each other as the intermittent and remittent forms are ; and independent of the fact, which an appeal to nature exhibits, of their occasionally passing and re-passing into each other, he particularly insists upon the proof of the affinity or identity of the remittent fever and typhus, afforded by the similarity of the pathological conditions attending them, which, as a combination, exist in no two other diseases whatever.

The remittent fever, as it was presented to his observation, was always accompanied by a simultaneous affection of the brain, of the mucous membrane of the lungs and intestinal canal, by that of the liver, and by a peculiar lassitude of mind and loss of muscular power ; and the only difference in the pathological conditions and symptoms of typhus is, that the former are more severe, and consequently the latter are not subject to any remission,—probably, as he thought, because the higher degree of inflammation existing in typhus, maintains a continued form of fever, attended, throughout the twenty-four hours, with a preternatural hot skin and quick pulse, subject only to that usual evening exacerbation which is observable in fever of every description.

These conditions, then, of remittent fever and of typhus, differ only in intensity ; and the outward distinction observable between them is, the remission in the symptoms of the one, which does not take place in those of the other,—an anomaly explicable on the difference of intensity in the ef-

fects produced upon the disordered parts. It is reasonable, therefore, to conclude that they are essentially one and the same disease, specific in its character, and consequently arising from the operation of one specific cause, which is admitted to be marsh effluvium for the milder modification; and this is, undoubtedly, equally the cause of the severe form, because the same specific effects are never found, in other cases, to be produced by the operation of two distinct specific causes, each special cause always giving rise to a distinct and peculiar effect, not produced by any other cause.

The conditions of remittent fever and of typhus are denoted by similar symptoms; that of the brain by a dropping of the eye-lids, and by a glairy eye, having the appearance of physical brightness, mixed with an intellectual dulness of expression, varying, however, with the degree of the fever or the local affection of the brain—sometimes amounting to a wildness, or maniacal look; that of the mucous membrane of the air passages by an unusual leaden or purplish colour of the lips and cheeks, by a huskiness of voice, observable more particularly when the patient coughs, the urgency of the cough being in general indicative of the degree of the affection; that of the mucous membrane of the alimentary canal, and of the liver, by evacuations of glairy mucus and dark bile, resembling brown melted resin, or urgent diarrhœa; by obscure uneasiness, on pressure over the epigastric and abdominal regions; by the tongue being covered with a dirty whitish fur in the centre, redder than natural at the edges, becoming dark and coated with

sordes as the disease advances ; and by the breath having, especially in typhus, a peculiar sickly odour.

The characteristic debility of mind and body in these specific fevers is intimately connected with the affection of the mucous membrane of the lungs, and with that of the brain ; for it is in proportion to their intensity or extent, and consequently more remarkable in typhus than in remittent fever.

“ The affection of the mucous membrane of the bronchia,” Dr. Armstrong remarks, “ is one of the most striking peculiarities of typhus. It is the main cause of the varying degree of heat, of muscular and mental disturbance, of that peculiar dryness and darkness of the tongue in the advanced stages, and of those malignant symptoms which the older writers found so difficult to explain on anything like rational principles. The want of due decarbonization of the blood is the cause of many of the most remarkable symptoms attendant on typhus ; but the degrees in which this process is impeded are not always proportionate to the mucus accumulated in the bronchial tubes, for in some instances the secretions on the tongue and fauces is a sort of sticky varnish, which is found on the mucous membrane, when little mucus is comparatively accumulated there. Blood, not duly decarbonized, operates more or less as a narcotic on the brain, and tends materially to influence the animal heat and the heart’s action ; and hence partly arise, in the progress of strongly marked cases of typhus, the muddled state of the brain, the smothered heat of the surface, and the soft compressible pulse, which be-

come its concomitants, however high the excitement may have been for the first three or four days."

From the facts above detailed, Dr. Armstrong concluded that typhus fever arose from some noxious exhalation of the earth, and that it assumed an intermittent, remittent, or continued character, either from the degree of concentration in which the exciting cause was applied, or from the less or more favourable condition of the body to its effects at the time of its operation. If this exhalation, or malaria, was in a low degree of concentration, or if it operated upon a person whose organs were sound and health vigorous, it gave rise to an intermittent form of fever, in which there was no apparent inflammation; but if it was highly concentrated, or if it operated upon a weak subject, whose organs were predisposed to disorder, it then induced a remittent or continued form of fever, because inflammation was excited in the brain, in the mucous membrane of the air passages or of the alimentary canal, or in the liver, more extensive and intense in those cases which were of the continued, than in those of the remittent type.

"Internal inflammation, then, is probably the immediate cause why typhus puts on the remittent or continued character. In large towns, but particularly in London, the malaria is probably applied in a much more concentrated state than in country districts, owing to the close, crowded, dirty and ill-ventilated state of the habitations of the poor. The poor themselves in London, too, on account of their more dissipated habits and the more anxious

conditions of their minds, have very often latent weaknesses about the internal organs ; hence, when they are exposed to the influence of this malaria, the subsequent shock most frequently gives rise to some visceral inflammation, and hence the disease so very often assumes the remittent or continued type in the metropolis, though I have facts to show that the intermittent form of the disease is more common than many practitioners imagine.

“ The only objection which has struck me to this view is, that the miasma which produces the intermittent form may be originally human, and not marsh miasma, because the ill-ventilated habitations of the poor will as certainly confine the effluvium of the human body as it will marsh miasma. But after the immense body of evidence which Dr. Bancroft has collected to show that human effluvium, however concentrated, does not produce typhus or contagious fever, it seems much more philosophical to conclude that it is the concentration of marsh and not human miasma which originally produces this disease. Besides, it is an important fact, that if the earth be bound up for some days by a hard frost, typhus fever ceases to exist in districts where it before prevailed, though the people are then as much or even more crowded together, which shows that something is necessary for the generation of the cause of this peculiar disease different from human effluvium.

“ The intermittent form of the disease, too, arises in situations where there is no reason whatever for suspecting the existence of human contagion, as

for instance in well-known places in various parts of England. The same remark as forcibly obtains in regard to the remittent form of the disease, which abounds in some places where the poisonous exhalations of the earth are known to prevail; and as the continued form of the disease is only an aggravated one of the remittent, as it has all its peculiar pathognomonic distinguishing signs, which do not combinedly exist in any other disease, the identity of the continued with the remittent form appears to me satisfactorily established.

“ It is I know a common opinion, that what is called in general terms Fever varies so much in its expression, that its characters cannot be delineated so as to present kindred and cognisable features: but all the observations which I have made respecting disease lead me to the conclusion that the same causes always present similar results under similar circumstances. Only, for example, ascertain the various forms which small-pox assumes, and the various circumstances under which these forms occur, and it will be found that they observe certain and regular laws. It is so with respect to all other diseases, but particularly with respect to typhus fever, the symptoms of which are as strikingly uniform in its leading varieties as those which occur in small-pox or in any other disease known to proceed from one specific source.

“ The effects of malaria when connected with fever are, according to my observation, as uniform as the effects of the peculiar matter of small-pox when that disease is connected with fever; and this

identity of regular effects is as strong a presumption of the identity of the cause in the one as in the other."

Though Dr. Armstrong was thus led to believe in malaria, marsh effluvium, or some noxious exhalation from the earth, being the primary source of typhus fever, which appeared under the forms of an intermittent, a remittent or continued type, he still was obliged in the year 1822 to admit, from a few facts which had presented themselves to his observation, that it was under certain circumstances contagious.

I shall quote the passage upon this subject from the paper I have already noticed, and afterwards extract one from his lecture on Typhus, which was published in May 1825, that he may speak his own sentiments. I shall then give a summary view of his arguments in favour of malaria being the primary source of this disease, and which, in proportion as they establish a conviction of the truth of this his first position, will tend to invalidate the idea that typhus, so arising from a cause external and foreign to the human body, is subsequently propagated by a different one generated within it. His mind was at all times open to conviction, and his nature too guileless to admit of his ever concealing his real sentiments. His expressions were the outward reflections of his inward feelings; and those who knew him well, however widely they might differ from him on this subject, were always satisfied that his opinions were the result of impressions which the circumstances connected with typhus,—a disease he had so long and patiently observed,—had

forced upon him. Though he could not deny that typhus might be contagious, he certainly believed it was not so, and he always acted on this belief so far as he was himself concerned. But the facts which appeared to disprove his own faith he always candidly stated to his pupils, and left them to form their own conclusions from the mass of evidence which he brought before them. In 1822 his own opinions were wavering. In 1825, and especially towards the close of his life, the doubts which he had entertained on the subject were almost entirely removed; and he confidently anticipated the time when the same change which had occurred throughout North America with respect to the non-contagious nature of the yellow fever, would take place in Europe with respect to typhus: whether time will verify his expectations it is impossible at present to determine; but should the doctrine of contagion prevail, there is ample scope and room enough for his name to descend to posterity, as that of one of the most luminous authors on the subject of fever, which his country has ever produced.

In the paper communicated to the Medical Intelligencer, he says:

“ From the explanation which I have given of the origin of typhus fever, it is natural to inquire whether or not it be contagious. With respect to this circumstance I also resolved to be entirely guided by the facts which came before me; for as soon as I satisfactorily discovered that I had formerly fallen into an error respecting the primary source of typhus fever, it became quite necessary to guard myself against that enthusiasm which so

often makes converts pass from one extreme to the other. On mature reflection, however, I could not help perceiving that what I formerly considered as decisive or probable proofs of the contagious nature of typhus, had not really the force which I then ascribed to them. For example, when I saw one person attacked with typhus who had visited another labouring under that disease, or when I saw person after person attacked in the same house or situation, I imagined that this circumstance formed a strong, nay a decisive evidence in favour of the disease propagating itself from person to person; but it must be apparent from what has been said, that this particular circumstance meets with as satisfactory a solution on the principle that the persons thus affected had been in their turn exposed to the malaria by which the first had been affected. Indeed I have every reason to believe that great numbers are actually affected in this manner who live in the same house or district, as the disease so often commences with the intermittent or remittent form: but at the same time it is right to confess that facts have fallen in my way which have led me to conclude that the disease under some circumstances does propagate itself by contagion. Speaking from my own observation, I could not take upon me to say confidently that the distinctly intermittent or remittent forms are contagious; but I have met with cases where the continued form of the disease, in which the secretions are foulest, certainly appeared to propagate itself by contagion.

“Among others which I could adduce, I will mention one instance, for the sake of illustration.

A very respectable woman who performed the office of a nurse to some patients labouring under typhus, was assisting one of them from the night-chair, and she became sick at the stomach and faintish, from the offensive odour of the evacuation which had just passed from the bowels. From that time she drooped, and a few days afterwards had a severe attack of continued typhus, characterized by its peculiar combination of symptoms. This is a striking instance; and I have met with some others, which are equally or even more striking. The probability is, that its contagious or non-contagious nature is dependent first upon the quantity or concentration of miasm thrown off from the body; and secondly, upon the closeness or openness of the situation in which the patient may be placed: at least the result of my observation would go to prove that its propagation by contagion, or non-propagation, is almost entirely dependent upon surrounding circumstances."

The example of contagion given in the above extract will be as conclusive in the minds of perhaps the majority of the profession, as to the real contagious nature of typhus, as it was at the time to Dr. Armstrong himself; and they will probably readily concur with him in admitting the influence of the circumstances which he has stated as likely to modify the liability of its propagation from one person to another. The only circumstances which could tend, on a more mature consideration, to weaken the force of this example in his own mind, would be those of the situation in which it occurred; for if it happened in the Fever Hospital,

he considered that institution to be within one of the infected districts of London: and he would at a later period of his life, perhaps, have argued on the probability of the primary influence of the atmosphere of the situation upon the person taken ill, and consider that the offensive odour he alludes to rather excited or accelerated by its debilitating effects the development of the disease which arose from another remote cause.

In his celebrated Lecture on Typhus, published three years afterwards, he thus expresses himself on this subject:—"It is a singular circumstance that when I first settled in London, the current opinion among the profession was, that typhus fever originated *solely* in human contagion; and it is remarkable that it should have been reserved for me to discover that mistake in this metropolis. But the discovery, from what I before mentioned, was quite accidental, and I take no credit to myself for having made it; though, when I reflect upon it, it gives me great pleasure, because, whatever prejudice may exist in the profession, the discovery will make its way, the truth will triumph and prove useful to mankind.

"Malaria, then, I hold to be the primary source of typhus fever. That I consider as a settled question.

"But this question involves another, viz., does typhus fever, thus originating, ever become contagious? Does it ever acquire the property of communicating itself from one person to another, like small-pox, measles, or scarlet fever? This, I repeat,

is another question, and one that requires an unprejudiced examination.

“Many men believe that typhus is contagious because they have been told so at school or college, precisely on the same principle that children take the assertions of their fathers and mothers upon all subjects. Now, as our fathers and forefathers of physic have often been mistaken, we should not take their assertions as necessary truths; and since they lived in a less enlightened age than the present, we should put them to the test of the most minute investigation.

“The question whether typhus fever is contagious or is not contagious, cannot be decided by any reference to black-lettered books; but by a reference to facts, and facts alone, contemplated with the most perfect impartiality. You know that I once believed typhus fever to be contagious; but I feel it my duty now to declare, that I have lived to doubt the correctness of that opinion, and shall not decide till I have made the most extended and complete inquiry. But I can say, from a review of a great many cases, that if ever typhus prove contagious, the circumstances of its being so must be rare, and that the public alarm upon the subject is not sanctioned by what occurs in London; for I must repeat again and again the incontrovertible fact, that this affection exists in certain patches or parts of the metropolis, almost in every parish, and yet it never spreads throughout society. It must be recollected, also, that most of the poor remain in their houses till the very last stage of typhus;

and, consequently, if this disorder were so contagious as is generally believed, it would spread in all directions. If small-pox, measles, and scarlet fever, thus existed in almost every district, and if they were thus allowed to advance to the last stage, without removal into some hospital, there can be no doubt but each of these affections would be diffused as it were all over London. Now why is this not the case in regard to typhus fever? Why, if it be so contagious, is it limited to particular places beyond which it does not pass? Why, I repeat, does it observe this law, so different from that by which small-pox, measles, and scarlet fever are regulated? Let the advocates for *unqualified* contagion answer these questions.

“Again; I have known a great many instances in which patients labouring under typhus were removed into a fresh atmosphere; and yet in no case did the disorder propagate itself to any other individual. Now how does this happen, if typhus be contagious? Had the cases been those of small-pox, measles, or scarlet fever, they would have been communicated to many persons, provided those persons had not been before the subjects of such affections. Why does this difference exist between typhus fever, small-pox, measles, and scarlet fever? Does it not show that they are, generally speaking, at least essentially different as to the capability of their being communicated? Besides, I have known wives kiss their husbands again and again when the tongue and teeth of the latter were crusted with the sordes of typhus fever. I have known fathers and mothers do the same thing to their children simi-

larly situated. I have known mothers suckle their children while they were the subjects of typhus. I have known persons in health sleep in the same bed with those sick of typhus; and yet in none of these cases has the disorder been communicated. Now, I ask you once more how such things could by possibility happen if typhus were that contagious affection which schools and colleges, and which those secondary intellects who borrow their notions wholly from such authorities, would have us implicitly believe?

“Perhaps we may be enabled to throw some light upon this obscure subject, upon the difference between infection and contagion, by referring to some facts observable in certain cases of erysipelas, and of fever following puncture in the dissection of bodies undergoing putrefaction.

“I have repeatedly observed, that if the wards of a hospital be crowded with bad cases, when the air is so stagnant out of doors as to prevent the removal of the foul air within by the fresh air without,—I have repeatedly observed that erysipelas arises under such a combination of circumstances, and alone under such a combination in the place specified. In one person the remote occasion shall appear to be the puncture of a leech; in another, cold applied to the cheek; in a third it shall arise from food offending the stomach; and in a fourth it shall arise spontaneously, without there being such apparently concurring cause. In the progress of such cases, a continued fever arises, which so exactly resembles the continued typhus, from malaria, that putting out of consideration the external erysipelas, it would

be difficult, perhaps impossible, to distinguish it from the continued typhus of marsh miasm. Though I have carefully watched the rise and progress of this form of erysipelas, which you know I call the erythematic, by way of distinction, yet I have never known one instance of it in which it appeared to propagate itself from person to person. It occurs within a local taint or contamination of air, and persons removed from that air do not communicate the affection. On reflection it appeared to me highly probable that this local taint or contamination of air was the product of the odour of the stools, urine, breath, and perspiration. Assuming this to be the case, when I was Physician to the Fever Hospital, I induced the Committee to establish convalescent wards; and as these enabled me to keep the receiving wards much less crowded, this expedient, together with free ventilation, nearly proved a preventive of the erysipelas, for I only had two slight cases afterwards during the time I remained in that office.

“With respect to the low fever which sometimes follows puncture in dissecting, it also puts on so exactly the character of typhus from malaria, that losing sight of the original puncture, the inflamed absorbents up the arm, and the tender glands in the axilla, in twelve cases which I have witnessed, I could not have distinctly drawn the line of demarcation. Yet, in none of these examples has the disorder propagated itself, though I have noticed their progress very narrowly, and though most of them occurred among my pupils in confined situations. Moreover, Gaspard has shown by experiment, that

putrid animal or vegetable matter, introduced into the blood, occasions a fever of the typhoid or typhous character.

“ It would appear then that a fever, having a peculiar intermittent, remittent, and continued character, arises from malaria, and malaria alone, as far as my observation goes : but it would also appear that a fever of a continued form, with a typhoid or typhous character, arises, secondly, from a local taint or contamination of air, from the odour of the stools, urine, breath, and perspiration ; and thirdly, from the introduction of putrid matter, as in the case of puncture from dissection, or of the experiments made by Gaspard on the lower animals.

“ Now does it ever happen, that persons labouring under this form of fever, so contaminate the air by a like miasm or putrid product as to affect those who approached them in a like manner ? Or does it ever happen that the clothes of persons who approach such patients are so imbued with such a miasm or putrid product as to give it off again, and occasion thus a similar fever in individuals previously healthy ?

“ These are questions which can only be answered by an observation at once the most minute and extensive ; and though I have been so long and so laboriously attending to the subject, I must pause,—must leave my mind open to the reception of future facts, and decide accordingly. In the meantime I would say that the thing is possible, but I have not yet met with any well-authenticated and well-considered facts which would justify me in drawing such a conclusion.

“ Common candour, however, requires me to state

that I have met with some cases, a few indeed out of a vast many, which at first sight gave a strong colouring to the doctrine of contagion, but which, duly considered, are explicable on that of malaria. Thus, for instance, the sister of a young lady who died of typhus, requested to see the body the day after death, and while standing over it she became faint and sick, and had an attack of typhus. But the lady whom I saw in a dying state, and who soon after expired, lived in a house where I had traced the existence of malaria for some years. Her sister, the second affected, had also lived in that house; and is it not therefore probable that the sight of the body, by debilitating her frame, was only the predisposing cause, and that this second individual, like the first, had been exposed to malaria, the exciting cause?

“One of the porters of the Fever Hospital was attacked by typhus, and an excellent physician told me that this surely was a convincing proof of the contagious nature of the disorder. But I replied that this man had been almost daily in districts where malaria prevailed; and it turned out, on investigating the case, that it had the character of a quotidian ague a week before it put on the continued form, thus showing that it had arisen from malaria. Nurses about the hospital are occasionally attacked, and especially those who wash the clothes of the sick.

“In allusion to the influence of smells, I may mention that I have seen individuals who, being debilitated by disagreeable odours of a common na-

ture, were seized, some by intermittent, some by remittent, and others by continued typhus ; and in such cases we can only suppose that the disagreeable odour of a common kind had been the predisposing cause, since the symptoms which arose were those of a peculiar character, such in a word as arise from malaria or marsh miasm. Confinement within the walls of a hospital is a powerful predisposing cause to some ; and the Fever Hospital stands in one of the malaria districts, to the influence of which its inmates must be occasionally exposed in passing to and from it. I might assume, with as much show of truth, that this theatre is a focus of contagion ; and might apparently prove it by saying that many of my pupils, far more than the proportion of the inmates of the Fever Hospital, are attacked by typhus. But the fact is, that many of them are broken up by hard study ; and lodging in the Borough, one of the malaria districts, they become predisposed, and being exposed at the same time to its influence, are attacked. But though their friends wait upon them affectionately as nurses, I have never known any of them receive the disorder from the sick.

“ Upon the whole, then, though I would not take upon myself to deny, in the present stage of the inquiry, the possibility of typhus being contagious, yet I have become more and more sceptical on the subject, the more intimately I have inquired into facts. Many men, it is true, make confident declarations, and say that typhus has spread from such-and-such a family, as from a focus ; but wherever I have

had an opportunity of investigating the matter on the spot referred to, it has happened either that the evidences of malaria were distinct, or that the drains were in such an imperfect state as to produce a local taint or contamination of air. What formerly deceived me, and what will deceive many persons, is this, that one, two, or more individuals may be attacked in the same house. But if one case arise from malaria, why not another and another? And where this is the case, generally speaking, we have grounds for inferring that malaria was the primary source, because, on examination of the testimony, it will be found that some cases, in the commencement, assumed an intermittent or a remittent character."

These copious extracts furnish the substance of Dr. Armstrong's sentiments respecting the contagious tendency of typhus fever, after he first began to entertain doubts upon the subject; and in obedience to the perfect integrity of his mind, he has candidly stated some facts, which he admits are of a doubtful nature. The advocates of contagion will see in them sufficient proofs of the correctness of their own conclusions; while those who admit, with him, that malaria is the primary source of typhus, and that it is merely a modification of intermittent and remittent fever, which are generally allowed to proceed from malaria, will, like himself, entertain doubts as to the inference to be drawn from these facts; and considering the weight of evidence that is opposed to the exclusive origin of typhus from contagion, they will, like himself, incline to the belief that they do not invalidate that evidence,

and that the doubtful cases alluded to are probably referable to the operation of the same cause as is proved to give rise to typhus, in by far the great majority of instances.

It may be desirable to give a brief summary of Dr. Armstrong's arguments upon this questionable subject, before it is finally dismissed. I shall confine myself to as concise a statement as is compatible with distinctness; and shall afterwards speak of the symptoms and treatment of typhus, as he has described them in his admirable writings on this disease.

I have already explained in what sense he uses the terms infection and contagion. By infection he means a taint of air, which arises from a combination of circumstances external to the human body. When this gives rise to fever, it is very questionable whether the disease is ever propagated by any other than its original cause; or whether, proceeding from atmospherical distemperature, it is ever diffused from person to person by contagion. By contagion he means a subtle emanation from the body in which it is generated, distinctly communicable from person to person,—this facility of transmission being its true test.

Typhus fever, he contends, is an infectious disease arising from malaria, which produces an intermittent, a remittent, and a continued form of fever,—effects which arise from no other known cause; and consequently it is a very questionable point with him, whether typhus so arising is ever propagated by contagion.

Debility, however induced, predisposes the body

to the effects of malaria ; consequently, physical and moral causes equally conspire to make typhus a prevalent disease, when predisposing circumstances affect a large number of persons who are exposed to its exciting cause ; or it is confined to a limited number, when a few isolated persons are thus exposed.

The exciting cause varies in its concentration and diffusion, and predisposing circumstances vary infinitely in their character and influence.

When debility arises from famine, and is thus induced in a large proportion of the people of a country or district, from the combined effects of want and mental distress, a low degree of concentration in the exciting cause will produce the worst forms of typhus throughout the space in which these concurring circumstances exert their influence ; and this explains why the poor in cities, who are so much exposed to the debilitating effects of deficient and coarse food, of cold, of bodily and mental suffering, and equally to an impure atmosphere, are so especially prone to the severest attacks of this disease.

In a less concentrated state, malaria, acting on the inhabitants of marshy districts, produces the milder forms of fever ; but typhus varies in its character, in the country or town, from the very variable influences of its predisposing and exciting causes : so that strong subjects occasionally suffer from its severest visitations, either from their being exposed to a concentrated malaria, or to a less degree of it, when they have been temporarily debili-

tated by any cause, as fatigue, fasting, intemperance, want of sleep, disorder, &c.

That the different forms of typhus are merely degrees of one and the same disease, appears by their passing, in some cases, from the milder to the severe modifications, or repassing from the severer to the milder: thus intermittent fever sometimes becomes remittent, and this continued; or the continued becomes remittent, and this intermittent.

Intermittent and remittent fevers have generally been considered modifications of one disease, arising from malaria. But there is the same relation between the remittent and continued forms as there is between the remittent and the intermittent; and as they are occasionally observed to pass into each other, they are consequently all modifications of one disease.

If, then, the milder forms arise from malaria, so must the severer form; for the distinguishing characteristic symptoms of each merely depend on a difference in the degree of the pathological effects produced. In the mildest form there is no apparent inflammation; in the severer form there is inflammation; and in the worst form this inflammation is so much more extensive or intense, as to prevent any intermission or remission of the symptoms.

Malaria, therefore, is a specific cause which produces effects observed to arise from no other cause, and these are an intermittent, a remittent, and a continued form of fever. The first is a simple fever, or one of simple excitement; and the two

last are inflammatory. The inflammation in both attacks the same structures; but in the remittent form it is not so influential as to prevent, more or less, a morning remission of the symptoms, while in the continued form it is so urgent as to make the fever assume a continued type.

But a difference in degree does not constitute a difference in the nature of a disease. It is admitted that intermittent and remittent fevers arise from malaria. Yet they differ in symptoms, because they differ in pathology; for the inflammation which is excited in the one is absent in the other. When this is excited, it prevents the intermission of the symptoms, and consequently we find that the cold stage which begins every paroxym of the intermittent, is absent in the exacerbations of the remittent.

Now the remittent and continued fevers merely differ in the intensity or extent of this inflammation, which is greater in the last; and hence the symptoms are still more modified in the continued form, and we lose even their remission, because the higher degree of the inflammation keeps up the heart's action and the heat of the surface to one uniform standard, subject only to that evening exacerbation which is observable in all febrile diseases.

But the identity of these latter forms is proved by the inflammation attacking the same parts, viz. the brain, the mucous membrane of the lungs, and of the intestinal canal, and the liver; and by its giving rise to the same symptoms, varying only in proportion to the degree of the internal conditions. They both are characterized by a dropping of the eyelids; a glairy eye; a combination of physical

brightness mixed with an intellectual dulness of expression; a leaden or purplish hue of the lips and cheeks; a huskiness of voice, and cough; evacuations of glairy mucus and dark bile; obscure uneasiness on pressure over the epigastrium and abdominal region; the tongue redder than natural at the edges, covered at first with a dirty whitish fur in the centre, and becoming dark in the advanced stages; and a faint sickly odour of the breath. This identity of pathological effects and symptoms is a convincing proof of identity in the original exciting cause, and in the nature of the disease it produces.

The close connexion, then, of the continued form of this fever, to which the name of Typhus has been hitherto exclusively applied, with the remittent and the intermittent forms, affords one satisfactory proof of its arising like them from malaria; and that this noxious emanation from the earth, or from drains and sewers, is the primary source of continued typhus, is established by a chain of evidence which must appear conclusive to any mind not previously prejudiced in favour of its exclusive origin from contagion. Whether it ever is propagated by contagion is a separate question. But that its primary source is malaria, is proved by the following facts.

Continued typhus often arises in isolated cases, at the same time in places remote from each other, and under circumstances which preclude the idea of contagion. There is no way of accounting for such individual cases, but by supposing that they arise from the influence of local taints of air.

It often attacks several persons at the same time

and in the same place, when no fever had previously existed in or near the spot.

When it thus prevails in many persons in the same place, it will sometimes be found that some of the cases begin as intermittent or remittent fever; which is explicable on the idea of infection, but not on that of contagion, for malaria is the only known cause that produces an intermittent, a remittent, and continued form of fever.

A continued typhoid fever is produced in local taints of air, arising, as in crowded hospitals, from the excretions of patients labouring under various maladies, attended with erysipelas; or from the introduction of putrid matter, by puncture in dissection, attended by inflamed absorbents,—and this fever, but for these local effects, is scarcely distinguishable from typhus. Yet cases of this kind are not propagated by contagion, but require the co-operation of the same concurring causes to produce them in one as another, while admitted contagious diseases, as small-pox, measles, scarlet fever, are propagated under all circumstances.

Typhus prevails remarkably in particular spots, so that a line might be drawn round them, which it does not pass. This is the case equally in the country as in cities; and this limited range is not satisfactorily accounted for on the principle of contagion. There is no such limited range for the admitted contagious diseases. Small-pox formerly extended, as scarlet fever and measles now extend, throughout all classes of society, and affect equally the rich and poor. Typhus, on the contrary, is peculiarly the disease of the lower classes, who live

in situations exposed to contaminations of air, from the crowded state of the population, from the want of cleanliness, &c.

Persons who have sickened in these infected districts, when removed to a pure atmosphere, do not communicate the disease to those about them. The few instances that have occurred of such apparent communication, compared with the very great number of instances in which nothing like a contagious character has been manifested, would reasonably lead to the conclusion that they arose, as the great majority of cases unquestionably do, from malaria, and not from contagion; or if they are justly to be ascribed to a contagious quality, the infrequency of well-authenticated cases of such contagion at least proves that it is only under occasional and peculiar circumstances that it operates; and consequently the dread so commonly entertained of typhus, as a contagious disease, is not warranted by facts, and is pernicious, because it tends to keep out of view entirely the great primary source of this destructive malady.

Typhus is most prevalent in autumn, when the air is moist, close, and loaded with impurities arising from the decomposition of animal and vegetable matter. Long-continued dry or frosty weather checks its diffusion. In winter, when the earth is hard bound by frost, the cases sent to the Fever Hospital fall off remarkably in number; and if the frost should last several weeks, the wards become almost empty of typhus patients, though before its occurrence the applications for admittance were too numerous for the accommodations which

the hospital afforded. This is easily explained on the doctrine of infection, but not on that of contagion; for under such circumstances the poor usually congregate in their confined and crowded habitations, and the fever, if really contagious, would be more apt to spread from this circumstance.

Typhus, in earlier times, was, in proportion to the population, much more prevalent in London than it has been of late years, because the sources of infection have been gradually lessened by the improved habits and greater cleanliness of the people, and the better draining of the city; and the frequency of this disease might be still further diminished, if adequate steps were taken to improve the residences of the poor, and to render the common sewers still more effectual. This is never likely to be accomplished if contagion is considered as the sole cause of typhus.

CHAPTER IV.

SYMPTOMS AND TREATMENT OF TYPHUS.

I HAVE endeavoured to give a concise statement of the opinions of my lamented friend upon the nature and origin of typhus fever. I shall now turn to the symptoms and treatment of this disease, as he has admirably elucidated them in his writings, confining myself principally to the continued form, for the masterly account of which, even those who are opposed to him on the subjects I have just treated of, must give him the meed of their applause.

In obedience to the convictions strongly rooted in his mind, of malaria being the primary source of typhus, and that its effects were those of an intermittent, a remittent, and a continued form of fever, Dr. Armstrong was accustomed to treat of these affections, in his Lectures, as modifications of one and the same disease.

Intermittent fever is most prevalent in fenny districts, and is remarkable for its aptitude to return at long intervals, in persons who have been exposed to marsh effluvium, even when, on its subsequent attacks, they are remote from the situation in which it was first contracted.

The character of this singular disorder is certainly widely discrepant from that of continued typhus; but intermediate shades of affinity between them are observable in the remittent fever, which is the connecting link, partaking in some respects of the nature of both. The mode of treatment of ague, also, is often the very opposite to that of typhus; but in the remittent fever we are under the necessity of combining the treatment of the two former; for while in the commencement we have to resort to calomel and aperients, or to bleeding, in the sequel we arrest its progress by bark, as in ague. These facts are in support of Dr. Armstrong's belief in the affinity between these diseases; and though the two extreme forms are sufficiently distinct in symptoms and pathology, they become insensibly blended together in the intermediate modification.

Intermittent fever is peculiar in having, in rapid succession, a cold, hot, and sweating stage, which,

after an intermission, return at regular intervals. The character of this common disorder is so well understood, that I need not enlarge upon it. It is a simple fever, or at least it is unattended by acute or subacute inflammation. A low degree of chronic inflammation is, perhaps, not incompatible with it ; but if inflammation to any appreciable extent or degree supervenes, the type of the fever is changed into that of the remittent or continued forms.

In the cold stage, or that of oppression, there is a variable degree of venous congestion, which is followed, in the hot stage, by reaction, in which the blood is equally distributed throughout the body ; the organs are excited, but not inflamed ; and this terminates in the stage of collapse, by sweating, leaving in protracted cases a sallowness of complexion, and some traces of languor and debility.

The treatment of this modification of fever is too well known to require any details. It should be remembered, however, that inflammation may arise in the stage of excitement, and that the employment of bark or the sulphate of quinia is not, therefore, in all cases equally admissible.

In what has been called an inflammatory constitution of atmosphere, ague is apt to pass into an aggravated remittent form, if treated early by bark. It requires, under these circumstances, the same decisive antiphlogistic treatment as the remittent ; and the greatest caution is necessary in the exhibition of tonics. The same disease, in the same place and at the same time, contracted in the country and in the town, may sometimes require to be cured by opposite remedies ; for bark will stop the one, and aggravate the other.

Remittent fever differs from the intermittent, in the cold stage being absent in the subsequent paroxysms. The hot stage comes on in the evening, and the fever increases through the night with symptoms of local disturbance in the head, chest, and abdomen. At an early hour in the morning the heat begins to fall, and a remission of the symptoms gradually takes place, which lasts till the afternoon, when an exacerbation, unattended by shivering, ensues, and increases until the usual time for the remission again to appear. When this is distinct, the skin is moist and warm, or cool and dry; the tongue moist, and the pulse soft and slow. It often happens, especially in an early period of the disease, that the remissions are imperfect, and then the febrile symptoms are more or less apparent through the day as well as night; and in cases where the excitement runs high, it is sometimes followed by a sudden and profound collapse, which immediately endangers life.

In those cases where there is not a complete remission, there are generally unequivocal signs of local disturbance; and then, according to the period of the disease, and to the condition of the patient, blood may be abstracted as the urgency of the case requires, or calomel with some appropriate aperient given, placing the patient at all times in a fresh atmosphere.

When the remission becomes distinct, indicated by the state of the skin, tongue, and pulse, the sulphate of quinia should be given every hour or two, from the first appearance of the positive abatement of the fever. But the effects of this remedy should be watched; for if it increases the fever

or the local disturbances, it should be withdrawn, and calomel substituted, until the quinia is again indicated by a distinct remission. When it operates successfully, it remarkably arrests the fever; and its continued exhibition for a day or two after the symptoms have subsided, will, with rest, an appropriate diet and a fresh atmosphere, produce convalescence.

In those cases, when, instead of the usual mild remission in the morning, the patient is suddenly thrown from a state of high excitement into an overwhelming collapse, attended by a cold skin, a sunk pulse, a weak respiration and pallid surface, active means must be resorted to to rouse the sinking powers, and the application of heat and of internal diffusible stimuli is essential to restore the animal temperature and equalize the distribution of the blood. These means, proportioned to the urgency of the occasion, and assisted by the invigorating effects of fresh air, guarding against its chilling effects by proper clothing, afford the only chance of safety. But stimulants are only required to restore the failing energies, and should not be unduly continued; for if they are persisted in after the collapse has been removed, they will produce an artificial excitement which probably will end in inflammation of some internal organ. I shall have occasion to notice this form of fever in detail, when speaking of Yellow fever, as it occurs in North America.

The continued form of typhus arises frequently out of the remittent, but in the great majority of cases, especially among the poor in cities, com-

mences as a continued fever, probably from the circumstance of a great degree of intensity in the remote cause operating upon a very favourable state of predisposition. It is especially the disease of the lower classes of society, confined in towns principally to those districts in which there is an overcrowded state of population among the poor, with all the circumstances attendant upon their mode of life, such as neglect of cleanliness, intemperate habits, poor food, bad air, &c. While other diseases, admitted on all hands to be contagious, pervade equally all classes of society, this is limited generally to the haunts of poverty, and is comparatively unknown in the well-ventilated parts of cities. It invariably follows in the train of famine and the miseries of war; and whenever the physical and moral energies are weakened by deficient nutriment or other general depressing causes, it spreads widely and proves extensively destructive to human life, because the debility which ensues from these circumstances powerfully predisposes to the action of its remote cause.

It will be found on reference to Dr. Armstrong's treatise on Typhus, that the opinion he there entertains of the origin and nature of this disease differs widely from the conclusions to which a longer experience, and a more extended survey of the circumstances connected with it, eventually led him. At the time of the publication of the third edition of that volume in which this essay appeared, he had not had the advantage of much experience from his practice at the Fever Hospital, and his views of febrile diseases were derived chiefly from the obser-

vations he had made in the North of England. His mind was still possessed with the idea that contagion was the sole source of typhus fever, and it had not developed those masterly views of the primary effects of the exciting causes of fever which were soon suggested to him when he began to arrange and methodize his thoughts on diseases generally for his Lectures. I can trace in many parts of his essay the dawn of his later opinions ; but it would be attended with no advantages to attempt to exhibit them in their then imperfect state. The valuable observations which are scattered through that work will always render it interesting to those who do justice to the sagacity of his mind ; and many, especially the advocates of contagion, will probably consider it as containing more correct views than those which he afterwards developed in his admirable course of Lectures. It will be profitable even to those who adhere to his ultimate opinions, if, in reading it, they will bear in mind how his explanation of the phænomena of typhus necessarily became modified by these general principles which he subsequently established.

In the essay alluded to he treats of Typhus under the forms of a simple, an inflammatory, and a congestive variety ; and he uniformly attributes to it a contagious origin and influence. In his more matured knowledge and more exercised judgement he arranged all fevers under the heads of Common and Specific ; and gave to each a congestive, a simple, and inflammatory form. There is no necessity, therefore, of considering here his congestive typhus ; for it is in no respects different from

congestive fever in the abstract. It is merely peculiar in its remote cause, which Dr. Armstrong first considered to be contagion, and afterwards believed to be malaria. His description of its morbid anatomy is more indefinite than his later views led him to believe; and he had not acquired a full perception of the effects which resulted from the peculiar inflammation of the mucous membrane of the bronchia in these specific fevers. He was indebted for some light on this important subject to a valuable paper published in the year 1820, by his friend Mr. Allcock, in the "Medical Intelligencer," on the Inflammations of the Mucous Membranes,—a treatise which he has commended in several parts of his Works. It afterwards became an axiom with him, that special causes always produce special effects; and, taking a broad view of the common symptoms of typhus, as they appeared in the majority of cases, he referred them to morbid impressions in particular parts, and found that he was justified by an appeal to the phænomena of the disease during life, to the effects of remedies, and to the appearances presented after death. These effects, so uniform in certain parts, he considered as the invariable results of the operation of the special cause; and if other parts became occasionally implicated, he referred their disturbance to accidental predisposition. He could not legitimately ascribe them to the influence of the contagion, or subsequently to that of malaria, because they were not uniform in their occurrence, while the specific effects, as he considered them, always were so.

I am well aware that a tendency to generalization

is thought to have been a defect in the mind of Dr. Armstrong. But the correctness or incorrectness of his opinions is not to be determined by individual judgement; and my task is merely to exhibit them as faithfully as I can. Whatever merits they possess, time will fully decide upon them; and now that the grave has closed upon their distinguished advocate, they will be discussed with that impartiality which he always coveted.

When typhus appears from the first in a continued form, it does not always manifest the same character as to the severity or progression of the symptoms; and the differences it exhibits necessarily lead to essential modifications of treatment. Like all specific causes, malaria, operating as a powerful depressant, may, either from its concentration, or from the very susceptible condition of the patient, at once overwhelm the energies of the system; and life may be extinguished from the force of the congestion, without there being inherent power sufficient to bear up against it, or time for the resources of art to be efficiently applied: and in some cases, when reaction does take place, an intense inflammation of some vital organ may follow, which, if unchecked, will destroy life in a few days.

But these are exceptions to the general course of typhus, which has commonly a regular progression of symptoms; a stage of depression, of excitement, and of collapse, each in the more favourable cases succeeding to the other, at somewhat regular intervals of time. In the worst cases, however, this progressive development is interfered with, and the

stage of depression is so rapidly followed by that of collapse, that the patient is often beyond the active resources of art before he is seen; for the brief period in which decisive measures can be employed is past, and he is reduced to a state of profound and almost hopeless debility.

This variation in the progress and symptoms of typhus depends upon the condition of the persons it attacks, and upon the effects it produces on the different organs which are particularly exposed to the operation of its remote cause. There are, of course, intermediate shades of mildness and severity in its character; but, for the sake of illustration, three examples may be selected, as exhibiting the ordinary phænomena of this formidable malady.

It begins with a cold stage, which varies in degree and duration; being sometimes slight and protracted, or very severe, like that of ague. As this declines, the skin, on the reaction being fully developed, becomes pungently hot and dry; the face flushed; the eye bright and injected; the respiration hurried; the pulse full, hard, and quick; the tongue furred, but moist; and signs of local disturbance occur in different parts, probably in the head, indicative of acute inflammation in the brain or its membranes. These symptoms, if the inflammation existing in the brain or elsewhere does not speedily lead to a fatal termination, last four or five days; and then the appearances of ardent fever begin to decline; the heat to fall; the respiration to become more feeble; the strength, which at first was not materially affected, rapidly to sink; the pulse to lose its force, and to become soft and com-

pressible; the lips and cheek to assume a leaden or purplish hue; and the tongue to become dry and brown; a change which is attributable to the specific affection of the mucous membrane of the bronchia, and to the effect produced through it upon the blood, which, not being duly arterialized, fails to maintain the energies of the brain and nervous system; so that the muscular and vascular systems ultimately become debilitated from the defect of their natural excitant.

In another form the excitement which succeeds to the cold stage is less intense; the fever is not so fully developed; the heat not so high; the respiration not so hurried; the pulse not so full and quick; and the local signs of disturbance not so urgent. These milder symptoms last seven or eight days; the tongue remaining moist and furred, either white or yellowish, and redder than natural at the tip and edges, with more or less cough and huskiness of voice. At length the same change as in the preceding example begins to take place, but at a later period by three or four days; the heat falls, the strength sinks, the pulse loses its force, the tongue becomes dry, and the same duskiness of complexion follows from the defect of decarbonization in the blood, and from the impression made through it upon the general system.

In a third form the excitement is very transient. Instead, as in the two former examples, of a well-developed fever, lasting from three to four, or from six to eight days, there is in this variety scarcely as many hours of even imperfect excitement, and this is rapidly succeeded by that collapse which is indi-

cated by a cool skin, a soft feeble pulse, a weak respiration, a dark dry tongue, a prostration of strength, a weak voice, a feeble cough, a dusky lip and cheek, from the immediate accession of a severe bronchial affection; so that in this formidable variety the last stage of the other examples is almost coeval with the onset of the disease.

The morbid appearances which typhus presents are in accordance with these symptoms; for we find the brain, or its membranes, the mucous membranes of the lungs, of the small and large intestines, and of the stomach and the liver, more or less affected. Other parts may occasionally be implicated, and thus vary the complexity of the symptoms; but this complication is not uniform, and is rather to be attributed to the individual predisposition of the person attacked, than to the direct influence of the peculiar remote cause of the fever itself. This is the more probable, as we find inflammation in different persons attacking different organs, and none of these accidental effects are so uniform as those associated impressions upon the parts above specified, which we invariably find more or less distinct, and which fully explain the symptoms of the disease. In fifty cases, we find the mucous membrane of the lungs or bowels presenting nearly the same appearance; but if the pleura or peritonæum should be the seat of inflammation only in a few of them, we should be justified in supposing it, and the pain of the side, or abdomen, to which it gave rise, to be dependent rather upon that part being, in the few who had pleurisy or peritonitis combined with typhus, strongly predisposed to in-

flammation, which arose out of the excitement, than that the inflammation was the immediate effect of the peculiar cause of the fever. We know that excitement taking place under common circumstances, when no special cause is operating upon the body, gives rise to inflammation in weak organs; and the same equally holds good in the excitement attending specific fever, whether it be typhus or small-pox, or measles, or scarlet fever.

The common symptoms of typhus therefore being those referable to the disturbance of the cerebral and pulmonary functions and of those of the alimentary canal and liver, we find on examination after death that these different parts present traces of inflammation and of congestion, and the diagnosis of this disease is determined by the coexistence of these morbid impressions and of the symptoms to which they give rise,—effects which are produced, when inflammation leads to the continued form of typhus, by malaria, and by no other known cause.

In those cases therefore where typhus has had its usual course, we find unequivocal traces of inflammation in the brain or its membranes; the pia mater is loaded with dark blood; the arachnoid is milky and opaque from an effusion of serum and lymph between them and in the ventricles; the substance of the brain is preternaturally vascular, exhibiting numerous red points when cut into. Similar appearances are generally found in the spinal cord. The mucous membrane of the bronchia is loaded with dark blood, and coated with a peculiar sticky secretion like varnish, and with more or less frothy mucus. When this is wiped

off with a sponge, the blood in the injected capillary vessels assumes a brighter colour from the influence of the air, which had been prevented during life from coming into free contact with the blood, from the impediment which the besmeared state of the mucous membrane presented. The liver and its associated veins are congested with dark blood, more especially in those cases where calomel had not been exhibited. The mucous membrane of the stomach and intestines exhibit variable traces of inflammation, denoted by redness, thickness, and pulpiness, and especially at the lower part of the ileum, where ulceration is generally found in protracted cases, extending in some instances through the small and large intestines.

These appearances, variable in degree, are sufficient to explain satisfactorily the ordinary symptoms of typhus, which will naturally present shades of difference, from some parts being occasionally more affected than others. Thus, in one case, the affection of the nervous system may predominate; in another, that of the mucous membrane of the chest, or of the alimentary canal and the liver; and not unfrequently other symptoms, depending on inflammation of other organs, may be developed, and occasion various complications in the phænomena of the disease during life, and in the morbid appearances after death. Thus, we may have pleurisy, or peritonitis, or inflammation of the substance of the lungs or of the pelvic organs, or laryngitis, combined with typhus; but these effects are uncertain, and may be said in consequence not to belong essentially to the disease.

We find a satisfactory explanation of its usual character in the disturbance of the parts which are always more or less implicated. That of the brain and its membranes explains the uneasiness and pain in the head, the glairy eye, the active or passive delirium, and, ultimately, the state of stupor and insensibility; that of the mucous membrane of the bronchia, the husky voice, the cough, the leaden or violet colour of the lips and cheek, the dark sordes on the tongue and teeth, the soft and feeble pulse, the weak respiration, the profound debility, the diminished heat, and the sunk position; that of the mucous membrane of the abdomen, the uneasiness in the epigastric and abdominal regions, the furred tongue, the redness of its tip and edges, the glairy mucus observable in the evacuations, the frequent diarrhoea; and that of the liver, the pain and distention in the hypochondriac region, and the dark biliary secretion which is perceptible until the approach of convalescence.

The concomitant effects on these remote parts must primarily be attributable to a vitiated state of the blood, probably arising from the absorption of the malaria; and the subsequent change in the constitution of the blood, from the morbid state of the mucous membrane of the bronchia, fully accounts for those putrid or malignant symptoms which have occupied so much the attention of the earlier writers, and which, associated with the profound prostration of strength that is so characteristic of the advanced stages of the disease, has erroneously led to the inference that typhus is essentially a disease of debility,—an opinion which, however justifiable towards

its close, cannot be maintained in the open and fully developed forms of fever at its commencement. The ardent fever, the high heat of the surface, the resisting pulse, the unsubdued strength, which are observable in the early stage of the majority of cases, together with the unequivocal signs of active inflammation in the brain or elsewhere, are all opposed to the doctrines of inherent debility; and it is a dangerous deception to characterize any disease by the symptoms of its decline. It is true that great debility attends typhus in its progress; but it is referable to the general impressions which its local effects produce on the body; and if we can lessen their violence, we diminish the hazard of the system sinking under the prostration which their unchecked career inevitably produces. Typhus, therefore, forms no exception to the general principles which are applicable to the management of all febrile diseases, though its peculiar character and the various modifications we meet with, and especially the stages of the disease, necessarily require due consideration in adapting the mode and degree of treatment to the exigencies of the occasion.

It is impossible to lay down general rules for the treatment of any specific fever, without incurring the hazard of supplying a superficial knowledge to persons of little observation and reflection, which, from its facility of application, may lead them to judge erroneously of themselves and of the exigencies of their patients. It has been emphatically said, that general rules murder their exceptions; and in no disease is this more true than in typhus. Though a disease of an inflammatory nature is to be

treated upon the common principles applicable to the removal of inflammation, yet as this pathological condition varies in itself, and as the state of the body varies with it, there is a constant necessity of modifying our measures to the circumstances of each case. What is urgently demanded in an acute inflammation in typhus fever, is no more called for in a subacute form of the same condition, than the measures suited in one stage of the disease to an active, are in a subsequent stage to a passive inflammation; and what would tend to lessen the violence and duration of the disorder, and probably to save life on the onset of a severe attack, before the strength is subdued, would inevitably, in most cases, prove fatal, if resorted to at a later period, when the energies are giving way under the shock to which the body has been long exposed.

In typhus, therefore, as in other inflammatory diseases, there is an imperious necessity for a sound discrimination, and a deliberate consideration of all the combined circumstances of each case. If it varies so materially, as in one instance to exhibit for several days the unequivocal indications of an open and ardent form of fever, and of an acute inflammation in a vital organ; and in another to present none of these signs, or at least only in a very subdued degree; and in a third instance to be ushered in from the first with all those symptoms of collapse which usually mark its decline,—we may certainly pause before we flatter ourselves with the possession of any one mode of treatment adapted to all the forms of the disease.

The profession labours occasionally under many

disadvantages in the management of typhus, from the prejudices which exist in the mind of the public respecting its nature; and it requires no ordinary firmness of purpose to enable a medical man to pursue an undeviating course, from the responsibility he takes upon himself by rejecting, perhaps, the suggestions of his colleagues, or of the friends of the patient, respecting the inherent debility ascribed to the disease. Those who suffer their own judgement to be influenced in this way by others, are liable to commit two errors of treatment, for they trust to inefficient measures at first, and they do too much afterwards. No one can practise successfully in typhus, who, perfectly conscious of what is demanded of him, does not rely upon his own resources, and turn a deaf ear to the councils of those persons out of the profession who, from their ignorance of disease, are incapable of appreciating what it may require. The public judge of specific fever, and particularly of typhus, by its ultimate effects, and cannot be made always to understand how active measures, in its rise, are occasionally required to obviate the debility of its decline.

In the treatment of typhus, Dr. Armstrong considered it essential that particular attention should be paid to its successive stages of oppression, excitement, and collapse.

Malaria, like all depressing causes, produces a shock upon the system which is followed by venous congestion. This may be so mild as to be promptly removed by the spontaneous efforts of nature, or so severe as to require the immediate and most efficient resources of art. Whenever the animal heat is

sunk below the natural standard, it is a golden rule of practice to restore its balance and that of the circulation as soon as possible, in order that we may guard against the probable occurrence of future ill consequences, such as an overwhelming attack of congestion, or of acute inflammation, supervening to the reaction, which is generally in proportion to the previous intensity or duration of the cold stage.

In the milder form of the congestive stage of typhus, the patient complains of languor and lassitude, of being fatigued on the slightest exertion, of a sense of chilliness, accompanied often with partial flushes of heat, and of a sense of weight about the head and epigastrium. The pulse is languid, variable however in its force and frequency; the countenance pale, and dejected in its expression; the eye dull, and the appetite impaired. If a person be allowed to go about in this state of incipient disorder, he may sink under the extreme form of congestion, or may have an attack of acute inflammation upon the development of the ardent symptoms of fever; but if he be put at rest, and if an antimonial emetic be immediately given, followed by a full dose of calomel, and the infusion of senna, the fever is checked at the commencement, and nothing in many cases remains but a slight degree of debility.

If the congestion be more severe, the extremities cold, the respiration laborious, the pulse heavy and oppressed, with indications of considerable disturbance in the head and liver, he may be relieved by a moderate abstraction of blood, in a recumbent position, avoiding the shock of syncope. The pro-

priety of continuing the bleeding will be determined by the effects. If the feeling of oppression be lightened,—if the pulse regains its elasticity, the strength be improved, the animal heat more equalized, and the local affections relieved,—it has operated beneficially; but it should not be carried beyond the relief of the present symptoms, as the only object is to free the heart from its state of oppression. When this is accomplished, a reaction succeeds, and it may be requisite, upon the supervention of an ardent form of fever, especially if it prove of an inflammatory type, to resort again to venesection, to control the excitement, or remove the inflammation. But, if on the first abstraction of blood, the heat falls, the pulse becomes weaker, the respiration more embarrassed, and the strength more sunk, the bleeding must be stopped, and a small dose of calomel given every three or four hours, the patient kept at rest, and the heat equalized by bottles of hot water applied to the lower extremities and epigastrium, or by the hot-air or steam bath, treating the excitement which follows according to its indications.

In the worst form of congestion, when the surface is universally cold, the strength prostrate, the pulse imperceptible, the intellect and general sensibility completely obscured, the only expedients which offer a chance of success are the hot-air or steam bath, friction upon the surface with stimulating lotions, aiding the effects of these remedies by the internal exhibition of brandy and laudanum, or of calomel and opium, withdrawing the stimulants as soon as free excitement is produced.

When reaction has taken place, the excitement must be treated according to its degree and character. It may be moderate and run a mild course without making any serious impression on the internal organs, or it may be more or less intense, attended by an acute or subacute inflammation.

If the patient be young and vigorous, the fever open and ardent, with a hot skin, a quick hard resisting pulse, he may be bled early with advantage even if no signs of inflammation appear; for the fever will run a milder course afterwards, its ultimate impressions will be moderated, and the debility attending its decline will consequently in some degree be obviated. But if, with this form of fever, there should be symptoms of acute inflammation in the brain or elsewhere, the only chance of safety lies in free depletion, which is the only means we possess of preventing the destruction that must inevitably follow the uncontrolled development of inflammation in a vital organ. Though the case be ascertained to be one of typhus fever, and although debility be associated in the mind of the practitioner with it, yet the circumstances of the example under consideration justify a recourse to the most decisive measures; for the period of the full debilitating effects of the fever has not arrived, and all the symptoms denote a vigour of the system which is capable of sustaining the loss of blood necessary to subdue the existing inflammation, which threatens a rapidly fatal termination to life.

The amount of blood to be drawn must be regulated by the effects produced on the inflamed organ. Sometimes a few ounces will bring on the approach

of syncope, and this decisive impression is considered as a proof of the patient labouring under specific fever, though it occasionally happens in common fever in persons of a lax fibre who have chronic determinations of blood to the head. But it must always be remembered that the combined symptoms and the condition of the patient are to be carefully observed, as the period for active measures varies in different examples. If the state of the skin and of the pulse be as above enumerated, the strength unsubdued, the pain distinct, and especially if the head be the part inflamed, and the patient be seized with active delirium, no time is to be lost in half-measures, and whatever may be the amount of blood requisite to subdue the inflammation it must be drawn. If one bleeding be not effectual, two or three must be ordered in as short a space of time as possible, so as to comprise its abstraction within that period in which the energies of the disease and of the body are most active.

Dr. Armstrong quotes a case of typhus attended by acute inflammation of the brain, which required, in three days, the abstraction of one hundred and eight ounces of blood before the violence of the local impression was subdued, and he remarks that the fever ran a mild course afterwards. He quotes this as an extreme case, and illustrative of the largest quantity of blood he had ever drawn in typhus. The measure of treatment, however, in every case must be left to the judgement of the practitioner, and he will be influenced by the inferences he draws from the symptoms. If the case be seen early after the excitement is fully developed, he must ascertain

whether it is complicated with any formidable degree of inflammation or not, and whether it requires an active or passive treatment. If no local disturbance be very apparent, and the excitement should lead to no apprehensions of any mischief arising out of it, a mild course of calomel and purgatives is all that is requisite. But if it be high, even though no part at the time appears particularly to suffer from it, there may be reason to apprehend its effects eventually taking a local direction; or that the degree and duration of the fever, with its proportionate impressions on those structures which generally suffer from it, may exhaust the patient, and ultimately destroy life; and in either of these contingencies a small quantity of blood may be drawn with propriety, to diminish the excitement, and thus lessen the probability of evil arising out of it. There is no necessity in a case of this kind for a large bleeding, because there is no great existing or impending danger. The only object is to moderate the fever at once; and after this has been done by bleeding, the case may be safely left to the influence of secondary means, such as calomel and aperients. Other means must duly harmonize with them, as absolute rest and quietude, the abstraction of all physical and moral stimuli, a regulated temperature, due ventilation, cooling sub-acid drinks, and a diluted farinaceous diet. Where the brain is inflamed, the light should be moderately obscured; the head shaved, and elevated; iced water diligently applied to the scalp, and the lower extremities kept of a natural warmth.

It must be recollected, however, that the period

in which general venesection can be safely employed in any form of typhus complicated with any degree of inflammation, is limited, and that its limits are denoted by signs which cannot be mistaken by any one who understands the natural progress of the disease, the changes it undergoes, and the impressions it makes on the body. So long as the excitement is openly developed, the skin distinctly hot, the pulse firm and resisting, bleeding may be resorted to, but with more advantage and with a greater confidence in its efficacy in the earlier than in the later period of the excitement; for though this may be declared still to exist at a late period from the evidence of the above indications, yet as it has somewhat of a definite duration, its termination is nearer at an advanced than at an early stage of the disease. But when its limits are distinctly passed, when the heat of the surface is declining, the pulse becoming soft and compressible, the tongue dry and brown, the complexion of a leaden or purplish hue, the respiration weak, the strength sunk, and the general sensibilities obscured, it is no longer possible to employ active measures with the least hopes of advantage. Even if inflammation, as is usually the case, exists, we cannot encounter it with any decisive or immediate means of relief, for we should sink the strength, already becoming prostrate under the disease; nor would a sound discretion justify strong measures of any kind, for the excitement has subsided, and the inflammation has passed from an active to a passive state.

The period of excitement, therefore, in typhus has distinct limits, and observation can alone deter-

mine them. In its highest degree, attended with an acute inflammation of the brain, it does not last, perhaps, over two or three days; and in those formidable cases where the bronchial affection sets in early, it scarcely endures as many hours; so that each example must be treated by its own indications. Where the excitement is moderate, and the inflammation of a subacute character, it is often protracted to the sixth or eighth day; and these cases are consequently the most manageable, not only from the mildness of the symptoms, but from the greater length of time in which we can apply decisive means of relief.

If we were fortunate enough to see typhus on its first invasion, many cases could be cut short, in the incipient stage of congestion, by the searching and powerful effects of an antimonial emetic, and the subsequent operation of a full dose of calomel; or if we were present at the commencement of the stage of excitement, we could control the fever by a graduated depletion, so as to ensure, in sound subjects at least, a mild course to it afterwards, by the secondary means of relief, and we should thus in a great degree obviate that profound debility which its unchecked career induces towards its decline. But generally much precious time is lost before the resources of art are applied for, and we are consequently called to cases in every stage of advancement. The history of the case and the existing conditions can alone regulate our practice in these early neglected fevers, and no one can err in adapting his measures to their exigencies, who correctly distinguishes the symptoms which denote

the transition of the stage of excitement into that of collapse. As the one is giving way, the other is taking its place; and the dry glazed tongue, the soft pulse, the diminished heat, the sunk position, and the smothered sensibilities, are so many legible appeals to an observing mind against all active measures. If the inflammation which exists in the advanced stage should appear to demand the abstraction of blood, it must be drawn very cautiously, by leeches, watching their effects upon the general strength. If they lessen the local disturbance, without increasing the debility, they may be allowed to bleed; but if the pulse sinks under their primary influence, if the breathing becomes more laboured, the orifices should be stopped; and then the only aids which remain, are small doses of calomel, fresh air, and a light farinaceous diet.

The collapse of typhus, it will be recollected, depends principally upon the supervention of that special bronchial affection which prevents the change of venous into arterial blood. The former circulates to a greater or less extent in the arterial system, and tends to stupefy the brain, and to obscure the general sensibility. The heart and the muscular system fail in their wonted energies,—all the functions languish, and the strength is completely prostrate. It is impossible, under these circumstances, to present any relief beyond that which may be afforded by the cautious use of calomel, by fresh air, and sub-acid drinks; and these, with a wise forbearance of interfering too much, are often capable, under the most disheartening appearances, of securing a favourable termination.

But there are several circumstances to be attended to in the management of the stage of collapse ; purgatives, and even calomel must be used with caution, for profuse evacuations would operate at times as fatally as depletion by the lancet. As long as the excitement continues, and the evacuations are dark and offensive, they may be freely used, but should be lessened in amount and frequency when it has subsided. Small doses of calomel are generally advisable, till the secretions of the liver are healthy ; but nothing in the shape of a drastic purgative should be given, so as to elicit large fluid motions in the stage of collapse, as it might induce a state of hopeless exhaustion, or occasion a hæmorrhage from the irritable mucous membrane of the bowels. If the air be brisk, cool, and dry, a purgative will be better borne ; but if it be moist, warm, and stagnant, it should be very sparingly employed, or altogether omitted ; so that the same case will support one day what it cannot another. Nothing, in this state of collapse, is so immediately soothing and invigorating as fresh air ; and we can satisfactorily explain its effects, from the condition of the blood, which is so much concerned with the existing debility. If the patient be fully exposed to its influence, protected against its chilling effects by warm clothing, and by bottles of hot water put to the lower extremities and to the epigastrium, he will have the best chance of rallying from his exhausted condition. He will require but slight support from some form of farinaceous food, flavoured with fresh lemon-juice ; for he cannot digest and assimilate much nutriment in his weak

state, and stimulants will only add to his debility by protracting the lingering remains of fever, and may endanger the kindling up of inflammation in parts which have already suffered from its influence. When convalescence arrives, which is denoted by the secretions of the liver assuming a natural colour, by the brightening of the eye and countenance, by return of appetite and sleep, the safest and most grateful stimulant is fresh small beer. Weak animal broths, with a little grated biscuit, may then be allowed, caution being still enforced as to rest and quietude; for the mind in this susceptible condition is as liable to suffer from moral excitement as the body is from the excess of physical stimuli.

Sometimes a sudden collapse comes on in the advanced stages of typhus, and wine is necessary to sustain the system and excite the heart's action. This prostrate condition is indicated by a cool skin, a feeble fluttering pulse, a gasping respiration, a sunk expression of countenance; and wine must be given in small quantities, till the energies of the system are restored. But it should not be continued beyond this effect, lest a state of excitement should supervene, which might lead to a renewal of inflammation.

The urine is sometimes apt to be retained in these cases, where the head has been much affected; and this retention is indicated by moaning, and by a state of general distress and restlessness, which at first cannot be accounted for. The liability to it depends on the low state of the sensibility, in which the bladder especially participates: and it should be

borne in mind, in order that the condition of the urinary organs may be attended to ; for the tumour above the pubis, and the wetting of the linen by the ineffectual dribbling of the urine will at once account for the distress, which can only be removed by the catheter.

If the treatment of typhus requires such nice modifications in its different stages, and the active measures which are demanded in the stage of acute excitement and inflammation are to be totally abstained from in that of the collapse which succeeds to the ardent form of fever after this has lasted several days, the same caution is requisite in those cases where the excitement is very transitory, and the collapse early in its approach. It would be happy if such formidable cases could be seen while the skin is hot, the pulse expanded and resisting, that depletion might be employed under these favourable conditions. But this available period is often passed before medical aid is obtained ; and all that can be done is to proportion the means of relief to the weakened condition. There is every motive for extreme reserve in the employment of depletion ; for there is no high excitement, no resisting pulse, no active inflammation, no distinct acute pain, and no strength to sustain debilitating measures of any kind. If there should be symptoms of inflammation in the head or elsewhere, leeches may be cautiously applied, observing the effects they produce ; and if they are well borne, they may be repeated if necessary ; but the bleeding should never be profuse, nor allowed to stop of itself, lest

exhaustion should follow, and endanger life. The same means which are suited to the stage of collapse in other cases are alone applicable here.

Calomel and purgatives are always necessary in typhus; but, like bleeding, they should be proportioned to the varying states of the disease. In the stage of excitement they are well borne; but they cannot be sustained to the same amount in the advanced stages, and should be gradually diminished in quantity as the case proceeds. Calomel may be considered almost as a specific, and is useful so long as the evacuations are dark and fœtid, and active purging with it and the infusion of senna is necessary at first to remove the offensive accumulation in the bowels, which, if retained, operates as an irritant; and, probably, with the morbid secretions from the mucous membranes, would tend, through absorption, to vitiate the blood.

There are two conditions which especially render caution necessary in the use of purgatives in typhus; and the one is when the inflammation is concentrated in the mucous membrane of the intestines; and the other, when hæmorrhage occurs from the bowels.

In some epidemics the mucous membranes of the alimentary canal bear the principal shock of the disease, as is indicated by the local pain, the state of the tongue, the slimy stools, and the frequent diarrhœa. These cases, if seen early, may be controlled by general bleeding; and when the force of the fever has been lessened by its means, leeches may be used with advantage. Small doses of calomel may be given, if necessary; but all drastic

purgatives should be avoided, and in those cases where the secretions of the liver are natural, small doses of castor oil are alone required.

In hæmorrhage from the bowels, which generally occurs in the advanced stage of typhus, perfect rest, fresh air, and a mild farinaceous diet, are all that can be advised; though, if the tongue be moist, or if the exhaustion from the loss of blood be great, a full opiate is required. This effusion of blood from the irritable mucous membranes is principally occasioned either by the injudicious use of drastic purgatives, or of some medicine, as nitre, which is so powerful an irritant that its use even in small doses is very questionable.

Sometimes there is a state of general irritation which comes on suddenly in the advanced stage of typhus, and which may exhaust the patient in his feeble condition, if not promptly removed. It is indicated by restlessness, loss of sleep, constant motion of the arms, and sometimes by a wild delirium. This state is brought on frequently by too close a room, or too high a temperature; and fresh air will often remove it. But opium is in most cases its true antidote, and may be given with immediate advantage where the tongue is moist. It must be more cautiously administered when the tongue is dry and glazed.

In the case of habitual drunkards, or of persons who have been accustomed to drink much malt liquor or spirits, this state is by no means unfrequent; and if the habits of the patient are known, it may be allayed by small quantities of their accustomed stimulant, which does not operate preju-

dicially on them, as it would on persons unaccustomed to its use.

This state of irritation, and the sudden collapse before alluded to, are the only occasions for the use of stimulants in typhus. The debility which attends its decline is the natural consequence of the disease, and is often attended by a low degree of passive inflammation; and stimulants merely give a transient and fictitious energy, which is succeeded by diminished action, having a tendency to keep alive the faint embers of fever and inflammation. They protract the disease; rendering abortive other and judicious means of relief; and frequently excite a chronic and fatal ulceration of the mucous membrane of the ileum, by prolonging the local increased action which attends the hypertrophied condition of the conglomerate glands.

Bark, perhaps, at no time is useful in typhus, for it very generally offends the stomach, producing irritation and excitement: and the same may be said of other tonics. If the morbid conditions are removed, the natural recurrence of healthy action, with the gradual return of appetite and of sleep, will effect all that is essential to the perfect restoration of health.

Convalescence requires great care and forbearance; and the least done in it the better, for it is a state of debility, and consequently one of imminent predisposition to disorder. Rest in the recumbent posture is necessary for some time after all appearances of the disease have subsided; for the heart's action is feeble, because its muscular structure is weakened, so that it cannot maintain

that energetic circulation which is required to sustain the muscles in a state of action. Too abrupt a return to the erect posture often brings on syncope; and if prompt assistance be not rendered, it sometimes terminates fatally in a few minutes. If patients on first sitting up are affected with dimness of sight, giddiness, or sickness, or if they become suddenly pale, and embarrassed in their breathing, they should be made to lie down instantly; and hence the propriety of observing a due caution in regard to the mode of passing the ordinary evacuations in the advanced stages of the disease.

A well regulated temperature, a proper diet, and the absence of all physical or moral stimuli, must be strictly enforced in convalescence. The extreme weakness of the system predisposes it to the shock of venous congestion, from cold or from offending food; and death may ensue either from it, or from the inflammation which may indirectly arise out of it. A fluid and easily assimilated diet is best till exercise can be taken; and the visits of friends should at first be restricted, and all subjects avoided which are calculated to operate too powerfully on the mind and feelings.

I have thus endeavoured to give a faint outline of Dr. Armstrong's views as to the nature and treatment of Typhus fever; and however familiar they may be at the present time to many practitioners, I would wish them to pay a candid consideration to his claims upon their respect and gratitude, by referring to the state of professional opinion on the subject of this formidable disease previous to the first publication of his writings, in

order that they may contrast his views with those which were current in this country before his time. I confidently appeal to the issue of this investigation, for the amplest evidence of the superior sagacity and discrimination of his mind.

I have enlarged upon the subject, because it seems to me that it is not well understood, even by many of those who profess to adopt his opinions and practice. He has been censured as the indiscriminate advocate of depletion, though his treatment is so cautiously modified to the different stages of fever, and to all the various conditions and circumstances attending it. Those who adopt opinions of disease as others do fashions, which are recommended to the frivolous merely by their novelty, or who derive their knowledge from books, satisfied that they comprehend the nature of fever, by merely applying names to its varieties, will find perhaps but little permanent satisfaction from the observations of this eminent physician. But those who appeal to nature with as much simplicity and integrity of mind as he did,—who study her laws and follow her indications, will ever admire his powers of observation and those clear perceptions which formed one of the leading characteristic features of his mind. There are many who may perhaps reasonably object to his opinions respecting the cause and the connexions of typhus, and who prefer adhering to the old doctrines, especially that of its contagious influence,—a subject which has been often discussed, and which will not be settled for the present to the satisfaction of the profession or the public; but such dissentients, if they are candid

disputants, will perhaps admit that it was no ordinary intellect which developed such comprehensive views; and while they admire their distinctness, and the simplicity of their general effect, they will be compelled, in the height of their scepticism, to admit that it is difficult to disprove their reality. Time alone, however, must determine upon *their* truth; but it does not require ages to appreciate the practical importance of Dr. Armstrong's general doctrines of fever. They may be put to the test by any faithful observer; and I have judged my friend very erroneously if, the longer they are scrutinized, their merits and his reputation do not equally enlarge by time, and if his name does not ultimately become associated with those of other eminent men who are revered as contributors to the stock of our knowledge, and as benefactors of mankind.

That he anticipated future distinction from his researches into the nature of fever, is proved by a passage at the close of his Lecture on Typhus, which I quote as an evidence of his unshaken faith in the truth of his own doctrines. If he looked forward to a more assured fame with posterity, than that which the contentions and the prejudices of present times permitted him to enjoy, he but shared with other distinguished men "the last infirmity of noble minds."

"Viewing typhus fever," he says to his pupils, "under its most comprehensive signification, I may be permitted to say that, by dint of industry I have made some improvements; first, in having more distinctly exhibited its remote occasions, the knowledge of which will enable you to prevent its occur-

rence in many places, or stay its extension when it may appear ; secondly, in having not only more minutely explained and detailed its morbid anatomy, but more clearly illustrated its internal pathology, which will enable you to perceive the various indications of treatment ; and thirdly, in having fitted the remedies to the different forms and stages, which will enable you to apply an active, an intermediate, and a mild treatment, with more precision than has hitherto been laid down by medical writers. Indeed, if you have fully comprehended the pathological and practical bearings of the doctrine of a congestive, simple, and inflammatory variety of fever,—if you have fully comprehended the modifying influence, not only of common and peculiar remote occasions, but of all those other particulars to which I have repeatedly adverted as necessary to be considered in practice, you will be at no loss, into whatever climate you may be thrown, since you will have principles to guide you,—principles which, in reference to the pathology and treatment of all febrile disorders, will not pass away with my brief existence, but which, being true now, will therefore endure, essentially unchanged, through succeeding ages.”

CHAPTER V.

YELLOW FEVER.—COMMON INFLAMMATORY ENDEMIC OF THE WEST INDIES.

THE “comprehensive signification” of Typhus fever, to which Dr. Armstrong alludes in the extract just quoted, may be supposed partly to refer to the intimate relation which he thought existed between it, the Plague of the East, and the Yellow fever of America. As he had never seen the two last-mentioned diseases, he could only infer their connexion with typhus from the published histories of these memorable epidemics, and from the reports of such of his friends who had observed them.

It is natural his attention should have been drawn to them, that he might put his general doctrines of fever and his practice to the test, by ascertaining how far these were applicable to the nature and treatment of two diseases which had so long occupied the attention of medical men, and upon which there had been a variance of opinion as to their contagious influence. The result of his inquiries and reflections was, that the same principles of treatment were as applicable to them as to typhus, because there were similar modifications of the febrile condition in each, and he was disposed to think they would be found to be mere varieties of one disease.

Under the denomination of Yellow fever he believed that three different affections had been included; viz. acute hepatitis—the inflammatory en-

demic of the West Indies, so well distinguished by Mr. Dickinson*; and the epidemic bilious remittent—the offspring of marsh effluvium.

I shall particularly notice the two last affections, one of which Dr. Armstrong considered as a *common* fever, arising from heat acting on unseasoned constitutions; and the other, a *specific* fever from malaria, and consequently characterized by an intermitting, a remitting, and continued type.

It is to the inflammatory endemic, and to the highest grade of the bilious remittent, that the name Yellow fever has been indiscriminately applied; and it is not at all times easy to discover to which of these two diseases the observations of authors strictly refer. The existence of yellow fever as arising, exclusive of the influence of malaria, from heat alone, has been denied by some authors. It is, however, admitted to exist by a very competent authority, Dr. Dickson†, who satisfactorily shows that the principal source of obscurity and of contradictory opinions on yellow fever arises from an inattention to those states of the system upon which the frequency and fatality of the disease so much depend. “The degree of predisposition to it,” he remarks “will fluctuate, during the early period of a residence in the West Indies, according to age, season, and the influence of various stimuli on the body, or as it has been suddenly or gradually exposed to their operation. In such a climate, where the sanguine temperament is thrown by the stimulus

* Observations on the Inflammatory Endemic, commonly called Yellow Fever; by N. Dickinson. London, 1819.

† Edinburgh Medical and Surgical Journal, xiii. 37.

of heat into febrile excitement, it is not surprising that this should terminate in fever, from the influence of free-living, undue exposure or exertion, unless the body has become inured by habit, or had its predisposition lowered by milder attacks of sickness. This variation of predisposition is seen in the disparity of health in different ships in the same harbour, depending on the length of their residence in the climate, or the degree of exposure. A fatal fever will become general in a short time in one ship, be partial and less severe in a second, and mild or absent in a third. The danger will be in the ratio of the predisposition and the cause,—a weaker cause operating on a strongly disposed person, and the reverse. But the degree of security will be relative; for the insusceptibility will be much greater after an attack of this fever, or from the person being habituated to miasma, or other remote causes, than from mere length of residence.”

Dr. Dickson justly considers marsh effluvium as the principal source of yellow fever, but remarks, that if the above premises are correct, it may arise out of the remote causes of fever in general, and that these will act in various degrees of intensity and combination,—the weaker requiring the aid of predisposition to become efficient. But when the system is highly excited and prepared to fall into fever, then any additional agency may become the occasional cause, and consequently yellow fever may be excited in some cases by such as are feeble, dissimilar and obscure.

It is evident from this extract, that Dr. Dickson was fully aware of the existence of the two dis-

eases, included under the name of Yellow fever ; but he does not allude to those essential differences in them which are determined by the remote cause ; nor does it appear that the discrimination was made by many of the early authors who wrote on West Indian diseases. Mosely, in 1787, distinguished his Endemial Causus from the nervous remittent, and justly ascribed the former to the influence of the climate operating on unseasoned constitutions ; but though his observations generally apply to the inflammatory endemic, it would appear that he did not always distinguish it from the specific disease ; for, in speaking of his causus, he says, p. 440, there are instances in which it has been protracted to the eighth, ninth, or tenth day, and others where it has never passed from the inflammatory stage, but being checked, though not extinguished, it has been lengthened out, and at last converted into a remittent of great duration, of most difficult cure, and tedious recovery.

Lind remarks, that any debauch will give rise to a fever, which is often fatal within forty-eight hours, and under circumstances which preclude the idea of its arising from malaria.

Bancroft*, who published in 1811 the substance of his *Gulstonian Lectures* delivered in 1806 and 1807, admits of a sporadic fever in hot climates, attended with all the symptoms characteristic of yellow fever, brought on by intemperance, fatigue after being over-heated in the sun's rays, sudden diminution of temperature, violent agitations of

* *Essay on Yellow Fever, &c.* by E. N. Bancroft, M.D. London 1811. See p. 257.

mind, and expresses himself confident of its existence, though it is denied by Lempriere; and he thinks all Hillary's cases were of this kind. He remarks, that he will not decide whether it has an equal tendency to remit,—an observation which shows that he did not discriminate between the effects of malaria and a common remote cause of fever.

Veitch, in 1816, makes a distinction between his ardent continued, or yellow fever, and the bilious remittent,—the former of which he says has always been known in the West Indies, when the climate has acted on susceptible constitutions.

But two very distinct affections are liable to attack the recently arrived European in the West Indian climate, and in some seasons both may prove equally rapid and formidable in their career. One of them may arise at any season in the young and plethoric, as a disease of direct excitement, producing a common continued, but highly developed inflammatory fever, which may be immediately controlled by prompt and adequate venesection; while the other is more common in autumn, arising from a depressing cause, which indirectly leads to excitement and inflammation proportionate to the unseasoned predisposition on which it operates, and which exhibits in its decline a distinctly remittent, and often an intermittent form of fever, proving its origin from malaria.

If this view of these two distinct diseases be correct, it will easily be seen how either affection may, towards its decline, if uncontrolled, exhibit some symptoms in common, and equally pass to a rapidly fatal

termination ; for the excitement, whether produced directly from the influence of a high temperature, or indirectly from that of the primarily depressing effects of malaria, will lead, in persons equally predisposed by an unseasoned constitution, to the development of acute inflammation ; and that collapse which succeeds to the inflammatory stage in the common fever might be mistaken, as it often has been, for the fatal and deceptive remission which occurs in the specific one. In the one case, heat alone operates as the remote cause ; in the other, its effects are superadded to those of malaria. But while the former directly produces always an openly developed excitement, which is rapidly followed by all the most distinctly marked symptoms of intense inflammation in the worst cases, the other commences with signs of oppression, which, sooner or later, gives way to excitement and inflammation, and is succeeded by distinct remissions or intermissions, which never occur in the former affection. Neither of the two diseases can appear in the natives of the West Indies at that grade which constitutes the yellow fever, because they have been habituated from birth to the influence of their remote causes ; but slighter affections of either, under the form of febricula or prickly heat, or intermittent or common remittent fever, may and do become developed in them. In Europeans, sporadic cases of the Causus or inflammatory endemic may occur at any season under circumstances which preclude the operation of malaria ; or isolated cases of the remittent yellow fever may arise where that specific cause is conjoined with high tem-

perature; but perhaps no epidemic prevalence of the remittent has ever occurred, except in those seasons which are so peculiarly obnoxious to it, and then only in years which, from some unknown condition of atmosphere, particularly favour its development. This enables us to explain the irregular and desultory appearances of these formidable diseases, and the discrepancies which appear in the description and treatment of them in the works of different authors; for while some have described the inflammatory endemic, and loudly advocated venesection as the self-evident and essential means for its cure, others have drawn their impressions and descriptions from the remittent yellow fever, in which appearances are early presented that tend to render the use of venesection questionable, and which often invalidate its effects; and hence, doubts have arisen as to the integrity of medical testimony, and of the efficacy of treatment, and, indeed, of the principles by which it is to be regulated.

The inflammatory endemic is the effect of a sudden change from a northern, or temperate, to a tropical climate, and not of the long-continued influence of high temperature; whence arises the complete exemption of the natives, or habitual residents in those climates, from its attack. The predisposing cause is the rigid fibre and phlogistic diathesis of its victims; heat is the remote occasion; and violent exercise, intemperance, direct exposure to the sun's rays are the usual and most powerful of its exciting causes.

Anything which tends to lower the tone of the

system operates proportionately as a preventative ; and Veitch hazards the supposition, that the comparative infrequency of its occurrence in the West Indies previous to 1793, depended on the British fleet and army being generally affected with a scorbutic taint. That this would operate, through its debilitating effects, in lessening the liability to the disease, is probable : but it cannot be supposed to have been universal, and the infrequency of yellow fever in the Islands previous to that fatal year, can only be explained by the absence of that peculiar constitution of air which favours the development of specific fever ; and by the inflammatory endemic being often warded off by slighter disorders, equally the consequences of high temperature, and its having fewer victims to feed upon. The circumstances which rendered the sickness and mortality so remarkable in 1793, appear to have been the coincidence of a very sickly season, and the arrival of great numbers, both of naval and military forces, in consequence of the French war. That the sum of mortality throughout the West Indies in previous years was great, we may infer from the proverbial sickliness of the climate ; but as it occurred probably in a more desultory and less epidemic form, it attracted less general attention, and may be referred to the ravages of the inflammatory endemic, to which strangers, independent of any peculiar sickliness of season, have always been exposed, and to such attacks of the remittent yellow fever as arose from the influence of local situations, obnoxious to malaria.

There can be no doubt that the epidemic of 1793

was generally of the remittent type, from the report of Chisholm and others ; and though undoubtedly many cases were examples of common fever, I think Veitch errs in referring the entire epidemic to what he calls the ardent continued yellow fever, or rather I would say, that his doing so is a proof that he did not so precisely distinguish the common from the specific fever as Dickinson has done. It may be argued that the distinction is of no consequence, since both diseases are examples of acute inflammatory fever, and to be cured by prompt and copious venesection ; but though this may be true of the epidemic in question, in which the remittent form of the disease was of so urgent and formidable a character, yet when it is considered that congestion is so constantly attendant on it, requiring in different cases essential modifications of treatment, and that this forms no part of the inflammatory endemic, I think it will be admitted that there is a necessity for distinguishing between them ; especially as the latter affection, taken in time, may be said always to be under the control of a very simple but vigorous antiphlogistic plan of cure.

A phlogistic diathesis, then, is the great predisposing cause of the inflammatory endemic, and a state of high excitement followed by topical determinations and acute inflammation, its essential characteristics. Unlike remittent fever, which from the influence of its essential remote cause commences with an oppression of the vital powers, this ardent form of common fever begins with an open and high excitement of the sanguiferous system, speedily followed by inflammation, which runs its course with

great rapidity, and is succeeded by a profound collapse or exhaustion of the vitality, proportionate to the intensity of the acute symptoms, and the organic derangements that have occurred.

The symptoms will be in proportion to the excitement and to the degree and locality of the inflammation, varying from simple to the highest grade of common inflammatory fever.

The skin is frequently hot and dry, the eyes red and painful, the pulse hard and quick, respiration short, thirst urgent, urine scanty, bowels costive, and there is general restlessness, with increased sensibility to light and sound, pains in the head and other parts, and sometimes nausea or vomiting.

If these precursory symptoms be not very urgent, and should be early attended to, they may be removed sometimes by the free use of the cold affusion, rest, cool air, and drinks. But if these are unchecked, the heat rises, the pain in the head becomes more urgent, attended with violent pulsation of the carotids; and a sense of tightness over the eyes, as from the binding of a cord, delirium, loss of vision, contracted pupil, pain at the præcordia, with a sense of urgent heat, and vomiting of viscid mucus, succeed. If the liver be inflamed, there is acute pain at the right side, and a jaundiced hue of the eye and skin, or in its place a vomiting and purging of dark bile, resembling tar or molasses.

In the last stage, the excitement sinks into a state of hopeless exhaustion; the pain subsides, the heat falls, the pulse becomes soft and compressible, the eyes dull and suffused, the pupils dilated, the tongue dry, foul, and tremulous, and the stools

black and fœtid. The blood passes into the capillaries without undergoing the necessary changes in the secreting organs, giving rise to congestions, effusions, and passive hæmorrhages.

Mr. Dickinson, from whose valuable work the above brief detail of symptoms has been abstracted, remarks, that at the close of the disease "the coolness and moisture of the skin, and abatement of the pain assume so much the appearance of remission, as to excite a false hope in the mind of the inexperienced practitioner. But they denote fatal symptoms; for determination of blood takes place to the brain, stomach, and liver, varying the symptoms as the one or the other is more particularly affected. If the stomach is principally affected, the heat and pain in the præcordia, and hiccough, with incessant efforts to vomit, or vomiting without effort, will occur while the intellect is clear. If the head suffers most, there will be an increase of pain, or the patient will sink under convulsions, or by violent delirium, ending in coma and insensibility; or sometimes he sinks suddenly, without any manifestations of particular symptoms, and dies at the moment when an inexperienced observer indulges the hope of amendment."

The appearances, on dissection, are those of the highest degree of inflammation. In the head, Mr. D. remarks that there is a great increase of vascularity, copious effusion of coagulable lymph, sometimes in an entire sheet between the membranes, and effusions of blood and serum. In the stomach a pellicle or film of lymph is found in parts of the villous coat, easily detached, and the membrane

beneath either natural in appearance or highly vascular ; numerous dark-coloured spots are scattered over it, which present the mouths of vessels, from whence issues black blood ; and these appearances are found more or less in the duodenum. The liver is spread over with dark-coloured spots, frequently purple throughout its structure, greatly enlarged, and full of dark blood, or yellow bile ; the gall-bladder full of dark viscid bile. If the chest has been much affected, as is sometimes the case, indicated by cough and pain, there are effusions of serum and coagulable lymph, adhesions, and the lungs are gorged with black blood ; and the same appearances are found in the abdomen, with a thickened and shrivelled state of the omentum.

It will be evident that these morbid appearances will vary in different cases, and may be found all united in some, or confined to certain regions of the body in others, according as the inflammation, which in common fever is determined by local defects, is more or less extensive.

The existence of this form of yellow fever will not be questioned by those who consider the powerful stimulating effects of heat under a tropical sun, operating upon the accumulated sensibility of the natives of a Northern region.

In the West Indies the medium heat on the coast is stated by Mosely to be about 80° of Fahrenheit, and so uniform, that it does not vary, through the year, more than 20° , ranging in day and night between the extremes of 70° and 90° . But in the sun it often rises to 120° or 130° . The effect of this permanently high temperature on unseasoned

constitutions is to produce a general state of excitement, which any disturbing cause may carry on to the full development of fever; and though others have been sensible of its influence in producing yellow fever, no authors that I am acquainted with have pointed so distinctly to it, as one of the essential causes of that disease, as Bancroft and Humboldt.

Bancroft explains the remarkable susceptibility to it in persons from cold climates, and the conditional exemption of the natives, or older residents of the tropics, by the exclusive effects of temperature upon the human frame; and he attributes the capacity of preserving an equable degree of animal heat to the "power of life *," which in proportion to its vigour enables the robust adult to resist the opposite extremes of heat or cold, and maintain the natural standard of 98° . In England, where the average heat of the climate is 50° , there is, he says, a considerable expenditure of this power, in order to generate constantly at the mean rate of 48° to compensate the cooling effects of the atmosphere; and after the body has been accustomed to make this effort, some essential changes in the functions must be requisite for the preservation of health on removing to a climate where the mean temperature is 80° . Till these changes are effected the body is unduly excited, and the derangement consequent upon this excitement explains the susceptibility to yellow fever.

Humboldt apparently ascribed yellow fever to the conjoint effects of heat and miasmata; for he re-

* Bancroft, Essay on Yellow Fever, p. 250.

marks that it has been sporadic in the two continents, since men born under a cold zone have exposed themselves in the low regions of the torrid zone to an air infected with miasmata; and he justly adds, that wherever the exciting causes and the irritability of the organs are the same, the disorders which originate from a disturbance in the vital functions ought to assume the same appearances.

He explains the comparative infrequency of the mortality in the 16th and 17th centuries, by South America being exclusively visited by the Spaniards and Portuguese, who, from the temperature of their climate, were less predisposed to the effects of heat,—and by their principally resorting to the high tablelands of the interior, where the climate approximates to their own; and by the early colonists in the West Indian Islands not being assembled in such populous cities as have risen up in late years. He shows that its epidemic prevalence does not occur at Vera Cruz before the mean temperature of the months rises to 75° Fahr., and explains its absence at Acapulco by the want of that climatic predisposition in those who resort there. It is difficult to believe that the bilious fevers which are epidemic at Acapulco, and which he says are often fatal to those who descend from the central table-land for the purpose of commerce at the arrival of the galleons, do not occasionally rise to the grade of yellow fever; since the predisposition must as equally exist in them, as in those who descend to Vera Cruz, and who often perish there of the yellow fever. He admits that if that port, “instead of being frequented by vessels

from Manilla, Guayaquil, and other places situated under the torrid zone, were to receive vessels from Chili and the north-west coast of America ; and if the town were visited at the same time by a *greater number of Europeans or inhabitants of the central table-land*,—the bilious fevers would soon degenerate into yellow fever, and the germ of that malady would develop itself in a still more fatal manner than at Vera Cruz *.”

It would appear from this observation, that Humboldt alludes rather to the absence of an epidemic yellow fever, and that when he speaks of it, it is in this epidemic sense ; for the number of persons descending from the high lands of Mexico to Acapulco would have no other influence over the disease than exposing a greater number to its attacks : and if, as we cannot doubt, isolated cases of it occur at Vera Cruz in individuals descending from the elevated regions of the interior, the same must happen at Acapulco. Indeed it is impossible, on this great man's own principles, to doubt it ; and though he considers epidemic yellow fever as a *Typhus sui generis*, distinct from the bilious stationary fevers and the pernicious intermittents of the Oronoco, the Magdalena, and Acapulco, it is certain that the same causes which excite these latter diseases in the natives of those places would excite yellow fever in persons duly predisposed to it.

Humboldt does not appear to have suspected that heat, with the ordinary disturbing causes of health, would create a disease like yellow fever ; and it must be admitted, either that the disease so pro-

* Humboldt, Political Essay on New Spain, p. 148.

duced is less liable to occur than that from the conjoint effect of heat and malaria; or that when produced it does not always present symptoms liable to be confounded with the remittent yellow fever, since several successive years have occasionally elapsed without the appearance of yellow fever at Vera Cruz. We can explain the absence of the specific disease from the long experience we have had of the desultory visitations of epidemics in all countries proceeding from like causes; but since the heat of the tropics is uniform, and the habits of mankind unchangeable, it is difficult to account for the absence of the inflammatory endemic when it is known that common causes are sufficient for its production. Bancroft, who was deeply read in the literature of yellow fever, ascribed all the cases recorded by Hillary to sporadic examples of the disease,—we may suppose either common or specific in their character. Such examples would, from the object which induced Humboldt to notice yellow fever, probably not be considered by him at all; and if no epidemic occurred within the years included in Hillary's observations, he would have spoken of it as a series of years in which the disease was unknown. Such I conceive to have been the case in all probability at Vera Cruz, during the years of exemption spoken of by Humboldt. Isolated cases may have occurred either of the common or remittent disease; but because no epidemic took place, the period was considered by him to have been exempt from the disease entirely.

It would be easy to offer, from the vast accumulation of the records of yellow fever, particular in-

stances of the occurrence of the inflammatory endemic; but this is not the place to enter fully upon the subject. My object has been merely to present some proofs of the correctness of the opinion of Dr. Armstrong,—that there were two distinct affections included under the denomination of Yellow Fever; a fact more decidedly stated and more fully illustrated by Mr. Dickinson, than by any author with whom I am acquainted. In the short papers scattered through the Medical Journals from the military and naval medical men of this country,—a class of practitioners who have done more to advance our knowledge of diseases than any other in the profession,—many proofs exist of the occurrence of a highly inflammatory form of fever, described as yellow fever, and not distinguished from the specific form of the disease; and from the number of cases reported to have taken place in a short time in a single ship, it is easy to conceive that this form alone might prevail extensively as an epidemic among the crews of a large squadron recently arrived in the West Indies from Europe, at a time when the general effects of malaria were unknown.

The cases reported to have occurred at Jamaica in 1814, by Mr. Allan in his very sensible paper in the eleventh volume of the Edinburgh Medical and Surgical Journal, were clearly those of the inflammatory endemic. He states, that in two months he met with thirty-five cases out of a crew of one hundred and thirty men, out of which he lost only two; and those, he remarks, would have been saved had he used the lancet as freely as his subsequent expe-

rience led him to do. From his very confident and judicious observations as to the efficacy of venesection, the advantage of which, with the free use of purgatives, he has completely established, and from his silence with respect to any other form of the disease, I should infer that he considered the examples he met with as the only modifications of the disease,—an idea however which is at once refuted by a reference to the epidemics of Rush; and the opinion which I hypothetically ascribe to him, has probably been that of other medical men, who have not distinguished between the effects of the common and the specific causes of fever; a distinction which will probably tend to reconcile some of the obscurity and discrepancies that appear in the opinions and practice of different authors.

CHAPTER VI.

BILIOUS REMITTENT YELLOW FEVER.

THIS form of fever requires the cooperation of four concurring causes: viz., malaria; a state of atmosphere like that so often insisted upon by Sydenham, favouring the development of epidemic diseases; a high temperature; and that predisposition of body which is connected either with a sudden change from a high to a low latitude, or with a great range of temperature from winter to summer. All these must concur to produce at least an epidemic prevalence of the disease. But sporadic cases may

occur without the existence of that occasional and obscure atmospherical distemperature which, since Sydenham's time, has been so often resorted to, to explain the extensive ravages of epidemic fever in places where the other remote causes exist more or less at all times in full force.

The essential remote cause is malaria, that peculiar product, either given off by vegetable and animal substances in a state of putrefaction, or by certain soils apparently independent of the decomposition of organic bodies, of which so much has been conjectured and asserted, the existence of which has been denied by some authors; and the nature of which has been considered almost as variable as the imaginations of those who have spoken of it. If its reality is to be admitted,—and I know of no other ground for doubt respecting it than the utter ignorance we are in of its nature and composition, otherwise than that nature is manifested by what we consider its effects on the body,—we may imagine it to exist upon all parts of the surface of the globe, except such as are constantly under the influence of water or frost; and that it is a very fertile source of disease, more or less powerful in proportion to the coincidence of other concurring causes, connected with climate, situation, and the condition of mankind.

Of the existence of some morbid agent, confined more particularly to certain situations, the remote cause of disease to those exposed to its influence, there can be no question, however in its isolated state it may elude investigation, and defeat every attempt of the chemist to detect and analyse it. Its

presence has forced itself upon the convictions of medical philosophers in almost all the climates of the globe, and there are facts to substantiate its injurious influence on the human body, which none of the known causes of disease can possibly explain. That its effects are not uniform, that the diseases to which it gives rise are not always the same in appearance and character, may depend on three causes,—either a variable degree of its own intensity or concentration, admitting its component parts are always the same in definite proportion; or a difference in quality, depending upon some excess of one or more ingredients over others; and the varying influence of those common agents by which man is everywhere surrounded, the force of which depends so much upon season, climate, his own habits and condition. Many conjectures have been hazarded as to the nature of this morbid cause,—none of which are satisfactory, for the diseases ascribed to it have occurred in situations which present the most marked contrasts. It has been supposed to proceed from animal—from vegetable putrefaction; or from both in variable proportions. It has been considered as a peculiar emanation from drying soils,—as the extrication of an unappropriated vegetable principle,—as some change in the component parts of the atmosphere, either an excess or deficiency of oxygen,—a binary compound of nitrogen and oxygen, or the super-addition of hydrogen. Humboldt would seem to insinuate that it may be a ternary or quaternary combination of phosphorus, hydrogen, azote, and sulphur. Some have associated it with earthquakes and

comets ; and others have imagined it to be a mephitic gas from the bowels of the earth, or to depend upon the presence of aqueous vapour in the air, or upon the changes that take place in stagnant water.

In a very sensible paper by Mr. Calvert, on the influence of what I should call the secondary causes of epidemic specific fever, the existence of malaria is considered at least questionable ; and Veitch, in relation to its connexion with yellow fever, insists so much on the stimulus of climate, as to express a belief that when the influence of the latter is correctly estimated, the opinion of miasm as a primary cause will cease to be entertained. The opinions of both these sensible men, so far as they exclude the agency of that cause which is implied by malaria or marsh effluvium in the production of specific fever, are, I think, untenable ; and they would abandon them, if yellow fever,—independent of the common modification which I have spoken of under the name of the inflammatory endemic, to which I consider their observations, at least those of Dr. Veitch, to apply,—is to be associated with intermittent and remittent fever, differing only in the intensity of the effects produced. This association has been made and proved to exist by Rush and others ; and it serves to explain, in conjunction with the common acute inflammatory fever above alluded to, much of the confusion and contradiction that has so long hung round the subject.

That ague and common remittent fever, wherever they are found, are merely lower grades of the remittent yellow fever, will not be doubted by those who have attentively perused and considered the

writings of Rush, the American physicians generally, of Humboldt, Jackson, and others : and the admission of this connexion necessarily implies its primary origin, at least, from malaria ; since all authors, even those who strongly contend for the contagious property of the more formidable modifications of specific fever, ascribe ague and common remittents to marsh effluvium. These milder disorders are widely disseminated over the globe, but yellow fever is confined to certain limits ; and the fact of this limited range is a subject of great interest to the medical philosopher, and admirably illustrative of the modifying influence of secondary causes. The singular exemption of the *natives* of Africa, of the West India Islands, of Vera Cruz, of New Orleans, and Charleston, from its attack, —countries in which it is most frequently and most formidably developed,—is a circumstance which at once proves the necessity of some concurring causes to produce it, to which such natives are not obnoxious ; and it is highly interesting to observe, that the causes to which strangers in these climates owe their susceptibility to the disease are endemic in other countries ; and that when they are favoured either by peculiar changes in the seasons, or by that obscure state of atmosphere which seems to give an epidemic prevalence to disease, then the natives of such places are as obnoxious to yellow fever as strangers are, in the West Indies, &c. This is the case in North America, beyond the latitude of 33° north, in the southern part of Spain, and in some portions of Italy and the Mediterranean.

On the authority of Mosely, Lind, Bancroft, Veitch, and Dickinson, I have endeavoured to show that a common inflammatory fever, the effect of heat operating on unseasoned constitutions, has passed commonly under the name of yellow fever. But this modification does not apply to the epidemic disease of Rush,—that form of yellow fever which many authors, besides himself, have considered as a higher grade of the bilious remittent of hot climates,—an autumnal disease, desultory, and often local in its attacks, sometimes prevailing to an extent and with a mortality equal to that of plague, and, like that disease, exhibiting in the same epidemic every gradation of character, from the most mild to the most severe,—under the simple, the congestive, the inflammatory, the intermittent, remittent, and continued forms of fever.

The proof of yellow fever being a higher grade of the common intermittent and remittent, is twofold; for it often commences under the milder form, and passes to the more severe; or, the reverse, it begins as a concentrated continued fever, and passes off under the form of a remittent or intermittent. I cannot conceive of any proof being more direct than this; and though this change of type is not observable in all cases, the exceptions cannot invalidate positive facts, and may be explained by the admission that a continued form of fever is as legitimately an effect of the operation of malaria as the two other forms, and that the causes which prevented the development of the milder modifications at first, equally prevented their appearance in the decline, possibly from the concentration of the

cause, or the condition of the individual attacked. An additional proof is derived from the fact that, in every epidemic, cases of every gradation are observed; and the locality of the disease, confined to certain parts of cities, or to particular spots in the country, is to be explained by local causes, the effects of which vary according to their intensity, or to the predisposition of those exposed to their influence; and a still further proof may be drawn from the circumstance, that when a change takes place in the temperature, the severer form of the disease is checked, leaving the milder ones to exist alone.

In the remarkable epidemic of Philadelphia in 1793,—a year memorable for the severity of the disease in that city and in the West Indies, and for the speculations of Dr. Chisholm as to its being a new pest generated in Africa, a hybrid of marsh effluvium and the contagion of typhus,—an opinion which had not even the merit of novelty to grace it, and which gave rise to fatal mistakes in treatment, and to a keen controversy among medical men,—Rush says: “In every case of this disease which came under my notice, there were evident remissions or intermissions of the fever. I have long considered, with Senac, a tertian as the original type of all fevers, and the bilious yellow fever indicated its descent from this parent disease. I met with many cases of regular tertians, in which the patients were so well on the intermediate days, as to go abroad. Nor was this mild form devoid of danger; it generally ended in a remittent before it destroyed the patient. The tertian type discovered

itself in some people after the more violent symptoms of the fever had been subdued, and continued in them for several weeks; it changed from a tertian to a quartan type in Mr. Willing, nearly a month after his recovery from the more acute and inflammatory symptoms of the disease."

In the yellow fever at Philadelphia, 1794, he remarks: "We had but one reigning disease in town during the autumn and winter, and this was a bilious remitting or intermitting, and sometimes a yellow fever; and all the fevers from other remote causes than putrid exhalations partook more or less of the symptoms of the prevailing epidemic. As well," he adds, "might we distinguish the rain which falls in gentle showers in Great Britain, from that which is poured in torrents from the clouds in the West Indies, by different names and qualities, as impose specific names and characters upon the different states of bilious fever."

In the very fatal epidemic of 1797, he furnishes us with examples not only of the intermittent, remittent, and continued yellow fever, but with evidences of its occurring from the slightest to the most fatal forms of a congestive or inflammatory disease. "In many cases," he says, "it appeared in the form of a remitting and intermitting fever. The quotidian and tertian forms were most common. In Mr. Wharton it appeared in that of a quartan. But it frequently assumed the character given of the same fever in Charleston by Dr. Lining. It came on without chills, and continued without any remission for three days; after which the patient believed himself to be well, and sometimes rose from

his bed and applied to business: on the fourth or fifth day the fever returned; and, unless copious evacuations had been used in the early stage of the disease, it generally proved fatal. Sometimes the powers of the system were depressed below the return of active fever, and the patient sunk away by an easy death without pain, heat, or a quick pulse."

In speaking of the forms the fever assumed, he says: "In a few cases the miasmata produced death in twenty-four hours, with convulsions, coma, or apoplexy. There were a few cases in which the pulse was full and tense, with a good deal of pain from the beginning to the end of the fever; *depressed* or *locked* cases, in which there was a season of great debility, but little or no pain, a depressed and slow pulse, a cool skin, cold hands and feet, and obstructed excretions; *mixed* cases, in which the pulse was active till the fourth day, after which it became depressed, with all the other symptoms of the locked state of the fever. In the *walking* cases the patients were flushed or pale, had a full or tense pulse, but complained of no pain, had a good appetite, and walked about as if they were but a little indisposed, until a day or two, and in some instances until a few hours, before they died. The impression of the remote cause of the fever in these cases was beyond sensation; for upon removing a part of it by bleeding or purging, the patients complained of pain, and the excitement passed so completely into the blood-vessels and alimentary canal, as to convert the fever into a common and more natural form. These cases were always dangerous, and when neglected generally

terminated in death. Mr. Brown's fever came on in this insidious shape, and was cured by the loss of upwards of one hundred ounces of blood, and a plentiful salivation.

"The *intermitting* form of the fever, like the last, often deceived the patient, by leading him to suppose his disease was of a common or trifling nature. It prevented Mr. Smith from applying for medical aid in an attack of the fever for several days, by which means it made such an impression upon his viscera that depleting remedies were in vain used to cure him.

"There was a form of this fever in which it resembled the *mild remittent* of common seasons, distinguished from it chiefly by the black colour of the intestinal evacuations. There were cases so slight that patients were said to be neither sick nor well, or in other words they were sick and well half a dozen times in a day. Such persons walked about and transacted their business, but complained of dullness, and occasionally of shooting pains in their heads. Sometimes the stomach was affected with sickness, and the bowels with diarrhœa or costiveness; all of them complained of night sweats; the pulse was quicker than natural, but seldom had that convulsive action which constitutes fever. Purges always brought away black stools from such patients, and this circumstance seemed to establish its relationship to the prevailing epidemic. Now and then, by neglect or improper treatment, it assumed a higher and more dangerous grade of the fever, and became fatal; but it more commonly yielded to nature, or to a single dose of purging physic. There

were a few cases in which the skin was affected with universal yellowness, but without more pain or indisposition than usually occurs in the jaundice. They were very frequent in the year 1793, and generally prevailed in the autumn in all places subject to bilious fever. There were also *chronic* cases of this fever, and it is from the want of observation that physicians limit the duration of the yellow fever to certain days. I have seen many cases in which it has been protracted into what is called by authors a slow nervous fever. The wife of Capt. Bell died with a black vomiting, after an illness of nearly a month."

Dr. Pinckard informed Rush he had often seen the yellow fever put on a chronic form in the West India Islands; and the same intelligent author reported to him, in a written communication in 1798, that the yellow fever, as it appeared among the troops in Guiana and the West Indies in 1796 and 1797, exhibited such perpetual instability, and varied so incessantly in its character, that he could not discover any one symptom to be decidedly diagnostic; and hence he was led to an opinion that the yellow fever is not a distinct or specific disease, but merely an aggravated degree of the common remittent or bilious fever of hot climates, rendered irregular in form, and augmented in malignity, from appearing in subjects unaccustomed to the climate.

In 1803, Rush, in speaking of the yellow fever, says, that "it was most malignant in Water Street, and as it travelled westward became less so, so that in Ninth Street it was a common intermittent. As in 1802, it often came on in all the milder forms of

autumnal fever, and went off with symptoms of yellow fever; or it came on with all the force and malignity of yellow fever, and terminated in a day or two in a common remittent and intermittent."

In 1805 the disease prevailed extensively in Southwark, a suburb of Philadelphia, lying in the Delaware: and Dr. Stewart, whose practice was extensive in that district, observed that all those persons who had been affected by the yellow fever in former years, had mild remittents in the same situations that others had the prevailing epidemic in a malignant form. The deaths amounted to between three and four hundred, and would probably have been more numerous had not those families who were in competent circumstances fled into the country, and had not the poor been removed by the Board of Health from the infected atmosphere of Southwark to tents provided for them in the neighbourhood of the city. Rush remarks that but few cases appeared in the city, most of which were in persons who had resided in or visited Southwark. It was brought on by weak exciting causes in Southwark; but the cases which originated in the city required strong exciting causes to produce them.

These facts, on so high an authority as Dr. Rush, —a man in every sense justly comparable to Sydenham; equally distinguished for candour, integrity, and sagacity; and I may add, to the disgrace of humanity, equally the victim of calumny and persecution, for opinions which now constitute, I might almost say, not only their glory, but that of their respective countries,—these facts, without resorting to the testimony of other authors, sufficiently prove

that yellow fever is merely a higher grade of intermittent and remittent fever, and, like them, that it arises from malaria, and is essentially distinct from the common inflammatory fever, which equally bears the name of yellow fever, but which is to be distinguished from the specific disease by the causes which produce it; by its never putting on the intermittent and remittent forms; and by the simple means which are adequate to its cure.

The existence of these two distinct forms of disease, often confounded together under one denomination, will not be questioned by the medical men of those countries where they occur, nor by those of any country who distinguish between common inflammatory fever and that modification which arises from marsh effluvium, and who take into consideration the comparative intensity of the remote and predisposing causes of them in a tropical climate, and in the tropical summer of North America.

But we are told that another specific disease exists, to which the name of yellow fever is alone entitled; one which has no affinity with the inflammatory, endemic, or the bilious remittent; which arises neither from the simple effects of heat, or the specific effects of malaria, but from contagion! The ashes of Warren have long since been left to the hallowed peace of the grave; and the disturbed spirit of Chisholm has more recently sought its asylum from the keen animosity of Bancroft. With him had died away the last echoes of that professional conflict which raged around him while living: but, though the original promoter of it is no more,

it would seem that a new advocate has arisen to uphold his cause, and gather together the scattered fragments of that armour which had been rent asunder, so as to leave its first occupant vulnerable to all who chose to assail him.

This doctrine of the contagious nature of yellow fever has served to embalm the memory of many men, who, however useful and excellent in their day, but for its preserving power would have reposed in the oblivion of posterity.

It has been successively derived from Siam, from Syria, and from the coast of Africa. The French who upheld the idea of its importation from Siam* at the close of the seventeenth century, first landed it at Martinique, where Desportes says that it destroyed many sailors of the ships who brought it. He speaks of it as "*la maladie de Siam*," and says, that "*le premier événement qui l'ait fait remarquer a été la relâche à la Martinique d'une nombreuse escadre qui venoit de Siam, et dont l'équipage pendant son séjour dans cette colonie, fut affligé d'une fièvre maligne ou pestilentielle, qui fit périr un grand nombre de matelots. Cette maladie attaque très rarement les créoles ou les sauvages habitants de l'isle ; les Européens destinés à vivre sous un climat plus tempéré, en sont, pour ainsi dire, les seules victimes.*"

Warren, who practised in Barbadoes, and who

* Bancroft, "*Essay on Yellow Fever*," p. 320, says, the *Ori-flamme*, a French ship of war, arrived about 1686 at Martinique, with some French people who had been driven from their settlements at Merguy and Bancok in Siam ; and the disease was supposed to be imported in her as usual.

wrote on "the malignant fever" of that island in 1739, speaks of it as the Siamese disease brought to Barbadoes about 1721, from Martinique, by a British man-of-war; and he derives it from the same island again in 1733. He then asserts, on the authority of an English surgeon, that the disease is from Asia, and was taken to Martinique by a fleet which had arrived from Marseilles, on board of which were some bales of Levant goods, taken in at that port of France from a ship which had come from St. Jean d'Acre. On opening these bales at Port St. Pierre, the disease broke out, and the contagion made great havock at the beginning. He adds that seamen and new-comers are most obnoxious to it.

These opinions have long since rested with their authors, and require no refutation beyond that which Hillary, Mosely, Humboldt, Bancroft, and others, have already given. That yellow fever should appear in the West Indies on the arrival of ships from Siam, or from France, may be explained sufficiently by reiterated facts which have occurred in modern times, without the necessity of resorting to a contagion packed in bales from Syria, or smuggled in some latent form from the confines of China. The fatal experience of the mortality in 1816, when the French Islands were restored to France, after the war, is a proof how much the development of yellow fever depends on constitutions unseasoned to the climate, even among a people whose predisposition to it may be supposed less than that of more northern European nations; and the comparative exemption of the British Colonies in that year shows what influence a long residence

in the West Indies has in mitigating the ravages of the disease.

In 1793 Dr. Chisholm* announced a *nova pestis*, before unheard of, brought to Grenada from Boullam; and, as Veitch remarks, "between contagion and cannibals of extraordinary ferocity, gave a tolerable specimen of what may be done on such subjects when aided by an ardent imagination."

" . . . Terruit urbem,
Terruit gentes, grave ne rediret
Seculum Pyrrhæ, nova monstra questæ."

The question of this new fever lies in a very narrow compass, notwithstanding the large space it occupies in the medical literature of the early part of this century; for it is to be settled by a reference to the character of the disease as originally existing at Boullam, on the coast of Africa,—the history of its supposed importation by the ship Hankey into the island of Grenada,—and the nature of the fever which prevailed there. Dr. Chisholm separates it entirely from the bilious remittent yellow fever, which he admits, in a communication to Dr. Duncan, published in the 9th volume of the Edinburgh Medical and Surgical Journal, p. 412, "in all its grades, and in all countries where it appears, is the product of local causes, and perhaps universally of marsh miasmata."

A brief reference to the facts connected with this subject will facilitate the inquiries of those who may wish to investigate it.

* Chisholm's "Essay on Malignant Pestilential Fever introduced into the West Indies from Boullam 1793-1796." 2nd Edition, 1801.

In 1791 an Association was formed in London for the purpose of making a settlement at the island of Bulama, or Boullam, on the coast of Africa, situated about 11° north latitude, with a view of promoting the civilization of the natives,—of substituting a commerce in the commodities of the country for the traffic in slaves,—and especially of raising cotton for the home market. The colonists, to the number of 275 persons, were embarked in the ships *Calypso* and *Hankey*, which were attended by a small sloop,—and arrived, the former at the end of May 1792, and the latter about a fortnight after. They were all in good health.

On the arrival of the *Calypso*, a party was surprised and attacked by the natives, several killed, and others taken prisoners. Sickness soon began to appear among the colonists, and especially on the rainy season setting in, which obliged them to remain in a confined situation on shipboard.

Captain Beaver, in his *African Memoranda*, p. 367, in alluding to the death of almost all the Europeans, says: “The mortality of those Europeans, though in some measure to be attributed to the climate, was much more so to the adventitious circumstances which have been already noticed; and I am inclined to think that, independent of its having really been the most unhealthy season of the year,—independent of our hard labour and great exposure during that inclement season, much of our very great mortality may be attributed to the uncommon depression of spirits which our situation produced on the minds of most of our colonists; and I verily believe

that I should have died too if I had ever suffered my mind to have been so subdued."

Under these disheartening circumstances, many determined to return to England, and embarked in the *Calypso* in July for Sierra Leone, where they remained a little time in a sickly state, and eventually arrived in the Thames on the 14th of November 1792.

The colonists who remained at Bulama, including the crews of the *Hankey* and sloop, amounted to 87 persons in number, which was increased by six others returning from Sierra Leone; and of these there died 40, of various diseases, between the time of the sailing of the *Calypso* and the departure of the *Hankey*, which took place on the 22nd of November. The official report of the governor of the colony at that time gave the deaths as follows:

26 Fever.

1 Fever and flux.

2 Phthisis.

1 Lunacy.

1 Mortified hand.

1 Drowned.

1 Worms.

2 Complication of disorder.

1 Hooping-cough.

4 Disease not specified.

40

In all, 23 men, 6 women, and 11 children; out of 51 men, 16 women, and 26 children.

The *Hankey*, on setting sail, got aground on a sand-bank, which occasioned her detention, during

which she lost eight of her men. The number on board, on her finally putting to sea, amounted to a crew of seven persons and five passengers. She arrived at St. Jago towards the close of December, where one of the passengers, a little girl, died; the others ill with debility and slight intermittents. During her stay at Port Praya the sick recovered their health, except the captain, whose fever and ague continued irregularly.

The destination of the Hankey was eventually altered at St. Jago, and she set sail for the West Indies; and, after stopping at Barbadoes and St. Vincent's, eventually reached Grenada on February 18th, 1793.

On the subject of the fever which prevailed at Bulama, like that to which the natives of Britain have always been and will be liable, on the sudden change of their own climate for one like that of the tropical region of Africa, or of any other similar part of the world, I would refer those who are curious about the particulars of it to the report of Captain Beaver, in his African Memoranda; and to a Review of Dr. Chisholm's Letter to Dr. Haygarth, in the 5th volume of the Edinburgh Medical and Surgical Journal, p. 364,—to a paper of Dr. Smith, in the first volume of the New York Medical Repository, p. 459, where the testimony of Mr. Paiba, one of the Boullam colonists, is given, who left Africa in the Hankey, and went in that vessel to Grenada. This was answered by Dr. Chisholm in the second volume of the same work, p. 268, and the date September 6, 1798, was only thirteen days anterior to the death of Dr. Smith. In 1809 Dr.

Chisholm published a letter to Dr. Haygarth, in support of his views of the contagious nature of yellow fever, which may be considered an attempt to refute the admirable opinions of Dr. Miller on the same subject, which were published in the third volume of the *Edinburgh Medical and Surgical Journal*, p. 276. The subject was minutely examined afterwards by Dr. Bancroft, in the seventh appendix of his *Essay on Yellow Fever*, published 1811,—and by Dr. Veitch, in his *Letter to the Commissioners of Transports*, published in 1818.

Dr. Chisholm replied to Bancroft in a paper dated March 15, 1813, addressed to Dr. Duncan, and published in the ninth volume of the *Edinburgh Medical and Surgical Journal*, which was answered by Dr. B. in the tenth volume of the same work.

In 1822 Dr. Chisholm published his *Manual of the Climate and Diseases of Tropical Climates*, which may be considered an abstract of his original work.

The occurrence of a fever at Cadiz in 1800, and in other parts of Spain and the Mediterranean in subsequent years, like that which desolated the West India Islands and North America, gave rise to the same conflicting opinions in Europe as had been entertained in the Western World; and there were not found wanting those who endeavoured to uphold the doctrines of Dr. Chisholm, with respect to its importation into Spain, and its contagious nature. The most distinguished of these advocates of contagion were Dr. Fellowes and Sir William Pym; the former published on the Spanish and Walcheren fevers in 1815,—and the latter, in the same year,

his "Observations upon the Bulam Fever," expressly to counteract the influence which the opinions of Dr. Bancroft had had upon the public and the profession; and the assertion of this gentleman, that the Bulam fever was never had a second time, led to two very admirable papers,—one by Mr. Sheppard, of Witney, published in the twelfth volume of the Edinburgh Medical and Surgical Journal; and the other by Dr. Dickson, in the thirteenth volume of the same work. It was in answer to Sir William Pym's work that Dr. Veitch wrote his Letter to the Commissioners of Transports above alluded to.

The above references include at least the principal publications which arose out of Dr. Chisholm's idea of a new pest originating among the colony at Bulam, and spreading its desolating effects over the world. I might mention other authors, as Gilpin, Hossack, Haygarth and his keen antagonist Dr. Caldwell of Philadelphia, who entered upon the same angry arena of discussion; but these and other partisans will naturally occur to the notice of any one who takes the trouble to peruse the publications I have particularly alluded to.

The conclusions to which Dr. Smith, Dr. Bancroft and Dr. Veitch came, with respect to the fever at the island of Bulam, was, that it was the endemic disease of hot climates, exhibiting the usual characters, grades and phænomena, such as have been since repeatedly observed in other instances of sickness among Europeans in different parts of the coast of Africa, and that there was no foundation for the idea of the Hankey taking a contagious disease to Gre-

nada, since no sickness was communicated from that vessel to the inhabitants of St. Jago, Barbadoes, or St. Vincent's. The assertion of Dr. Chisholm respecting the communication of disease at St. Jago, to the Charon and Scorpion by the Hankey, was proved to be wholly without foundation by Dr. Trotter in his *Medicina Nautica*; and his ideas respecting the sickness on board the Calypso at Sierra Leone, were shown to be untenable by Dr. Winterbottom in his work on the diseases of that place.

The circumstances which attended the fever at Grenada, according to the recital of Dr. Chisholm, were explained on satisfactory grounds by the testimony of other witnesses, and the assertion that the *carénage* where the Hankey anchored was a healthy spot, has been disproved by the experience of less prejudiced minds.

If the circumstances of the year 1793 be taken into consideration, especially those connected with the large military and naval forces sent to the West Indies on account of the recent declaration of war, the general sickness which prevailed, aided by a favouring state of atmosphere, is sufficiently explicable without resorting to the cooperation of imported contagion, especially since the experience of many successive years has established, I should say incontrovertibly, the endemical origin and the non-contagious nature of the worst forms of yellow fever at Vera Cruz, on the testimony of Humboldt, and throughout North America by the almost unanimous consent of its medical men.

Dr. Chisholm and his early supporters admitted that it was difficult to draw any well marked distinc-

tion between the imported Bulam disease, and the remittent yellow fever. In his Letter to Haygarth he attempts to show that they are not *precisely* the same disease ; and four years afterwards he extracts from the same Letter the following passage, showing that time and reflection had not enabled him to discover any broad distinction between them : “ Within the tropics,” he says, “ there are superadded to the most malignant virus of typhous infection, many of the distinguishing features of the most violent yellow remittent fever ; thus forming a monstrous compound, which hitherto has not found a place in any nosological arrangement. It is a disease which from this peculiar conformation is defined with difficulty, and is distinguished by shades which require the industry, the discernment and the fidelity of a Claude Loraine to delineate. It is hence we so often meet with counterfeits, and with so many on whom the imposture has been too successfully practised : and it is hence, that a *libro di verita* of its history and portraiture is become so indispensably necessary. It is a disease, however, more obvious to the senses of the experienced, discerning and unprejudiced observer, than capable of being thoroughly conceived by description. The *coup d'œil* of the former at once perceives and distinguishes it. In the latter it becomes too often doubtful, too often assumes the garb of the malignant offspring of marshes.”

It would have soothed the irritated mind of Chisholm could he have foreseen that a Claude was to appear, gifted with an unerring discernment, capable of seeing in broad distinctiveness the lights and shadows of the mists of his imagination, and that those

aspirations after the fame of a discoverer in the regions of fever, which the pertinacious reason of Bancroft nipped in their bud of promise, were finally and for ever to bloom in perennial beauty over his tomb: while the spot which marked the remains of Rush was to be a leafless and barren beacon, to warn future generations from the homage of the dust that reposed below in inglorious rest with its congenial earth.

The fact of yellow fever assuming occasionally the aspects of a typhoid continued fever in tropical countries, is in unison with Dr. Armstrong's opinion that the common typhus of Europe originates in malaria, and that this specific cause gives rise to an intermittent, remittent and continued form of fever. If this be true in Britain,—and a reference to the admirable pages of Sydenham will show at least that it is more than probable,—there is nothing in the fact of continued fever occurring in tropical climates from the influence of marsh effluvium, to justify surprise or embarrassment in the mind of any one who has inquired largely into the nature of specific fever as it occurs throughout the different latitudes of the globe.

Sydenham's observations of the fevers of London extend from the year 1661 to 1689; and any one who follows the succession of his epidemics from season to season and year to year,—especially if he has compared the facts recorded by this great man, with those which have since so lavishly been recorded by other observers in Europe, Asia, and America,—will be disposed to agree with him, that there are various general constitutions of years

which depend, perhaps, on some inexplicable alteration in the bowels of the earth, whence the air becomes impregnated with effluvia which subject the body to particular distempers so long as that kind of constitution prevails ; and that there are, also, particular constitutions of the year, occasioned by the sensible qualities of the air, which, though they do not cause the epidemic peculiar to the general constitution, may more or less dispose the body to the particular epidemic disease.

The most remarkable circumstance connected with these diseases, which are supposed to arise from malaria, is their general prevalence in autumn, in every country where they occur : and there are facts which render it probable, that when they appear in other seasons, they are attributable to the influence of a poison imbibed in the preceding autumn, which, from some peculiarity of constitution in the individual, or the necessity of the cooperation of some exciting cause, as cold, or the alternation of cold and heat, &c., had failed to produce its full effects at the usual time. That malaria does not produce fixed and invariable effects of itself, is proved by the varieties of fever which are universally ascribed to its agency ; as, quotidians, tertians, quartans and remittents, and I may add continued fevers, since aggravated remittents often begin in a continued form, and do not show their remittent character till the force of the disease is weakened, either by the efforts of nature or those of art. What it is that occasions this variety of effect from a cause essential to all of them, it is impossible to explain. It may depend on the

quality or quantity of malaria, the condition of the individual, or the circumstances around him. As it is, however, notorious, and as it would seem to prove that malaria is subject to influences foreign to its own nature, we might, *à priori*, infer that a fever which owes to it its essential remote cause, would exhibit very different characters in autumn, winter, and spring ; and such we find to be the case.

Under favouring circumstances malaria may be said, perhaps, generally to produce mild intermittents in the autumn of every country where it locally exists. Sydenham says, they prevail oftener epidemically than any other disease ; and Senac and Rush believed that the tertian was their true type. But under circumstances less favourable to health, it produces either severe intermittents or remittents ; and these last, at times, are of such a nature as to be among the most formidable diseases to which mankind is liable. The occasions of this aggravated effect may reasonably be supposed to depend on the quality or concentration of the miasm in some cases ; and it certainly is produced in others by the stimulating effect of heat : or if the miasm be invariable in its character, we can only explain the intensity of its effects by imagining, with Sydenham, that there is a peculiar constitution of atmosphere which predisposes the body to sickness, and thus aggravates the action of the morbid cause. That heat is one of the essential causes is proved by remittents being confined to the hottest season of temperate climates ; and by the frequency of their occurrence in tropical countries, where they

constitute the chief epidemic disease. But remittents, even in temperate climates, often begin as continued fever ; and unless the efforts of nature, or the resources of art break the force of it, it ends fatally as such. Sydenham says, when autumnal intermittents appear early, as in July, they resemble continued fever in all respects ; but when the force of the prevailing constitution is weakened, they appear at the close of autumn as intermittents of the tertian or quartan kind, as they were from the first.

Continued fever, therefore, on the authority of this great observer, arises from the same cause or causes as intermittents ; and we have seen that the remote cause does not produce its effect always at once, but that it is delayed for weeks or months ; and there is reason to believe that the continued fever which prevails in the winter of temperate climates, depends on the conjoint operation of malaria, cold, and damp ; and that it never prevails epidemically in that season, but after very sickly autumns ; because we find that in ordinary years the autumnal fevers cease on the approach of cold weather, and are stopped at once by hard frost. But in epidemic years the cold of winter would seem to operate as an exciting cause to the malaria imbibed in the preceding season, especially if the winter is open ; and that the fever produced is of the continued form, exhibiting, perhaps, no trace of an intermittent character till towards the decline of the epidemic, when it often ends as it began.

In the history of the epidemic constitution of the years 1661—1664, Sydenham affords proof of this change of type in different seasons. In 1661,

he remarks, the autumnal intermittents appeared in new force, especially a bad kind of tertian in July, which proved extremely violent in August, seizing almost whole families, after which it declined, so as to appear seldom in October. A few quartans attended these tertians, but both went off on the approach of winter, and were followed by a continued fever, which differed from the autumnal intermittents only in this,—that while they happened at stated times, this happened without intermission, for they both seized almost in the same manner. The difference between them consisted chiefly in this,—that the continued fever finished its period of effervescence all at once, but the intermittents by fits at different times ; and in his Recapitulation he says that this fever, which depended on that constitution in which intermittents prevailed over the rest, changed, if it were tedious or the patient weakened by large evacuations, sometimes to an intermittent.

There can be no question that Sydenham ascribed these different types to the same causes, modified by what he calls the particular constitution of the year ; for he says, the greater part of continued fevers depend on the influence of a general constitution of the air ; and however numerous the species of epidemics in any constitution may be, they all proceed from one general cause, viz. this peculiar state of air ; so that the principal symptoms are alike in all, with the exception of the particular manner of evacuation, all of them growing mild or violent at the same time.

The symptoms of this continued fever show its

affinity to the modern typhus, —a disease which remarkably varies in degree in the same epidemic, a gradation which, it is fully admitted by Bateman and many other advocates of contagion—a doctrine subsequent to the age of Sydenham—does not imply any essential difference in its nature. They were, great faintness, vomiting, a dry black tongue, great and sudden loss of strength, dry skin, and looseness in the decline; and in his 4th Chapter, he adds, it was attended with a bad cough, sometimes by delirium, suppression of urine, epistaxis, and hiccough. It lasted from fourteen to twenty-one days, when it went off with a sweat, or rather a gentle moisture.

Bancroft says that Sydenham was not aware of the existence of malaria, and we cannot, therefore, say that he attributed his epidemics to any cause so local in its range; but that he considered them the offsprings of atmospherical impurity, is proved by every page of his writings; and the gradations and affinities which he observed in the fevers around him, naturally led him to explain their origin by the supposition of some modifying state of atmosphere, with the exception of what he calls a malignant fever, to which he believed a contagious effluvium was essential.

Lancisi, who wrote twenty-five years after the death of Sydenham, first most elaborately directed the attention of medical men to marsh effluvium, to which he distinctly traced, at one and the same time, not only intermittents, but the most acute continued fevers; and later observation has shown that these two types often exist together; or that

the one entirely takes place of the other; or that the mild passes into the more severe, or the reverse.

Boate, in his Natural History of Ireland, says in the middle of the seventeenth century, that among the diseases to which it is obnoxious is a sort of malignant fevers, vulgarly called *Irish agues*, because they are at all times so common in Ireland. Harty, in his account of the epidemic of 1817, says, that such parts of the coast or of the interior of Ireland as were low and marshy, and the inhabitants of which were subject to agues, were free from the ague during the epidemic season, but not free from the epidemic fever; or if this complaint began with ague, it terminated in continued fever.

These facts, and many others of the same kind, certainly show a close connexion between intermittent and what is now so generally called typhus fever in Great Britain, and justify the opinion of Dr. Armstrong that malaria is the common source of both.

In Sydenham's time intermittents were more common in London than they are at present, and we have seen that they existed with what would now be considered typhus fever. They prevailed from 1661 to 1664, with a mild continued fever, were displaced by one of a more formidable character, followed by the plague; and the intermittent type did not return till 1671. It may be reasonably asked why intermittents were absent from 1664 to 1671? Was there no malaria to produce them? or was it of such a nature, or attended with such associated circumstances, as to produce continued fever

only? So long as the intermittent type predominated, the continued fever was mild, and, according to Sydenham, at times it passed into the intermittent; but when this type entirely passed away, the continued fever was more severe, and he says scarcely ever became intermittent. Out of this aggravated fever arose in 1665 the memorable epidemic plague which raged in autumn, and died away in sporadic cases the year following. It was succeeded by continued fever, till in the revolution of causes the tertian intermittents were developed again in February 1671, but so feebly that they died away at the summer solstice, and they did not prevail epidemically till 1678. So that during thirteen years from 1664, Sydenham remarks, they had been extinct in town, or only seized a few sporadically. In 1678 even, he shows the tendency they had to pass into the continued form; for he says, "Tertians and quotidians were most common, unless the latter be termed double tertians. Though these tertians sometimes began with chilliness and shivering, succeeded by heat and sweating, and ended in a perfect intermission; yet they did not keep this order after the third or fourth fit, especially if the patient was confined to bed, or used hot cordials. But afterwards this fever became so violent, that only a remission happened in place of an intermission, and approaching every day nearer to the species of continued fevers, it seized the head, and proved fatal to many." It is no anomaly, therefore, to find an aggravated remittent, or the worst forms of continued fever, arising out of malaria; and the doctrine of contagion being essential to the latter,

is not borne out by an appeal to facts ; for on referring to the reports of epidemics in different countries, ascribed on the one hand to marsh effluvia, or on the other to contagion, we find a remarkable coincidence of effects in some instances, contrasts in others, which a difference of concentration in the remote cause, or of climate, may enable us to explain, and often a combination of phenomena, which irresistibly leads to the inference that every grade of these specific fevers depends upon one essential remote cause, modified by atmospheric influences, the vicissitudes of seasons and of years.

The occasional absence of the milder forms of epidemic marsh fever, and the occasional prevalence of the worst forms in the same or in different countries, or in different parts of the same countries, will not appear anomalous to any one who attends to the history of epidemics throughout the world, especially as numerous instances occur of every gradation of effect being observable sometimes in a very limited space.

If the absence of the common bilious remittent, and the severe visitation of the epidemic yellow fever in Philadelphia in 1793, and its irregular appearance in that city during subsequent years, should appear difficult of explanation,—so equally is the absence of intermittents from London during the thirteen years from 1664 to 1678, with the exception of their brief occurrence in 1671, and the substitution first of a mild, and afterwards of a severe continued fever in their place.

In both cities, the usual mild forms of fever

ascribed to malaria gave way to severe forms, which are arbitrarily ascribed to contagion, though this accidental introduction of a foreign cause cannot account for the disappearance of the endemical one. In both we find the endemic disease passing insensibly into the imported one, which is inexplicable on the supposition of two totally distinct causes, but which is perfectly intelligible if we dismiss from our minds the incumbrance of the hypothetical contagion, and ascribe the aggravated effect to some corresponding modification in the remote cause which we know to be essential to the milder form of fever, between which and the more severe, there is no sensible and abrupt line of demarcation. Sydenham evidently thought the mild continued fever of 1661 was merely, as it were, a concentration of the then prevailing intermittent; and Rush says in 1793, that in July a few cases of bilious remitting fever appeared, one of which ended in a typhus, or chronic fever. These cases proved, at all events, that malaria was abroad, and that there was something peculiar in it to produce, out of a common remittent, a chronic typhoid fever. No suspicion arose of any malignant fever till about the 19th of August, the period when the autumnal remittents are most prevalent in America; and that the epidemic, which has so unnecessarily been derived from Africa, was nothing but an aggravation of the usual autumnal remittent is proved, not only by an appeal to its history by Rush, but by the testimony of others who saw it and the subsequent epidemics of succeeding years. Many cases, Rush remarks, were regular tertians in which on the intermediate days

the patient was well enough to go about ; but if neglected, such cases proved fatal under the remittent form.

It is nothing rare, he adds, for a malignant fever to appear as a tertian, for the plague often assumes this type ; and he quotes Riverius's description of a tertian fatal on the third day, evidently derived from an exhalation which produced a malignant continued fever.

He divides the patients into three classes ;—the first including those in whom the miasm produced congestion indicated by coma, languor, sighing, a disposition to syncope, a weak and slow pulse : the second, those in whom there was reaction and inflammation, indicated by heat, a quick tense or full pulse, great pain in the head and other parts, delirium, vomiting, and obvious remissions and intermissions ; and a third and very numerous class, in which it acted so feebly as not to confine them at home. He remarks that this feeble operation of epidemic miasm is common, and that it is a common observation in the Southern States, that nobody is quite well when the common bilious fever is epidemic.

Dr. Vaughan, in the third volume of the New York Medical Repository, p. 368, shows very distinctly the source of the yellow fever which prevailed at Wilmington in the State of Delaware in the autumn of 1798. It was very prevalent that year in Philadelphia ; and Dr. Tilton, in speaking of the epidemic at Wilmington, p. 128 of the work above mentioned, says : “ At Wilmington we have no apprehension of domestic origin. Every medical charac-

ter in this place takes it for granted that the disease was imported from Philadelphia, and no otherwise created. It appeared to me also, that infected household goods and furniture brought from the city by new shallops, had more influence in spreading the contagion than diseased persons ; for it was very remarkable that the disease was not communicated from the first person who died of it, and who came down and sickened in the land stage. But when the fever became epidemic, it took rise at the water's edge, and infected all, or with few exceptions, gradually up to High-street. Above this the town is more thinly built, and the cases were more solitary, as in the country."

Dr. Vaughan, who did not reside at Wilmington in 1798, confesses that he was an advocate of Dr. Tilton's opinion as to the imported source of the disease, but that the facts which had come to his knowledge induced him to believe that they were both mistaken ; and he states them, to enable an impartial public to decide the question.

"Wilmington," he says, "is seated on a hill of 109 feet elevation above the level of the tide ; the most crowded part of the town being on the southwestern declivity. It is bounded west by Christiana creek, a tide water ; S.S.E. by the Delaware, distant a mile and a half,—the intermediate space composed of flat ground, a considerable portion of which is marsh ; E. by Brandywine creek, and N. by the highlands. The N. side is intersected by a small vale. The western side of Christiana creek is bounded by an extensive marsh, which had been continually inundated for a number of years, but

drained in the spring of 1798. From the middle of July this marsh became very offensive, from one hundred acres of mud, covered with dead fish and decaying vegetables, being exposed to the action of a vertical sun. This, in addition to some filthy docks, rendered the atmosphere of Water Street so disagreeable that the inhabitants were obliged to close their doors and windows at sunset."

After quoting the passage from Dr. Tilton which I have given above, Dr. Vaughan adds, "The fact certainly was, that the inhabitants thought themselves secure until the lower streets were considerably infected. The fever soon became general, nay almost universal in the three lower squares, extending south and south-east, round into the flats facing the Delaware, and north into the valley afore mentioned, depopulating as it went. In this circuit of about four squares, upwards of two hundred persons died, whereas the remainder and higher parts of the town were almost entirely exempt, though by no means equally deserted.

"An intelligent gentleman who resided here during the fall of 1798, informed me that on rising early one morning, he was surprised at the appearance of a cloud coming from the marsh on the lower parts of the town. Struck with this phenomenon, he rose the next morning at day-break, and observed a very thick fog on the surface of the marsh, of about four feet in height, totally obscuring the bodies of the trees in the marsh. As the sun rose, the fog rose also, leaving the surface of the marsh perfectly visible, and, passing gradually over the creek, settled on the lower part of the

town, and ramifying round into the south-eastern flats and northern vale, till the heat of the sun entirely evaporated it. He repeated his observations frequently, and always observed the same phenomena. Others have informed me that the atmosphere of the diseased circuit was not only offensive to the sense of smelling, but extremely oppressive,—that the air appeared to have lost its elasticity altogether.

“These facts are equally true and important, and tend to reflect much light on the origin of our yellow fever, notwithstanding the foreign origin of the disease was so generally admitted. The nurses and attendants at the hospital here, in 1798, all escaped infection because they were removed from the sphere of miasma; and it is worthy of remark, that while the disease raged so violently in this town, the inhabitants of the opposite side of the marsh were not affected. The wind blows almost constantly from the south-west, wafting the miasma over to the less fortunate Wilmingtonians.

“In reviewing this short account, three questions naturally arise in the mind of every unprejudiced man. 1st, If the yellow fever be of foreign origin and contagious, why did it not spread here in the summers of 1793 and 1797*, when the Philadelphians were admitted, nursed and buried, without restraint? Not a single instance of communication happened. 2nd, If the remote cause of yellow fever be contagion, why does it not, like

* These years were not equally fatal in Philadelphia; but their respective epidemics of yellow fever were the most malignant of any that had occurred in North America.

the small-pox and measles, communicate under all circumstances, without the aid of marsh effluvia? It will scarcely be denominated less virulent, if we admit a proportion between causes and effects. 3rd, If the disease was produced by the effluvia of the west marsh, it must have been at this time more ponderous than usual, by its grovelling on the flats and up the valleys, and not soaring on to the hills as in ordinary cases.

“ This hasty sketch will serve, I hope, to show the difference between implicit assent and investigation. To the former I have confessed myself a victim; to the latter I avow myself a convert, believing that a man deserves more credit for acknowledging than persisting in an error, particularly when the welfare of society is in some measure involved in his opinions.”

Dr. McCabe, in the fifteenth volume of the *Edinburgh Medical and Surgical Journal*, p. 533, gives an account of a very fatal epidemic yellow fever at Port of Spain, in the island of Trinidad, in the autumn of 1817, which arose from causes like those recorded by Dr. Vaughan; and though ascribed to contagion, was evidently occasioned by marsh effluvia driven over the town by an unusual prevalence of a south-west wind.

“ In the beginning of August 1817, a fever of a most malignant character made its appearance in the island of Trinidad; the town of Port of Spain, the capital and seat of government, being the first and chief theatre of its devastations. The Governor of the colony, and many gentlemen who held official places, were among the first attacked. The

florid and plethoric, and particularly the newly arrived Europeans, were chiefly the subjects of its attacks ; but no length of residence in the island appeared to afford much security against the disease, as very few Europeans escaped, however long resident in the colony. The fever appeared less aggravated in such as had been long in the country, the newly arrived European having but little chance of recovery. In the course of four months about eight hundred persons had fallen victims to it in the town and environs."

The fever was generally considered the genuine yellow fever of the West Indies, usually fatal on the third or fourth day, and sometimes earlier. In some cases an effusion took place tingeing the skin and eyes of a deep yellow colour ; but this symptom was by no means general, though it usually attended the most aggravated cases. A suppression of urine sometimes occurred, and whenever it happened was fatal. In many cases black vomiting came on a few hours before death ; and though it did not accompany all the fatal cases, might be considered a mortal symptom.

Dr. McCabe was of opinion that the fever differed only in degree from the common endemic fever of Trinidad, cases of which are met with even during the most healthy seasons ; and consequently that it was merely an aggravated form of the common bilious remittent, arising from the same sources, accumulated and concentrated by the causes he enumerates.

" The general prevalence of the fever," he says, " suggested the idea of contagion ; and the dreadful

mortality that attended it, gave a most melancholy impression of its malignant nature. As the medical practitioners were divided in opinion respecting the contagious or non-contagious nature of the fever, it may not be uninteresting to notice such circumstances as appear to be connected with the subject.

“The fever on its first appearance was said to be confined to one particular street, and even to a particular part of it, and gradually to have spread from thence to other parts of the town. In whatever house the disease appeared, it generally continued there till it had passed through all the members of the family, or persons inhabiting it. In the military hospital at Orange Grove in the suburbs of the town, all the European soldiers that acted as orderlies, or attendants on the sick, were seized with the fever. Many of the civilian medical practitioners in town were also attacked with it, and every European military medical officer in the colony, without exception, in the course of about two months from the first appearance of the fever, had suffered one or more attacks of the disease. From these facts a strong presumption might be inferred in favour of the opinion that the disease was contagious; and it would appear that the point must be conceded in favour of that opinion, unless other causes can be assigned which may be considered capable of occasioning the facts above mentioned, independent of contagion.

“The weather during the prevalence of the fever was different from what the oldest inhabitants of the island could remember ever to have witnessed there, the thermometer in the shade at St. Joseph’s,” (a

military station, situated eight miles east of Port of Spain, where Dr. M'Cabe resided during the epidemic,) "often rising as high as 89° , averaging about six or seven degrees higher than the usual temperature of the place; the thermometer at Port of Spain varying from 96° to 98° , in the shade, between the hours of one and three in the afternoon. The temperature of Port of Spain exceeds that of St. Joseph's generally about six or seven degrees. Occasional showers of rain were succeeded by a scorching sun, a sultry and oppressive heat, and a total stagnation of the atmosphere.

"The island of Trinidad is a low marshy soil, particularly in the vicinity of Port of Spain and St. Joseph's; the face of the country is covered with trees and brushwood, and in every part of it there is the greatest luxuriance of vegetation. The action of the sun's rays on decaying vegetation, together with the moisture supplied by occasional showers of rain, incessantly keep up a continual putrefaction of vegetable matter, whilst not a breath of air communicated a motion to the atmosphere, which thus continued saturated with these unwholesome effluvia.

"In addition to these causes of unhealthiness, which at this time applied generally to the island, there were some local causes which applied particularly to Port of Spain. An immense marsh or swamp extends from the town along the south coast of the island. In the usual course of the wind from the eastward and northward, the town is not subject to the influence of this marsh; but during the period of the sickness in town, whenever the

stillness of the atmosphere was interrupted by a breeze, the wind continually blew from the southward and westward, and sweeping over a marsh of about 400 square miles carried to the town its noxious exhalations. The Government of the colony about this time had been engaged in paving the streets of Port of Spain, in digging new beds for rivers about the town that had been recently choked up by torrents of rain, and also in making and repairing wharfs on that side of the town, which, by the change of direction of the wind, was now the windward side, and over which the south and southwest wind blew from the great marsh before mentioned.

“The fever first appeared, I understand, in a street near the wharf, in the immediate current of the wind blowing from the marsh, and which must have arrived impregnated with miasmata from it, and further loaded with the noxious exhalations occasioned by the exposure of an alluvial soil. This street was crowded with Spaniards from the Spanish main, in a deplorable state of wretchedness. On such subjects and under such circumstances the causes of fever were likely to operate with double effect. Here the fever commenced, and from hence it spread to almost every part of the town. Here the effluvia arising from the bodies of the sick, the dead and dying, congregated together in a state at which humanity shudders, was added to the other noxious gases, with which I have already shown the atmosphere must have been impregnated. Were I required to give an opinion whether the fever was contagious or not, I should be greatly at a loss. That

the causes of the fever existed in the island, I believe, and that it was not occasioned by contagion or infection, imported from any other place. If by contagion is meant the communication of fever by contact, I do not think the fever at Trinidad to have been contagious; but if by contagion we are to understand the accumulation or concentration of causes capable of inducing the action of fever, then the fever at Trinidad might be considered contagious; for it appears to me, that when the atmosphere of a whole town is loaded with noxious effluvia, as has been already mentioned to have been the case in Port of Spain, the putrid exhalations arising from human bodies in the apartments of the sick and dying, superadded to such an atmosphere, will be likely to accelerate the febrile action, and consequently that in the apartments of the sick a person is more susceptible of the disease than elsewhere, as there the atmosphere must be more impure, and the causes of fever more concentrated."

Dr. M'Cabe adds, that the "mortality occasioned by the fever among the troops, was by no means in the same proportion as among the inhabitants, although the increase of sick among the military was to a most melancholy extent. It is true that the European troops were stationed at St. Joseph's and Fort George, each post almost seven miles from town; and it is probable that the fevers at these stations were not of so malignant a character as those that happened at Port of Spain. At the commencement of the sickly season, the number of sick in the regimental hospital of the Royal York Rangers at St. Joseph's amounted to about fifty-four;

the total number present was 480; and in the course of about twenty days from that period, the number of sick had increased to about 120, mostly cases of fever. This increase of sickness at St. Joseph's will show that the fever must have been occasioned by causes that generally affected the island, although, as I have already remarked, some local causes in town, superadded to these general ones, may have occasioned there a more malignant and concentrated form of the disease.

"In about two months eighty cases of this fever were treated in the regimental hospital: out of that number, as well as I can recollect, five died. It is true that all these cases were not equally severe. Among them might be seen every variety of shade or difference, from the common remittent fever of the climate, to the most aggravated and malignant form of what is called West India or Yellow fever. There were many however very severe; but I conceive that the whole might be considered of the same description, differing from each other only in degree of mildness and malignity."

I have extracted largely from Dr. M'Cabe's interesting paper, that I might not omit any observations bearing on the subject of contagion. The source to which he sagaciously refers the epidemic is like that described by Dr. Vaughan, except that no mention is made at Trinidad of any part of the pestiferous marsh having been drained. That the causes enumerated, together with the condition of the inhabitants of Port of Spain, and the state of the atmosphere, unusually hot and stagnant, were sufficient to produce the disease, will be acknowledged by

all who, like Humboldt, admit that malaria aided by heat is adequate to the production of yellow fever.

Those who insist on the existence of a distinct disease, the offspring of contagion, derived from Africa, insist much on the existence of certain symptoms in the imported disease which are not observed in the bilious remittent, and would infer that these imply a difference in nature and not in degree. Dr. Gilpin, in the Report he has given of the fever at Gibraltar, in 1813, in the tenth volume of the *Edinburgh Medical and Surgical Journal*, says, that in August and September the cases were the usual autumnal bilious remittent, but that soon after he saw cases of yellow fever like that at Grenada in 1793, which, though they had some symptoms like the bilious remittent, exhibited others which he thought characteristic of the disease, as the protruded red eye,—the exquisite pain at the bottom of the orbit, and of the forehead, back, and limbs; and as the disease advanced, the dilated pupil, the excessive irritability of stomach, hæmorrhage from the mouth and nostrils, dark vomiting, skin of a dingy yellow, unlike the bright yellow of the bilious remittent, and in many cases a total and fatal suppression of urine, and that insidious cessation of symptoms about sixty hours from the attack, followed by their aggravated recurrence before death.

Many of these symptoms, which are considered so peculiarly characteristic of the disease, are evidently to be attributed to the extreme aggravation of yellow fever, considered as the highest grade of the common remittent, and attend other diseases of

similar severity. The darker yellow hue of the skin is analogous to what we see in the deeper and duller redness of the surface in the worst cases of measles, scarlet fever, and erysipelas. The suppression of urine not unfrequently occurs in small-pox, typhus, and spasmodic cholera ; and the redness of the eye, the severe pains, the irritability of the stomach, are all referable to the intensity of the impression made upon the system.

Rush notices the striking appearance of the countenance in the epidemic of 1793. "It was," he says, "as much unlike that which is exhibited in the common bilious fever, as the face of a wild is unlike that of a mild domestic animal. The eyes were sad, watery, and so inflamed in some cases as to resemble two balls of fire. Sometimes they had a most brilliant or ferocious appearance. The face was suffused with blood, or of a dusky colour, and the whole countenance downcast and clouded. After the 10th of September, when a determination of blood to the brain became universal, there was a preternatural dilatation of the pupil."

Cleghorn, in his third chapter, on the Tertian Fevers of Minorca, which often assumed the grade of yellow fever, remarks, that "the utmost danger is to be apprehended if a few drops of blood fall from the nose,—if black matter like the grounds of coffee is discharged upwards or downwards,—if the whole skin is tinged of a deep yellow, &c. These formidable symptoms seldom appear before the third revolution, but frequently come on in the fourth, fifth, or sixth period, even where danger was not foreseen ; and if they go off with the fit, and the

patient seems in a way of recovery, they commonly return in the next period with increased violence, and end in sudden death."

In a note he remarks, that the English were more liable than the natives to become yellow in these fevers,—an effect which he elsewhere ascribes to a total corruption or gangrenous disposition of the mass of the blood; and which he says is frequently the harbinger of death.

It is evident from these observations, made as early as from 1744 to 1749, that there is nothing peculiar in the symptoms selected by Dr. Gilpin, as characteristic of the Bulam yellow fever, as similar phænomena have been observed to attend the worst forms of remittent fever, wherever the combined circumstances have been such as to give full intensity to it.

Dr. Bancroft has shown that yellow fever has occurred in the interior parts of America, under circumstances which entirely preclude the possibility of imported contagion; and Dr. Robertson, in his valuable observations on the diseases of the British forces before New Orleans in 1814–1815, published anonymously in the 12th volume of the *Edinburgh Medical and Surgical Journal*, states that that city had been visited by the yellow fever every summer during the war, though all intercourse with the West Indies had been cut off.

We have also the very interesting testimony of Mr. Coventry, in the 18th volume of the same *Journal*, that the fevers of the Lake Country often exhibit the symptoms of yellow fever; and his evidence is the more valuable, as he had ample oppor-

tunities of observation, having "spent the best part of his life in the forests and amongst the swamps and marshes of North America." He remarks, that "it requires a residence in particular parts of this country, and that for some time, to become thoroughly acquainted with the nature of yellow fever. Those practitioners who reside north of the 41st degree of north latitude, and within two hundred miles of the sea-coast, except in some unfavourable seasons, in uncommonly bad situations, will have few opportunities of studying the nature of this fever. This exemption I believe to be much more owing to the hilly or ridgy surface of the country than to the latitude; but south and west of these lines, there are tracts of flat country abounding in stagnant water. During a residence of five years on the Hudson river, one hundred and twenty miles north of New York, I never met with a case of fever the symptoms of which resembled the yellow fever. After my removal to the flat country, called the Lake Country, I met with fevers that bore no resemblance to those previously seen, but in which I often recognised the black vomit and intense yellowness described in the yellow fever. Acquainted with the diseases prevailing in the cities only through the medium of their newspapers, I had conceived the disorder raging there as one of a very different type, and resembling what I conceived to be the plague of the Levant, more than the epidemic that was so generally spread over the western district of the State of New York, and with which I had become so well acquainted, having in my own family, and

subsequently myself, undergone the disease. But a visit to New York, in the autumn of 1805, undeceived me; for in that part of the city near the wharfs, and bordering on the East River, I recognised on the first glance the cast of countenance with which I had been but too familiar since the 20th of July preceding. It happened, also, that the most intimate friend I had in the city resided in a low situation called Pearl Street, and had remained there during the season. He had the yellow fever himself; also three of his family, two of whom were victims. It was conceded by the gentleman who attended this family, that these were genuine cases of yellow fever. I noted, from the reports of my friend, confirmed by the testimony of his physician, the symptoms; and found every one correspond with those of many patients who had fallen under my care, none of whom had been near the sea-coast, and most had never seen anything larger than a canoe or small boat in their lives. After the most close attention I was as fully convinced of the identity of this disease with the epidemic that had ranged along the margin of the western lakes, as I was of my own existence; but had I even doubted what I heard and saw, my nose and stomach gave me ample evidence that the causes to which I attributed the sickness in the west had existed in this city. The principal difference appeared to me, that in the former case it was owing to causes not within the compass of human beings to prevent; in the latter it was self-destruction, brought on by neglecting those means within their power, and perhaps acting under a mistaken

and very erroneous idea of the foreign origin of this disease, which they had nursed up and raised in a hot-bed themselves. The great encroachment made on the river, estimated at ninety acres, composed of perishable or perishing materials, was the evident cause of the mortality in New York, very similar to what took place last season at Mobile."

The medical literature of North America abounds in instances of epidemic fevers arising from marsh effluvium derived from evident localities, and limited to a certain space around them; and those who recognise in these impurities of atmosphere the essential remote cause of the common bilious remittent, and the yellow fever, will not be surprised at meeting with one or the other, and the combination of them both in variable proportions, as circumstances favouring the higher or lower grades of the disease are associated with the operation of the remote cause.

In Philadelphia, Baltimore, New York and other cities of the United States, during the prevalence of yellow fever, cases of the common bilious remittent are always met with, especially in situations more or less remote from the most sickly district. Those streets of Philadelphia which lie near to the Delaware river, are the peculiar haunts of yellow fever, which seldom appears except in sporadic cases at any distance from the alluvial low grounds; and the occurrence of these isolated cases depends on the individuals attacked having been exposed to the concentrated malaria of the infected part of the city. In the year 1793, the epidemic was more generally diffused, either from a wider range of the

miasm, or from persons exposing themselves unconsciously to those parts of the city where it most abounded. In 1797 *, the common bilious fever existed at Fell's Point in the city of Baltimore † from June ; and one practitioner, Dr. Coulter, had met with 300 cases from June to the end of August. No apprehension was entertained respecting it, so late as September 2nd, though the Medical Faculty had made inquiries into its nature, and decided on August 29th that it was not a malignant contagious or yellow fever, but the common bilious remittent. On September the 2nd, it was reported to have spread, but still the same opinion was expressed as to its nature. On the 7th, many persons witnessed the launch of a frigate ; and getting wet, and being exposed under the influence of a hot sun to fatigue, some of them sickened in the western part of the city ; and on the 8th, a contagious fever was publicly declared to exist by one of the faculty. In this very instructive example, we have an instance of local causes giving rise to the lower grade of remittent fever in the early part of the season, when neither the concentration of the remote cause, nor the predisposing effects of high and long-continued heat, existed to such a degree as to produce the higher grade ; but we observe, as these concurring causes contributed their effects, the lower passed into the higher form of fever, and the sudden exposure of many persons to the exciting causes of

* Med. Repos. i. 380. Davidge, " Treatise on the Autumnal Endemical Epidemic ; Baltimore 1798."

† See Report of Med. Faculty of Baltimore, 1800, Med. Repos. iv. 351, for facts against contagion.

fever, gave a wider extent to the disease, and led to the idea of contagion.

That the disease which prevailed from June to the end of August, at Fell's Point, had not reached to the degree of yellow fever, was proved by the rate of mortality, as Dr. Coulter only lost eight out of 300 patients between the third week of June and the 26th of August; and on the 29th a deputation of medical men who inspected the sick, reported that the patients they saw "all laboured under the common bilious remittent, and that they would generally recover with common attention."

As the season however advanced, the fever assumed a more formidable character, and was declared on the 2nd of September to have much increased within two days past; still on the 3rd it was reported by Dr. Moores, that though the disorder had spread, it was chiefly among the poor, who lived in confined houses; that the number of deaths, as well as of the sick deemed dangerous by the respective physicians, was comparatively small; and that he was still of opinion there was no contagion in the disorder, and that the sick wanted good nursing more than anything else, and that with proper attention and care many would recover.

In the ensuing week the disease was observed to be spreading, especially after the sudden exposure on the 7th of September of a crowd of persons to heat, fatigue and wet; and this diffusion of fever, from causes so naturally disposed to occasion it, was gratuitously ascribed by Dr. Moores to contagion, though on two occasions, the 29th of August and September the 3rd, he had expressed himself con-

fidant, on inspecting the cases, that no such property belonged to it,—an opinion which was still held and expressed on September 11th by a “large number of the Faculty,” to the Board of Commissioners.

The Board in their Report say, after noticing the visit paid by five of their body, with Dr. Moores, on September 3rd to the sick, “It was however in the ensuing week that the disorder put on a more threatening appearance. A large number of people having collected to see the launching of a frigate on September the 7th, many of them getting wet, being exposed to a hot sun, and undergoing considerable fatigue, excited in themselves symptoms of the complaint. Hitherto the sickness was confined to Fell’s Point ; but now several persons in West Baltimore, who attended the launch, were taken suddenly ill and died in a few days ; and it is worthy of observation, that until the day after the launch the Board of Health never received any regular information that there was contagion in the disease ; for at the meeting of the physicians and commissioners of health at the Exchange, the former were requested, that whenever any case of a contagious disorder came under their notice, to leave information thereof with the Chairman of the Board ; and on the 8th of September, and not before, was such information given by Dr. Moores.”

The fever which had prevailed in Baltimore from June as a common remittent, and, according to Dr. Jaquitt in his letter to the Board, also as an intermittent, assumed in September the form of yellow fever, and it prevailed as such till November ; the number of burials from August the 1st to October

the 29th amounting to 545. That it arose from local causes, and eventually deepened into the higher grade of yellow fever, from the influence of season giving intensity to the malaria and to individual predisposition, no one will doubt who admits that these associated circumstances are the only requisite for the production of yellow fever. Dr. Coulters's very sensible letter shows, even at the early period of the epidemic, how nearly, except in mortality, it approached to it; and the absence of some of those symptoms which have been considered characteristic of the disease, when taken with the low ratio of mortality, clearly show that they depend merely on the intensity of effect produced, and do not indicate any difference in the nature of the disease itself or the remote cause.

Under date of August 27th he says in his letter to the Chairman of the Board of Health, "Ever since the third week in June, I have observed a particular species of fever becoming epidemic, affecting all ages, sexes and colours, but more particularly confined to that class of people who labour hard and exercise violently in the heat of the sun, live intemperately, or who imprudently expose themselves to the night air by lying down in it after returning from work. During the wet weather, in the last of July and first of this month, it yielded for near two weeks to the dysentery, which has now decreased, and the usual epidemic again prevails. I have always been cautious of exciting any unnecessary alarm; and while the fever is so manageable, and the deaths so inconsiderable to the number of sick, I am strengthened in the propriety of this

conduct. I have called it an epidemic in contradistinction to an imported contagion, and because, if it is contagious, it is in the locality of our atmosphere, the source of which I can perceive in every ten steps I take in our streets; ponds of stagnant water, and sinks of putrid animal and vegetable matters, exhaling perpetually, under a hot sun, the most offensive effluvia;—even our market, and the space around it, not paved,—and the earth constantly covered with offal matter thrown away by the butchers. It is strikingly true that many of the sick to whom I have been called went out well in the morning, and came home from market affected with the symptoms. The conclusion to be drawn, then, from these observations is, that I do not think the fever infectious individually; but from a certain aptitude in the body of every individual in this climate, at this season of the year, meeting with the exciting causes of labour and fatigue in the heat, sudden obstruction of perspiration by rain or night air, intemperance in drink or diet, they are thrown into fever, which fever is modified by the predominant exhalations with which the atmosphere is loaded. From the uniformity of the symptoms of the fever, which has prevailed here at this season for several years past, and its correspondence with the epidemics in other parts of the continent, I think we may safely reason in this way; and as the Faculty in different situations have given different appellations to what I think the same disease, it will be thought sufficient, perhaps, after what I have said, to enumerate the symptoms. It attacks suddenly with violent pain in the head and eyes, back and limbs;

languor, weakness and sickness at stomach; great tenderness, heat and pain at the pit of the stomach, and over the region of the liver, preceded mostly by a chill. Sometimes it approaches more slowly and insidiously, but not less dangerously; for about the fourth and fifth day, if timely and proper remedies have not been administered, a hiccup and vomiting of blackish matter, like coffee-grounds, sometimes mixed with dark-coloured blood, comes on, attended with profuse hæmorrhages from the nose, gums, and intestines, which generally carries them off by the sixth day. I have prescribed for upwards of three hundred in this fever since June last; and I am sure I am accurate when I say, only eight of them have died,—two only of whom were visited on the first day of their illness; and in one of these cases I was interrupted in my method of treatment; and the other lay in a small and filthy apartment, with two more in the same complaint.”

Dr. Jaquitt, in his letter to the Board, dated August 27th, says, “ Out of about twenty-one patients now under my care, eighteen of them appear to be confined by bilious remittent and intermittent fevers; and I am happy to add, that I have lost only two within these six or eight weeks. In no case that has come to my knowledge has the disease originated from contagion: I believe our end of the city is as healthy as common for this season of the year.”

Dr. Davidge states that the disease was most prevalent in the direction of winds which blow over the marshes, stagnant waters, and deposits of filth; and that Dr. Watkins of Kentucky, who witnessed

the fever at Baltimore, declared it resembled, in all essential points, the fevers of that State, which are evidently the product of marshes, and not contagious.

In the case of a lady who had come from Philadelphia, and who sickened at Baltimore under the yellow fever in its worst form, Dr. Davidge says that no contagion was imparted to her attendants; and he brings this fact forward in answer to those who imagine that the disease is communicated in an impure air, when the exhalations of the sick are superadded to the original source of atmospherical impurity.

The most unequivocal examples of the local origin of the bilious remittent and yellow fever are those which occur in the interior of America, from causes that admit of no dispute, and which are limited to a defined space, proportionate to the extent of surface from whence the malaria proceeds, and its diffusion to a greater or less distance in the immediate vicinity.

Dr. Bancroft has noticed the very remarkable instance, mentioned by Dr. Buel, of bilious fever and dysentery excited by the evaporation of the water of a mill-pond and adjacent ground which it inundated, in the hot and dry summer of 1796, at Sheffield, in the State of Massachusetts, leaving an exposed surface which contaminated the air to such a degree as to produce immediate nausea and vomiting in those who were near the source; and the diseases which prevailed were limited to a circle of about a mile and a half round the infected spot. The fever did not reach the grade of yellow fever,

which may be explained by the different condition of persons attacked, a healthy and vigorous peasantry, and by the northern latitude of the place where the sickness prevailed,—a circumstance which has always prevented the prevalence of yellow fever in Massachusetts and the adjoining States, to that degree, extent, and frequency, that is common in the midland and southern States.

Dr. Bancroft quotes this paper of Dr. Buel to prove that dysentery, when epidemic, is produced by malaria,—a fact which Dr. Coulter's letter above quoted will help to confirm, and which is established by many observations made by Rush and other physicians.

The Rev. Dr. Warden, in his *Natural History of Kinderhook in the State of New York*, lat. N. $42^{\circ} 36'$, mentions in 1786, that “an iron forge was erected on a stream which runs from some lakes in the vicinity, a mound of earth raised, and a sluice to confine the water or suffer it to flow, at pleasure. It was allowed occasionally to rise six feet above its natural level, overflowing the meadows, swamps, and borders of the lakes, which were covered with wood. The banks being overrun with weeds and corrupted vegetables, and laid under water, by the influence of the intense heat of the sun emitted pestiferous vapours, and impregnated the air with unwholesome exhalations, which, as far as they spread, created an obstinate malignant fever that proved fatal to many. The people imprudently remained on the spot, and sought no medical aid. The baneful effects of it extended two miles in cir-

cumference, and swept about forty or fifty persons from the stage of life. It was complained of to the Grand Jury as a public nuisance." (Med. Repos. vi. 9.)

Dr. Coventry, in the paper I have already referred to, mentions similar effects: "During my residence," he says, "among the marshes and swamps of the West, I watched the condition of two ponds near which I had occasion frequently to pass. They were near the outlet of a lake; when the waters were high, there was a free communication between the ponds and the lake. The waves of the latter passed into the ponds, and kept the waters fresh; but when the waters began to lower, the waves drove up the sand or shingle on the beach, forming a dam across the outlet of the pond. If the season proved dry and the lake continued to decrease in depth, the ponds gradually dried up,—putrefaction began,—they emitted a horrible stench: the easternmost and most shallow affected the senses often by the last of June, a fortnight before the westernmost, and would dry entirely up, cease to annoy the smell, and if no rain fell, become verdant with a growth of vegetables; but the other, whose bottom was on a level with the shallow part of the lake, although later in polluting the air, would continue the process till arrested by autumnal frost. I have known a whole village, in which there was not a sick person on the 20th of June, or indeed later, to be laid on their beds within forty-eight hours, evidently from the putrid effluvia emanating from these ponds, the fact being ascertained by a

shift of the wind, which brought the exhalations directly into the place ; and some of these people had every symptom of yellow fever."

Humboldt*, in his masterly essay on the *vomito prieto*, or yellow fever, as it appears at Vera Cruz, shows how much the prevalence of that disease is under the influence of the mean temperature of the different months of the year, even in a city where the mean heat of the year is so high as 77° of Fahrenheit.

He remarks, that "an intimate connexion is observed on the coast of Mexico between the march of diseases and the variations of the temperature of the atmosphere. Two seasons only are known at Vera Cruz,—that of the north winds, from the autumnal to the spring equinox, and that of the south winds, which blow with considerable regularity between March and September. The month of January is the coldest in the year, because it is furthest from the two periods in which the sun passes through the zenith of Vera Cruz. The *vomito* generally begins first to rage in that town when the mean temperature of the month reaches 75° of Fahrenheit. In December, January, and February, the heat remains below this limit ; and accordingly it seldom happens that the yellow fever does not entirely disappear in that season, when a very sensible cold is frequently felt. The strong heats begin in the month of March, and the epidemical scourge begins at the same time. Although May is warmer than September and October, it is,

* Political Essay on the Kingdom of New Spain. London, 1822, vol. iv. p. 132.

however, in the two last months that the *vomito* commits the greatest ravages; for in every epidemic, it requires a certain time before the germ of the disease is developed in all its energy; and the rains, which last from the month of June to September, have an undoubted influence also on the production of the miasmata which are formed in the environs of Vera Cruz."

In the very instructive meteorological and nosological Table of Vera Cruz, for the year 1803, the progress of yellow fever is clearly shown; and I abridge it for the illustration of this interesting subject. He remarks in 1803, that the concourse of strangers was uniform throughout the different parts of the year; and that the number of patients who sickened and died of yellow fever at the hospital of Saint Sebastian sufficiently indicates the progress of the disease. He, however, only includes individuals the nature of whose disease was in no respect doubtful, from the frequent vomiting of black matter.

		Mean temp. Fahr.	Entries.	Deaths.	
N. Winds.	January ...	70°	7	1	
	February ..	72	6	2	
	March	73	19	5	
S. Winds.	April	77	20	4	N. wind sometimes blows.
	May	80½	73	11	Sun passes the zenith of Vera Cruz.
	June	80	49	6	Beginning of rainy season.
	July	80	51	11	Sun passes the zenith of Vera Cruz.
	August	80½	94	16	
	September	80	68	8	End of rainy season.
	October	78	29	3	N. wind sometimes blows.
N. Winds.	November	75	9	2	Dry month.
	December	70	3	0	
			428	69	1 in 6½ about.

From the rate of mortality as shown by this Table, about 2 in 13, it is to be inferred that the *frequency* of black vomiting, which the learned author alludes to, only occurred in the fatal cases, as the general experience is highly unfavourable to the recovery of those patients who exhibit it. It is worthy of remark, in a city like Vera Cruz, situated in lat. $19^{\circ} 11' 52''$, the mean temperature of which is so high as 77° of Fahrenheit, that the yellow fever is most prevalent and fatal in autumn; and that the north winds, which begin to blow steadily in November, while the mean temperature of the month is so high as 75° , should have such decided influence in checking the progress of the disease. Taking the larger number of entries, from 19 to 29, as indicative of its greater prevalence, it may be said that at Vera Cruz it exists from March to October inclusive, and is most frequent from May to September; and that the transition from the north to the south winds has a material influence in exciting it in spring, while the reverse has as sensible a one in checking it in November.

The influence of high and long-continued heats is more sensibly perceived in the epidemics of higher latitudes, as Philadelphia and New York, where, though a few sporadic cases are observed in summer, the disease may be said to be almost exclusively autumnal; and the great variations of temperature to which these and other North American cities are liable in different years, sufficiently explain the irregular appearance and the greater or less prevalence of the disease. The reduc-

tion in the mean temperature, likewise, in the more northern states, explains its comparative infrequency and even entire absence in them, though in particular situations, in occasional years, a few cases are now and then met with. Generally, however, the form of autumnal fever in these high latitudes is that of the common bilious remittent, or a continued fever, which, according to circumstances, will exhibit more or less tendency to assume the appearances of yellow fever; and hence the discrepancy which is to be found in the reports of different medical men, as to the nature of the fever which is met with in these latitudes, either in the same or different years; for the variable character of the disease, taken in conjunction with its comparative infrequency under the decided form of yellow fever, would lead one medical man to designate it as the bilious remittent, while another would perhaps consider it as true yellow fever: nor can we be surprised at this, when, even in southern latitudes, the same epidemic exhibits every grade of disease, from the mildest to the most severe. It is evident, from almost every page of Rush's work, that he considered the fever in Philadelphia to be constantly under the modifying influence of seasons and years; and that even in 1793, that memorable year of the most severe visitation of it, he met with cases of an intermediate character, which might with equal justice be referred either to the common remittent or to the yellow fever. Mr. Evans, from his observations on the temperature of Philadelphia, between 1793 and 1809, found that yellow fever

had never been epidemic there when the medium heat of June and July was below 79° of Fahrenheit, except in 1802, when it was 78° , in which year about two hundred persons died of it.

Rush remarks that the medium heat of those summer months in 1809 was only 74° , and that the expectation raised by Mr. Evans's observations of the city escaping an epidemic yellow fever that year, was realized by the prevalence of a chronic or protracted remitting fever of a moderate grade, during the months of July and August, in every part of the city and suburbs ; from which, he says, it was natural to infer that the constitution of the atmosphere did not dispose to malignant fevers.

Dr. Dickson, in his very sensible paper on the Causes of Yellow Fever, published in the thirteenth volume of the Edinburgh Medical and Surgical Journal, very satisfactorily shows how much it is under the influence of seasons and other circumstances, even in the same parallels of latitude. In the West India islands, he says that a similar increase of the disease is observed during the hurricane or autumnal months, as Humboldt remarked at Vera Cruz ; and that this is in proportion to the previous unseasonable state of the weather. But he thinks that the medium heat at which the disease begins to be prevalent there, may be calculated at from five to ten degrees higher than that stated by Humboldt at Vera Cruz ; from which he infers that, in proportion as the air is more loaded with miasmata, as on the coast of Mexico, the disease may become more active at a lower temperature than when these effluvia are less abundant and con-

centrated ; and that this accounts for its appearance beyond the tropics during the high summer heats. And he shows, from the report of Dr. Macarthur, that the earlier or later period of the disease at Barbadoes depended on the comparative dryness or wetness of June, July, and August,—a dry summer accelerating its development, while a very wet one protracted it till September, October, and November.

It is then, as Dr. Dickson justly remarks, only “by tracing the connexion of yellow fever with the seasons, that we can rationally expect to unfold the laws which govern it ;” and as we know that it is especially the disease of tropical countries, or rather the autumnal disease of all countries which have a medium heat high enough to give development to it,—as is proved by its endemic character and its almost constant occurrence in the West India islands, Vera Cruz, and the southern states of America,—we should not *à priori* expect to meet with it in higher latitudes, except as an occasional disease, when the temperature of those latitudes approximates to that of tropical countries. But as heat is only one of its favouring causes,—as individual predisposition is a very variable condition,—as exciting causes differ very much in themselves and in their liability to produce disease in different persons,—and as malaria does not appear to be always the same in concentration and power,—we should expect to find much that is desultory and contingent in its occurrence, in situations where it is only an occasional visitant. Nor are these circumstances apparently all that are essential to at least the epidemic prevalence of yellow fever ; for it is sometimes absent for years in

those situations which are most remarkable for the constancy and fatality of its ravages,—such as Vera Cruz, where Humboldt says it did not appear for eight years, between 1786 and 1794. It is impossible to conceive that the heat of those years did not rise to the adequate height, or that malaria was not produced; and we can only approximate to an explanation of this singular exemption by supposing with Sydenham, that there are secret constitutions of years, depending on some unknown state of atmosphere, which favour, or otherwise, the production of disease.

The same anomaly is observed in the plague of Egypt and the typhus of this country: and whatever may be considered their remote cause, it is difficult to account for their disappearance, or for their occasional comparative virulence, otherwise than by the supposition that there are states of atmosphere, not dependent on any sensible qualities, which render innocuous, or give additional intensity to their remote cause and its effects; while the local circumstances of particular spots in the country, or of cities, are the same from one year to another. While the habits and condition of mankind remain the same, and the seasons pursue more or less regularly their unchangeable succession, we observe the greatest irregularity in the occurrence, character, and mortality of endemic fevers, which are mild or severe from causes that do not admit of apparent explanation, and which are also remarkably desultory in their visitation, when nothing, to human observation, appears to account for the unfortunate selection of one spot

for the display of its ravages, that may not be presumed to exist in another that is exempt from them. This incongruity is especially observable in yellow fever and its associated diseases, and must be taken into their general character.

CHAPTER VII.

FEVERS OF THE SOUTHERN STATES OF NORTH AMERICA.

FROM what has been said of the influence of heat over yellow fever, which may operate, as Humboldt suggests, by giving intensity to malaria, and creating a powerful predisposition by exalting the irritability of the organs, it may be expected that in a country of such extent as North America we should find yellow fever most frequent in its occurrence in the southern, and most rare in the northern parts; that it would attack strangers only in the one, and natives as well as strangers in the other; and that where it does not exist, its place would be supplied by some other modification of fever.

It will be interesting to notice from among the medical records of America, which are so peculiarly valuable, from the scattered and, as it were, isolated situation of the inhabitants in many parts of the interior of the country, some proofs of the occurrence and character of the disease in different places. We shall find that the two extreme effects of malaria, under different aspects, prevail in the two ex-

treme points of comparison: that intermittents, and a severe bilious remittent, or yellow fever, are common at the south; and intermittents, occasionally remittents, and continued fever, occur at the north. But if there be any truth in the idea that malaria is equally the remote cause of the typhus of Europe, we should expect to meet with instances occasionally of an analogous form of fever in America; and it can be shown that such really exists, sometimes with yellow fever, but more commonly in places not obnoxious generally to the latter modification; or in seasons when concurring causes do not exist adequate to the development of it.

Many authors have expressed their conviction of the unity of fever in all the countries of the globe; I mean those which arise from malaria, the putrefaction of animal and vegetable substances, the influence of climate, &c. But while some have, like Sydenham, generally referred them to peculiar states of atmosphere, to causes wholly independent of that state of body which generates a specific contagion, others have acknowledged this contagious effluvium as the sole cause of the most formidable modifications.

Dr. Armstrong was convinced that malaria was at least their primitive remote cause, and that the typhus of Great Britain could not be considered essentially a contagious disease;—an opinion which was so much opposed to the general sentiments of the profession in this country, that in the zeal of his own convictions, he speaks of the proofs of its origin in malaria as a discovery. But other ob-

servers had long before come to the same conclusions, though no one had attempted to establish them on such definite grounds. The state of opinion at the present moment in the profession is perhaps unfavourable to his views, especially among those who limit their observations to the fevers of a particular country. But if there be any real foundation for the idea that typhus arises from malaria, it will be evident that the fevers which it produces in all climates should be attentively considered, and it may be reasonably expected that we should find under similar circumstances similar effects; and that those remarkable modifications which are found in particular countries will more or less have some counterparts in others, when there is any approximating analogy in climate, temperature, habits, and condition of mankind. And if it can be shown that the fever of one country apparently obeys the same general laws as that of another, though they may present some modifications as to symptoms and pathology, an inference may perhaps be legitimately drawn as to the unity of their remote cause; and we may attempt to explain the discrepancies between them by the influence of climate, and other modifying circumstances.

There are examples of fevers of very different aspect in America,—all beyond any possibility of dispute arising from marsh effluvium; and these very satisfactorily prove how much the same remote cause is in its effects under the influence of some modifying circumstances: and these examples are highly interesting and instructive, and may serve to explain the difference in the character of fever

in different countries. It may be shown, indeed, that the fever of one country taken to another, loses its own character, and assumes that which is the type common to the fevers of the country it is taken to; and proofs may be found in the epidemics of Great Britain and America, of almost every form of fever existing together; though one will greatly predominate over the others, from the circumstances of each country or season favouring its own particular kind of fever.

Dr. Bancroft has asserted that typhus is not to be found in tropical countries; and no one will dispute the assertion, if he means a fever characterized by all the symptoms of the typhus of Great Britain: but that a specific continued fever actually exists in either India, the product of malaria, differing in no other essential respect from our common endemic than might be expected from the difference of climate, is proved by the observations of several authors. A similar fever is also frequently mentioned in America, even in places where yellow fever exists; but its occurrence is most common in the midland and northern states, north of lat. 39° or 40° , where the temperature is on the average too low to give full development to yellow fever, at least in its epidemic form.

I shall offer proofs of the correctness of these remarks by facts drawn from such sources of information as I possess.

Dr. White* has given a very interesting account

* The Medical Repository, 3rd edit. New York, 1804. See vol. ix. p. 36.

of an epidemic fever at Waynesborough, in Georgia, 1802. This place, containing twenty-five dwelling-houses, is situated about lat. 33° , one hundred miles west of Savannah; the nearest sea-port, Briar Creek, distant three or four miles, is the only water-course of any considerable size near it. A small stream runs in part through the town, but in dry summers has no water. Another takes its course within a mile from the town; both bordered by low ground. At the upper end of the town is a pond of two acres; and west of it three smaller ones,—all, except in very dry seasons, filled with water. The soil is sandy, except in and near the ponds, where it is clay. Within a mile there are two mill-ponds, and most of the intervening space is wood. The first of these ponds was made for ginning cotton, but the water is now suffered to run off in its usual channels, exposing a surface of an acre and a half covered with dead trees, bark, &c. and a few inches of water: the other supplies a grist-mill with water, is filled with dead trees (most of them standing), and other vegetable matter. The soil in the neighbourhood is generally sandy on the surface, but clay sometimes forms the upper stratum. There is a great number of natural ponds from a few hundred yards in circumference to one or two miles, generally bordered with wood, and at some seasons they afford good pasturage for cattle: they are more or less filled with water, in proportion to the rain which falls. Several small creeks intersect the neighbourhood in various directions; and though many furnish water for grinding corn in wet seasons,

they are often dry. The temperature, as given by Dr. White, of the year, will show how far it contributed to the production of disease.

In January the thermometer only once fell below 35° ; on the 28th it was at 76° ; and February was uniformly warm.

March,	mean temperature was . . .	$61\frac{2}{10}^{\circ}$
April,	do. do. . . .	$73\frac{1}{10}$
May,	do. do. . . .	$75\frac{7}{10}$
June,	do. do. . . .	$80\frac{5}{10}$
July,	do. do. . . .	81
August,	do. do. . . .	$80\frac{9}{10}$

September 1st to 6th the thermometer varied from 73° to 92° .

In July and August the quantity of rain which fell was very great, doing great damage to bridges and mill-dams, overflowing creeks and rivers. "Such a quantity of moisture, aided by subsequent heat and dryness,—for it rained but twice in the last twelve days of August and the first ten in September,—it may be supposed would produce a sickly state of atmosphere. This indeed became too evident. The usual endemic of the season made its appearance in June. Cases were more numerous in July and August, but not so violent as in September. Those who had before escaped were with very few exceptions now attacked, and many suffered a relapse two or three times. It was difficult to renovate the constitution, to restore the healthy action of the system, while the person remained within the influence of the febrile poison, and the slightest exciting causes were sufficient to kindle it afresh. Not differing very essentially from our common endemics,

except in violence, it will be unnecessary to enter into a minute description of all the symptoms. The fever most generally put on a remittent form; and when intermittent, the intervals were so short as to render the treatment almost as difficult. It often changed its type and became remittent. It seldom indeed preserved the intermittent form long; but the paroxysms became gradually longer, sometimes by anticipating the usual period of return, and the intermissions shorter. Symptoms of malignancy were manifested in various instances, not only by the violence of local pain, but by the discharges from the stomach and bowels, often dark-coloured, black and foetid. Several cases occurred of fatal termination in three, four, and five days; and the body, after death, was covered with livid spots."

The cases which Dr. White mentions were examples of an aggravated bilious remittent, which he treated judiciously by venesection. One case, in December, was that of a middle-aged robust man, native of Virginia, who had been but a short time in Georgia. He was attacked, after a night's debauch, with nausea and inability to keep anything on his stomach, dull heavy pain in the head and back, internal heat and oppression at the præcordia: his pulse was weak, slow and intermitting. He was bled, &c. but without relief, and became delirious. His eyes had a furious wild appearance; and a medical gentleman in consultation remarked that something seemed to dart from them, and shoot through the frame like an electric shock. At this time he had frequent involuntary discharges of blood from the intestines, and he died a few hours

after, on the tenth day of his disease. It will be admitted that this fever was an aggravation of the common bilious remittent, approaching in some of its characters to yellow fever; and that the inland situation of the town, the gradual approach of the epidemic, and its rising to its height in September, are all presumptive arguments against any but an endemic origin. It should be recollected by those who may be disposed to question its affinity to yellow fever, that the subjects of it were all natives or residents, and not predisposed by an unassimilated constitution to the worst effects of heat and malaria, as strangers are who resort to the sea-ports of America, and who afford the principal examples of yellow fever in the Southern States. This want of adequate predisposition in the natives of the interior of the southern part of North America, sufficiently explains the absence of yellow fever remote from the sea-coast; for no comparison can be drawn between them and strangers from a northern latitude, with respect to their liability to yellow fever; and when it is recollected that at Vera Cruz the sufferers are *always* strangers, or persons descending from the elevated table-land of Mexico, and that the deaths from yellow fever in Charleston, South Carolina, are principally of those foreign to the climate, it is not to be expected that the natives of Georgia should, even in a sickly season, exhibit all the well-marked symptoms of the disease.

The case which occurred in December is interesting, from the circumstance of its happening so late in the year, and in a person who had not long

resided in Georgia. Dr. White considered it an example of yellow fever, but I quote it merely to show that a peculiar wildness of expression in the eye is observable in severe forms of remittent fever, as this symptom has been insisted on as peculiar to the Boullam fever, and consequently that disease is said not to arise from malaria.

Dr. White mentions heaps of putrefying cotton-seeds used as manure, the stench of which was intolerable; and he supposes these aided the noxious quality of the atmosphere. They may have proved an exciting or aggravating cause.

“The inhabitants of Waynesborough,” he says, “were more particularly sufferers; for not a family, and scarce an individual of a family, escaped. The sources of putrid exhalations were more numerous than in the neighbourhood. I have mentioned several ponds contiguous to the town; these became highly offensive; and not more than 150 yards apart were two large heaps of cotton-seed, either sufficient to fill several waggons. The stench emitted from them was intolerable, and could be smelt at the distance of several hundred yards. The two mill-ponds were in the worst state for emitting putrid effluvia. The continued wet weather of July and August filled every place where water could remain; the ground became so soft that, to use a common expression, ‘it was rotten, and dangerous to leave the beaten path on horseback:’ a fœtid smell was observed by persons riding through or contiguous to woods. Under the combined influence of such causes, is it surprising that a pestilential state of atmosphere was produced, and that dis-

eases should manifest much violence? Facts are multiplied to prove the domestic origin of a highly bilious malignant fever in various parts of the United States. Physicians have differed too much respecting the name, and attended too little to the state of the disease. It may be called a simple remittent; a bilious remittent; a malignant bilious, or a yellow fever. They are only different grades of the same disease, arising from the difference of constitution, and a diversity in the nature of the predisposing and exciting causes. I do not hesitate to declare I have seen since my settlement here many well-marked cases of yellow fever, though the yellowness was not always an attendant symptom. At the distance of a hundred miles from the nearest sea-port it is farcical to look for foreign sources of infection."

In a very valuable paper on the climate and diseases of Georgia, by Dr. White, in the 9th volume of the Medical Repository, p. 349, he remarks, "The months of April and May are generally the most healthy throughout the year. June is not often sickly, though in 1801 cases of remittents were common. The endemics of the season begin to be rife in July, and increase in August and September. The last I consider the most sickly, and the cases are marked by symptoms of greater violence. The tertian type is the most usual, except in the sickly months. They then become quotidian, and quickly run into the remittent form. In the latter fall and winter months, the quartan ague is not unusual,—generally obstinate, and commonly lays the foundation of dropsy."

In another paper, on the topography of Savannah,

Georgia, lat. $32^{\circ} 2'$, Dr. White says that September and October are the most sickly months; the latter the most fatal. After the rice-fields have been drained, and when to hot days succeed cold nights, with heavy dews, fraught with the poison extricated during the day, Savannah, he remarks, must ever remain unhealthy, from the nature of its climate and soil. "But though I will not admit that any meteorological states will more than partially prevent the general prevalence of our endemic diseases in the summer and autumn, they are certainly influenced in a greater or less degree by immoderate rains, violent winds and their direction, and by the degree and duration of summer heat. The exhalations which are diffused are not uniform either as to quantity or activity. Various circumstances effect correspondent changes in our atmosphere. This, with the variable predisposition of the system to disease, will aid us in accounting for the want of uniformity in the diseases of different seasons. If we rest solely on the evidence of facts as presented to our senses, and from them venture to foretell the diseases which will prevail, we shall often be deceived. Similar states of the weather will not always lead to the same result. We are then compelled in some instances to resort to an invisible agency, a secret *something* floating in the atmosphere, to explain the variableness of diseases, even of such as are endemic, being in some years epidemic to an extent of hundreds of miles, travelling, as it were, on the wings of the wind; and in others confined to narrow limits. This occult inexplicable source of epidemics is what the Father of Physic

called a divine something,—what Sydenham attributed to mineral exhalations,—what many have acknowledged, but which has hitherto eluded research.”—(Med. Repos. vol. x. p. 361.)

Dr. Smelt, in the ninth volume of the Medical Repository, p. 125, notices, briefly, an epidemic at Augusta, Georgia, in 1804. This city is situated on the Savannah river, in lat. $33^{\circ} 28'$, more inland than Waynesborough; and Dr. Smelt remarks that the bilious remittent is rife from the 1st of June to October; after which time, though the bilious symptoms do not entirely subside, they are accompanied with higher marks of inflammation, and often require a liberal use of the lancet.

“From June to the 1st of August I did not remark any anomalous symptoms, except that the disease assumed a degree of obstinacy rather unusual so early in the season. Augusta is favourably situated for the production of miasmata: it stands on an extensive flat plain, nearly encompassed on the south and east by a large swamp, which is generally in the autumnal months covered by stagnant water; the soil very rich and marshy. Dry and wet seasons have much influence on our diseases; in the former they recur more frequently, and require a more energetic treatment,—in the latter we meet with fewer cases, and they often yield to mild remedies. Southerly winds prevail in summer, and the putrid effluvia generated in pools are wafted to the inhabitants. I have generally considered this as the source whence the epidemic takes its origin. In this opinion I am fortified by the removal of patients to the adjacent sand-hills,

where they recover quickly. About the commencement of August we had heavy rains, and the mercury was very high; to this succeeded a long drought. Fever began to show itself in all directions with aggravated symptoms. Though the cases were very numerous, and the symptoms highly malignant, and in many instances death supervened, I did not suppose the epidemic came under any other denomination than bilious fever of a higher grade than usual. The deaths were more numerous than in any preceding year,—say as two or three to one. An intelligent man in the country above us is convinced more persons died there the last fall than in the five preceding years. The fever terminated about the 1st of October, after much rain, thunder, and cool nights. If asked whether the fever originated from the common local causes around us,—I answer in the affirmative: if connected, directly or indirectly, with foreign contagion,—I answer decidedly in the negative. Nor do I think it was contagious from one to another. Such symptoms as have been noticed by Rush in its last stage seldom exist here in a high degree, though I think in one or two cases we discovered a discharge from the stomach that approached nearly to what has been denominated black vomit. I do not recollect to have met with hæmorrhagy or petechial spots; where the disease proved mortal, the intestinal discharges were very dark and fœtid.”

This epidemic, like that mentioned by Dr. White at Waynesborough, was an aggravation of the bilious remittent, approaching as near yellow fever as may be generally expected among the natives of

so southern a climate as Georgia. Dr. Smelt attributes the sickness which occurred in the country immediately above Augusta, in part to the use of cotton-seeds as manure. This country he describes as high, with good water, and the air, till within a few years, very salubrious. Tobacco was then the commercial staple of the upper parts of Georgia; but within a few years it has been changed to cotton, the seed of which is found to be an excellent manure. "It is the practice," he says, "to cover the surface of the field with the seed in winter; it is superficially ploughed in in the spring; and in summer, from the great heat of the sun, and the seed then being in a state of putridity, we may easily account for more cases of fever, symptoms highly malignant, and more unhappy terminations."

The diseases which occurred among the British forces in the winter and spring of 1814-15, before New Orleans, and in the Gulf of Mexico, are described in a very animated paper by Dr. Robertson, in the 12th volume of the *Edin. Med. and Surg. Journal*. So long as the cold weather lasted, they were principally dysentery, scurvy, and intermittents; but in April and May, when the heat in the Gulf, after the forces had left the Mississippi, became oppressive, the thermometer never falling below 80°, cholera and yellow fever prevailed, the last "entirely confined to those who had been previously serving on shore, or exposed much to the sun and night dews, while pulling in boats, on the coast, or in the river of Apalachicola. The features of this fever were precisely such as I have been accustomed to see in

the *Kausus* or yellow fever, so well known in other parts of this great western archipelago."—Dr. Robertson's observations on this fever are admirable for their good sense and practical importance; but as they are not limited to the disease which occurred on board the British fleet, I shall content myself with referring to them, and to the evidences they afford of his convictions of the endemic origin and non-contagious nature of yellow fever, and of its being merely a higher grade of the common bilious remittent. From his limiting the disease to those who had been exposed to malaria on or near the shore, it was, probably, the specific disease of marsh effluvium, excited into action by the stimulus of a high temperature, as often occurs in boats' crews who have been employed in watering in tropical latitudes, and in whom fever is subsequently excited, and to whom it is exclusively confined.

In a brief and very unsatisfactory notice of the sickness in a portion of the American army encamped below New Orleans, on the banks of the Mississippi, in the summer of 1809, contained in the 14th volume of the *Med. Repos.* p. 85, scurvy is mentioned to have existed with dysentery, intermitting, and remitting fevers; and from the analogy between it and that described by Dr. Robertson, and the unhealthy nature of the country, it might be considered to give some support to the idea of Rush, that scurvy is "a misplaced state of fever, in which the heat and quick pulse is absent, because the excitement of the vascular system is confined to those extreme vessels which pour forth blood, just as the

symptoms of fever in small-pox desert the blood-vessels as soon as the new action begins on the skin."

In the 4th volume of the Medical Repository, there is an extract from the journal of Mr. Ellicot, dated Galliopolis (lat. 39°), on the Ohio, Nov. 15th, 1796. This gentleman was employed as a surveyor by the United States Government. "Arrived at Galliopolis about eleven in the morning. This village is a few miles below the mouth of the Great Kanha-way, on the west side of the Ohio river, situated on a high bank, and inhabited by a number of miserable French families. Many of the inhabitants this season fell victims to the yellow fever. The mortal cases were generally attended with black vomiting. This disorder certainly originated in the town, and in all probability from the filthiness of the inhabitants, added to an unusual quantity of animal and vegetable putrefaction in a number of small ponds and marshes within the village. The fever could not have been taken there from the Atlantic States, as my boat was the first that descended the river after the fall of the waters in the spring; neither could it have been taken from New Orleans, as there is no communication at that season of the year up the river, from the latter to the former of these places; moreover, the distance is so great that the boat would not have time to ascend the river after the disorder appeared that year in New Orleans, before the winter would set in."

In the same page of the Repository, the following facts are communicated to the editors by Dr. Watkins, from his own personal knowledge. "There

is a village called New Design, about fifteen miles from the Mississippi, and twenty miles from St. Louis (lat. $38^{\circ} 36'$), containing forty houses and two hundred souls. It is on high ground, but surrounded by ponds. In 1797, the yellow fever carried off fifty-seven of the inhabitants, or more than a fourth. No person had arrived at that village from any part of the country where this fever had prevailed, for more than twelve months preceding. Our informant resided in the village at the time; and having seen the disease in Philadelphia, he declares it to be the same that prevailed at New Design. He also mentions an Indian village depopulated by the same disease, two or three years before."

If these facts are to be admitted as proofs of the existence of yellow fever, in situations so remote from the sea-coast, they are sufficient to set at rest for ever the question of its spontaneous origin. Though the victims of these epidemics may naturally be supposed to have been natives of the soil, there is no reason to doubt on that account that the disease was yellow fever, as we know that the inhabitants of Philadelphia, which is in lat. $39^{\circ} 57'$, are obnoxious to it.

I shall advert to several instances of epidemics in the State of Ohio, to show how far the detailed observations of medical men in that inland district countenance the idea of yellow fever being endemic there.

In the 10th volume of the *Med. Repos.* p. 6, Dr. Harrison gives a brief account of two epidemics near Chillicothe, Ohio (lat. $39^{\circ} 18'$), in 1800 and 1801.

This place is situated on the Scioto river. The summer of 1800 was generally dry, till about the middle of August, when rain fell, which swelled the almost exhausted streams over their banks, and in a few days after, a large proportion of the inhabitants fell sick with bilious fever, mostly of the remitting type, and with symptoms of great violence and danger in a majority of cases. About the same time a fever of a similar nature made its appearance in all the principal settlements on the Scioto and its tributary streams; but the settlement at the mouth of Deer Creek suffered more in proportion to the number of inhabitants. Several of those in whom the disease proved fatal at this place, Dr. Harrison was informed, turned yellow soon after death. The fever abated its ravages early in October, though frequent cases of intermittents were protracted into winter, and a few into spring. The spring of 1801 was unusually wet, till the 1st of June, and the bottom lands overflowed. From this time to the end of August there was a great deficiency of rain, and it was for the most part intensely warm. About the 1st of July, the bilious remitting fever, in a mild form, appeared on Deer Creek. Its attacks soon became more formidable, and towards the middle of the month began to discover violent and dangerous symptoms. It appeared in several places, and Dr. Harrison calls it the Scioto epidemic. He met with no cases of pure intermittents till the middle of October, when remittents had much declined.

The premonitory symptoms were chiefly a sense of weariness, soreness, or stiffness in all the voluntary muscles, not excepting those which move the

eye-balls, rendering their motions painful,—and frequently pains in the head and bones. The immediate accession of fever was generally, though not always, preceded by a chill or increased sensibility to cold. If pains of the head, back, and bones did not exist as premonitory symptoms, they invariably attended the accession of fever. The stomach was always affected with sickness, often with pain, tension, and soreness. There was great prostration of muscular strength; face flushed; the eyes suffused and turgid, with giddiness and syncope in an erect posture; the bowels most frequently constipated or often affected with diarrhœa; the evacuations from them and the stomach for the most part bilious, either yellow or green. The pulse generally in the commencement was frequent, full, and hard, or almost imperceptible in the radial artery, when beating with great force in the carotids. If the fever ran on without intermission for two or more weeks, the pulse progressively passed through the various grades of morbid force, until it became typhous. This was not unfrequent when early depletion was neglected; and in one or two cases took place in spite of depletion, carried as far as it was thought safe. “I am firmly of opinion,” adds Dr. Harrison, “that autumnal bilious fevers, of what type soever, will very seldom degenerate into the typhous state, when timely and appropriate depletion has been used; but my experience has convinced me, that winter fevers frequently will become typhous in spite of the most appropriate treatment.”

Hæmorrhages were not frequent, and when they happened, were salutary, by diminishing the force

of the morbid action. They took place from the nose, bowels, and urinary passages. In one case a quart of blood was discharged from the bowels of a girl fourteen years old, and it was shortly followed by a regular paroxysm of an intermittent, and she soon after recovered.

In one or two cases which terminated fatally, there was a total suppression, for a considerable time before death, of the urinary evacuation. The tongue was always foul, and its appearances served to indicate the different stages of the fever;—when it was covered with a whitish scurf, an inflammatory diathesis might in general be inferred; but in a few days it became yellowish, and a dry blackish furred tongue always announced the typhous state. Regular intermittents were rare, but the fever had a universal tendency to observe the tertian type. Its exacerbation was about sun-set, and an abatement did not happen till towards the morning of the second night inclusive; so that the paroxysm continued about two nights and one day, or thirty-four hours, and of course the duration of the remission was about fourteen hours. The exacerbation was in some attended with a slight chill, but in many it was unaccompanied with any increased sense of cold, or the extremities were cold without any general chill; and corresponding with the distinctness of the remission and exacerbation, the abatement was attended either with sweating or without. Those cases, in which the accession was not attended by some chillness, and the abatement by some sweating, were most violent and dangerous. “In a few instances the fever degenerated into the chronic or

typhous state, with weak, frequent pulse, dry tongue, delirium, coma. It was rare that a salutary crisis happened before the ninth or eleventh day, and a solution of the fever could seldom be obtained sooner under any treatment. It often ran to a much later period before a favourable issue took place, without degenerating into typhus. A fatal termination seldom happened before the ninth day, but generally on uneven days between this and the twentieth, and sometimes much later."

Dr. H., in alluding to the causes of the epidemic, says, that "humidity is one of the great characteristics of the climate, evinced by the frequency and density of the fogs, the cool nights, and heavy dews." The prevalence of the fever was almost exclusively confined to those tracts of country which lie low, and for the most part along the water-courses. "Prairies," he remarks, "are extensive openings covered with a luxuriant growth of sedge-grass, generally situated on the bank of some water-course, and bordered on one side by what are called stools or benches, which are sudden transitions from first to second bottoms, rising almost perpendicularly twenty or thirty feet from their base. These benches are most remarkable along the Scioto, and have no doubt once been its bank; but the river, gradually shifting its channel, has left extensive and inexhaustibly fertile low grounds. At the foot of these benches the ground is lower than towards the margin of the river, and hence the water stagnates here. In a serene summer day a stench almost insupportable arises from these moist prairies, and the humidity with which the air is loaded during the hot

days, is precipitated during the cool nights in copious dews and dense vapours. Hence these prairies are the most fruitful sources of the febrile cause, and in these the hydra dwells. Every circumstance favourable to the generation of a deleterious principle exists here in an eminent degree,—putrefying vegetable and perhaps animal substances, high heat, and a low humid soil; and the means provided by nature for arresting its destructive tendency with respect to animal beings are few, the prairies being almost entirely bare of trees.

“When the miasmatic principle had not sufficient force to produce morbid excitement in the whole sanguiferous system, or when the whole system was unsusceptible of its noxious stimulus, it frequently appeared under a variety of local affections, according to the local susceptibilities of the subject; as head-ache, ophthalmia, ulcerations of the gums, colic, dysentery.

“The sore mouth at first had very much the appearance of being occasioned by mercury. The teeth were sore, gums spongy and red where they joined the teeth, and painful. In a few days the gums began to separate from the teeth, and to slough off, so as to leave the teeth bare in many instances quite down to the jaw-bone. The gums had now a gangrenous appearance, and the teeth were rough and eroded.” In the case of a lady previously exhausted by fever, where an affection of this kind had lasted several weeks, Dr. H., a convert to Dr. Mitchill’s theory of malaria being septic acid, directed the mouth to be washed with a solution of potash mixed with bark, which was efficacious in a

few days without the aid of any other external or internal remedy,—the deficiencies in the gums being in a short time obliterated by a growth of new parts.

The history of this bilious remittent fever is interesting, from its tendency to run into typhus,—a change of type which may perhaps have been connected with the great moisture of the climate, as we find this form of fever endemic in the autumns of those countries where the summer heat is moderate, and the autumns cool and damp. The unquestionable source of the epidemic was the malaria, generated in the rich alluvial deposits of the Ohio and its tributary streams, which are said to drain a tract of country four times the superficial extent of England and Wales, and the Ohio is but one of many large rivers tributary to the Mississippi. The high heats of summer and autumn along the streams of this majestic river give rise to a concentrated malaria, and to a high degree of irritability in the animal frame; and the fevers are proportionate in their character.* At New Orleans,

* I refer the reader to Letter. 13, in Flint's "Recollections of the last Ten Years, passed in the Valley of the Mississippi," for a most interesting account of the navigation of this great river and its tributaries, which drain a valley 2,500 miles in width, and 3,000 miles in length.

This work abounds in beauties of description and of feeling, which ought to recommend it to every lover of nature and of man. During the residence of the amiable and admirable author at St. Charles on the Missouri river, he was attacked with bilious fever; and his account of his case is so interesting, that I offer no apology for inserting it. He had made an excursion from St. Charles, the object of which was "to examine into the moral condition and

near the mouth of the Mississippi, the yellow fever is almost annually endemic, as at Vera Cruz; and the remittents prevail in the interior, more or less running into it, or into a typhoid

wants of the new settlers on the Illinois river." It was in August. "I had suffered," he says, "much from heat, bad food, and exposure; and had breathed the air of the Illinois, charged at this sultry season with miasma. The week after my return, I was taken down with a severe bilious fever. Emigrants generally suffer some kind of sickness, which is called 'seasoning;' implying that it is the summit of the gradual process of *acclimation*. This sickness commonly attacks them the first, second, or third year; and is generally the more severe, the longer it is delayed. This came in my third year's residence in the country. I am aware that every sufferer in this way is apt to think his own case extraordinary. My physicians agreed with all who saw me, that my case was so. As very few live to record the issue of a sickness like mine, I will relate some of the circumstances of this disease. And it is, in my view, desirable in the bitter agony of such diseases, that more of the symptoms, sensations, and sufferings should be recorded than have been, that others in similar cases may know that some before them have had sufferings like theirs, and have survived them. I had had a fever before, and had risen and been dressed every day. But in this, with the first day I was prostrated to infantine weakness, and felt with its first attack that it was a thing very different from what I had yet experienced. Paroxysms of derangement occurred the third day, and this was to me a new state of mind. That state of disease, in which partial derangement is mixed with a consciousness generally sound, and a sensibility preternaturally excited, I should suppose the most distressing of all its forms. At the same time that I was unable to recognise my friends, I am informed that my memory was more than ordinarily exact and retentive; and that I repeated whole passages, in the different languages which I knew, with entire accuracy. I recited, without losing or misplacing a word, a passage of poetry which I could not so repeat after I had recovered my health. Sometimes imaginations the most delightful, and at other times the most terrible, took possession of my mind. But at that hour in the even-

fever, as on the banks of the Scioto. The existence of typhus in such thinly peopled and isolated villages, derived from marsh effluvium and arising out of the intermittent and remittent type, must be taken into consideration in the general estimate of its nature and causes, where it is the prevailing form of fever, as in Great Britain ; and if it can be shown that temperature and other causes appa-

ing, when my family had been used to sing before prayers, I constantly supposed that I heard two flutes playing harmonies in the most exquisite and delightful airs. So strong was this impression, that it was difficult to persuade me, on the recovery of sanity, that it had not been so. As my strength sunk, and as the painful process of blistering and emetics, and other distressing operations was laid aside as of no further use, I remember well that every person who came into my room seemed to come with an insufferable glare of light about his head, like a dazzling glory ; and that every one about me seemed to walk in the air, and in eccentric ellipses. Then there were continual flashes from my own eyes, like those when we receive the concussion of a violent blow on the head. When the paroxysm came upon me, a kind of awful curiosity, not unmixed with delight,—for at that time I was not afraid to die,—dwelt on my mind ; a straining of its powers to imagine the scenes that would burst upon me when I should shut my eyes upon time, and open them in the light of eternity. I passed the greater part of two days in such extreme weakness, as to be unable to close my eyes ; and yet, during this period, when I was supposed unconscious, I was possessed of consciousness in such a degree, as to hear and to know all that was passing about me. I expected every moment to have done with the earth ; and of one thing I am sure,—that I was then perfectly willing to lay down the ‘ worn being, full of pain.’ A feeling not unlike regret accompanied my first impresson that I was returning back to life. Too soon, in such cases, resolutions vanish ; life and the earth regain their charms and their influence, and the former train of feelings return.

“ Every one who has been sick in this way, and who, from the

rently influence the type of marsh fevers, less emphasis will be laid upon the assertion that the continued type is of a nature wholly different from the others, and is the product of a specific contagion. The occurrence of scurvy at the Scioto settlements, blended with the fever, is surely not to be considered an accidental coincidence with what fell under the observation of Dr. Robertson, and what happened in the detachment encamped below New

extreme of emaciation and weakness, has recovered a renovated existence, has probably been conscious in some degree of the same delightful sensations of convalescence which I experienced. In that state of debility, from which all the seeds of disease and all causes of irritation have been removed, there is something in the tranquillity and repose, which excludes all uneasiness and all vexation, not unlike the serenity and satisfaction which are supposed to be the portion of the blessed. I remember days of more elastic feeling, and which gave rise to more expressions of happiness; but I do not remember to have experienced such a placid and contented frame for such a length of time. I attempted to analyse my feelings; and I flattered myself that the consciousness of restoration from the grave, and returning health, did not make a material element in this state of tranquil enjoyment. How strongly we feel, under such circumstances, that the vexing and bad passions will never regain a place within us! The remembrance of the manner in which the world and its hopes and desires had affected me, seemed like a shadowy dream. I shall not forget, until memory has lost her seat, the sensations excited by the first view of the earth, the trees, the river, and the heavens, the first time after this illness that I was carried out to ride. Every object had a new aspect and a new colouring; and I beheld the beauty of nature, as if for the first time. I had been confined fifty-five days; and with the weakness of an infant, I had all its freedom from cares and desires. How earnestly did I wish that such a state of abstraction from passions and cares, and such fresh and admiring views of nature might last for ever!"—Letter XIV. p. 131. Boston edition, 1826.

Orleans; but whether it is to be ascribed to any kind of diet, to the effects of a very moist air, or to malaria, I leave to the judgement of others. We might reasonably suppose the influence of diet in the case of the British and American forces, but scarcely in the other, as vegetables and fruits must have made a part of the food of the Scioto settlers.

Bellepré, lat. $39^{\circ} 27'$, situated on the river Ohio, was visited by an epidemic in 1807, an account of which is given by Dr. Hildreth in the eleventh volume of the Medical Repository. "The town is on a clay soil, on what is called *first bottom* land, which for the distance of ten miles is in a very high state of cultivation, being covered in summer with large fields of corn; meadows of the finest English grass, with orchards of peaches and apples, are all emblematical of its name—'*pleasant meadow*.' The winter of 1806-7 was very cold, the thermometer for two or three days in January being five or six degrees below zero; so that the Ohio was frozen so hard that loaded waggons crossed on the ice. The spring was backward and wet, and the summer not less so. The heat not greater than common, the thermometer never rising above 90° . In the course of the spring and summer there were three freshes in the Ohio, which inundated the low lands, and destroyed many fields of corn. The stagnant waters in every direction, full of corrupting vegetable and animal matter, exhaled putridity and disease. The inhabitants, from their situation on the bottoms, were most of them in the neighbourhood of standing pools, and of course most of them diseased. In February and March there were obsti-

nate catarrhal fevers; and by the middle of July fever and ague, with some cases of remittents, were common. In August, scarcely a family in the township was free from the disorder in some form or other: indeed it extended up and down the river for several hundred miles, but was confined to its banks. The fever most common was the bilious remitting; though it put on every form, from the mild intermittent to the highest grade of bilious fever; amounting in many instances as nearly to the yellow fever of our cities as the situation would allow. It was even termed yellow fever by some. It began with pain in the head and limbs, yawning, pain in the back, rigor followed by fever, attended with more or less of delirium. The tunica adnata was inflamed, and of a yellow cast; skin hot and dry, in many yellow at the commencement, and in all at the end of the disorder. The stomach was affected with a nausea; in some rising to full vomiting of a dark green-coloured matter, in some verging almost to black; the dejections of the same cast, and extremely foetid. The tongue was covered with a thick dark coat in some: as fever continued, it became almost black. In the worst cases, however, the tongue was clean. August and September were most sickly; October less wet, and cooler: this checked the disease, and cold weather put a stop to it. Intermittents were common till the middle of winter.

“When the disease was not checked by medicine, it commonly ran from fourteen to seventeen days, unless death put a stop to it. When this was the case, it commonly happened on the fifth or ninth

day; some as early as the third, and some as late as the thirtieth. Many had common intermittents only, while others suffered both from this and the remitting fever. It affected all ages and sexes: children suffered most from intermittents. Influenza appeared on October 1st. It came from the east, and travelled westward. Old people suffered most from it. Some who had fever and ague suffered much; the cough being obstinate, and removed only by removing the ague. It left by November 1st. Towards the last of October many were seized with a disorder that had the appearance of a violent pleurisy. The patient was seized with a chill, in some amounting to an ague, followed by violent fever, severe pain in the side, difficult respiration, distressing cough, skin dry, and intensely hot about the præcordia, but the extremities cold; great thirst; tongue dry and trembling; pulse small, 110 to 120 in a minute; low delirium; eyes watery and dull; great prostration of strength, and dejection. From the violent pain and oppression I was led to suppose venesection would be useful. After eight to ten ounces had been drawn, I discovered, from the sinking pulse and increased weakness, it was hastening the patient to his exit. The bowels were then cleansed, blisters applied to the sides, and warm moist cloths laid on the extremities. Two ounces of serpentary root, with half a drachm of bark, were ordered every hour; and a grain of opium and camphor every two hours, to relieve the pain, and bring on perspiration. This plan had the happiest effect, and snatched my patient from the jaws of death. Before this tonic course was adopted

he was every moment sinking ; his eyes glassy and dim ; hearing dull, with great languor and oppression ; pulse small, and very quick ; the skin on his breast gave the finger a burning prickly sensation ; his face covered with a cold sweat, and extremities cold. This was the first case I had of this mock pleurisy. All who pursued the above plan recovered, while many who followed a different course died."

We again perceive in this epidemic close approaches to yellow fever ; such cases in the seaport towns, according to the repeated testimony of Rush, being met with in every epidemic of that disease, and not considered distinct as to cause or nature with those rapid cases which are characterized by the coffee-ground vomiting. The influenza here alluded to was a very memorable epidemic that spread over all North America. It was supposed first to attack New York about the end of July : and an interesting report of its progress is given in the eleventh volume of the Medical Repository, p. 190. I find it, however, mentioned as early as February and April, on Block Island, by Dr. Willey : but it appears to have yielded to the hot weather, and not to have reappeared there till August. It is also mentioned at Wheeling on the Ohio, by Dr. Forsyth, as early as April. It prevailed in Canada in October, and did not reach the Southern States till November, when it appeared in conjunction with pleurisy.

The autumnal pleurisy of many parts of America appears to be connected with malaria, excited into action by cold, and is generally termed bilious

pleurisy. Rush mentions it as common in Philadelphia after epidemics of yellow fever; and Dr. Forsyth (Med. Repos. xii. p. 350), in speaking of the diseases in the State of Ohio, says, "Our pleurisies are almost in every instance attended with bilious symptoms. A person will be seized with all the symptoms of a genuine pleurisy;—we deplete, and about the fifth or seventh day his skin and urine will turn yellow,—a slow bilious remittent follows, perhaps for some weeks."

Cleghorn, in his classical work on the Diseases of Minorca, describes a similar disease among the winter fevers of 1745–1746, and quotes two letters of Dr. Font, who says they are sometimes attended with a quotidian or tertian fever.

In another paper by Dr. Hildreth (Med. Repos. xii. p. 358), descriptive of Marietta, lat. $39^{\circ} 25'$, on the Ohio, (and I suppose not far from Bellepré), he gives a bill of mortality at Marietta for 1808, in which, except one case of puerperal fever, the only fever mentioned is *typhus gravior*, of whom four persons died. The total number of deaths is twenty-eight; while in a note at the bottom he mentions that the deaths in 1807 were fifty-one, "principally of *bilious fever*."

In the paper of Dr. Forsyth above alluded to, there is an interesting passage on the subject of the fevers which attacked the first settlers at Wheeling, situated in lat. 40° , on the Virginia bank of the river Ohio. "In the first settlement of this country," he says, "the inhabitants were under the necessity of living in small log cabins, in which large families were crowded together like so many sheep in a pen,

and several years would pass before a sufficient improvement could be made to let the sun and wind have their necessary influence. Under such circumstances, where vegetables grow so luxuriantly, their sudden decomposition must afford much miasma, which could not be carried off sufficiently by the winds to keep the air pure; so that by day they were exposed to this unfriendly air, and at night confined to their own effluvia in those unventilated cabins. Add to this, that the unreconciled state of their minds, by coming so far from their native homes, and settling among strangers, creating home sickness, could not otherwise than have a sensible effect on their diseases. All these causes had a tendency to give a typhous state to them. For the four first years after I came here, I found fevers of the nervous type, and very obstinate. Whole families would be laid up frequently from four to eight weeks, before any symptoms of convalescence appeared, except those who called for medical aid in the forming state of their fever. In proportion as the country has become cultivated, the inhabitants better clothed and fed, their houses enlarged, and a more free circulation of air, the diseases are less frequent, and their type materially changed."

Here is an example of a typhoid nervous fever occurring in an unsettled country, notorious for malaria, among a people whose crowded, anxious and depressed condition was in some respects analogous to that of the poor of this country, who are proverbially the victims of typhus fever. But the analogy with respect to deficient nutriment, which is so generally considered a predisposing cause of typhus

in Great Britain, does not hold; for however rude the habits of the settlers in the wilds of America may be, they are generally abundantly supplied with food; and Dr. Forsyth says that the settlers alluded to lived principally on "fresh meat and vegetables;" and that "they could raise forty or fifty bushels of corn, and from twenty-five to thirty of wheat per acre; while one half of that quantity would have been considered good crops, and required double the labour in the country (New England) where they formerly lived."

Facts of this kind, drawn from such isolated masses of population as are found in the townships of North America, are very instructive: and if there be any analogy between these fevers on the banks of the Ohio, which are termed *typhoid*, *nervous*, *typhus gravior*, and the common endemic of this country,—of which I entertain no doubts,—they must have their full weight in determining its nature, and its remote and exciting causes. Dr. Hildreth records fifty-one deaths from bilious fever in 1807 at Marietta, and four deaths only in 1808 from *typhus gravior*; as if certain causes, either in combination or in succession, gave rise one year to the periodic type of fever, and in another to the continued. We shall find at New York a similar record; that in those years in which yellow fever did not prevail, it was represented by typhus: and Dr. Vaughan in the State of Delaware mentions the simultaneous existence of them both, in situations where it was impossible to doubt they took their origin from one and the same remote cause.

Humboldt, in speaking of the insusceptibility of

the natives of the torrid zone to yellow fever, shows what slight causes will occasionally destroy it,—such as a temporary change of residence from one place to another. And if this can happen in climates of comparatively uniform character to persons subject from their birth to their influence, we might expect every degree of susceptibility to febrile disease in the natives of the varying climate of the midland parts of North America, and that every form of fever would be developed, from the great vicissitudes to which they are exposed.

“The farm of l'Encero, near Vera Cruz,” he says, “which I found to be 3043 feet above the level of the ocean, is the superior limit of the *vomito*. We have already observed that the Mexican oaks descend no further than that place, being unable to vegetate in a heat sufficient to develop the germ of yellow fever. Individuals born and brought up at Vera Cruz are not subject to this disease; and it is the same with the inhabitants of the Havannah who do not quit their country: but it happens that merchants born in the island of Cuba, and who have inhabited it for a great number of years, are attacked with the *vomito* when their affairs oblige them to visit the port of Vera Cruz, during the months of August and September, when the epidemic is at its height. In the same manner Spanish Mexicans, natives of Vera Cruz, have been seen to fall victims to the *vomito* at the Havannah, Jamaica, or the United States. These facts are no doubt very remarkable, when we consider them with respect to the modifications which the irritability of the organs exhibits. Notwithstanding the great ana-

logy which the climate of Vera Cruz bears to that of the Island of Cuba, the inhabitant of the Mexican coast, insensible to the miasmata of the air of his native country, falls under the exciting and pathogenical causes which act on him at Jamaica and the Havannah. It is probable that under the same parallel the gaseous emanations which produce the same diseases are almost the same; but that a slight difference is sufficient to throw disorder into the vital functions, and to determine that particular succession of phænomena by which the yellow fever is characterized. Thus I have shown by a long series of experiments, in which the galvanic excitations serve to measure the state of irritability of the organs, that chemical agents excite the nerves not only from the qualities which are peculiar to them, but also from the order in which they are applied after one another. Under the torrid zone, where the barometrical pressure and temperature of the air are nearly the same throughout the year, and where the electrical tides, the direction of the wind, and all the other meteorological variations succeed one another with an immutable uniformity,—the organs of the man habituated from his birth, in his native climate, to the same impressions, become sensible to the smallest changes of the surrounding atmosphere. From this extreme sensibility, the inhabitant of the Havannah transported to Vera Cruz while the *vomito* is committing the most cruel ravages there, runs sometimes the same risk as persons not seasoned to the climate,—I say sometimes, for in general the examples are as rare of persons born in the West Indies being attacked

with the yellow fever at Vera Cruz, the United States, or Cadiz, as of negroes falling victims to this disease."

This predisposition alluded to, acquired by the change of residence, may be supposed to depend on moral as well as physical causes, as we know that fear and passions of the mind have great influence in exciting fever. I have somewhere read that Phillidore, the great master of chess, used to play frequently with a friend who was his equal in the game, and that it was found the average of success was always in favour of him at whose house they played, as if the mind of the visitor had, to a degree, lost its equilibrium, by being from home.

The inconstancy of the type and character of fever in America is well shown by Dr. Watkins in his observations on the Influenza, November 1807, at Nashville, Tennessee, lat. $36^{\circ} 10'$, (Medical Repos. xii. 5.) Nashville is situated on the Cumberland River, one of the largest tributaries to the Ohio, and is near the centre of Mero, the westernmost, and formerly the only district of the State, west of the Cumberland Mountains.

Dr. W. says, "The district of Mero has been settled rather more than twenty years,—at first by a very few. Within twelve years past the country has been comparatively much opened. I have been told by those on whom I rely, that first, rheumatic affections were common; then, autumnal intermittents and bilious remittents; and finally, continued fevers have in succession pervaded the settled parts of this country, each in their first order of time, simple and uniform in their nature and symptoms,

and readily yielding to one simple and unvarying mode of practice. For three or four years past, however, (I have lived there no longer,) this simple and easy nature of diseases has very much changed for the worse; and a more complicated, varying, and obstinate character has rendered the duties of a physician much more arduous, and his success more precarious. There have been intermittent fevers that would not yield to emetics and bark; bilious fevers, so called, that would not yield to jalap and calomel, the lancet and bark; and continued fevers, with full pulse, florid countenance, and hot burning skins, that have been precipitated to the most dangerous states of malignity by drastic purges, injudicious bleedings, or oppressive stimulation: and indeed such has appeared to me the unstable nature of our diseases of late, and each year and every season presents such new, unlooked-for and complicated difficulties, as to render it impossible for a physician to *foreknow* how to proceed. No season has been more remarkable for this protean difficulty in the nature and symptoms of our diseases, than the one of which I am speaking, before and when the influenza came down upon us, on the 1st or 2nd of November, ushered in by cold north-eastern winds and rain. It seemed to fall on all at once; but most believed they had it first, for few had time to hear it from their neighbours before they felt it themselves. Quotidians, tertians, quartans, and double tertians, fevers without agues, and agues *in* fevers, remitting and continued, alike distressed and destroyed our patients, and embarrassed and perplexed their physicians. But the most prevalent

disease, immediately at the time of the influenza's approach, was a fever with a full, flowing, and quickened pulse, hot burning skin, red thickish urine, sometimes a dilated pupil with a weak watery eye, but most generally a contracted pupil with a wild and restless look and action ; generally a hard, dry and black, or a glossy, red and smooth tongue. If the tongue inclined to be furred, white and moist, thirst was more common ; if black, dry and hard, or red, glossy and dry, it was otherwise.

This fever was generally preceded by or accompanied with moderate or violent pains of the head, back, or limbs, and the latter were called by the sufferers "racking pains" in their bones. In Logan county, Kentucky, fifty or sixty miles north-west of Nashville, a place in general very healthy, this fever proved very distressing : many died, and others with difficulty escaped, after long and tedious illness. Their physicians were violently attacked, and incapacitated from attending the sick for many months. This fever, in different directions, was treated in different ways by many with nearly equal success ; drastic purges, bleeding, and blisters, proved no more successful in one place, than wine, bark, and blisters did in another. It appeared to me that mild emetics, gentle calomel purges, alkalis, mercurials, opium, camphor, cold bath, nutrentia, with constant fresh air and cold drink, all moderately and patiently used, would have borne most constitutions safely out, if applied before any fatal congestions had taken place. Bark would not do ; and bleeding I felt fully impressed was injurious in most diseases which occurred before the influenza ; but the very

moment this transient epidemic took hold, there appeared in almost all cases contrary indications : the pulse, instead of full and flowing, became small and locked ; its diameter was reduced to one half, one third, or one fourth, but attended with a sly sharpness. The tongue, instead of dry and hard, became white, soft, and furred ; and the urine assumed a bright yellow or straw-colour. Delirium rarely ever occurred ; but an almost indomitable dryness of the skin, in the commencement of most cases, seemed to aggravate every other symptom. Pains in the ears, eyes, breast, or side, were very common and severe. In one case a violent pain in the head alternated with an acute pain in the side ; and during its prevalence in either part, relief was felt in the other. In most cases where pains in the ears or eyes occurred, pleuro-pneumony did not, or was less violent ; but the last was most common. Upon this sudden change in the symptoms of diseased persons, I found it necessary to change my practice. Bleeding was in many cases *necessary*, in most useful, and in all these its good effects were instantaneously visible. I have been called in great hurry in the night to persons not used to call on physicians, who had the disease violently, sitting erect, and writhing under violent pains and difficulty of breathing, with a hard cough. A pint of blood drawn directly, and an active bolus of calomel, worked off with sweetened cream-of-tartar water, have in a few hours produced the most unexpected relief. A cooling regimen, particularly cool drinks, appeared most salutary ; and indeed those who took the disease, or rather those whom it overtook tra-

velling, if they continued on, had it lighter, and rarely required or had medical aid until housed. In those cases where pneumonia occurred, I found it necessary, as I thought, to bleed more cautiously than where the head was chiefly affected.

“In the former, typhus often succeeded influenza; in the latter, never that I saw. Many who were attacked with violence, if not early and copiously evacuated, especially those who took heating things, inclined to spasms, opisthotonos, paralysis, tetanus, —all of which states myself and others witnessed about the second week from the commencement of influenza, and we neither saw nor heard of them before nor after. These appeared to me the symptoms of influenza, and to give the indications of cure when it was simple and unmixed, though this was not universally the case. In short, it appeared to me essential for the medical mind to attain the following general ideas, during the prevalence of the influenza. First, that a sudden universal cause might arise, calculated to swallow up existing causes of disease, or so bear down their local influence, or incorporate them with itself, as to produce a new disease *sui generis*. Secondly, that such an established predisposition to be diseased from a pre-existing cause, might have become already so fixed in some constitutions, as to exclude the influence of a new supervening cause; in which case I supposed the latter might act principally as an exciting cause to the former. Thirdly, that such a combination of the two causes might exist as to produce, blended together, a contending influence in the system without a marked ascendancy of either. I did see cases

where bleeding injured during the height of the prevalence of influenza, and stimulants above ordinary produced restlessness and distraction. These cases seemed to go on best with gentle laxatives, a cool regimen, alkalies, cider beverages, and then opium, calomel, and camphor. Towards the latter end of the second week of the reign of influenza, it became evident it was going. I left the western country for the city of Washington before I learned where it went, but not until I heard of it on the road to Louisiana. After its departure, the fever which I have described as prevailing before it came, and which I sometimes called one thing and sometimes another of the malignant kind, according to its violence, gradually crept up again, only a little frightened out of its natural appearance, and forced to assume a new complexion, from the influenza's superior power. Instead of pains in the bones, it appeared now with pains in the chest and side, with obstinate cough in the form of a typhoid pneumonia, now a still more mongrel disease, and requiring a more mongrel kind of treatment than before. During the prevalence of influenza I practised very much from my impressions. If I felt a small infrequent pulse, with a somewhat coolish dry wrist, and otherwise bad symptoms, I felt no disposition to hesitate about using the lancet; but if I felt a full and quicker pulse and hot skin, I instantly felt doubts. In many parts of the western country, the influenza was said to prove fatal: some few died in the neighbourhood of Nashville. For my own part, I did not see much necessity for anybody's dying with it; and if they had been treated

right, I do not think they would,—not even those who had previous indisposition, for in such it was only necessary to strike more immediately at the influenza.”

I have been unwilling to make a shorter abridgement of these highly interesting observations, as they serve to show how variable the fevers in North America occasionally prove, and how prone the fever in question was to mould itself to the transitory impression of that epidemic cause which gave rise to the influenza. The fever in November, as described by Dr. Watkins, was, I conceive, typhus, excited by the autumnal cold; this diminution of temperature apparently having in many situations a tendency to excite the continued form of fever in those who have been exposed to malaria in summer and the early part of autumn. I may be wrong in using the conventional term typhus; but by it I mean a continued fever, the remote cause of which is malaria, and of course, therefore, a modification of the intermittent and remittent fevers. I shall hereafter show that in the epidemics of this country, fevers attended with similar symptoms are called typhus; and I insist more particularly on the importance of these limited epidemics in America, because the periodical types of fever are so common in them, to which all authors agree in referring malaria as a remote cause; and because it is more easy to take a *coup d'œil* view of them in their origin, progress, and decline, than in similar examples of epidemics in large cities. No one who attentively considers the observations I have quoted illustrative of fever as it has appeared in the states

of Ohio and Tennessee, and who considers also the nature of the soil and the climate, will be disposed to question the existence of malaria, to which all those who dwell on the alluvial banks of the large rivers are equally exposed; and it seems to me almost a necessary inference that, if the epidemic prevalence of intermittent and remittent fever in the summer and early part of autumn are to be ascribed to its remote effects, the same prevalence of a continued form under the colder climate of the advanced autumn and the beginning of winter, is to be attributed equally to it, especially as we repeatedly observe a transition from one of these types to the other in the same individual. The fact of the winter pleurisies in many of the malarious districts of America, as in the Island of Minorca, assuming bilious symptoms, shows the predominating influence in the constitution of marsh effluvium, which, excited into action under opposite degrees of temperature, exhibits corresponding differences, as to type and symptoms. How far the occurrence of the periodic types of fever under the influence of high temperature, and of the continued form under that of a low temperature, will admit of explanation, I know not; but the frequency of intermitting and remitting fevers in hot, and in a much feebler degree in the summer and autumn only of temperate climates,—and the absence of low continued fevers in the one, and their predominance in the other, would seem to show that temperature has some share in producing these effects.

I perfectly coincide in the inferences drawn by Dr. Watkins, to which I attach a high degree of

interest. The continued fever which existed previous to the influenza, was arrested and supplanted by it, or called into action by its means; and the last left its traces in the cases which occurred after its own brief career. His paper is well calculated to show how different the wide-diffused and subtle cause of epidemic catarrh is to that comparatively limited and local effluvium which we term malaria.

I shall quote a few other examples of fever in the *interior* of the Southern States, before I turn to the epidemics that have prevailed on the sea-coasts of the Carolinas and Virginia.

In the 11th volume of the Medical Repository, p. 337, Dr. Pitt gives a brief account of the diseases on the Roanoke River in North Carolina, his observations applying to the country lying about the 36th degree of north latitude.

The foundation of the whole tract is clay, covered by a very fertile soil of different depths. The low grounds are intersected with ponds and marshes, which are more or less covered with water, except in dry seasons; the high lands swampy, and so flat that water, after great rains, stands a considerable time on the surface: the former are generally overflowed several times in the course of the year. The farmer often experiences great losses from the freshets drowning his stock in the winter season; in spring he is often obliged to plant his crop two or three times, and after all his toil it is sometimes destroyed by the summer and fall inundations. The seasons are extremely variable, particularly in winter and spring; very little snow falls, but frequent cold storms of rain occur in the winter and

spring months; and often sharp cold north winds are suddenly succeeded by warm relaxing south winds,—and thus alternately and suddenly piercing cold and enervating warmth diversify these seasons: the summer is generally excessively hot. The country is entirely flat from the sea to the western hills, a distance of from eighty to one hundred miles. “We are situated,” he says, “at about an equal distance from the sea and mountains, so that we cannot have the advantage of sea breezes, nor of the cool mountain air. The country is covered with woods, interspersed with plantations; and in riding from one settlement to the other, through the woods, in narrow roads, a person can scarcely get a breath of cool air. As the autumn approaches, the heat gradually abates; but cool nights succeeding warm days render the season very unhealthy.

“Remitting and intermitting bilious fever is epidemical every year in summer and autumn, beginning in July and lasting till November or longer: some years one prevailing over the other, as the poisonous effluvia from the ponds and marshes are more or less concentrated in wet or dry seasons. Bleeding is seldom necessary in the treatment of the natives; but people from the northern parts and foreigners, who are strong and full of blood, require it in the first stage. Typhus and dysentery are sometimes epidemical; but not every year, like the disorders above mentioned: they are most prevalent in dry seasons. The spring of 1799 was dry, and typhus was epidemical, and both it and dysentery were so in the remarkable drought of the summer of 1806; and in many other years, from

accidental and local causes, these complaints have prevailed, but never epidemically, except in dry seasons. This circumstance induces me to believe that the same septic exhalations from the ponds and marshes, being more concentrated, and rendered more virulent from the excessive heat, are the principal cause of typhus and dysentery."

Dr. Williamson, under date of 1797, (*Medical Repository*, vol. ii. p. 145,) says: "I have not seen a single instance of the yellow fever, properly so called, in North Carolina. The most fatal fevers with us, of a bilious origin, do not commonly appear in the warmest season. Bilious intermitting fevers are very prevalent during the autumn in the level country near the sea-coast, and near rivers for some distance above the low lands, seldom fatal except to strangers who have a tense fibre, or who are careless. They disappear as the cold weather sets in, but are frequently succeeded by fevers of a different type that are more fatal, commonly attended by symptoms of partial inflammation, whence they are called pleurisies of the eye or head; at other times they affect the side,—equally dangerous in these several forms. As those symptoms of pain are attended often with a high degree of fever, the general practice has been to bleed once and again, but the greater part of the patients sink under the disease. I believe this fever is of the putrid kind. It commonly attacks people who have been afflicted by intermitting fevers during the summer and autumn, and appears chiefly, perhaps only, in those places where people are subject to intermitting fevers in low sunken grounds and along the sides

of rivers. In the beginning of the winter 1792, it was very fatal in Martin County, near the river Roanoke, which had lately been very low, and much of the muddy bottom, and other grounds usually covered by water, had been exposed to the sun. The pain was then in the head. In 1794, ten or twelve men, the heads of families, adjoining one another, died of it in December on the river Neuse. They had lived near the beginning of the high grounds on the north-east side of the river: there had been a dry season;—the other inhabitants of the adjacent country, except on that narrow strip by the river, enjoyed good health. In 1792, in the beginning of winter, this pleurisy in the head was endemic near Matamusket, where the land is rich, but very low, and much of it covered with water. We have little intercourse with people in that settlement, for they are surrounded by an impenetrable dismal swamp on a broad sound. As the patients who suffer by the complaint are commonly men and not women, and as men expose themselves much more imprudently to cold and rain, there is reason to believe that a checked perspiration is the proximate cause of the complaint. Any fever thus induced, where the fluids are dissolved, must soon be expected to put on a dangerous appearance. I have known a man, thus prepared by intermittents, bring on what was called a pleurisy in the head, by dancing, and die in forty-eight hours."

Dr. Williamson's experience was against bleeding in this disease, and in favour of sudorific diluents and bark.

The diseases of the same country are noticed in

a paper, (Medical Repository, vol. v. p. 137,) by Dr. Pillson, of Greenville, situated on the south side of Tar River, North Carolina. " Greenville, lat. $35^{\circ} 30'$, is a small town, built on a considerable elevation, nearly insulated by the river and two branches whose sources are but a short distance apart. The land on the north side of the river is low, broken by ponds, and subject to be overflowed during a fresh, which occurs five or six times a year, and to such an extent as to cover the low land half a mile from the bank. The branches are constantly supplied with water from a variety of springs, which issue from their high banks, and also receive the river water during a fresh. Their miry state renders them dangerous to cattle, tempted by the tender grass they afford in the spring. South of the town, and nearly a mile distant, is a mill-pond, the dam of which accidentally got broken during the summer, by which a considerable extent of its muddy bottom and decaying trees were exposed to a hot sun for nearly two months. The usual complaints of the town and country are not distinguishable, in general, from those of other low parts of the State, though I believe the fevers of the last year (1800) have been more particularly marked. Early in July the dysentery appeared. The four succeeding months were distinguished, as usual, by a prevalence of bilious intermitting and remitting fevers. The most distressing symptom in each was a severe pain of the head, in some cases so violent as to amount to constant delirium. Nor do I recollect a single patient exempt from it, most commonly accompanied by an insupportable pain in the

lumbar region. The head was invariably relieved by a blister to the back of the neck; and a free evacuation of bile, by the use of jalap and calomel, when the stomach would retain them, relieved the pain in the back; the discharges were remarkably dark-coloured, putrid, and offensive. Notwithstanding the many cases which occurred this fall, the mortality was but small. I only lost one patient. The complaints during the winter were mostly of the breast and lungs. Pleuritic cases continued to occur frequently and fatally in February, March, and April (1801). The attack is most commonly in the night, commencing with a violent long-continued ague, or a chilliness of some hours' duration: before this is entirely worn off, a pain of the head, breast, side, or back, seizes the patient, and frequently a concurrence of two or more of them. These continue to increase in violence as the fever comes on, and during its progress. The pain is generally confined to the forehead, of a heaviness in which and the eyes the patient complains; a turgescence and inflammation of the vessels of the eye are apparent. In most violent and fatal cases delirium takes place on the accession of the fever, and continues, with few intervals of reason, till the termination of the disease. The pain and oppression of the breast are such as usually accompany a peripneumony, but the pleuritic pain exhibits unusual violence. The cough is urgent; the expectoration is in small quantity, frothy, and intimately mixed with blood; breathing frequent, laborious, with a wheezing noise,—and this symptom continues to increase till death.

The stomach is affected with pain and distention; and nausea, and a vomiting of bile from yellow to the darkest green takes place at an early period; a diarrhœa soon succeeds, and sometimes precedes the vomiting. The discharges by stool are bilious, of a dark colour, nearly black, and emit a putrid offensive smell. The bilious symptoms have invariably appeared from the first attack; and in those cases in which they predominated, the lumbar pain was most urgent. In the generality of patients, the pneumonic symptoms did not display themselves before the third, sometimes the fourth or sixth day. The pulse was such as to forbid bleeding; and in those cases in which it was incautiously resorted to, on the supposition of its being of an inflammatory kind, the event was fatal. No certain prognosis of the time to which the fever would be protracted could be formed: where the affections of the head and stomach were most violent, the fatal period soonest took place; where the bilious and pneumonic symptoms were predominant, it was protracted to the seventh and ninth days, and the probability of recovery was greater; while a bilious affection alone, or slightly combined with pneumonia, lasted for twelve or fourteen days, and the danger was consequently less. In one instance it was fatal in sixteen hours, in another in sixty. These were both females of middle age. One patient, a man of robust make, forty-five or fifty years old, who died on the sixth day, was observed for a short time before his death to be affected with an eructation of fluid, which he endeavoured to suppress; however, it continued in frequency and

quantity ; and, finally, the ejection of a large quantity of extremely black fluid, in a curdled state, and answering nearly to the description of the matter of black vomit, as occurs in yellow fever, closed the scene. These were the only deaths in town."

Dr. Pillson found blisters to the chest and free purging, with sudorifics, the best plan of treatment.

Dr. Pitt, in the paper I have alluded to, takes notice of this pneumonia ; and remarks, that it is necessary in the cure to distinguish the diathesis ; for when "sthenic, with considerable local inflammation, bleeding is the principal remedy, and must be repeated according to the fullness and hardness of the pulse. Cooling purges, antiphlogistic febrifuges, and pectorals are necessary. Flannel wrung out of warm water, and applied to the breast as a fomentation, and the steam of warm water inhaled into the lungs, are useful ; and about the second stage, when the inflammatory symptoms have in some measure abated, blisters may be applied with advantage. But when an asthenic diathesis prevails, the local pain is commonly spasmodic. Bleeding is improper, and a blister is the principal remedy, with the other means just enumerated."

In these observations of fever, as it occurs in the interior of North Carolina, we find intermittents and remittents prevailing in the usual seasons seldom fatal to the natives of the country, but more formidable to strangers,—typhus attacking the former in dry seasons, spring, or summer, sometimes epidemic, and referred distinctly by Dr. Pitt to a concentrated marsh effluvium ; and in the winter and spring, a continued fever, certainly of a

specific kind, according to Dr. Williamson's observations, attacking "those who have been afflicted with intermittents, and prevailing within certain limits, chiefly, perhaps only, in those places where people are subject to intermittents, in low sunken grounds and along the sides of rivers."—We observe that this formidable disease is not limited to an affection of the chest, as in common peripneumony, but attacking the head and stomach in some cases, with bilious and pneumonic symptoms predominating in others, or with the former alone, and fatal sometimes in sixteen or sixty hours, with appearances in one instance of something very like the black vomit of yellow fever. Like the typhus of this country, it appears more or less in an inflammatory or masked form, affecting the same parts, requiring an active or a cautious treatment, as inflammation predominates over the congestive or mixed character of the disease, many cases showing no pulmonary affection before the fourth or sixth day, and then attended with an urgent cough, a scanty frothy expectoration, a laborious wheezing respiration, which increase till the close of life ;—symptoms distinctly referable to that bronchial affection which constitutes one of the most formidable characters in some of the epidemics of typhus in Great Britain.

Having given this view of the fevers of the *inland* parts of the midland and southern States, I shall now turn to the sea-coast, which is the scene of the principal ravages of yellow fever in its most decided and fatal form.

In the Medical Repository, vol. ii. p. 143, Dr. De

Rosset describes an epidemic at Wilmington, North Carolina, in 1796. This town is situated in lat. $34^{\circ} 11'$, on Cape Fear River, just below the confluence of its two branches, and about thirty-five miles from the sea-coast: vessels of three hundred tons can pass up to it. It contained about one hundred and twenty or one hundred and thirty families, out of which, from August to November, there died of dysentery and fever one hundred and fifty persons.

The spring and early part of summer had been very wet, scarcely a day having passed for several weeks without rain, and the weather afterwards became dry and unusually warm. In July the dysentery was very general, declining towards the end of August, when the first cases of bilious fever occurred, and scarcely ever appearing after the fever became more prevalent; and all, without exception, escaped the fever who had laboured under dysentery. On September the 20th, after several warm days, the weather was so cold as to make a surtout comfortable; and more persons were taken ill on that day than on any two others during the epidemic.

The symptoms which ushered in the fever were chilliness and rigor alternating with heat; pains in the head, back, loins, and extremities; faintness and vertigo; difficult respiration, with tightness across the chest; oppression at the præcordia; pain in the hypochondria and stomach, which scarcely admitted of the slightest pressure; neck and face flushed early in the disease; heat and redness of eyes, which after a few days became yellow with the skin, first observable on the upper

part of the breast ; pulse quick and full, not hard, becoming in a few days small and weak, or in several fatal cases appearing natural after the second day. Nausea and retchings were constant ; sometimes nothing was discharged from the stomach ; but generally a yellow bile, changing by degrees to a greasy-looking green water, often thrown up without any conatus, by a kind of gulping or involuntary eructation ; and ultimately the true black vomit came on, as described by writers on the yellow fever.

Dr. De Rosset adds, " Opinions differed here as to the origin of this fever : but I have no doubt of its having originated amongst us, of its differing from our common autumnal bilious remittent only in degree, arising from the same causes, and being aggravated by the circumstances of season. The situation of Wilmington, much exposed to the operation of marsh miasmata : the weather which preceded and accompanied the disease ; and our not being able to trace it to any other source,—all tend to the confirmation of this opinion. I did not observe one unequivocal instance of its being communicated by contagion, nor do I believe that with us it was so ; though I have no doubt that diseases arising from miasmata may become highly contagious from particular circumstances. A few cases every year, of our common fall fever, take on all the symptoms of a violent yellow fever ; and in the present epidemic, many cases were without those symptoms which peculiarly characterize it, and differed in nothing from the common autumnal fever."

We have an example here of sudden cold in Sep-

tember acting as an exciting cause to the fever, and may readily conceive that the same cause will occasionally operate in the more advanced periods of the year, or in winter; the low temperature of that season, however, modifying the fever,—giving it a tendency to affect the chest, and to assume the continued type.

Dr. Norcom, (Medical and Philosophical Register, New York, vol. i. p. 17,) in his observations on the Fevers of North Carolina, attempts to draw a distinction between the inflammatory remittent and the bilious remittent, as “two original and distinct diseases.” He resided at Edenton, a small sea-port town situated on the north side of Albemarle Sound, in lat. 36° . This place is “surrounded by a country which is for the most part low and swampy, and in which there is occasionally to be found a great deal of stagnant water, rendered offensive by dead vegetable matters, that decay and putrefy in them during the heat of summer. Our summers,” he says, “as regards temperature, are very irregular. The hot weather sets in about the last of May, and ends in September, though we often have days in April and October exceedingly warm. The mercury in our hottest months commonly fluctuates between 80° and 90° in the shade at 3 P. M. For a few days together it sometimes rises from 92° to 97° ; or on the other hand it will fall to 72° , or even below 60° . The greatest heat is in June; but that which is by far the most disagreeable and oppressive, most uniform, and continues longest, occurs in August and the first weeks in September. The same variety is observable with respect to rain. Sometimes we have

the fervours of summer tempered with regular showers, or gusts and tornadoes with thunder and lightning and cataracts of rain; and at other times frequent copious distillations every day for weeks together, deluging the country, sweeping away bridges, and drowning crops. Then again we have summers extremely dry, insomuch that even meadows and marshes lose their humidity, vegetation declines, and the earth presents a surface as parched and dreary as the plains of Hindostan. There is no particular time when rain falls or is with certainty expected. Sometimes it descends in the greatest quantity in June and July, or in August and September; but August, one year with another, is the driest and warmest of the summer months. In our driest and wettest seasons we are most exempt from bilious fevers of every description, and summers uniformly wet and uniformly dry have invariably been remarked in every respect to be the most healthy.

“The annual remitting fever of Edenton and its vicinity usually begins in August, and the most malignant always occur in this month or during the hot weather in September. As the autumn advances, and the heat decreases, fevers of every grade seem disposed to assume more and more the character of intermittents, which generally conclude the sickness of the season. The remitting fever is most fatal in seasons *tending* to dryness, and accompanied with unusual heat. In its character and symptoms it is as various as the circumstances of climate and season. Sometimes persons are seized violently, without previous indisposition, with a

chill, or mixed sensations of heat and chilliness, that last for an hour or two, and are succeeded by a severe fever, with pains in the head and back; a full, hard, quick and bounding pulse; great thirst; a hot and dry skin; hurried respiration, with redness or a muddy suffusion of the eyes, and a disposition to delirium. The stomach is not affected with much sickness or nausea, yet vomiting is a frequent occurrence, and it is with difficulty that a patient can retain the least particle of food whatever. A sense of heat or burning is generally complained of, which is very distressing, and occasions everything to be thrown up, if it contains stimulus or be in any way substantial. The exacerbations of the fever are oftenest quotidian, returning generally in the afternoon, and the intervals short, with an imperfect remission, without sweating or any considerable abatement of pain. The most successful mode of treating this inflammatory or malignant remitting fever is by venesection, purging, emetics, &c. Bark does little or no service; on the contrary, much harm. I have never done good with mercury, except in the decline of the fever, after plentiful evacuations.

“Another form of remittent fever, which is the true *bilious* remittent of our climate, comes on with a distinct chilly fit, of greater or less duration, and is succeeded by the ordinary symptoms of fever, with a frequent, full, and soft pulse, such as almost always may be felt in the paroxysms of an intermittent. It is not accompanied with much acute pain, but great aching and restlessness, nausea or vomiting, with ejections of bile, or matter exhibiting a

bilious appearance. The type is generally that of a double tertian, having an exacerbation one day in the afternoon, the next in the evening. Its remissions are more distinct, seldom requires bleeding, and after the exhibition of proper intestinal evacuants invariably yields to the bark. It is rarely fatal, and seldom before ten, or sixteen, or seventeen days. Towards its close it sometimes puts on the garb of typhus, and does not end in death or a recovery in less than twenty or thirty days. This fever is that we usually meet with which affects the greatest number of persons at a time, and is the least mortal of any of our continued fevers. Neither the inflammatory nor the bilious remittent is very fatal; the former, however, is much more so, in the proportion of three to one. It either ends fatally in from four to eight or nine days, or favourably between the eighth and thirteenth, but is not unfrequently protracted to a later period: the fatal issue generally occurs early. The tongue, in the bilious remittent, is commonly furred and yellow; the skin likewise exhibits a yellow hue, which increases as the fever progresses; whereas in the inflammatory remittent the tongue exhibits the common febrile fur, in most cases without yellowness, and the skin is hardly ever discoloured till about the close of the complaint. In two or three instances I have known the surface of the body turn yellow soon after death from the inflammatory remittent, when not the smallest discolouration had been observed before. The vomiting in one of these fevers, or forms of fever, is different from that which attends the other. In the first it occurs with little nausea or sickness,

is seldom attended with bilious discharges, affords scarce any relief, and is always increased by bark and stimulants. In the last it is preceded by great nausea, attended with large discharges of bile, gives the patient relief, and is very often to be removed altogether with bark, aromatics, and cordial drinks.

“During the prevalence of the bilious remittent, we now and then meet with cases marked with the symptoms and requiring the treatment of the inflammatory remittent; and they occur, with us at least, principally among strangers, more especially the natives of the north and east States. But the position will hardly bear to be reversed; for I have generally observed that during the prevalence of an inflammatory remittent, though we sometimes see cases that are considerably bilious, symptoms of inflammatory diseases almost invariably attend, and call for the use of antiphlogistic remedies. From the bilious remittent of Carolina, no age, sex, constitution, or condition is exempt. To the inflammatory remittent, the young, the robust, the plethoric, and *strangers* are peculiarly subject; and these last are oftenest the victims of the disease. Both these forms of fever are most severe and fatal about the latter end of summer or beginning of autumn,—that is, in proportion to the number of persons affected: yet, from the much wider prevalence of their milder grades in the variable weather of autumn, the absolute number of deaths will upon the whole sometimes be the greatest in the latter season; and hence it is that, strictly speaking, when we have the most sickness we have comparatively the least mortality.

“I am not quite certain that I have ever seen *the* black vomit in any of our endemic fevers; but *a* vomiting of black matter of various descriptions is no unfrequent occurrence. In 1799, when we had a true yellow fever in Edenton, I saw the genuine black vomit in several cases; but I do not believe I have ever seen *exactly* the same thing since, though I confess I have seen perhaps half a dozen cases in which my suspicions have been strongly excited. Hæmorrhages from the nose and gums are occasionally met with in protracted cases ending fatally; and I remember one case of a malignant nature, in which a bleeding from the mouth took place, that ended in death in three or four days. In most of the fatal cases of inflammatory remittent, the heat of the skin has continued intense until a short time before dissolution; and the patient has expired in a paroxysm or exacerbation of fever. The bilious remittent, when about to prove mortal, in a majority of instances puts on the garb of typhus, and terminates with the symptoms common in the last stage of that disease.”

These observations, though general and not confined to the fevers of any particular year, are interesting, as showing the difference between the character of the disease in the natives of North Carolina and in strangers, and in its occasional chronic typhoid termination. I have met with no description among the American writers so nearly corresponding to that of the inflammatory endemic of Dr. Dickinson as this form of fever, which Dr. Norcom calls the inflammatory remittent; but the very circumstance of its having remissions forbid

my considering it as the exclusive offspring of heat operating on unseasoned constitutions. He has evidently, in my opinion, heightened the contrast between it and the bilious remittent, and probably made the distinctions more apparent than they are in reality, if both are in truth remittent fevers. He indeed acknowledges that they do not "always attack and progress precisely as in the history sketched of them: They both vary," he says, "in their modes of attack, in duration, in violence, in the remissions and exacerbations that attend them, and in many of their less essential symptoms." He does not apply his observations on black vomit to either modification particularly: but it is evident, at least, that he refers it to a disease endemic in the country; and if it did not amount to that which he calls the "genuine black vomit," it would not justly lead to the inference that the disease was not yellow fever; as, on the supposition that it only occurred in cases of the bilious remittent, to which all conditions of natives were liable, we know that persons born in so southern a latitude are not the most liable to exhibit the symptoms of the disease in their fullest development. Nor is the symptom itself, even in unquestionable examples of yellow fever, invariable or always present. The latitude of Edenton is the same as that of the country on the Roanoke River noticed by Dr. Pitt; and in both situations typhus is mentioned as arising out of the bilious remittent in the one, and being epidemic in the other.

The city of Charleston, South Carolina, situated in lat. $32^{\circ} 47'$, on a peninsula between Ashley and

Cooper Rivers, about seven miles from the sea, has been for many years the scene of the ravages of yellow fever,—the first treatise in America on this disease having been published here by Dr. Lining, in 1753.

Dr. Ramsay, the historian of the State, supposes that as early as 1699 and 1703 it existed in Charleston; as an “infectious epidemical distemper, generally called the plague by the inhabitants,” prevailed in those years,—about twenty years from its first settlement. The first distinct mention of the disease was, however, twenty-five years afterwards, in 1728, by Dr. Hewatt, who states that the summer of that year was “uncommonly hot in Carolina: that in consequence thereof the face of the earth was entirely parched,—the pools of standing water dried up,—the beasts of the field reduced to the greatest distress; and that an infectious and pestilential distemper, commonly called the ‘yellow fever’ broke out in town, and swept off multitudes of the inhabitants, both white and black.”

It was epidemic also in 1732 and 1739, but prevailed less extensively in 1745 and 1748. For forty-four years after, no epidemic is recorded; though sporadic cases are mentioned in different years, especially in 1753 and 1755. In all these years it was generally supposed to have been imported; but it was observed that it never spread in the country, though often carried there by infected persons, who died out of the city, after having caught the disease in it.

In 1792, the year preceding the memorable epidemic in Philadelphia, Dr. Ramsay remarks, “a

new æra of the yellow fever commenced. It raged that year in Charleston, and in 1794, 1795, 1796, 1797, 1799, 1800, 1801, 1802, 1804, and 1807. It appeared slightly in 1803 and 1805. In both years its victims did not exceed 59.

The deaths in 1799	were	239
1800		184
1802		96
1804		148
1807		162

In 1793, 1798, and 1808, the disease is not mentioned; and in 1806, as having occurred only in a very few cases.

“In its visitations it extended from July to November, but was most rife in August and September. With a very few exceptions, chiefly children, it fell exclusively on strangers. The unseasoned negroes were not exempt from its ravages; but they escaped oftener than other strangers, and had the disease in a slighter degree. Persons, both black and white, from the West India Islands, enjoyed similar exemptions. In 1796 and 1799 it raged with the greatest violence; but has since considerably abated, partly owing to the diminished number of subjects, for strangers have been cautious of residing in or visiting Charleston in the warm months.

“The laws of Carolina guard against the yellow fever as an imported contagious disease. The uniform experience of the physicians in Charleston since 1792 proves that it is neither the one nor the other; for in no instance has a physician, nurse,

or other attendant on persons labouring under this disease, caught it from them. Several, after taking it in Charleston, carried it with them, and died in the country ; yet it never spread, nor was communicated to any one who attended on them. In every such case of mortality the disease and the subject of it expired together."

The summer of 1799 was moderate, there being only three days in which the mercury rose above 88° . It was 89° on June 14th and July 15th, and 91° on July 19th. In the course of the year, 75 inches of rain fell, nearly half of which was in August, September, and October. Till August the year was healthy to all descriptions of people. A solitary case of yellow fever was fatal in May, in a person thirty days from the Havannah. In June and July some seafaring people were seized with it ; and about the middle of August it became epidemic, and prevailed till October ; only six or seven deaths occurring from October to the middle of November. The number of interments of white persons from the 1st of August to the 1st of December was 362, of which 239 were strangers.

"Persons," says Dr. Ramsay, in his Address to the Medical Society, December 1799, "coming from the higher northern latitudes of Europe and America were most subject to the disease, and rarely survived it. The inhabitants of the country parts of South Carolina had little better chance of escaping. Some instances occurred of persons being seized with it who had resided one or two years in Charleston ; but of these, several recovered. Five or six children from two to seven years of

age, who had been born and usually resided in Charleston, were carried off with it. There were no instances clearly marked of its attacking and proving fatal to adults who had been long used to the air of the city, though some of its symptoms usually attended common fevers. We have no reason to believe it was either imported or communicated by contagion. It raged most in the north end of King Street, where the greatest number of persons from the country resided, and in those streets where seafaring persons usually fixed themselves."

In a brief notice of the yellow fever in 1800, (Med. Repos. iv. 217,) Dr. Ramsay says: "The disputes about the origin of the yellow fever which have agitated the northern States have never existed in Charleston. There is but one opinion among the physicians and inhabitants; and that is, that the disease is neither imported nor contagious. This was the unanimous sentiment of the Medical Society, who gave their opinion to the Government last summer, that the rigid enforcement of the quarantine laws was by no means necessary on account of the yellow fever. Our whole mortality from July to October was 516; of these 134 were reported to have died of yellow fever—

In July . . . 23

August . . . 55

September 46

October . . . 10

Forty-one were sailors from the Marine Hospital. With the exception of two children, the dis-

ease has been exclusively confined to persons unaccustomed to the air of Charleston. Many of them are in circumstances unfavourable to their recovery. Such is the rapid and violent nature of the disease, that they should have free ventilation, and several attendants night and day; but they are mostly unknown strangers, often in crowded lodging-houses, in the most thickly settled parts of the city, where the apartments are small, and the servants few."

In the Charleston Medical Register for 1802, Dr. Ramsay remarks, that the general complexion of the diseases for the first seven months of the year was inflammatory. "Pleurisies, acute rheumatisms, and complaints of the breast were uncommonly frequent. July and the first seventeen days of August were cool and healthy,—only one day in which the mercury rose to 89° . The last of August and the first twenty-two days of September were steadily warm, though not to so great a degree as in former years. In only three of them the thermometer rose to 89° , and in two only was it below 80° . The old inhabitants were generally free from diseases of every kind; and only two strangers died of the yellow fever before September. In this warm season it began to extend, but was less mortal than usual. No instance can be recollected in which there was any ground to suppose it was either imported, or had been contagious. No physician, nurse, or other person, from their intercourse with the sick, caught the disease. It was exclusively confined to strangers."

The number of deaths was ninety-six—

2 in August.

64 in September.

30 in October.

—

96

In the whole number there was no native of Charleston. The native countries of eighty-nine who died were ascertained.

20 were from the Northern States.

21 ——— England.

19 ——— Ireland.

7 ——— Scotland.

8 ——— Germany.

5 ——— France.

5 ——— South Carolina.

1 ——— North Carolina.

1 ——— Spain.

1 ——— Prussia.

1 ——— Madeira.

—

89

Their time of residence in Charleston was—

74 from six days to eight months.

18 one year.

2 one year and a half.

1 two years.

1 three years.

—

96

No black died of the fever, and only one mulatto.

In Med. Repos. viii. 365, Dr. Ramsay gives an

interesting, but very brief account of the yellow fever at Charleston in 1804. A few cases occurred prior to the 10th of July; but from that date to the 20th of September it was epidemic, then gradually declined, and disappeared about the 1st of November. The deaths were between two and three hundred. The weather was very hot during the epidemic, and the mortality increased with the heat. "The disease was marked with the ordinary symptoms. But in the following particulars, an unusual proportion of patients deviated from what had been the more common form of the disease in preceding years. Neglected intermittents frequently terminated in the yellow fever. The black vomit was neither violent nor constant even in fatal cases, where the depleting system was carried to a proper extent. Several cases of clearly marked yellow fever terminated in low nervous fevers, which ran on to a period of two or three weeks; and, in different cases, with opposite results. The disease bore tonic medicines better and earlier than in the preceding years; blisters were uncommonly useful, and when applied freely and judiciously, saved several lives. As usual, the disease was confined to strangers, and in no instance proved contagious; neither physicians nor nurses were attacked with it. Such persons as removed from the thickly settled parts of Charleston, and fixed their residence in its environs, were sometimes attacked with intermittents; but in no case, to my knowledge, with yellow fever, while they steadily kept aloof from the air of the crowded city. On the 8th of September we had a hurricane which exceeded everything of the

kind since the year 1752. For about a fortnight after, there was no sensible abatement of the reigning diseases ; but from the end of that period to the present day (December 14th), the inhabitants have enjoyed as much health as could be expected in the mildest season of the most salubrious climate. Of the few fevers we have had, most of them wore the livery of the yellow fever."

In 1807 Charleston was visited by the yellow fever in August, and by the influenza in September,—"the blackest month," says Dr. Johnson in his Oration before the Medical Society, "ever recorded in the city, there having been three hundred and twenty-eight interments, of which one hundred and fourteen were from the endemial causus, and at least one fourth of the inhabitants were affected by the influenza about the last of the month."

Dr. Ramsay (Med. Repos. xi. 233), in speaking of this year says : "About the middle of August the yellow fever commenced, and in the course of the season it proved fatal to one hundred and seventy-six persons,—of whom

18 died in August.

114 ——— September.

42 ——— October.

2 ——— November.

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176

The first death took place about the 15th of August, and the last on the 2nd of November. The disease was almost exclusively confined to strangers. A few children, and a few persons who had spent one or two summers, or even more, in Charleston,

became its victims. It bore tonic medicines sooner than was usual; and on their early application after competent evacuation, and on the liberal use of blisters, the recovery of persons very much depended."

Dr. Johnson says, "The symptoms varied from those of former years in a greater disposition to *typhus*, so that bark and other tonics were frequently beneficial."

From these reports of yellow fever on the sea-coast of North and South Carolina, it is evident that at Charleston, in lat. 32° , it is generally confined to strangers; that it prevails most extensively in August and September,—those months in which the common bilious remittent is most prevalent in the interior of America; that it sometimes arises out of the intermittent type, and degenerates into a chronic or typhoid fever; that the experience of many years is against the idea of its importation or contagious property,—no native or acclimated physician, nurse, or attendant, ever taking the disease from the sick, and no instance being known of its spreading in the country from persons who, after being exposed to the infected atmosphere of the city, have sickened and died out of it; that, like the aggravated bilious remittent of the inland provinces, it is desultory in its visitations, appearing irregularly in different years,—sometimes for a series of years occurring only in sporadic cases, at others epidemically; and that, as in 1799, some of its symptoms usually attend common fevers. The exceptions in Charleston to its being exclusively the disease of strangers, are found among young children

from two to seven years of age,—a period of life very susceptible to the extremes either of heat or cold,—as is proved, with respect to the former, by the prevalence of *cholera infantum* throughout the southern and midland States previous to any general manifestation of sickness in adults from the summer heats.

In the epidemic at Wilmington, two degrees north of Charleston, we find Dr. De Russet distinctly referring it to local causes, aggravated by the inclemency of the season, long-continued wet succeeded by dry and hot weather. Epidemic dysentery made its appearance in July, but declined towards the end of August as bilious fever arose. This in some instances maintained its ordinary character, or degenerated into yellow fever; and that both are merely modifications of one disease, is shown by Dr. De Russet's observation, that a few cases every year of the common fall fever take on all the symptoms of a violent yellow fever; and that in 1796, many of the cases during the epidemic were without the characteristic signs of yellow fever, and differed in nothing from the usual autumnal remittent.

Dr. Chalmers, who published "An Account of the Weather and Diseases of South Carolina, London, Dilly, 1776," acknowledges that what he calls the "putrid bilious fever" sometimes appears here in summer with such symptoms of a confirmed putrefaction as to differ but little sometimes from the pestilential yellow fever (p. 163). In speaking also of the anomalies in autumnal intermitting fevers, he says, p. 10, "The fevers of this season only re-

mit in some patients for the first two or three days ; in others from having intermissions they change either to continued or remitting fevers."

Drs. Selden and Whitehead have given an interesting report of two epidemics of yellow fever at Norfolk, in Virginia, in 1800 and 1801 ; the former of which is particularly valuable, as descriptive of those sources of impurity to which the city owed, amid the intense heats of summer, the aggravated form of fever that prevailed among strangers who had visited the port.

Norfolk is situated in lat. $36^{\circ}52'$, and I must refer to the first Report in the fourth volume of the Med. Repos. p. 329, for their description of the state of the town, and especially for that part "where the malignant fever chiefly prevailed, which stands entirely on made land reclaimed from the river." The hot weather set in very early, and the thermometer on the 8th of April rose to 90° . On the 20th of June it became steadily hot, and continued with little variation till the middle of August. Light southerly winds prevailed, often interrupted by calms ; "nor did we once experience during that period the north-west wind, which usually succeeds rain at this season, and which proves so refreshing and invigorating, and suspends for some time the powerful influence of the sun in a sultry climate. Rains had been very frequent in June and July ; but instead of cooling the atmosphere, they were invariably followed by more intense heat. For more than two months after the 25th of June, the inhabitants of Norfolk lived in an atmosphere heated above the 85th degree of Fahrenheit, sometimes to

the 94th and 95th, but very frequently upwards of 90°. Such a long tract of intensely hot weather is not, we believe, within the remembrance of any person now living in this place."

The sickness, which began in July, is attributed by the authors of the Report to two sources,—the effluvia arising from the made land already alluded to, and to a quantity of rotten fruit which had arrived from the West Indies. In order to show how far the original germ of the fever was derived from the first source, I shall quote the words of the Report. After describing that part of the town which consists of land reclaimed from the river, where the fever chiefly prevailed, it adds: "In the only tolerable public street in this part of the town, there are two places, about twenty yards each in length and eight or nine in breadth, which have never been filled up with other materials than what accident has carried thither, and the filth of the neighbourhood, for which it serves as the common and only receptacle. In these ponds or rather sinks of putrefaction, though sixty yards from the river, the tide ebbs and flows through the open texture of the adjacent reclaimed ground: yet at low water they are never entirely dry, but form an agreeable retreat for hogs to wallow in, as is customary with these animals in the sultry months. The effluvia which were exhaled from these and similar places during the warm months of summer and autumn, were indeed highly offensive, and will appear to many medical men almost sufficient of themselves to account for the generation of pestilential diseases, wherever they may exist. And in fact the malig-

nant fever did first make its appearance about twenty yards from these offensive pools, in a wooden house resting on logs, the ground under it not being raised to a level with the adjacent land, and which was always covered partly with water, and completely overflowed twice in twenty-four hours with the tide. Besides these and many other sources of pestilential vapours which abounded in this quarter of the town, another at this time was accidentally added. Three vessels arrived from the West Indies, successively, on the 21st, 22nd, and 23rd of July, loaded partly with fruit. These cargoes were landed about sixty yards from the above-described ponds; and the greatest part of the oranges and limes being spoiled, the casks were opened and picked on the quay, and the rotten fruit left on the spot many days. These formed a large mass of vegetable matter in a state of putrefaction, the offensive smell arising from which was so great, that gentlemen have declared they were unable to pass that way without stopping their nostrils, and in one person *deliquium animi* was well nigh induced. Yet this nuisance was not removed till after a number of persons, seized with a malignant fever in the neighbourhood, excited alarm, and attracted the attention of the public. Two young gentlemen employed in a vendue office where the fruit was landed, and by whom it had been picked and repacked for public sale, and near the window of whose chamber the above-mentioned putrid vegetable mass had been for some time lying, were the first attacked in this street, on the 26th of July; and both dying with the usual symptoms of yellow fever in its most malig-

nant form, occasioned no small apprehensions. Several indeed had died after a short illness, some days before ; but these being mostly sailors in obscure boarding houses, and not regularly attended, we believe, by any physician, had drawn but little attention. On the 22nd of July, while yet no suspicion existed of an epidemic complaint, we were called to see a sailor, then in the third day of his illness. His eyes were much inflamed and watery ; his countenance expressive of great anxiety and distress ; he complained of intolerable pain over his eye-brows, great oppression about the præcordia, with a sensation of burning in the region of the stomach, which made him feel, he said, as if his bowels were all on fire. The heat of the body was much increased, face flushed, and pulse more remarkable for frequency than strength. He had taken some evacuant medicines before we saw him. He was bled, with manifest relief of his head-ache ; a purge of jalap and calomel was exhibited, and a blister applied to the region of the stomach. By these means the febrile symptoms were considerably moderated, but the blister was not suffered to remain till vesication was accomplished ; and the sensation of burning in the region of the stomach increasing, vomiting became incessant, and of a dark colour ; the strength sunk rapidly, while the skin assumed a yellow hue, and the disease hastened to a fatal termination with symptoms unusual in the febrile diseases of ordinary seasons. We have been induced to notice this case more particularly, in consequence of a belief with many, that the malignant fever was introduced by the vessels which arrived

from the West Indies on the 21st, 22nd, and 23rd of July. Although the extreme degree and long duration of the hot weather had not excited apprehensions of a fatal epidemic, it was impossible to help observing, during the progress of the above case, the strict resemblance it bore to the bilious yellow fever, as described by physicians in different parts of the United States. Our apprehensions were but too soon realized. In two or three days after its termination, almost every physician in town had patients labouring under the same disease."

The circumstance of ships arriving from the West Indies, about the time that yellow fever excited general attention, naturally led to the idea of imported contagion: but those who consider the local circumstances of the city, and the unusual degree of heat, dryness, and prevalence of southerly winds, will admit that these were sufficient to excite an aggravated form of the common endemial fever of the season; and the case recorded on the 22nd of July, as seen then in the third day, shows that fever had been excited in an individual at least two days previous to the arrival of the first ship; and several persons are mentioned in the Report as having died after a short illness, in a house adjoining the ponds, previous to the 20th of July.

In many of the local epidemics in the cities of America, accidental sources of contamination of air are frequently recorded, like that of the spoiled fruit at Norfolk; and these are considered to give origin to, or to be implicated in the causes of fever. It has already been seen that a heap of putrid cotton-seeds was enumerated among the causes of fever

at Waynesborough ; and Rush ascribed the origin of the great epidemic at Philadelphia, in 1793, to putrid coffee. But it is questionable whether these visible sources of putrefaction act in any other way than exciting causes by the nausea and faintness which they occasion, as the putrid fruit did at Norfolk ; and whether, if all other noxious effluvia were absent, any disease like a remittent fever would ensue. At least, the remote cause of fever and the matter of putrefaction are considered by Dr. Ferguson as essentially distinct ; since fever is excited where no great or concentrated putrefactive process can be detected or imagined to exist. I cannot, however, but entertain a very confident opinion that these local effluvia, from the putrefaction of animal and vegetable substances, tend to aggravate, by their amount and concentration, the character of fever ; and that, when they cooperate with seasons of unusual and long-continued heat, they afford a sufficient explanation of the frequency of yellow fever in cities, as compared with the country. I shall offer, in the course of this inquiry, repeated proofs of this ; and if their agency can be established, as contributing to the production of yellow fever in the cities of the South, it at least may be inferred that they equally contribute to the production of typhus in the higher latitudes.

In the epidemic at Norfolk, " Europeans and natives of the northern States, who had not been accustomed to warm climates, were most exposed to the disease in its severest form ; those who had resided here some time, and strangers from this and the neighbouring states, were not exempt, but the

disease put on a milder form ; while those who were born in Norfolk, and were old residents, never enjoyed a greater portion of health in any former season ; none of them died, or were even affected with the prevailing epidemic. The fever, for several weeks after its commencement, was quite local. For several days in the last of July and early part of August the weather was cooler, and there was a temporary suspension of the disease. It became steadily hot again about the 6th of August ; and the disease returned, and continued with unabated violence to the end of the month. On the 4th of September the thermometer stood at 60° in the warmest part of the day : attacks of the fever were less frequent, but there was little alteration as to the form or severity of the disease. The number of cases was diminished, evidently from the lessened number of subjects susceptible of this form of fever. About the middle of the month it again became sultry, rains were frequent, and the heat of the sun oppressive ; and though the number of new cases was very sensibly decreased, yet no vessel arrived from Europe or the northern States without some of the crew being immediately affected with the prevailing complaint. Towards the latter end of September the fever appeared under a new form in young subjects of both sexes, but more particularly with delicate females ; many young persons who had hitherto escaped, were now overtaken with the disease, in the well-marked form of *typhus gravior*, free from local complaints ; they exhibited marks of strong nervous affection, and generally became deeply comatose three or four days before

death. On the 5th of October a deluge of rain fell, accompanied with a powerful sweeping wind from the north-east; the mercury fell to 48° on the 6th, and on the 7th it was 42° . In a few days after this, not a vestige of yellow fever was to be seen in Norfolk; but children under fourteen were very commonly attacked with a fever of a continued type, with severe nervous affections and frequent discharge of worms. The weather became hot again on the 12th and 13th; on the latter day the thermometer stood at 80° in the shade, and it was oppressively hot in the sun, and continued till the 20th. The cessation of the fever in the early part of the month induced those who had removed to return; and strangers began to visit us after the 15th, several of whom were attacked with this fatal disease, and not being aware of its existence, neglected themselves in the commencement, and in many instances fell victims to it; but since the 30th, all descriptions of persons have enjoyed good health. The deaths did not exceed 250."

It will be remarked in this epidemic, that its duration from July to October accords with that of others already noticed; that the decline and rise of the fever, according to the variations of temperature, do not accord with the progress of a contagious disease; that the insensibility of the natives to its attacks is like that observed in the more southern latitudes; and that a continued fever, expressly denominated *typhus gravior*, attacked young and delicate persons towards the end of September, probably excited by the change of temperature in those most sensible to its variations.

In 1801, Norfolk was again visited by yellow fever; and the circumstances associated with the epidemic will serve to explain how much this disease is liable to be affected, as to the period of its invasion and of its greatest mortality, by the temperature, and the number of persons predisposed to the influence of its remote and exciting causes. The spring was extremely cold, and frequent falls of rain and a cloudy sky had sheltered the inhabitants from the usual heats of the season, as late as the 25th of June. From this date to the beginning of July it was very hot, but without any sensible effect on the general health, as it was followed by occasional rains and cloudy weather till the 23rd of August. Early in June, intestinal fever, under the forms of diarrhœa and dysentery, prevailed in Norfolk and throughout the State, affecting the natives, and running a tedious course in many instances, exhibiting symptoms of severity or mildness corresponding exactly with the variations of the weather.

In August, particularly after the 23rd, some sporadic cases of yellow fever occurred, entirely confined to the shipping and Marine Hospital, and consequently excited no alarm. "On the 1st of September, however, the weather became extremely hot, calm, and serene. Not a cloud was to be seen for eleven days, to afford shelter from the scorching rays of the sun. The thermometer frequently rose to 94°, and was seldom below 90° even at ten o'clock in the evening. This extreme change of weather was followed by a no less remarkable one in the form of the diseases. The intestinal fever

entirely disappeared; and by the 7th or 9th of September, the cases of yellow fever had become so numerous as to deserve the name of an epidemic, those who had laboured under the former affection being found generally not subject to the latter. On the 10th and 11th, the number of sick increased greatly; and on the afternoon of the last day the thermometer fell to 71° , and the wind, which had blown from the S.W. since the beginning of the month, veered to N.E. with a cloudy sky and some rain. But this change did not check the progress of the epidemic: on the contrary, so much more frequent did the attacks of the fever become from the 11th to the 15th, that the mind was strongly impressed with the belief that the rapid increase of disease had, in some measure, arisen from the sudden change in the weather. Other causes, however, besides atmospherical and local ones, combined to augment it. On account of the high price given for American produce in England, all the ships fit for the purpose, that could be procured, had been dispatched during the summer for that market; so that in the months of July and August the harbour was almost entirely clear of shipping. Previous to the hot weather in September, several vessels, at different times, had arrived from Europe with a great number of passengers. Those of them who remained in town had hitherto suffered little from sickness; but after being exposed to the extreme heat, many were taken sick; and from their indigent circumstances, being generally badly lodged and attended, numbers fell victims to the disease. The wind, which changed on the 11th,

brought in a vast number of vessels; so that by the 15th the harbour was crowded with ships, chiefly from Europe. The fever now spread rapidly and increased in malignity, and many of the sailors and passengers of these newly arrived ships were among the number of the sick. About the 20th of September the disease was at its height, but it continued to the end of the month with very little abatement of its violence. It gradually declined during the month of October, and by the 1st of November scarce a vestige of it was to be found. In proportion as it subsided, the intestinal complaints that preceded it began to reappear; and towards the end of October many recoveries from the fever were rendered tedious by a dysenteric affection supervening, and some who had resisted the violence of the former sunk under the wasting influence of the latter disease. The dysentery, however, was confined to no particular class of the community like the fever, nor was it marked with that character of malignity which often attends it when it appears as an epidemic. The deaths were as numerous for some weeks as in 1800, though fewer on the whole in this year. They were evidently greatly augmented by the accidental arrival of crowds of emigrants from Great Britain and Ireland during the violence of the fever, who being mostly of the laborious poor, without the means of comfortable subsistence, were placed in the most unfavourable circumstances for recovery; and thus whole families fell a sacrifice to the distemper."

In the eighth volume of the Medical Repository there is a very superficial Report of a malignant fever

in 1803 at Alexandria, in the district of Columbia, by Dr. Hall, which affords no details worthy of notice. This city is situated on the Potowmac River, in lat. $38^{\circ} 49'$. In May, *cholera infantum* was very fatal; and in July, dysentery prevailed. Cases of malignant fever occurred in August, which were treated, especially if the system was much depressed, by bleeding; and after the pulse had recovered itself the disease is said to have changed, sometimes into the intermittent, or common bilious remittent.

Dr. Dick, the Health-officer of the port, in his Report of the fever, says: "The deaths were upwards of 200; and the epidemic continued throughout the season to be singularly limited in its operations. I must here, for the sake of truth, venture an affirmation, which will probably stand in opposition to some of the popular doctrines of the day. I witnessed during the whole course of the epidemic three distinct species of fever,—what I have hitherto denominated yellow fever; mixt; and common autumnal remittents: the first and last defined by topographical boundaries. Whenever I was called to a patient in the western division of the town I was ready to venture a decision, from the symptoms alone, whether the subject had been occasionally exposed to the infected atmosphere in the other portion of it; while, on the other hand, I have scarcely met with a case of fever within the limit of the infected part, which did not present at once in intelligible characters its malignant nature. The intermediate description was often seen by others as well as myself in that space which may be considered as connecting the two extremes of

the town. I have not been sensible of any peculiarities that distinguish this epidemic from those that have occurred in other places since 1793. Whenever morbid bile, like tar, took possession of the intestines, coma generally took place early, the stomach remained quiet, and the pulse was more natural than in any other variety of the disease, till a short time before the close of the scene. On the other hand, when this redundance and quality of bile was wanting, the stomach grew restless on the second, third, or fourth day, slight retching followed, and soon after a discharge appeared, commonly at first resembling a strong infusion of tobacco, becoming afterwards thicker and darker; but sometimes, on the first appearance of the discharge, it consisted of a black, viscid, flaky matter, which adhered firmly to the sides of the vessel in which it fell. This state of the stomach was for the most part accompanied by a sudden depression of the pulse, and a recession of animal heat from the extremities. This variety of the disease was more frequent than the former, but that was more uniformly fatal. So uniform was this result from the relative states of the stomach and liver, that I recollect to have seen but one or two instances during the season of black vomit connected with discharges of tar-like bile from the intestines. In the comatose cases, blood issued from points in the lips and from the nose, and the skin became yellow earlier than in other cases; but the colour in these cases I thought materially different from that which marked the approach of death in the other variety. The one I considered as arising

from the deposition of bile, and the other from an obstructed morbid excretion of the skin."—Med. Repos. vii. 190.

This fever is noticed in the eighth volume of the Repository, by Dr. Worthington in his account of an epidemic at Georgetown, Columbia, in 1804. He relates the case of a stout healthy man, who went to Alexandria in July 1803, during the time of the fever, and was exposed upon the wharves some time while attending to business. "As he did not wish his family to know of his going, he walked to Green-leaf's Point in the city, and went from thence in the packet, and returned by the same route, much fatigued, as the day was very hot. The night after his return he was seized with a chill, which was succeeded by a violent fever. On the third day black vomiting came on, and continued till the night of the fourth day, when he expired."

Georgetown is situated on the Potowmac, in lat. $38^{\circ} 54'$, and is only separated from the city of Washington by a small creek. The spring and early part of the summer 1804 were unusually wet, and great inundations took place about the time of the hay harvest, which swept away all the mill-dams in almost every part of the country. "The vast mass of putrefying clover and other decaying vegetable matter upon the fields; the quantity of grass, weeds, and shrubs covered with mud, on the meadows and low grounds; and the numerous surfaces of drained mill-ponds, when exposed to the rays of the sun after the weather became hot and dry, —would afford a sufficient exhalation of noxious miasmata to produce fever with very formidable

symptoms; and to this I think may be attributed the unusual prevalence of intermitting and bilious remitting fevers during the last summer and autumn in many parts of the country generally healthy. They prevailed more generally in the neighbourhood of this town last autumn than in common years; but their ravages were confined principally to the vicinity of overflowed grounds and drained mill-ponds, while remote situations in the more elevated, level, and poor lands, remained healthy. Although Georgetown is generally healthy, and was as much so last summer and autumn as it had been in any preceding year, we did not escape attacks of the bilious fever, some few of them of a very high grade. The autumnal fever of this town and the neighbouring country is generally mild, and admits of easy cure; but I have occasionally seen, within the last ten or fifteen years, cases of bilious fever on the Potowmac, as high up as the great Falls, in different parts of the country, and in this town, attended with such malignant symptoms, though not always with black vomiting, as would constitute what is now called yellow fever."

In August 1804, a female in Georgetown, whose residence was in a low situation near the side of the creek that passes through the centre of the town, being incommoded by freshets, determined to protect her garden and dwelling by raising a wall to dam out the water. She superintended the work in person several days exposed to the rays of the sun, protected occasionally only by an umbrella. "In a day or two after, she was attacked with an irregular intermittent, which after four or

five days assumed a more continued form, and she became seriously ill. Her friends urged her to apply for advice; but having an utter aversion to medicine, and trusting to the strength of her constitution, she refused. Hearing of her illness, and having for many years attended the family, I called to see her. She refused to admit me to her bedroom, but came to me in the parlour to convince me that she was not ill enough to take medicine. She was much reduced, and scarcely able to walk across the floor; her skin cold and clammy; her pulse weak, frequent, and oppressed; her tongue moist, and covered with a light brown fur; her countenance sunk, and her eyes of a yellow tinge. I told her she was very ill, and endeavoured to prevail upon her to permit me to prescribe for her,—but without effect; nor could she be persuaded to take more than a single dose of medicine, which was a cathartic, during her illness. On the third day, I think, after my first seeing her, she complained of great heat, oppression, and sickness at the stomach; and the next day began to vomit or gulp up large quantities of black flaky matter, mixed with a thin mucous fluid, which continued to be discharged at short intervals for twenty-four hours, when she expired. I have seen several persons ill of the yellow fever who have come to this place from Baltimore and Alexandria, and died here; and the symptoms corresponded exactly with those of the cases above mentioned. If it should be said that in the first case the contagion was received in Alexandria (1803), the second proves that a solitary case of fever, terminating with all

the symptoms of yellow fever, may be sometimes found even in Georgetown, where the inhabitants are generally healthy, and no trace of contagion exists; for the subject of the last case was remarkably domestic, seldom went beyond the limits of her own lot, and had not been with any sick person whatever."

We have in this case an instance of a common intermitting fever, occurring in a very sickly season, and being allowed to run its course unchecked, terminating in yellow fever; and the interest attached to it is, that it was a solitary example. Rush repeatedly quotes a similar termination to neglected intermittents in the epidemics of Philadelphia; and the fact of the severer form of the disease beginning from the first with the strongly marked symptoms of yellow fever, sometimes terminating in the intermittent form, completes the proof of the affinity between these two modifications of disease, and of their arising from one remote cause, modified either by its variable intensity,—by the influence of different exciting causes—or the condition of the person attacked,—or that inscrutable state of atmosphere which favours the development of disease, either in a mild or aggravated form.

Dr. Dunbar has given us an opportunity of judging of the nature of this fever of 1804 in a more inland part of Virginia,—for Georgetown and Alexandria, though within the district of Columbia, may be considered as belonging to Virginia, and both are ports accessible to shipping. Georgetown, however, is on the Maryland side of the Potowmac, which separates that State from Virginia.

Winchester (Med. Repos. viii. 252,) is situated in lat. $39^{\circ} 3'$, not many miles from the Shenandoah River. The principal part of it is built on low ground, and through the centre of the town runs a small stream. "The spring of 1804, from March to the middle of May, was cold; from that time to July there was rain in some part of every day, the thermometer ranging from 66° to 86° . From the beginning of July to the 13th the weather was very warm, with occasional heavy showers; but from the 15th to the 22nd it was fair and extremely hot, the thermometer rising to 94° and 96° ; and towards the last of the month there were three days of constant rain, with close sultry air, so that every substance susceptible of moisture became moulded.

"A few cases of fever and of dysentery occurred in July; but in August the latter prevailed in many parts of the country: the former, however, began to increase, and was pretty general about the 20th. Few of those who had the dysentery were attacked with fever, or only had it lightly.

"The fever was ushered in with chilliness; pains in the head, back, and limbs; the pulse was full, frequent, but soft, and in the more dangerous cases about natural; the face flushed; eyes red and watery, and their appearance served as a prognostic of the force and malignity of the disease. The tongue, in slight cases, was white and moist; in the worst, black, for the most part parched and dry, or clean and shining; and this red colour, accompanied with moisture, was one of the first signs of recovery. In every case, even of little danger, in the height of the paroxysm there was a degree of stupor, de

lirium, and coma ; and the comatose state in some instances existed for several days, so that it was difficult to arouse the patient. In other cases the patients, nearly from the first, were totally deranged and maniacal. They did not know their parents or any inmate of the family ; were afraid of every person present, and used every effort to escape from them. Yet, notwithstanding this derangement of the intellectual faculties, and insensibility to every other object, their whole complaint was of their head. Nausea and constant retching were general symptoms in the early stage, and often continued throughout the whole period of the fever. In some cases these efforts produced no discharge ; in others, on the first or second effort, very yellow bile was ejected, changing by degrees in consistence and colour, assuming the dark green and blue, down to the completely black vomit, resembling the sediment of very impure coffee. This occurred in three or four cases, two of which were mortal. Faintness, partial vertigo, oppression of the præcordia, with difficult respiration, anxiety, and depression of spirits, were frequent symptoms. Slight affections of the pleura ; pains in the hypochondria and region of the stomach, descending through the intestinal canal, which would scarcely admit the slightest pressure ; paucity of urine, with strangury, occasioned much complaint.

“The duration of the paroxysms, at the commencement of the fever, was extremely various,—from twelve to twenty, thirty-six, and forty-eight hours. It continued for that space of time, with-

out the smallest abatement that could be termed an intermission, or even a remission. In a few cases nature seemed to make considerable efforts to accomplish a termination of the paroxysm by sweating, which, as it was the more profuse, the more perfect and permanent was the relief obtained. The febrile action gradually abated, so as to produce a remission, and sometimes an intermission of considerable duration. This interval was very irregular. It assumed all the varieties of quotidian, double tertian, and quartan. Indeed, in some instances it was difficult to class it in any of the usual distinctions of intermittent fever. This anomalous appearance was most general in the vicinity of marshes, creeks, and mill-ponds. The regular tertian was generally the aspect it assumed, and was the most easy to subdue; for when it was quotidian or double tertian, the intermissions or remissions were too short to accomplish any relief. In the first stage of the disease, before any relapse took place, we did not meet with any regular quartan."

Dr. Dunbar does not mention the number of deaths from this epidemic, nor the period of its decline; but from the following observation we may infer that it was attended with great mortality. "From a review," he says, "of the imperfect statement I have given of the disease which swept away so many of our citizens, you will perceive its identity with the yellow fever. The sallow appearance, early apparent in the countenance and over the bodies of those attacked with the fever, was a proof of the presence of a preternatural secretion of bile,

which was a never-failing concomitant, from the first commencement of the disease to the termination of a lingering convalescence. Creeks, marshes, and mill-ponds were embraced in the precincts of our practice in the country, which enabled us to see the worst cases of the fever, and the different aspects assumed by it in all stages."

This epidemic, so distinctly arising from those endemic causes which give rise to intermittent fever, and occurring in so insulated an inland situation, is a very instructive comment upon the sickness which occurred at the same time at Georgetown; and it is not the less valuable that a few cases only were attended with black vomiting, which is generally considered as the characteristic symptom of yellow fever, though in reality it is not essential to that disease.

The same epidemic occurred in 1804 in Frederick county, in the interior of Maryland, a district of country separated from that round Winchester only by the river Potowmac; and a very elaborate account of it is given by Dr. Duvall, in the eighth volume of the *Med. Repos.* p. 374.

Fredericktown, the capital of the county, is situated in lat. $39^{\circ} 25'$, on a small creek, and in a rich plain which extends from the Potowmac to the borders of Pennsylvania. This plain is bounded by the Monocasy River on the east, and by the Catoc-tin chain of mountains on the west: it abounds with limestone, and is the richest tract of land in the county, generally highly cultivated and extremely productive. Beyond the Catoc-tin, and between it and the South Mountain chain, is a large valley, in

which the limestone is not found. This plain and valley were the principal seats of the epidemic; while the eastern section of the county, separated from the above plain by the Monocasy River, especially the lower part of it, bordering on Montgomery county, and composed of hilly, uneven and barren land, was peculiarly healthy. The mountains are generally reserved for wood, though a few plantations and farms are scattered on them; and in former years these situations have been invariably healthy. During the epidemic, however, they were the reverse; for although it did not begin to rage in the very first instance in these elevated spots, it sooner became general amongst them. It is remarkable that those who resided immediately on the banks of the *large* water-courses were not so subject to the fever as in former years. Scarcely an instance occurred of any one being attacked who resided in such places; and considering their state in common seasons, their exemption was the more singular. Dr. D. imagines this is to be explained by the circumstance that, though the *vernal* rains were incessant, *they* did not swell the rivers over their banks; and consequently no matter was deposited on them whence effluvia might arise and infect the atmosphere. In former years it was common for the Potowmac and Monocasy to be overflowed, and have an immense mass of mud deposited on the alluvial flats bordering them, which, acted upon by the rays of the sun, gave origin to miasmata which infected the inhabitants. "It is true," he immediately adds, "that the Potowmac was raised to an uncommon height over its banks;

but this was from rains beyond our mountains *in the summer*, and at a time when it was never known by the oldest liver on it to be so high before. The bottom lands were in full cultivation, and the sun was powerful enough *at that season* to dissipate the germs of disease which lurked in the deposited trash, by immediate evaporation and consequent dryness: hence we found that this great inundation could have no influence in promoting the epidemic, as we still found the inhabitants upon and nearest to the rivers healthy, while those at a greater distance were remarkably unhealthy."

It is probable that the insusceptibility of those who lived near the rivers arose from the sickness they experienced the year before, in consequence of repeated inundations; and that in 1804 the epidemic did not appear so much among them as in situations remote from the water-courses, because the inhabitants in the last were more predisposed.

As there are several facts communicated in Dr. Duvall's paper, which are highly interesting, I shall give an abstract of it, as brief as perspicuity will allow, as I am anxious to accumulate evidence as to the character of the fevers in America, that they may serve as points of comparison with those of other countries; and I must again repeat, that I know of no body of facts more instructive in the whole compass of medical literature, than those contained in the reports of medical men scattered through the States of North America,—men who, however imperfect their early education might have been, as compared with those who had all the advantages of the elaborate instruction of the European

schools,—thrown as they necessarily were upon their own resources, in a country fertile in all the varieties of fever, and obliged to discharge *all* the duties of the profession, may be said ultimately to have been taught in the great school of Nature, where the observation of her phænomena led to the best practical information, unfettered by those systems and creeds which hold such influence over the minds of men in a narrower field of observation, and limited, as in this country, to the practice of one particular branch of the profession. A comparison of the medical literature of America from the time that Rush's views began to be widely diffused, with that of this country up to the publication of Mills's work on the Efficacy of Blood-letting in Fever, would, I am confident, reflect honour on America. The earliest writers of this country who threw off the doctrines of the schools, are to be found among the professional men of the Navy and Army, a class of practitioners who, like their provincial brethren in the United States, were thrown suddenly into a new field of observation, and obliged to rely upon their own responsibility: and it would be a curious and instructive labour, to trace in the writings of many of them their early perception of the errors of education, and their emancipating themselves from the influence of opinions which were still taught *ex cathedra*. I would refer to Dr. Irvine's work on the Fevers of Sicily for the proofs of that conflict which arose in his mind between what the schools had taught and observation was teaching him;—and to my friend Dr. Graham's pamphlet on the Epidemic in 1817 at Glasgow, for evidences of his apprehen-

sion in deserting the long-established maxims of the age.—Rush had thirty years before inculcated what are considered at the present day sounder views of disease ; and his influence in America was equal to that of the great Edinburgh Professor in this country. “We remember (says a well-known Journalist in 1809,) the horror and incredulity that was excited some years ago by the evacuating system of Dr. Rush, and of some West India practitioners in the yellow fever ; and how a celebrated German Professor of the stimulating school shrugged up his shoulders and prognosticated the certain death of a patient in our infirmary labouring under typhus, when he heard his physician prescribe some necessary evacuations. But the practice of Dr. Rush was successful, and our condemned patient speedily recovered.” (Edin. Med. and Surg. Journ. v. 85.)

Dr. Duvall prefaces his account of the epidemic of 1804 with a brief notice of the diseases of the two preceding years. In the summer of 1802 the *cholera infantum* was obstinate and fatal ; and as autumn approached, remitting and intermitting fevers increased ; but they were not severe, and yielded to the usual evacuants, bleeding, and bark. In October many who had been affected with either form of these fevers were seized with a symptomatic choleric, which also attacked some who had had no fever ; and this disorder proved unusually severe and obstinate. When a strong choleric-like attack occurred in the stomach and bowels, there was an apparent absence of fever and of ague or chill. In other respects the symptoms were the same ; the exacerbations took place in the same manner in both forms

of complaint, and the state of the pulse, head-ache and sick stomach, were the same. The painful paroxysm returned periodically, imitative of the ague or chill, observed the same duration as the fever, and always went off leaving the same symptoms: Dr. D. found that it was only curable by bark. Throughout the autumn cases frequently occurred, till the severity of the season checked the prevalence of all bilious disorders, and brought on others of an inflammatory kind.

The spring of 1803 was cool and very wet, so that the rivers and creeks overflowed their banks several times; and it was succeeded by one of the driest summers ever remembered, to the great injury of every kind of crop. In the autumn, the inhabitants on the banks of the rivers and water-courses near the Potowmac and Manocasy were much afflicted with agues, and the different types of bilious fevers; and in several instances the attack came on in the form of cholic, as in the preceding year. As the cold weather advanced, "the type of disease changed, and assumed the more terrible appearance of inflammatory disposition ending in nervous fever." The winter for the most part was severe, and many cases of violent inflammatory fever occurred, several of which proved fatal to the young and robust.

In the spring of 1804 the weather did not moderate much, nor did the snow begin to dissolve until March; and so gradually was it carried off, that the rivers and creeks did not rise above their banks, though they were very high, and continued so for a much longer period than usual.

In April and May the rains, though almost continual, never fell in large quantities at a time; so that the water-courses could empty themselves rapidly enough to prevent overflowing, except in the hilly districts from which the rains rapidly descended. Towards the 20th and 25th of June, there fell a vast quantity of rain in the high parts of the country in Maryland and throughout Virginia, so that the Potowmac, which separates these two States, and the water-courses south of it, and even those north of it below the falls, were raised to a height which never had before been observed at this season of the year. But the water did not lie long; for it rose rapidly, and as rapidly declined. On the Potowmac the bottoms were inundated, and immense quantities of hay, corn and tobacco, were destroyed and swept away.

At the end of the month the weather became dry and warm; and in July the heat was almost insupportable. Early in August the epidemic made its appearance, but the first cases were slight and easily controlled: it increased, however, till late in October, and became very general in that part of the county west of the Monocasy River, beginning first in the plain, but not proving so soon prevalent there as on the Catoctin chain and the valley beyond it. The inhabitants of Fredericktown were exempt from its ravages till September; but by the end of that month almost all of them had felt its power. It fell with most severity on the poor; for though it was indiscriminate in its attack, those who enjoyed the comforts and luxuries of life passed through it most easily. In a few places only, and

to a very circumscribed extent, did it affect those who resided in that section of the county east of the Monocasy River, who in fact enjoyed a superior degree of health to what was common in preceding years. It attacked all ages ; but the negroes suffered least,—it proving very rarely fatal to any of them, and generally of short duration.

The earliest symptoms were very severe pains in the bones, not confined to any part, but most frequent in the legs and fore-arms. They generally announced the approach of disease in the first attack, and of the exacerbations afterwards, and went off on the accession of fever, and remained absent during the remission or intermission.

Pain in the head was almost universal, in the forehead and eyes, or occiput, apparently depending on the disorder of the stomach ; and it sometimes continued after every other symptom had disappeared, until the patient could take his usual exercise, and had his appetite restored. “ At the time I had the disease,” says Dr. D., “ it invariably came on after the pains, chiefly in the legs, with sick stomach, followed by a chill or ague ; when this was about going off, I generally vomited two or three times ; fever followed ; and when this remitted or intermitted, the head-ache came on ; or if it did not then just come on, I felt it in a more sensible manner than at any other time, which I accounted for by supposing, that at the time I laboured under fever, oppression of the præcordia, &c., I was not so sensible of the head-ache, as the pain was swallowed up by more distressing sensations ; but as soon as these went off, the head-ache was left alone.

In no one instance did I see blood-letting entirely relieve this symptom. It increased its violence in my own case.

“ In the first instances the disease generally appeared in the remitting form, and afterwards changed to an intermittent, which continued many weeks. After an illness of several days it assumed the form of a tertian. The most difficult cases were those in which the remitting fever, or the quartan, tertian, and double tertian intermittent, changed to the quotidian type, which was unusually obstinate.

“ The stomach appeared to be more affected than any other part; every paroxysm was accompanied with nausea and vomiting in a greater or less degree. Many complained of great pain in the stomach, which abated on spontaneous vomiting, followed by diarrhœa, taking place. In most cases the irritability was so great that neither the lightest food, nor any kind of medicine, could be retained. Many were saved from an attack of the epidemic by spontaneous vomiting. Great quantities of acrid bile were evacuated in this way, and sometimes with obvious relief to the symptoms ushering in the complaint. The first efforts usually brought up phlegm, mucus, afterwards dark green bile, extremely tough and viscid, and then yellow bile. I did not witness a single case of genuine black vomit, though I frequently heard of dark-coloured matter being discharged from the stomach, and in several instances I saw the discharge of a dark brownish dirt-coloured fluid, which by no means resembled the black vomit according to the idea I

have of it, having never seen a case of the kind myself."

The skin was always very hot and dry at the commencement of the paroxysm, but became relaxed, moist and cold, as the fever abated. The evacuation by the pores was never critical, and no benefit was apparently derived from its quantity; for the same appearance occurred at each succeeding paroxysm, and sometimes continued long after the fever was gone. It was then debilitating, and required tonics and exercise to remove it. In many, this inordinate perspiration was foetid, and communicated a sour smell to the body and bed-clothes, and had a sharp saltish taste. The skin was tinged with bile in very many instances, and those who had been severely affected were known for a long time after convalescence by the peculiar yellowish white colour of the countenance. In many, an eruption took place like erysipelas; in some there were red, hard, inflamed spots, rising into small circumscribed tumours, like the bites of insects, attended with violent itching, which after several days disappeared, and left a scaly rough surface. This symptom appeared after convalescence, and was considered favourable; and whenever it disappeared suddenly, it was followed by sickness and irritation of stomach.

Delirium, more in the absence of fever than during its continuance, and great prostration of muscular strength were common. Trembling ensued in those cases which terminated in nervous symptoms, and these in several cases were very alarm-

ing. Despondency and the fear of death predominated over every other consideration.

The secreting organs generally were stimulated. The fæcal evacuations were large and excoriating to the rectum, often extremely foetid in the early stages. The urine was discharged frequently, and in large quantity, generally pale and without smell; rarely high-coloured, and then only in cases of violent fever, with a tendency to inflammation. The disposition to relapse was great, but always into the intermittent type. Very few when recovered from a remittent relapsed into the same type again. In many instances the disease seemed to change from one to the other from natural causes. The treatment consisted in frequent emetics, calomel purges, subcarbonate of potash given in a state of effervescence; bleeding in those cases where there was local inflammation or determination of blood to the head, especially towards the decline of the epidemic; blisters and sinapisms after free evacuations had been obtained, and finally the bark.

The effervescing draught was very efficacious in removing nausea, preventing vomiting, obviating thirst, and producing perspiration. "I was led to prescribe it in a case which made its appearance first under the form of cholera. The patient had been vomiting constantly and violently for four hours and a half, had an almost inextinguishable thirst, pain in the stomach, and head-ache. Her eyes appeared hollow, she could scarcely be heard to speak, and the pulse was hurried and reduced. Her cries for cold water were incessant, and whatever was drank gushed back in a stream to some

distance. To restrain the vomiting and allay the irritation of the stomach, I administered a solution of the salt of tartar in cool water, in doses of a table-spoonful, to which sharp vinegar was added till effervescence took place, and it was ordered to be given every half hour. After the second dose she did not vomit; but the remedy was persevered in, and a moist skin and revived eye soon became apparent. The cardialgia and head-ache vanished, the pulse restored, thirst no longer prevailed, and in six hours she was able to sit up and retain food. The next day she took a bolus of calomel and tartar emetic, which operated well; but on the day after, the symptoms returned, not however with so much violence, and were again checked by the same remedy; and so on alternately every other day, in the same manner that an ague would recur. After plentiful evacuations, I treated it as a case of intermittent with bark, and the patient recovered. After the issue of this case, I prescribed this medicine in almost every case. It was sometimes gently laxative; and to encourage that operation I occasionally added magnesia. The salt of tartar was the most successful and pleasant medicine that was used, and deserved more reputation than any other for its qualities in affecting the bile and lessening fever."

In some counties of Pennsylvania, in those of Washington and Alleghany in Maryland, and in Loudoun, Prince William, Fauquiere, and Culpepper counties in Virginia, "the epidemic was malignant to an extreme." The fatal cases were remitting fevers, or after nervous symptoms came on,

which sometimes happened where much blood-letting was practised, or where inflammatory symptoms were not checked in due time.

“ Having thus given,” adds Dr. Duvall, “ a detail of this interesting subject, you will be enabled to judge wherein this fever resembled the endemic fever of our sea-ports. Making a sufficient allowance for the confined atmosphere, the heated walls and pavement, the dirt of the streets, alleys, common-sewers, docks, and manufactories,—all of which assist to render any fever more malignant,—I think every reflecting mind will acknowledge the identity of the endemic disease of the large cities, and the epidemic as it lately prevailed in the interior of the country. With the difference of the exciting causes, I think we feel as much malignancy in the remitting bilious fever as the inhabitants of the sea-ports : the symptoms, causes, effects, and cure, are the same. The difference in the degree of violence with which it affects the body in cities and in the country, is altogether from the causes I have mentioned, and not from the qualities of the disease-producing principle, which I consider the same, whether they carry pestilence to the citizens of a sea-port, or are content to infest the dwellings of the more temperate inhabitant of the country. The prevalence of so malignant an epidemic in the interior and otherwise healthy parts of our country, must shake the opinion of the believers in the importation of yellow fever. When they find the same disease committing such havock among the very mountains of our country, they must find themselves much at a loss to prove its foreign origin.

When the yellow fever raged in Philadelphia, in 1793, the bilious fever was extremely malignant and fatal here and in the neighbourhood. It prevailed also, but more slight, in 1795. In 1798 it was very fatal in this town and adjacent country."

Dr. Speed, whose observations of the disease have not been confined to one spot, confirms this opinion of Dr. Duvall. "I have had (*Med. Repos.* vol. ix. p. 259,) opportunities," he says, "of observing the autumnal bilious fever in the Federal city in 1795, in Norfolk; Virginia in 1797; in Kentucky in 1798, 1799, and 1800, and in New Orleans in 1801 and 1802; and am fully persuaded that the yellow fever is but a higher degree of the common autumnal bilious fever of our country."

This was the mature conclusion of Rush; and I have given a particular description of the epidemic at Maryland, that it may serve as a mean of comparison with those of Philadelphia, and also exemplify the desultory nature of its visitations; preferring particular spots, in a manner which admits of no satisfactory explanation.

CHAPTER VIII.

FEVERS OF THE MIDLAND STATES OF NORTH AMERICA.

I HAVE already quoted Dr. Vaughan's account of the yellow fever which prevailed at Wilmington, in the State of Delaware, in the year 1798, in which

he mentions a fog rising from an extensive marsh, and driven by the wind over that portion of the town where the fever exclusively prevailed. In a valuable paper in the 3rd volume of the Medical Repository, pp. 221, 336, and vol. iv. p. 130, on the Diseases of the State of Delaware, he has some general observations on fever, which are too important to be passed over.

Delaware is a small State, situated in lat. $38^{\circ} 27'$ and $39^{\circ} 50'$ between Maryland and Delaware bay and river, consisting principally of low land, large tracts of which, in the spring and early part of summer, are overspread with stagnant water, which renders them unhealthy and unfit for agriculture; and Dr. Vaughan having resided near that fenny country known by the name of the Welsh-tract Swamps, had a favourable opportunity of observing those forms of fever for which the State has become proverbial.

He remarks, that "as the spring diseases are influenced by the fevers of the preceding autumn, it will be most satisfactory to commence with the diseases of summer, and end with those of spring." May and June are the healthiest months: towards the middle of July eruptive and intestinal diseases usually occur, with sporadic cases of fever. The eruptive diseases are generally critical and salutary; those children who are affected with them, as nettle rash and prickly heat, are otherwise free from complaint, while others have diarrhœa, cholera, or intermitting fever. They often alternate in the same person; and the eruptive state, if secondary, affords

a sure relief: but if the eruption be suddenly checked by cold, especially if the cold be accompanied by moisture, it reverts to an obstinate intestinal state of fever.

This intestinal state of fever, whether under the form of cholera, diarrhœa, or dysentery, is much more tedious and difficult of cure than intermittents. Diarrhœa is the most common, usually neglected until it becomes mucilaginous, and attended with tenesmus, assuming the form of dysentery, or serous and profuse. Dysentery was never epidemic during his residence in the marshy country, though annually sporadic; but, he says, "while we were labouring under remittent and intermittent fevers, our neighbours on an adjacent ridge of hills were infected with the dysentery in a very mortal degree, confined within a parallel line from six to ten miles in extent, from the marsh miasma becoming concentrated or condensed in its passage through a colder stratum of air.

"August and September may, with propriety, be denominated the fever months, remittents being more frequent in the last. Of intermittents, the quotidian is the most common,—the chill slight, but the fever violent, as in every other form,—the cold and hot stages being opposite in duration and violence. Its period of invasion generally between eight and eleven o'clock A.M. The semi-tertian invades at eight or ten o'clock on the first day with a chill; recurs the next at two or three P.M. without a chill; fever alternately moderate and violent. Tertians invade at two or three P.M.; chill

greater than in quotidiens, and *vice versa*. Quartans at five or six P.M. ; chill greater, and fever less than in any other form.

“ Relapses are milder than first attacks, unless in very debilitated subjects ; but degenerations critical. Quotidiens often degenerate into tertians and semi-tertians, and the latter not unfrequently into continued fever. If the degenerated types postpone the accession, it is always favourable, and the disease is shortened in duration. If they anticipate, they are proportionately violent and tedious. The duration may be commonly ascertained by the state of the stomach and type. The disorder of the stomach is proportioned to the duration of the chill, and vomiting generally occurs at the end of the horror, or beginning of the hot stage ; and the type indicating danger or difficulty is that in which there is least release from fever, which is usually the semi-tertian. The cold stage is the most fatal.

“ Why remittents are more frequent in the latter part of the season I refer to older heads ; for unless it be imputed to a concentration of miasmata, or higher degree of the cause of intermittent fevers, I must confess myself ignorant. If the same effluvia may produce dysentery and intermittents, they may, when modified by maturity, produce remittent fevers of various degrees of violence. They bear but a small proportion in the general scale of fevers, perhaps not more than one to thirty of intermittents. The concomitant evils, however, are mostly parallel. Though annually harassed by agues, we are not much troubled with their more formidable relations. The autumn of 1798, however, forms

an exception ;—and presuming a history of the disease of that season will answer the present purpose, without a minute detail of our common form of the disease, as it is only different in degree, I shall confine myself to that subject.

“The first case of remittent fever that occurred, was in July. It assumed no regular or distinct type ; the remissions were obscure, and the debility great. When I first saw the patient, which was on the eighth day, the tongue was parched and dark, blood oozed from the nose, and the surface was variegated by purple blotches. By the liberal use of wine and tonics he recovered.

“The second case was in October, in a boy six years old. I was called on the eighth day, and found him irascible, without fever ; tongue black ; pulse feeble ; surface yellow ; breathing laborious, with frequent sighing ; a perpetual vomiting of granulated black matter, and blood oozing from the lips and gums. He died comatose in a few hours. About ten days before the attack of this child, a woman had died in the same house, with similar symptoms. This made me suspicious of contagion ; but the parents affirmed that neither of them had been exposed to disease. They lived in a sequestered place adjacent to an extensive marsh ; and the occurrence of numerous other cases, in different parts of the neighbourhood, soon convinced me that it was an indigenous disease.

“The general character of the disease was as follows :—It sometimes attacked suddenly with rigor, but frequently was preceded by languor and nausea, of two or three days' duration. The violence of

the case was announced by the manner of the attack; for if sudden, the case was desperate, and *vice versa*.

“The fever was sometimes obscure,—generally a remission morning and evening; and it partook in some measure of the tertian type. The pulse was generally full and quick,—not always tense; and the blood showed little buff unless there were local affections. The head was generally affected with pain, particularly in the forehead, and the eyes with inflammation and jaundice. An icteritious colour of the skin soon succeeded. The bowels generally costive in the commencement; stomach irritable; vomiting often intervened on the third or fourth day. The crisis usually happened on the fifth, seventh, or eleventh day. If protracted beyond the fifth, the breathing became oppressive, with cardialgia, great anxiety of the præcordia, and frequent sighing. If it passed the seventh, it frequently reached on towards a putrid fever, so called; the teeth became incrustated with a black matter; a vomiting of chocolate-coloured matter came on; the tongue became parched, and fissured; blood oozed from the lips and gums; the heat retreated from the extremities, and coma and death soon closed the tragic scene. But if it lingered on to the eleventh day, without these urgent symptoms, it became an ordinary typhus fever.

“The intermittents of this fall were also unusually obstinate and varied in their form, frequently alternating double tertians, appearing like two diseases, running different courses, worse and better every other day. The intermissions were of short

duration, and they not unfrequently degenerated into typhus fevers. It is a singular fact that all our febrile diseases partake of the tertian type, and are also of the synochoid genus. Others may solve these problems ; I am content with relating facts.

“November is usually healthy, except it be from the remains of febrile diseases, as œdematous and anasarcaous swellings, anorexia and muscular debility, with occasional feverish attacks, usually called inward fevers. If anasarca be attended with schirrosities of the spleen and liver, they are frequently troublesome and fatal. If not neglected, a course of mercurial alteratives with friction is generally successful ; but if ascites be added to the list and the strength be exhausted, a lingering death usually ensues.

“If there be much wet weather attending the transition from heat to cold, catarrhs, mucilaginous diarrhœa, erysipelas, &c., ensue. Flannel shirts are the most effectual preservatives.

“December and January are also healthy if the weather be dry and uniform ; but if variable, with rain or snow, without severe frost, pneumonic diseases and catarrhs become epidemic.

“February, however, is the proverbially morbid month of winter. The miasmata of autumn are effectually destroyed by frost ; a respite has been obtained from the attacks of ague, and a new order of diseases arise from sudden transitions of temperature. If the attack be sudden and severe, the violence of the case is announced ; but in most cases, irregular feverish heats and chills, with the ordinary symptoms of catarrh, precede for three or four days.

The affection of the breast now becomes insupportable; cough incessant, with an expectoration of frothy mucus; great oppression of the præcordia, with a sense of soreness. On the second or third day the cough becomes more violent; expectoration suppressed; the head attacked with pain and confusion; tongue furred and parched; skin dry and hot; and pulse frequent and soft. On the fourth or fifth day these symptoms are aggravated; the patient becomes irascible with sudden startings from apparent sleep, and with great anxiety; as his strength fails, the pulse becomes more frequent and irregular; the delirium is a typhomania; the eyes assume a glassy appearance; the extremities gradually become cold; the respiration resembles uninterrupted sighing; and, from twenty-four to forty-eight hours, death closes the scene. A jaundice frequently pervades the body shortly before or after death, and often petechiæ. The bowels are either constipated or affected with diarrhœa.

“In the more active forms of the disease, the symptoms approach towards ordinary pneumonia; the pulse is full, but not tense; the expectoration copious, and streaked with blood on the third or fourth day; pain of the breast more acute, and the oppression less; yet in many cases the disease terminates in twenty-four or forty-eight hours.

“The general character of this disease is a *peripneumonia notha** in a majority of cases; yet I

* For a more particular account of this disease, as it occurred in the eastern States, see “Mann’s Medical Sketches of the Campaigns of 1812—1814;” Dedham, 1816, pp. 16, 19, 186, 305. And, Gallup, “Epidemic Diseases of Vermont;” Boston, 1815, p. 281.

think the denomination is delusive ; for the general state of the system is disregarded, and the local affection is the only object of concern, as the fever is often so irregular as to escape attention. It is not uncommon to be told by the patient that his only complaint is an uneasiness in the breast, or an affection of the head, when the extremities are becoming cold, stupor gliding on, and death assuming his seat. To say that a congestion of the lungs or brain is of no importance, would be absurd ; but to disregard the diathesis of the patient would be to ensure him a speedy death. I have witnessed many cases where the local affections only were considered, and the disease termed pleurisy and phrenitis, and depletion commenced *secundum artem*; and in which none of the patients survived forty-eight hours. And I should probably have fallen into the same error, had not the state of the pulse, the frequent sighing in respiration, the tendency of the fever to assume a tertian type, the early appearance of the Hippocratic countenance, convinced me it belonged to the genus of autumnal fevers, varied by the casualties of the atmosphere. It may be said that this is too far strained, and that frost destroys marsh miasmata as a tropical plant. Granted: when the ponds are covered with ice, exhalation is overpowered ; but if these fevers suffer a common fate with their causes, why do intermittents exist or occur in winter, and winter quartans, the most obstinate of the whole tribe ? Why do valetudinarians suffer relapses in the frosts of January and February ? and why are persons on a removal from a marshy to a high country attacked with the endemial fevers of

the fens, if the remote cause be not dormant in the system, and excited into action by a concurrence of predisposing causes? These facts I presume substantiate the position that our winter diseases are but varied forms of the autumnal fever.

"A female, æt. twenty-five, of a florid complexion, and habituated to laborious exercise, was attacked on the evening of January 3, 1796, with a chilly fit, succeeded by fever, cough, oppression at the præcordia. I was called at ten o'clock the next morning, when her pulse was imperceptible, respiration sighing, the surface cold and covered with purple spots. In a few minutes a great quantity of granulated blood burst from her mouth, nose, and ears. I stood a passive spectator of her unceremonious fate.

"An active robust man, æt. twenty-six, indisposed by a slight catarrh, was attacked with a chill at a fox-chase on the 10th of March, 1797. During the chill he drank freely of cool water, and vomited incessantly. Fever succeeded; and about an hour from its commencement I saw him. He had a frequent dry cough, oppression, and pain in the breast, pain in the head, pulse full and rather tense, and in fact the complete symptoms of pneumonia. I drew twelve ounces of blood; gave an effervescing mixture to check the vomiting, and an antimonial febrifuge to promote perspiration. At nine P. M. he was much relieved, and inclined to sleep. At seven the next morning, to my great astonishment, I found his pulse feeble, extremities cold and of a leaden hue; his lips and tongue covered with a dark scurf, and fissured; his eyes glassy, and pupils

dilated, with typhomania. Blisters were applied, and cardiacs given; but he died comatose at four P. M.—‘a sudden rush from life’s meridian joys.’

“A variety of similar cases occurred this spring, but most of them were confined to the centre of the Welsh-tract Swamps. Many were of the phrenitic state of fever, and uniformly fatal; whereas the mortality of the ordinary grade of the pneumonic state is about one in ten.

“A favourable crisis mostly happened on the third, fifth, or seventh day, announced by a copious expectoration streaked with blood, and a diaphoresis.”—“It will be readily observed that this fever belongs to the synochoid genus, and that its transition to typhus is often uncommonly rapid; and in fact it was sometimes typhus in the commencement.”

This rapid sketch of the diseases of the different months of the year, traced as it is by an observing and sagacious mind, requires no comment.

I would only recall the reader’s recollection to the nature of the country where Dr. Vaughan resided;—to his referring the remittents of autumn to a more concentrated miasm;—to the fact of quotidians generating into tertians and semi-tertians, and these into continued fever;—that remittents, protracted beyond the eleventh day, became ordinary typhus fever;—that intermittents even often passed into the same form; and that the formidable disease of February and the early spring months, excited into action by transitions of temperature, was sometimes a congestive, an inflammatory, or a mixed form of fever, evidently allied to the au-

tumnal diseases,—varying its character according to the locality and nature of the diseased action; sometimes a *peripneumonia notha*, or an ordinary pneumonia, or a fever with a tendency to the tertian type, or a typhus with startings, stupor, delirium, glassy eye, petechiæ, diarrhœa.

In a paper descriptive of the diseases at Wilmington in the summer and autumn of 1800, (Med. Repos. iv. p. 238,) Dr. Vaughan states a fact which is important with reference to the cause and desultory prevalence of fever.

“One fact, which serves to characterize the grade of our morbid cause, is the circuit of our fogs. Instead of soaring over the body of our town to the hills, as in ordinary cases, or grovelling over the south-western flat, as in 1798, it took a circuitous route along the south-eastern level fronting the Delaware and extending to Brandywine; and I believe not a single house escaped. It was sporadic over the town. Another singular circumstance is, that the French who escaped the fever of 1798 were generally affected this season. Mr. Webster, in his ‘History of Pestilence,’ mentions a variety of cases of pestilential diseases affecting certain descriptions of persons at one time, and exempting them at another; and that it sometimes passed one town, and seized another contiguous. Such has been the fact in this neighbourhood. There is a small village, five miles distant from this, on the borders of the marshes, in a direct line between this and Christiana village, and it has been unusually healthy this season; while Christiana village was generally infected with bilious fever.”

Wilmington was again visited by malignant bilious fever in the autumn of 1802, the deaths amounting to eighty-six ; and Dr. Vaughan published an account of it in a small pamphlet, an extract from which is given in the sixth volume of the *Med. Repos.* p. 298.

The first serious alarm of malignant fever was in the first week of September. It began in the narrow part of King Street and the adjacent district, progressing over the lower parts of the town, finally encroaching on the district north of Third Street, but principally confined to the south-east of Market and Third Streets. The disease was suspended by a great change of weather on the 5th of September, resumed a formidable shape about the 9th, and became general in the southern district by the 25th. After the 15th the air had a taint resembling bilge-water, especially in the night and after a light shower of rain, sensibly perceived by persons coming from a higher region. The fogs which collected in the evenings were suspended on the flats during the nights, gradually becoming more compact in the mornings, and passed off in a dense cloud towards the Delaware, between seven and ten o'clock. This semi-circuit of the fogs from Market Street, southward and eastward, was the seat of concentrated disease, so well defined, until the 15th of October, that the inhabitants north of Third Street felt little apprehension. As the fogs became diffused, a few scattering cases of disease appeared, and removal was the only mean of safety. The poisonous matter exciting disease was evidently a constituent part of the fogs. Many persons visited the infected district in

clear weather, and in the day time, without injury ; and several of the same persons contracted disease by a single exposure in the night time. It is remarkable that the disease generally attacked in the night time.

“ Its non-contagious nature was repeatedly attested by persons sickening after removal from the lower to the higher parts of the town ; and being nursed with every attention, and dying, without communicating the malady to their attendants : and its indigenous nature was shown by the ultimate sameness of every form and grade of fever ; for after the middle of September, the subordinate grades, not arrested within forty-eight or seventy-two hours, passed on to the malignant state of disease, no matter how slight the attack, nor who was the subject. A noxious state of atmosphere was manifested by the lingering state of convalescents who remained in the contaminated region ; while those who removed into the country were speedily restored to health.

“ The rise, progress, and confined state of the disease ; the manner in which the fluctuating malady corresponded with the varying states of the weather ; its non-communication to the attendants on the sick, when out of the original sphere of infection ; and its sporadic appearance in other parts, after the more extended fog on the 15th of October, with the final termination of the progress of infection by a single frost, are, in my opinion,” says Dr. Vaughan, “ evidences, as striking as the nature of the case will possibly admit, that the

multiform disease which afflicted us was not of foreign origin, nor specifically contagious."

The account of the weather and diseases at Wilmington in 1803, by the same intelligent author, (*Med. Repos.* viii. 139,) is so important with relation to the different character assumed by marsh fever in different years, that I shall offer no apology for reporting it fully. We have seen the epidemic prevalence of the periodical types of fever, in a district of country eminently calculated to produce their remote cause; and that a typhoid form has occasionally arisen out of them, which I have imagined to be identical in nature with the endemic fever of Great Britain, differing from it in no other respects than might be reasonably expected from the difference of climate, and its modifying influence on the body; and if, in the same season and under apparently similar circumstances, in the same place, this typhoid disease should be found to prevail in the absence of the usual periodical bilious fever, and to obey the same laws, it would materially tend to confirm the idea that these forms of fever are modifications of each other, and that they proceed from the same remote cause. It will be seen, from Dr. Vaughan's Report, how far this idea is probable.

"The winter of 1802-3," he remarks, "was healthy. After the pestilential fever, in 1802, was arrested by the frosts of October, there was a suspension of everything like an epidemical disposition to disease until March, when influenza appeared in a moderate degree. June was warm and dry, the thermometer

varying from 80° to 86° ; and the same weather continued till towards the close of July, when some heavy showers fell, which were highly acceptable and invigorating. Perhaps rain has not been more welcome since 1793. The frosts of spring, and the drought of June and July, had nearly destroyed our summer fruits. The grass itself was so much parched, that cattle could merely subsist, without fodder. Diarrhœa and dysentery were general. The first half of August was temperate and showery—the last half, dry and warm. Dysentery was more formidable, but gave place to typhus fever after heavy rains on the 16th and 18th. September, after the 5th, was cool, with frequent rains; and typhus became general and stationary during autumn. Hoar frosts were frequent in September; and on the 18th of October there was ice. November and December might be termed healthy: a very few cases of typho-catarrhal fever occurred.

“ Though dysentery as an epidemic is unusual with us, there was nothing otherwise remarkable in the character of the disease. The febrile action was moderate: I knew of no case requiring blood-letting, and heard but of one proving fatal in town:—alkaline remedies were generally relied on. Our neighbours in the adjacent country were less fortunate; and a variety of circumstances combine in rendering this disease more fatal to country people than to citizens. The unconquerable horrors of contagion, with a general ignorance of nursing, conspire against the indications of the physician and the life of the patient. I firmly believe that our disease was indigenous, and not contagious. It

superseded *cholera infantum*, and, in its turn, gave place to autumnal fever on an incidental change of weather. The transformation of dysentery into typhus fever, immediately after the rains in the middle of August, was as strongly marked as any case of the kind could be. An epidemical disposition to intestinal disease commenced with the drought in June, continued with it throughout July, and until the middle of August, and immediately changed its shape with the change of weather. Typhus, like all other febrile tyrants, banished every subordinate relative. The pestilential fever of 1802 possessed not a more despotic dominion than the typhus fever of 1803."

Dr. Vaughan distinguishes three grades of the disease:

"1. The walking state of fever, or an insidious form which was attended with a dull pain of the head, mostly in the forehead, a small and frequent pulse, lassitude, furred tongue, and costiveness, which if neglected eight or ten days, terminated in a confinement of four or six weeks. But every case might within the first week be arrested by a blister to the nape of the neck, to concentrate the undefined action in local disease, the free use of seneka, and bark, to give tone to the system.

"2. The common grade of the disease commenced with a sensation of chilliness, pains of the head and limbs, and especially of the back; a general sense of weariness and prostration of strength; dullness of the eyes; soft, small and frequent pulse, and costiveness. The tongue soon became coated with a clammy fur, like white velvet besmeared with

soap ley. If these symptoms were not arrested within ten days, a new and more formidable train succeeded, constituting—

“3. The malignant state of disease; the eyes assumed a glassy appearance; the tongue became dry, the edges brown, the end husky and parched; the stomach irritable; or diarrhœa supervened with nasal hæmorrhage, *subsultus tendinum*, and strangury. A small, irregular and often shattered pulse, with typhomania and black or coffee-ground discharges from the bowels, closed the tragedy on or about the twentieth day; or a gradual abatement of these symptoms, with returning softness of the tongue, and a free though weak pulse, indicated a favourable issue. A considerable affection of the brain was always dangerous, if not speedily relieved by blisters.

“The malignant state of disease, however, was not always a degenerated condition of the walking or ordinary states of fever. In one case to which I was called on the second day, I found the patient in an apoplectic stupor, with a labouring pulse, and convulsive agitations of the limbs. I drew six ounces of blood, when his pulse faltered, then became free and frequent, sweat appeared on the surface, and the agitation of the limbs ceased; but he could not be aroused from his stupor. His bowels being costive, stimulating injections were given till they operated freely; and as the heat and action on the surface remained defective, four blisters were applied to the arms and legs, and in six hours he awoke as if from a sound sleep. He finally recovered, after a varied and lingering course of fever.

“ In one case of degenerated disease, from the walking through the ordinary form to the malignant state, the patient had daily oozings of blood from the nose, gums, lips and bowels, his blisters gangrened, and it formed a complete case of putrid typhus fever. By the aid of bark, volatile alkali, and wine, he recovered. The ordinary course of febrile action was a partial remission in the morning, increasing through the day, and a more violent exacerbation in the night. . In August a few cases of the synochus grade occurred, requiring one bleeding.

“ As it is desirable to ascertain whether the autumnal fevers which afflict us are indigenous or of foreign origin; and as all the grades of typhus fever, whether under the character of the ship, gaol, or hospital fever, are considered contagious, and propagated by a specific matter of a mysterious birth and unknown nature, I was extremely anxious to watch the rise and progress, and ascertain, if possible, the real nature of this disease.

“ The occurrence of fever at different places at the same time, renders the idea of propagation by contagion more than improbable. In fact there were but few persons among us who indulged the apprehension of contagion in typhus fever, though the reverse was the case respecting dysentery.

“ The indigenous origin and sameness of disease are clearly deducible from the following facts:—

“ 1. The usual forms and course of our summer disease are the cutaneous, intestinal (*cholera infantum*), the intermittent and remittent fevers in autumn. In 1803 we had vesicular eruptions, or

diarrhœa, alternately ; epidemic dysentery ; and, after the rains in the middle of August, the latter was transformed to typhus fever.

“ 2. Dysentery superseded the *cholera infantum*, and typhus fever completely precluded the bilious remittent fever, which is our ordinary autumnal disease.

“ 3. Dysentery and typhus fever are alike unusual in this district, and hence reciprocally dependent on the extraordinary states of season. Intestinal disease commenced with the drought in June, and continued until the change of temperature in August.

“ 4. The epidemical state of season giving birth to dysentery and typhus fever was checked by frost ; but the forms of disease only were varied by intermediate changes in the sensible qualities of the atmosphere.

“ 5. Typhus fever, like the common autumnal remittent of the tertian diathesis, conveyed its livery to the catarrhal affections, which succeeded in November and December.

“ 6. The pestilential fever of 1802 partook unusually of the typhus type, and was probably dependent on a state of atmosphere not dissimilar to that of 1803. The fever of 1802 was uniformly aggravated in frequency and force, by every considerable change from heat and dryness to coolness and moisture of the weather. So was the fever of 1803.”

I shall have frequent occasions to refer to this memorable epidemic of 1803 at Wilmington, and need not attempt to add anything to the observa-

tions of Dr. Vaughan. We have hitherto seen, by a circumstantial statement of facts drawn from different places, south of the 40th degree of latitude, both maritime and inland, that the endemic fevers of this portion of America are the intermittent and remittent of various grades, unquestionably arising from marsh effluvium ;—that they invariably follow in the train of summer and autumn, and often impart traces of their existence to the subsequent diseases of winter and spring ;—that a continued fever, resembling in many respects the typhus of Great Britain, occasionally, as a comparatively rare occurrence, arises out of them ; and at last we find a place notorious for malaria, and which annually is afflicted with intermittents and remittents, sometimes to the grade of epidemic yellow fever, affording an example of an epidemic typhus, or in other words a low chronic continued fever, which prevails to the exclusion of all other forms, and which, like the tertian remittent, equally imparts its peculiar character to the diseases of the ensuing winter. This occurrence of a low chronic fever may be considered an exception to the usual character of the diseases of Wilmington. We shall find, however, in a more northern latitude, that the occurrence of yellow fever is the exception to the usual appearances of disease there, and that typhus is the common endemic ; while in other situations, in those years when yellow fever does not prevail, its place, as at Wilmington, is supplied by a typhoid continued fever. These facts manifestly prove the modifying influence of temperature over marsh fever ; that there is a certain medium of heat in which remittents

obtain their highest development under the form of yellow fever ;—that below this, the common bilious remittent is more or less endemic in autumn, approximating in some of its characters to the highest grade, but generally differing from it in the lesser intensity of its symptoms, and its more protracted duration,—sometimes running more distinctly into yellow fever, or degenerating into a low continued fever, like typhus ;—that while in ordinary years the intermittent with a few common remittents prevail, which are easily subdued—in extraordinary years, the former runs generally into the latter ; and this assumes a formidable character, and is the prevailing type,—lost occasionally, towards the close, in the symptoms of yellow fever or typhus.

I shall now turn to the memorable epidemic of Philadelphia in 1793, and take a rapid view of fever as it has appeared there in that and subsequent years : and if it can be shown that during the ravages of yellow fever the lower grades have simultaneously existed, as exceptions to the general character of the disease, I should claim from this fact the same inference of their being modifications of each other, as was drawn in inland situations, when the exceptions to the prevailing form of fever were occasional examples of cases approaching in character to yellow fever.

Though the year 1793 was remarkable for the unexpected severity and great mortality of fever in Philadelphia, there are satisfactory proofs on record that yellow fever had existed there in 1699, 1741, 1747, 1762, and 1763. But there are no precise

details of the fever in these years. Rush has preserved a brief note of the epidemic of 1762, the symptoms of which, he says, were among the first impressions which diseases made upon his mind*.

In his observations on the state of medicine between 1760 and 1766, and 1809, in speaking of the first period, he says, (vol. iv. p. 280,) "The intermitting fever prevailed in the month of August, and in the autumn, chiefly in the suburbs and neighbourhood of the city; and the slow chronic, called at that time the nervous fever, was very common in the thickly settled parts of the city. The bilious fever prevailed at the same time in Southwark. The late Dr. Clarkson, who began to practise medicine in that part of the city in 1761, upon hearing some of his medical brethren speak of the appearance of bilious remittents in its middle and northern parts, about the year 1778, said they had long been familiar to him, and that he had met with them every year since his settlement in Philadelphia. The yellow fever prevailed in the neighbourhood of Spruce-street wharf, and near a filthy stream of water which flowed through what is now called Dock-street, in 1762: some cases appeared likewise in Southwark. It was scarcely known in the north and west parts of the city. A few sporadic cases appeared in 1763.

"I shall here introduce a short account of it from a note book which I kept during my apprenticeship.

"In the year 1762, in the months of August to

* Medical Inquiries and Observations, by Benjamin Rush, M.D. 5th edit. Philadelphia, 1818, 4 vols.

December, the bilious yellow fever prevailed in Philadelphia after a very hot summer, and spread like a plague, carrying off daily, for some time, upwards of twenty persons. The patients were generally seized with rigors, which were succeeded by a violent fever, and pains in the head and back. The pulse was full, and sometimes irregular. The eyes were inflamed and had a yellowish cast, and a vomiting almost always attended. The third, fifth, and seventh days were mostly critical, and the disease generally terminated on one of them, in life or death. An eruption on the third or seventh day over the body proved salutary. An excessive heat and burning about the region of the liver, with cold extremities, portended death to be at hand.

“ Fevers have assumed several new forms since the year 1766. The mild bilious fever has gradually spread over every part of the city. In 1780 it prevailed as an epidemic in Southwark, and in Water- and Front-streets, below Market-street. In 1791 and 1792 it assumed an inflammatory appearance, and was accompanied, in many cases, with hepatic affections. It appeared in 1793 in the form of yellow fever, in which form it has appeared, in sporadic cases or as an epidemic, nearly every year since. During the reign of this high grade of bilious fever, mild intermittents and the chronic or nervous forms of the summer and autumnal fever have nearly disappeared.”

The fever of 1780 is the only one previous to 1793 particularly described by Rush, and is too interesting and instructive to be passed over in silence. But before noticing it, it will be necessary to men-

tion that Philadelphia, lat. $39^{\circ} 57'$, is situated about five miles from the conflux of the Delaware and Schuylkill rivers. It extends several miles north and south along the Delaware, and westward to the banks of the Schuylkill, occupying the narrowest part of the peninsula included between the two rivers. The land near the rivers, between their confluence and the city, is in general low, moist, and subject to be overflowed. The mean height of the ground on which the city stands, is about forty feet above the Delaware; but one of the longest and most populous streets rises only a few feet above the river.

The climate is variable, subject to sudden vicissitudes of temperature; the cold of winter often intense,—the thermometer sometimes falling to 5° below zero of Fahr.,—and the Delaware being frozen from December to March. The summer and autumn are hot, the thermometer sometimes rising to 90° and 95° . The greatest heats are from June to September. Rush remarks, that the higher the mercury rises in the day-time, the lower it falls the succeeding night; that from 80° it generally falls to 68° , while from 60° it only descends to 56° . The disproportion between the heat of day and night is greatest in August, and the dews are then heavy in proportion to the coolness of the evening,—sometimes so considerable as to wet the clothes; and there are instances in which marsh meadows and creeks, that have been dry during the summer, have been supplied with water from no other source than the dews which have fallen in August and the first weeks of September. The

mornings and evenings become cool at that time, and a scarcely perceptible increase of cold occurs till the middle of October, with occasional frosts, when the autumn is closed by rain, which sometimes falls in such quantities as to produce destructive freshets in the rivers and creeks.

From a review of facts, this eminent man adds, “ it appears that the climate of Pennsylvania is a compound of most of the climates in the world. Here we have the moisture of Britain in the spring; the heat of Africa in summer; the temperature of Italy in June; the sky of Egypt in autumn; the cold and snows of Norway, and the ice of Holland in winter; the tempests, to a certain degree, of the West Indies in every season, and the variable winds and weather of Great Britain in every month of the year. As we have the climates, so we have the health and the acute diseases of all the countries that have been mentioned. Without attempting to enumerate the diseases, I shall only add a few words upon the time and manner in which they are produced.

“ It appears from the testimony of many aged persons, that pleurisies and inflammatory diseases of all kinds are less frequent than they were fifty years ago;—that intermitting and bilious fevers have increased in proportion as the country has been cleared of its wood in many parts of the State;—that these fevers have lessened or disappeared in proportion as the country has been cultivated. Heavy rains and freshes in the spring seldom produce fevers, unless they are succeeded by unseasonably warm weather. Sudden changes from great

heat to cold or cool weather, if they occur before the 20th of August, seldom produce fevers,—after that time are generally followed by them. The same state of atmosphere, whether cold or warm, moist or dry, continued for a long time without any material changes, is always healthy. Acute and inflammatory fevers were in vain looked for in the cold winter of 1779–80. The dry summer of 1782, and the wet one of 1788, were uncommonly healthy in Philadelphia. These facts extend only to those diseases which depend on the sensible qualities of the air; for diseases from miasmata and contagion are less influenced by the uniformity of the weather. The autumn of 1780 was very sickly in Philadelphia, from the peculiar situation of the grounds in the neighbourhood of the city, while the country was uncommonly healthy. The dry summer and autumn of 1782 was uncommonly sickly in the country, from the extensive sources of morbid exhalations which were left by the diminution of the waters in the creeks and rivers. Diseases are often generated in one season, and produced in another. Hence we frequently observe fevers of different kinds to follow every species of the weather that was mentioned in the last observation. May and June are usually the healthiest months in the year. The influence of the winds upon health depends very much upon the nature of the country over which they pass. Winds which pass over mill-dams and marshes in August and September generally carry with them the seeds of fevers. The country in the neighbourhood of Philadelphia was formerly more sickly than the central parts of the city, after

the 20th of August. Since the year 1793 the reverse has been the case. The night air is always unwholesome from the 20th of August, especially during the passive state of the system in sleep. The frequent and sudden changes of the air from heat to cold render it unsafe to sleep with open windows during the autumnal months."

I shall now turn to the consideration of the fever at Philadelphia in 1780, the mixed character of which renders it of importance in this attempt to elucidate by facts the origin, nature, and causes of marsh fever.

The winter of 1779-80 was intensely cold: the thermometer in January fell to 5° below zero; the river Delaware was frozen over for three months, the ice being from sixteen to nineteen inches thick, and the depth of the frost in the ground from four to five feet. The spring was dry and cool. A catarrh appeared among children between one and seven years of age; in some cases complicated with the symptoms of a bilious remitting and intermitting fever. An intermittent prevailed among adults in May. July and August were very hot. The thermometer on the 6th and 15th of August rose to $94\frac{1}{2}^{\circ}$ and 95° . *Cholera infantum* was very prevalent and fatal; and blotches and boils, especially on the face, were common in children; and the prickly heat among persons of all ages. The wind was from the south and south-west, and of course passed over the land which lies between the city and the confluence of the rivers. The remitting fever made its first appearance in July and August, but the symptoms were mild. On the 19th of Au-

gust the weather became suddenly cool. "Many hundred people complained the next day of different degrees of indisposition, from a sense of lassitude to a fever of the remitting type. This was the signal of the epidemic. The weather continued cool during the remaining part of the month, and the whole of September. From the exposure of the district of Southwark (which is often distinguished by the name of the Hill,) to the south-west winds, the fever first made its appearance in that suburb of the city. Scarcely a family, and in many families scarcely a member, escaped. From the Hill it gradually travelled along the second street from the Delaware, improperly called Front Street. It prevailed but little in the northern liberties, and was scarcely known beyond Fourth Street from the Delaware.

"The fever generally came on with rigor, but seldom with a regular chilly fit, and often without any sensation of cold. In some with a slight sore throat, hoarseness, or a giddiness, so sudden in its attack as to produce faintness, and even symptoms of apoplexy: and it was remarkable that all who were affected in this violent manner recovered in two or three days. The pains were exquisitely severe in the head, back, and limbs; sometimes in the back part of the head, or only in the eye-balls. In some they were so acute in the back and hips that they could not lie in bed. In others they affected the neck and arms; and all complained of a soreness in the pained parts, especially in the head and eye-balls, and some of their flesh being sore to the touch in every part of the body; whence

the disease was sometimes thought to be a rheumatism, though its general name was the *break-bone fever*."

Nausea universally, and sometimes vomiting, occurred; the tongue was moist and yellow; urine high-coloured. The matter discharged from the bowels was bilious, highly offensive, and so acrid as to excoriate the rectum. Skin generally moist; pulse quick and full, but never hard till the end of September; little or no thirst: there were generally remissions every morning, and sometimes in the evening; the exacerbations more severe every other day, and two were often observed in one day. "When the fever did not terminate on the third or fourth day, it frequently ran on to the eleventh, fourteenth, and even twentieth days, assuming in its progress, according to its duration, the usual symptoms of the *typhus gravior* or *mitior* of Dr. Cullen. In some cases the discharge of a few spoonfuls of blood from the nose accompanied a solution of the fever on the third or fourth day; while in others a profuse hæmorrhage from the nose, mouth and bowels, on the tenth and eleventh days, preceded a fatal issue of the disease."

Several cases occurred in which the fever was followed by a jaundice. At the beginning of October the weather became cool, and the fever declined or was accompanied by inflammatory symptoms.

There can be no doubt, I think, that if the great heats of July and August had been continued, this epidemic would have assumed a very different character; and probably have risen to the higher grade

of the bilious remittent fever. Its sudden diffusion after the 19th of August, when the weather became cool, is a striking example of the exciting effects of a change of temperature ; and its typhoid character during the unusual continuance of cool weather shows how much the existing temperature modifies the character of fever. It and the epidemic of 1803 at Wilmington,—both typhoid fevers occurring in *cool* autumns,—afford a great contrast to the epidemic of 1793, which I shall particularly enlarge upon, as this year was supposed to owe its sickness and mortality to the accidental importation of contagion from the coast of Africa into the island of Grenada, and subsequently from the West Indies into Philadelphia,—an assertion which has been patiently and most completely refuted by Bancroft ; which is considered futile by Humboldt ; and has been disproved by the experience of subsequent years, to the satisfaction of every unprejudiced mind.

The year 1793, at Philadelphia, was remarkable for the intense and protracted heats of summer and autumn, the stagnation of the atmosphere, the unusual and long-continued drought, the unprecedented character and great mortality of the usual endemic fever of the climate.

The weather, which had been moderate in December and January, became cold in February ; the thermometer, observed at seven in the morning and at two P.M., ranging from 9° to 59°. Towards the end of the month there were great and sudden changes of temperature from day to day, as will be seen by the following extract from the Tables given by Rush, vol. iii. p. 117.

	7 A.M.	2 P.M.
February 19.	31°	41°
20.	52	53
23.	22	34
24.	54	59
25.	34	35
27.	43	43
28.	14	26

March was dry; there being only six days in which rain occurred through the month.

Blossoms were universal on the fruit-trees on the 1st of April: there were only nine days in which rain fell, and the early part of the month was warm, the thermometer, on the 3rd, rising at two P.M. to 80°, and only twice falling below 70°.

May was generally dry and warm, the thermometer ranging between 45° and 87°; there were twenty days in which the mercury rose above 70°, and in eight of them it stood from 80° to 87°.

June was hot, the thermometer ranging between 53° and 91°; there were twenty-three days in which it rose about 75°; and in sixteen of these it was above 80°, and in ten it stood at 88° to 91°. There were sixteen rainy days. The only diseases that had hitherto prevailed were the mumps and scarlet fever.

July was uniformly hot, and towards the close of the month a few cases of the bilious remittent occurred, one of which "ended in a typhus or chronic fever, from which the patient recovered with great difficulty." The thermometer, throughout the month, at six A.M., ranged from 63° to 78°; and in twenty-four days stood at this early hour from 70° to 78°; at three P.M. it ranged from 80° to 91°, with

the exception of one day, when it stood at 75° ; there were sixteen days in which it stood from 85° to 91° , and rain only partially fell at intervals.

In August, the thermometer at six A.M. ranged from 59° to 74° ; there were fourteen days in which at this hour it was below 70° ; there were twenty-six days in which it ranged, at three P.M., from 80° to 90° ; three in which it rose only to 77° , 75° , and 73° ; and two in which it stood at 66° and 69° , during a memorable fall of rain on the 25th and the next day, which was cloudy. Rain fell partially on the 8th, 14th, 24th, and 31st; but profusely on the 25th,—the first instance for several weeks, and the last that occurred for two months. Rush says, the weather for the first two or three weeks in this month was temperate and pleasant; “but that there was something in the heat and drought of the summer months which was uncommon in their influence on the human body. Labourers everywhere ‘gave out’ (to use the country phrase,) in harvest, and frequently, too, when the mercury was under 84° Fahrenheit. It was ascribed by the country people to the calmness of the weather, which left the sweat produced by heat and labour to dry slowly on the body.”

The influenza at the beginning of August spread rapidly among the citizens; and cholera and remitting fevers were common, with a few cases of dysentery in the city and neighbourhood.

From the 5th to the 18th, Rush met with several cases of fever, some of which exhibited the usual character of the bilious remittent, and recovered under the ordinary treatment; and others which

were fatal in three or four days, with symptoms of yellow fever. None of these, however, "excited the least apprehension of the existence of a malignant or yellow fever in the city; for I had frequently seen," he says, "sporadic cases in which the common bilious fever of Philadelphia had put on symptoms of great malignity, and terminated fatally in a few days; and now and then with a yellow colour on the skin before or immediately after death."

But the next day suspicions of a malignant epidemic were excited. "I was requested on the 19th," he says, "to visit the wife of Mr. Le Maigre, in Water Street, in consultation with Dr. Foulke and Dr. Hodge; and I found her in the last stage of a highly bilious fever. She died the next day. On coming out of the room I remarked that I had seen an unusual number of bilious fevers, with symptoms of uncommon malignity, and that I suspected all was not right in our city. Dr. Hodge replied, that a fever of a most malignant kind had carried off four or five persons within sight of Mr. Le Maigre's door, and that one of them had died in twelve hours after the attack. This information satisfied me that my apprehensions were well founded. The origin of this fever was discovered to me at the same time, from the account which Dr. Foulke gave me of a quantity of damaged coffee which had been thrown upon Ball's wharf and in the adjoining dock on the 24th of July, nearly in a line with Le Maigre's house, and which had putrefied there, to the great annoyance of the whole neighbourhood.

"This discovery of the malignity, extent, and

origin of a fever, which I knew to be attended with great danger and mortality, gave me great pain. I did not hesitate to name it *the bilious remitting yellow fever*. I had once seen it epidemic in Philadelphia in 1762, and its symptoms were among the first impressions which diseases made upon my mind."

The announcement of a malignant disease existing in the city subjected this excellent man to unmerited obloquy, to which he sensitively alludes in several passages of his work. The report, however, gained ground; and the Governor of the State directed Dr. Hutchinson, the Inspector of sickly vessels, to inquire into the truth of it, and the nature of the disease. On the 27th of August this gentleman communicated the information which he had collected to the Health Officer, and his conclusion was that it was not an imported disease.

The epidemic which began in July, towards the end of the month, prevailed in August, and steadily increased in September and October, declining in the first week of November; the last day on which any deaths are recorded in the lists of daily mortality given by Rush being the 9th of that month. According to these tables the deaths—

In August were	325
September	1442
October	1996
November	118
	<hr/>
	3881

In the last ten days of August the deaths were 164,

exceeding by three the number that had occurred in the twenty-one days preceding.

“The state of the atmosphere,” says Rush, “during the whole month of September and the first two weeks in October, favoured the accumulation of miasmata in the city. The air was little agitated by winds. In vain were changes in the moon expected to alter the state of the air. The light of the morning mocked the hopes that were raised by a cloudy sky in the evening. The sun ceased to be viewed with pleasure. Hundreds sickened every day beneath the influence of his rays ; and even where they did not excite the disease, they produced a languor in the body unknown to the oldest inhabitants of the city at the same season of the year. There was no rain between the 25th of August and the 15th of October, except a few drops, hardly enough to lay the dust of the streets, on the 9th of September and the 12th of October. The springs failed in many parts of the country. The dust in some places extended two feet below the surface of the ground. The pastures were deficient or burnt up. There was a scarcity of autumnal fruits in the neighbourhood of the city. But while vegetation drooped or died from the want of moisture in some places, it revived with preternatural vigour from unusual heat in others. Cherry-trees blossomed, and apple-, pear- and plum-trees bore young fruit in several gardens at Trenton, thirty miles from Philadelphia, in the month of October.”—p. 86.

“However inoffensive,” he adds, “uniform heat may be when agitated by gentle breezes, there is, I believe, no record of a dry warm stagnating air

having existed for a length of time without producing disease. Hippocrates, in describing a pestilential fever, says, the year in which it occurred was without a breeze of wind. The same state of atmosphere prevailed in London for six weeks during the plague in 1665. Even the sea air becomes unwholesome by stagnation: hence Dr. Clark informs us that sailors become sickly after long calms in East India voyages. Sir John Pringle, from a number of similar observations on this subject, delivers the following aphorism: 'When the heats come on soon and continue throughout autumn, not moderated by winds or rains, the season proves sickly, distempers appear early, and are dangerous.'"

Of the existence of a concentrated malaria, under these aggravated circumstances of an unusual season, there can be no doubt; and I shall offer proofs of its more local range in Philadelphia in other years. Admitting its more general diffusion in 1793, from the peculiar stagnation of the air, it is highly interesting to observe the different circumstances which appeared to the sagacious mind of Rush to act as *exciting causes* of the disease. It will be seen hereafter, that few persons escaped some manifestations of disorder; that, in fact, all were exposed to the morbid influence of the remote cause; and that very opposite sources of disturbance called the disease into action.

Among these exciting causes he enumerates—"great labour or exercise. It was labour which excited the disease so universally among the lower classes. A long walk often induced it. Few escaped after a day, or even a few hours, spent in

gunning [shooting]. A hard-trotting horse brought it on in two of my patients. Perhaps riding on horseback, and in the sun, was the exciting cause in most of those who were affected by it in their flight from the city. A fall excited it in a girl, and a stroke upon the head in a young man who came under my care. Many were seized with disease in consequence of their exertions on the night of the 7th of September, in extinguishing a fire.

“Heat, but more especially of the sun, was a very common exciting cause. The register of the weather during the latter part of August, the whole of September, and the first two weeks of October, will show how much the heat of the sun must have contributed to excite the disease. The heat of fires, also, was a cause; and hence the greater mortality of the disease among bakers, blacksmiths, and hat-ters, than among any other class of people.

“Intemperance in eating and drinking seldom failed to excite the disease; and when the body was strongly impregnated with its seeds, the smallest deviation from the customary stimulus of diet roused them into action.

“It was remarkable that it was not excited, in many cases, in the attendants upon the sick, while there was hope of recovery. The grief which followed the extinction of hope, by death, frequently produced it within a day or two afterwards,—not in one person only, but often in most of the near relatives of the deceased.

“The disease was also produced by a change in the state of the mind, directly opposite; for many, who attended patients that recovered, were seized

with the disease a day or two after they were relieved from the toils and anxiety of nursing; as if the collapse of the mind from the abstraction of the stimulus of hope and desire produced that debility and loss of equilibrium in the system which favoured the activity of the miasmata. The effects of both these states of mind have been happily illustrated by two facts recorded by Dr. Jackson. The garrisons of Savannah and York-town were both healthy during the siege of those places; but the former became sickly as soon as the French and American armies retreated from before it, and the latter immediately after its capitulation.

“Cold was an exciting cause. The night air, even in the warm month of September, was often so cool as to excite the disease; and every change in the weather that was less than that which produces frost, evidently increased the number of the sick. This was obvious after the 18th and 19th of September, when the thermometer fell to 44° and 45° . The hopes of the city received a severe disappointment upon this occasion, for I well recollect there was a general expectation that this change in the weather would have checked the disease. The same increase of the number of sick was observed to follow the cool weather which succeeded the 6th and 7th of October, when the thermometer fell to 43° and 46° .”

To show the gradual rise, progress, and decline of the epidemic, I shall insert a Table illustrative of the daily and weekly mortality, and of the temperature.

	Thermometer.		Deaths.	Weekly.		Thermometer.		Deaths.	Weekly.
	6 A.M.	3 P.M.				6 A.M.	3 P.M.		
Aug.					Sept.				
1	65°	77°	9	61	22	63°	83°	76	512
2	63	81	8		23	62	—	68	
3	62	82	9		24	65	70	96	
4	65	87	10		25	61	68	87	
5	73	90	10		26	58	79	52	
6	77	87	3		27	64	—	60	
7	68	83	12		28	54	73	51	
8	69	86	5		29	56	74	57	
9	75	85	11		30	57	75	63	
10	67	82	6	49					423
11	70	84	7			7 A.M.	2 P.M.		
12	70	87	5		Oct.				
13	71	89	11		1	64°	80°	74	
14	75	82	4		2	70	72	66	
15	72	75	9		3	50	72	78	
16	70	83	7		4	59	72	58	
17	71	86	6		5	58	66	71	
18	73	89	5		6	43	66	76	557
19	72	82	9	51	7	46	—	82	
20	69	82	7		8	53	68	90	
21	62	83	8		9	53	70	102	
22	63	86	13		10	49	74	93	
23	63	85	10		11	51	74	119	
24	73	81	17		12	58	64	111	
25	71	66	12		13	49	69	104	658
26	59	69	17		14	52	76	81	
27	65	73	12	103	15	56	54	80	
28	67	80	22		16	37	53	70	
29	72	86	24		17	37	60	80	
30	74	87	20		18	41	62	59	
31	74	84	17		19	51	66	65	
					20	44	54	55	454
Sept.					21	49	59	59	
1	71	86	17	130	22	51	65	82	
2	73	86	18		23	47	60	54	
3	60	—	11		24	36	59	38	
4	55	75	23		25	46	71	35	
5	62	80	20		26	60	72	23	
6	70	89	24		27	44	44	13	166
7	65	77	18		28	34	37	24	
8	64	70	42	188	29	28	44	17	
9	66	80	32		30	28	49	16	
10	64	72	29		31	42	45	21	
11	62	72	23						
12	58	76	33		Nov.				
13	57	72	37		1	40	41	13	
14	58	79	48		2	32	49	21	110
15	65	80	56	390	3	43	56	15	
16	70	84	67		4	55	67	15	
17	66	67	81		5	50	64	14	
18	44	—	68		6	63	67	11	
19	45	70	61		7	44	64	15	
20	54	69	67		8	43	56	8	29
21	59	78	57		9	42	64	6	

Rush divides the patients affected with the disease into three classes, the two first of which correspond to the congestive and inflammatory divisions of fever of Dr. Armstrong ; and the last includes those in whom the miasmata produced premonitory symptoms, which, taken in time, were soon followed by the return of health ; but which, if neglected, often terminated fatally. The great number of persons who thus exhibited evidences of slight disorder in the midst of so formidable a disease, affords a strong presumptive argument against its contagious nature, and in favour of atmospherical infection ; for it is never, perhaps, found, in a very fatal epidemic of small-pox or scarlet fever, that the majority of persons affected with those contagious diseases have them in a very slight way : but we can reasonably conceive that a morbid cause existing in the atmosphere, producing in many a malignant yellow fever, might operate so generally as to cause a slight disorder in the far greater proportion of persons exposed to its influence. We consequently find that few, if any, escaped some of the effects of the widely diffused morbid atmosphere in Philadelphia.

“ After the 15th of September,” Rush remarks, “ there were few citizens, in apparent good health, who did not exhibit one or more marks of the presence of miasmata in their bodies,—as a yellowness in the eyes, and a sallow colour of the skin ; a preternatural quickness in the pulse ; yellow sweats, often offensive, resembling the washings of a gun ; a scanty discharge of high-coloured or turbid urine ; a deficiency or excess of appetite ; cos-

tiveness ; wakefulness ; headache ; and a preternatural dilatation of the pupils, which was universal. Many country people, who spent but a few hours in the streets of the city, took the disease and died at home ; and others, whom business compelled to pass a day or two in it, but who escaped an attack, were indisposed during the whole time with languor and headache.”—“ It was easy,” he adds, “ to distinguish, in walking the streets, the persons who had returned from the country to the city, from those who had remained in it : the former appeared ruddy and healthy, while the latter were of a pale sallow colour.”

From the very detailed account of the symptoms which Rush has given, as they appeared in the different systems, I shall merely select such as will serve to show an analogy with the epidemics I have already described in different places in the interior of America. The aggravated form of the disease in cities has generally led to the idea, that in them it is distinct, not in degree only, but in nature, from the epidemics of the interior ; but this opinion is not supported by facts, for cases in every respect analogous occur in both situations ; and the aggravated character of the disease in populous cities is probably to be explained by the influence of the more heated, confined, and impure air,—by the greater predisposition to disease in a large proportion of the inhabitants, whether natives or foreigners,—and by a more concentrated miasm. Rush ascribed the origin of the epidemic in Philadelphia to the emanations of a quantity of putrid coffee, which had been thrown on one of the

wharves and into a dock, towards the latter part of July ; and if such sources of impurity are to be considered equivalent to the production or aggravation of fever, it will be admitted that they abound more in cities than in open and cleanly country towns.

It will be evident from the observations of Rush, on the state of the pulse and the condition of the brain in this epidemic, that he was fully aware of the congestive state of fever. The weakness of the pulse was no obstacle in the early stage to his drawing blood ; and the absence of the signs of congestion after death was no proof, in his mind, that it had not existed during life.

“ I wish it to be remembered,” he says, “ that the yellow fever, like all other diseases, is influenced by climate and seasons. The determination of the fluids is seldom the same in different years ; and I am sure it varied with the weather in the disease I am now describing. Many complained of a dull pain in the region of the liver ; but very few, in the beginning of the disease, of that soreness to the touch about the pit of the stomach which is taken notice of by authors. In proportion as the cool weather advanced, a preternatural determination of blood took place, chiefly to the lungs and brain. Many were affected with pneumonic symptoms, and some appeared to die of sudden effusions of blood or serum in the lungs. But the brain was principally affected with morbid congestion, indicated by the suffusion of blood in the face, redness of the eyes, dilatation of the pupils, pain in the head, hæmorrhage from the nose and ears,

sickness or vomiting, and an almost universal constive state of the bowels. It is difficult to determine the exact state of these viscera in every case of bilious and yellow fever. Inflammation certainly takes place in some cases, and internal hæmorrhages in others ; but I believe the most frequent affection of the viscera consists in a certain morbid accumulation of blood in them, which has been happily called by Dr. Clark an engorgement of the blood-vessels. I believe, with him and Dr. Balfour, that death, in most cases, in bilious fevers is the effect of these morbid congestions, and wholly unconnected with an exhausted state of the system, or a supposed putrefaction of the fluids."

The state of the stomach and the character and appearances of the matter vomited have been much insisted on in yellow fever. Humboldt, as I have already mentioned, included no case as such at Vera Cruz, in the Table of mortality he has given, that had not exhibited the black vomit ; but others do not consider this peculiar symptom essential to the disease ; and I have shown that it frequently was absent, or only occasionally present, in several of the epidemics in the interior of North America. Rush says, " The stomach and bowels were affected in many ways in this fever. The disease seldom appeared without nausea or vomiting. In some cases they both occurred for several days or a week before they were accompanied by any fever. Sometimes gastrodynia ushered in the disease. The stomach was so extremely irritable as to reject drinks of every kind. Sometimes green or yellow bile was ejected by vomiting on the first day of the

disease, but I much oftener saw it continue for two days without discharging anything from the stomach but the drinks. If the fever in any case came on without vomiting, or if it had been checked by remedies that were ineffectual to remove it altogether, it generally appeared or returned on the fourth or fifth day of the disease. In some cases the vomiting was more or less constant, from the beginning to the end of the disease, whether it terminated in life or death. The vomiting which came on about the fourth or fifth day was accompanied by a burning pain in the stomach, producing great anxiety and tossing of the body from one part of the bed to another. In some cases this painful burning occurred before any vomiting had taken place. Drinks were now rejected from the stomach so suddenly as often to be discharged over the hand that lifted them to the head of the patient. The contents of the stomach were sometimes thrown up with a convulsive motion, that propelled them in a stream to a great distance, and in some cases all over the clothes of the bystanders.

“ In some cases there was a total obstruction of bile, but more frequently a preternatural secretion or excretion of it, discharged in most cases from the stomach and bowels in large quantities, and of very different qualities and colours. On the first and second days many patients vomited from half a pint to a quart of green or yellow bile. Four cases came under my notice in which black bile was discharged on the first day. Three of these recovered; on the fourth and fifth day there was frequently a discharge of matter from the stomach, resembling

coffee impregnated with its grounds,—always an alarming symptom. I believed it at first to be a modification of vitiated bile, but subsequent dissections by Dr. Physick have taught me that it was the result of the first stage of those morbid actions in the stomach which afterwards produce the black vomit. Many recovered who discharged this coffee-coloured matter.

“Towards the close of the disease there was a discharge from the stomach of matter of a deep or pale black colour, on the surface of which flaky substances frequently floated. It was what is called the black vomit, formerly supposed to be vitiated bile, but has been proved to be the effect of disease in the stomach.”

This discharge Rush considered fatal, as the symptom of approaching dissolution. Besides the matters above enumerated, viz. black bile, or green or yellow bile thrown from the stomach in the first or second days of the disease, that resembling coffee mixed with its grounds, occurring at a late period, and the black flaky matter, he mentions, also at the close of the disease, a large quantity of grumous blood being discharged, and of mucus and tough phlegm. Several persons, he says, died without a black vomiting of any kind.

It is evident, therefore, that the qualities and appearances of the matter vomited vary in different cases, and in the different stages of the disease,—and that even in fatal examples, where the action was not concentrated in the stomach, the black vomit would be absent; so that the comparative infrequency of its occurrence in the epidemics of

the interior affords no valid argument against their identity with those of the sea-coast.

The bowels, he remarks, were generally costive, and sometimes as obstinately so as in the dry gripes. In some cases there was all the distress of a bilious colic, or the tenesmus, and mucous and bloody discharges of dysentery. The colour, quality, and quantity of the *fæces* varied; when active purges had been given, they were copious, *fœtid*, dark or black; if spontaneous, or elicited by laxatives, they had a more natural appearance; sometimes in both cases they were of a green or olive colour, and ex-coriating often to the rectum; rarely they were white, as in jaundice.

The urine in some cases was plentiful, high-coloured, clear or turbid,—sometimes, about the fourth or fifth day, dark like strong coffee. A total deficiency of it occurred in many people for a day or two without pain, generally indicating great danger; and rarely there was a suppression, requiring the catheter. One young man discharged several quarts of limpid urine just before death.

Many were relieved by copious sweats on the first day,—spontaneous, or excited by diluents and strong purges, often yellow, and sometimes offensive; but in general the skin was dry, and few instances occurred of the disease terminating like common fevers on the third day by sweat.

One who freely expectorated mucus recovered. The tongue was in every case moist and white on the first and second days, but assumed a red colour, and a smooth shining appearance as the disease advanced, but not quite dry. Towards the close, a

dry black streak appeared in the middle, which gradually extended to every part of it, and few recovered after this took place.

In several instances the sudden and violent action of the miasmata induced apoplexy, syncope, or general convulsions. Coma or an obstinate wakefulness was observed in some in every stage: in others a violent cramp in the arms and legs attended the first attack; hiccup occurred in the last stage, but Rush thinks less frequently than in that of the common bilious fever. In some cases there was a deficiency or an excess of sensibility.

"I was surprised," he says, "to observe the last stage of this fever to exhibit so few of the symptoms of the common typhus or chronic fever. Tremors of the limbs and twitchings of the tendons were uncommon, and occurred only in those cases in which there was a predisposition to nervous diseases, and chiefly in the convalescent state."

While many cases exhibited so many marks of preternatural weakness, others exhibited preternatural excitement: hence some patients, in the close of their disease, often rose from their beds, walked across their rooms, or came down stairs; and one person stood up before his glass and shaved himself on the day of his death.

Delirium was common: some were maniacal; and in these there was an apparent absence of fever. The spirits were generally much depressed, or the temper was irritable.

The pain which attended the disease varied according to the different states of the system. In those cases in which it sank under the violence of

the disease, there was little or no pain ; but in proportion as the system was relieved from oppression, it recovered its sensibility, and the pain in the head was acute, affecting the eye-balls and extending down the neck. The sides, stomach, liver, bowels, were, in different persons, the seats of dull or acute pains. The stomach towards the close was affected with a burning pain, producing great anguish. The back suffered much, so that the stoutest men groaned under it, and the pain extended to one or both thighs, the legs and arms ; and in many persons there was a soreness to the touch over the whole body.

The thirst was moderate, or absent, or intense ; convalescence was marked in some instances by a sudden revival of the venereal passion.

“ I met with three cases of swelling in the inguinal, two in the parotid, and one in the cervical glands, and all recovered without suppuration. In one of the cases of inguinal buboes, the whole force of the disease seemed to be collected in the lymphatic system ; the patient walked about and had no fever or pain in any part of his body, except in his groin.”

The yellow colour of the skin was not universal, and seldom appeared where purges had been given in sufficient doses. It generally appeared about the fifth or seventh day, rarely before the third. The eyes seldom escaped a yellow tinge. It appeared and disappeared two or three times in the course of the disease.

Various eruptions occurred, like that of scarlet fever ; watery blisters, which, after bursting, ended in deep black sores,—or about the mouth ending

in scabs, as in the common bilious fever,—or like mosquito bites, red and circumscribed, which came and went two or three times. Petechiæ were common in large or small red blotches, soon turning dark; several cases of carbuncles,—boils.

Hæmorrhages occurred in the beginning of the disease, chiefly from the nose and uterus; sometimes but a few drops distilled from the nose. As it advanced, they occurred from the gums, ears, stomach, bowels, urinary passages, or orifices made in bleeding, after they had appeared to have been healed.

Rush, in the extracts I have quoted, has already spoken of some persons sinking under the violence of the disease, without pain; and these are to be excepted when he says that evident remissions or intermissions occurred in every case that came under his notice. He met with regular tertians, in which the patients were so well on the intermediate days as to go abroad; nor was this mild form devoid of danger, for many died who neglected it, though it generally ended in a remittent before death. This tertian type not only thus commenced the disease, but appeared in some instances after the more violent symptoms had been subdued, and continued for several weeks. The remissions were more evident than in the common bilious fever, and generally occurred in the forenoon. A violent exacerbation on even days was attended with more danger than on the odd days. The deaths which occurred on the third, fifth and seventh days appeared frequently to be the effects of the commotions or depression in the system on the second,

fourth, and sixth. An apparent remission on the third frequently led to a belief that the disease had run its course, and that all danger was over; but a violent attack of fever on the fourth removed the deception; and if the proper remedies had been intermitted on the third, death frequently occurred on the fifth or seventh. The termination of the fever in life or death was much more frequent on the third, fifth, seventh, ninth, and eleventh days, than is common in the mild remitting fever. Where death occurred on the even days, it seemed to be the effect of a violent paroxysm, or of great vigour of constitution, or of medicine, which protracted life beyond the close of the odd days. "I think," he says, "I observed the fever to terminate on the third day more frequently in August, and during the first ten days in September, than it did after the weather became cool; and in this it resembled the common bilious remittents of our city, and the simple tertians described by Cleghorn. The danger seemed to be in proportion to the tendency of the disease to a speedy crisis: hence more died in August in proportion to the number who were affected than in September and October, when the disease was left to itself. But however strange, after this remark, it may appear, it yielded to the remedies which finally subdued it more speedily and certainly upon its first appearance in the city than it did two or three weeks afterwards. It continued for fifteen, twenty, and even thirty days in some people,—its duration much influenced by the weather, and by the use or neglect of certain remedies in the first stage."

I have already mentioned that Rush divided the patients affected with this disease into three classes: 1st, those in whom the miasm produced coma, languor, sighing, a disposition to syncope, a weak or slow pulse; 2nd, those in whom it produced great pain, delirium, vomiting, heat, thirst, a quick, tense or full pulse, with obvious remissions or intermissions; 3rd, including a very numerous class, in whom the malaria acted so feebly as not to confine them at home; many of whom recovered without medical aid, or by a spontaneous diarrhœa or plentiful sweats, or were saved by moderate bleeding and purging; while some died who conceived their complaints to be occasioned by a common cold, and neglected themselves.

"I have before remarked," he says, "that the scarlatina, the influenza, and a mild bilious remittent prevailed in the city before the yellow fever made its appearance. In a few weeks they all disappeared, or appeared with symptoms of yellow fever; so that after the first week of September it was the solitary epidemic." All ages were affected by it; but persons between fourteen and forty were most subject to it, men more so than women. The refugees from the French West Indies universally escaped it. The disease was first confined to Water Street, and the poor were the first victims; but after the second week in September it spared no rank. Whole families were confined by it. There was a deficiency of nurses and physicians. At one time there were but three physicians who were able to do business out of their houses; and there were pro-

bably then not less than six thousand persons ill with the fever.

“The principal mortality was in the second week of October. A general expectation existed that cold weather was as fatal to this fever as heavy rains. The usual time for its arrival had come, but the weather was still not only moderate but warm. In this awful situation the stoutest hearts began to fail, hope sickened, and despair succeeded distress in every countenance. On the 15th of October it pleased God to alter the state of the air. The clouds at last dropped health in showers of rain, which continued during the whole day, and which were succeeded for several nights afterwards by cold and frost. The effects of this change in the weather appeared first in the sudden diminution of the sick; for the deaths continued for a week afterwards to be numerous, but they were of persons who had been confined before, or on the day in which the change had taken place in the weather. The appearance of this rain was like a dove with an olive branch to the whole city. Public notice was given of its beneficial effects to the Mayor of New York by the Mayor of Philadelphia, in a letter dated October 17, acknowledging the benefaction of five thousand dollars from the Common Council of New York, an extract from which is as follows: ‘The refreshing rain which fell the day before yesterday, though light, and the cool weather which hath succeeded, appear to have given a check to the prevalence of the disorder: of this we have satisfactory proofs, as well in the decrease of the

funerals as in the applications for removal to the hospital.'"

From the 15th of October the disease not only declined, but assumed more obvious inflammatory symptoms, and its duration was more tedious than in the warm weather. There were a few cases in November and December, after the citizens who had left the city returned to it. Rush says he heard of but three persons who returned to the city being infected with it; so completely was its cause destroyed in the course of a few weeks. The winter months which followed the epidemic were in general healthy. A catarrh affected a number of persons in November. The few fevers which prevailed in the winter were highly inflammatory, and many of them, especially pneumony, had several of the symptoms of the yellow fever, particularly a vomiting of bile, dark-coloured stools, and a yellow eye. "None of these bilious symptoms of the inflammatory fevers of the winter and spring surprised me," he says; "for I had been early taught by Sydenham that the epidemics of autumn often insinuate some of their symptoms into the winter diseases which follow them; and Cleghorn informs us that the pleurisies which succeeded the autumnal tertians in Minorca were accompanied by a vomiting and purging of green or yellow bilious matters. It belongs to powerful epidemics to be followed by similar diseases after they disappear, from a peculiar state of the body, created by the epidemic constitution of the air not having been changed by the weather which succeeded it."

It will not be necessary for me to enter into the

consideration of the treatment of this epidemic, which in the practice of Rush consisted in the free use of purgatives, bleeding, cool air and drinks, and the application of cold water. Bark was hurtful in every case in which he tried it. The candour and sagacity displayed by this excellent man, as well as the humanity and moral courage which he evinced in his conduct amid the general terror and distress, must endear his name to his country and the world; and it is a most painful and humiliating reflection, that his wisdom and virtue exposed him, as they did Sydenham before him, to hatred and persecution.

I shall offer no comments upon the character of this memorable epidemic, which I have enlarged upon, that it may be compared with those I have previously detailed, and with others I have to describe. Rush, during its prevalence and for some years afterwards, was a believer in the contagious nature of yellow fever; but facts were too strong in favour of its endemic origin, and his mind too honest to refuse to admit their influence; and he consequently acknowledged his early error in a manner which adds lustre to his fame.

“In the histories of the disease which have been preserved in this country,” he says, “it has six times appeared about the first or middle of August, and declined or ceased about the middle of October,—viz. in 1732, 1739, 1745, and 1748, in Charleston; in 1791 in New York; and in 1793 in Philadelphia. This frequent occurrence of the yellow fever at the usual period of our common bilious remittents cannot be ascribed to accidental coincidence, but

must be resolved in most cases into the combination of more active miasmata with the predisposition of a tropical season."

"You will perceive," he says in a letter to Dr. Miller, 1802, (*Med. Repos.* vi. 147,) from the facts and reasonings contained in this letter, that I have relinquished the opinion published in my account of the yellow fever in the years 1793, 1794, and 1797, respecting its contagious nature. I am aware of the influence which such changes in medical opinions* as I have acknowledged have upon a physician's reputation; but small indeed should I consider the total sacrifice of mine, could it avert the evils which are connected with a belief in the importation of pestilential diseases, and insure the benefits to the world which would necessarily flow from the establishment of the principles contained in this letter. I expect but little success from it. My principal design in writing it, is to deduct that portion from the misery produced by plagues and yellow fevers, which my former opinion of the manner in which they are propagated may possibly have created."

In the preface also to one of the subsequent editions of his work, he says, "In the fourth volume the reader will find a retraction of the author's former opinion of the yellow fever spreading by contagion. He begs forgiveness of the friends of science and humanity, if the publication of that opinion has had any influence in increasing the misery and mortality attendant upon that disease. Indeed such is the pain he feels in recollecting that he ever entertained or propagated it, that it will long

and perhaps always deprive him of the pleasure he might otherwise have derived from a review of his attempts to fulfil the public duties of his situation*."

The yellow fever appeared in Philadelphia in 1794, but in a less decided and much less fatal form. Some cases of a malignant nature occurred as early as June and July, even under an intermitting form, one of which Rush reports was cured by five bleedings to the amount of sixty ounces, copious doses of calomel and jalap, and a large blister to the neck, without the aid of bark. Occasional showers of rain in September and October frequently checked the disease, so as to make it disappear altogether for two or three days; but it was observed that moist weather without rain increased it. The cold of October put a stop to it; but it was succeeded in November and all the succeeding winter and spring months by a very fatal bilious pleurisy, which was distinguished from those of common years by a red eye, vomiting of green or yellow bile, black stools, and its requiring very copious bleeding to cure it. This form of the disease, which occasioned the greatest mortality, and which extended to January, February, and March 1795, is included by Rush in the epidemic; and those who consider marsh effluvium as its remote cause, excited into action by changes of temperature, either from heat to cold, as in November, or from cold to heat, as in the spring months, must admit its affinity to the common autumnal diseases. It prevails only in places obnoxious to malaria, and is the most for-

* See Bancroft, *Essay*, &c. p. 377; also *Sequel to an Essay*, p. 467; and Rush, *Med. Inq.* vol. iv. p. 168, 5th edit., Phil. 1818.

midable of its effects to the natives of hot climates. In speaking of the treatment of the epidemic, Rush says, "I found strong mercurial purges to be extremely useful in the winter months, when the fever put on symptoms of pleurisy. I am not singular in ascribing much to the efficacy of purges in the bilious pleurisy; nor am I singular in keeping my eye upon the original type of a disease, which only changes its symptoms with the weather or season, and in treating it with the same remedies. How long the pleurisies of winter in Philadelphia may continue to retain the bilious symptoms of autumn, which they have assumed for three years past, I know not; but the late Dr. Faysseaux, of South Carolina, informed me that for many years he had not seen a pleurisy in Charleston, with the common inflammatory symptoms. They all now put on bilious symptoms, and require strong purges to cure them. The pleurisies which Dr. Chalmers supposes he cured by purging, were probably nothing but bilious fevers in which the cool weather had excited some pleuritic symptoms."

This modification of the effect of malaria from the influence of temperature and its sudden vicissitudes, is a subject of great importance in determining the nature of its diseases, which bear different names, and which are ascribed to different causes. It would lead us to expect material differences in the fevers of those countries which afford strong contrasts as to climate; since in the same situation we find such remarkable modifications as are presented by the intermittent, the remittent, the yellow

fever, the chronic or typhoid fever, and the bilious pleurisy or peripneumony.

In speaking of the type or general character of the epidemic of 1794, Rush says, "We had but one reigning disease in town during the autumn and winter; and this was a bilious remitting or intermitting, and sometimes a yellow fever; and all fevers from other remote causes than putrid exhalation partook more or less of the symptoms of the prevailing epidemic.

"The forms in which this fever appeared were a tertian, most frequently a remittent; and during November and the winter months it was accompanied with pains in the sides and breast, constituting what nosologists call the *pleuritis biliosa*."

Rush bled in this fever earlier than in that of 1793; from which it differed "in coming forward in July and August with a number of paroxysms which refused to yield to purging alone." From a Table illustrative of his practice in August, September and October, 1794, and January 1795, it appears that he took from fifty to one hundred and fifty ounces of blood in from three to fifteen venesections; and he trusted the cure to the lancet, to calomel purges, and blisters. His observations on the efficacy of mercurial salivation, at this early period, conform to those of Mr. Shepherd*. "Out of upwards of two hundred patients to whom I was called," he says, "in the first stage of the fever, between the 12th of June 1794 and the 1st of April

* Edinburgh Medical and Surgical Journal, vol. xiii. p. 427.

1795, I lost but four persons, in whom the unequivocal symptoms had occurred which characterize the first grade of the disease."

The number of deaths in 1792, a year free from yellow fever, exceeded by thirty those in 1794; which he accounts for by the large mortality in 1793 having reduced the number of inhabitants by four thousand, and the fatality of the epidemic of 1794 falling principally in the spring months of 1795. In 1792 the burials in the Strangers' Graveyard were two hundred and one; while in 1794 they were six hundred and seventy-six,—an interesting fact as connected with this last year, and which, he says, is "easily accounted for, when we recollect that these people are chiefly labourers, and exposed to the constantly exciting causes of the disease, and that in all countries they are the principal sufferers by it. But in order," he adds, "to do justice to this comparative view of the mortality induced by the yellow fever of 1794, it will be necessary to examine the bill of mortality of the succeeding year, by which it appears that 2274 died, making 1139 more than died in 1794. The greatness of this mortality, I well recollect, surprised many of the citizens of Philadelphia, who had just passed an autumn which was not unusually sickly, and who had forgotten the uncommon mortality of the months of January, February, and March, which succeeded the autumn of 1794.

"Notwithstanding the numerous proofs of the prevalence of yellow fever in Philadelphia in 1794, there were many thousands of our citizens, and a majority of our physicians, who did not believe that

a case of it existed at that time in the city ; nor is a single record of it to be met with in any of the newspapers, or other public documents of that fever. Let us learn from this fact that the denial of events, or a general silence upon the subject of them, is no refutation of their truth, where they opposed the pride or interests of the learned or great. Notwithstanding this general denial and silence, there was scarcely a citizen or physician who, three years afterwards, did not admit of its having prevailed in that year ; and we learn from this fact another important truth, that departed vice and error have no friends nor advocates."

The fever of 1797 in Philadelphia differed in the variety of its forms from that of 1793 and 1794, and was of a more malignant nature, the moderate cases being few compared with those of an opposite character ; whence the mortality was greater in the same number of patients treated with the same remedies, though the whole number of deaths did not exceed 1300*. The weather differed materially in August, September and October, from that in the same months of 1793, both in regard to temperature and moisture, being cooler and the rains frequent.

In December 1796 the thermometer fell to 2° below zero ; but the winter and spring of 1797 were generally healthy ; the last was cold and wet. In June and July 1797 there fell but little rain ; dysenteries and cholera appeared in the suburbs in July ;

* Pascalis Ouviaère ; An Account of continued epidemic Yellow Fever : Philadelphia 1798. Rush says the deaths, August to October, were between 1000 and 1100.—iv. p. 18.

and on the 8th and 25th, two cases of yellow fever occurred in the practice of Drs. Rush and Physick.

“On the 1st of August,” Rush remarks, “I was called to Mr. Lewis in a malignant bilious fever; and on the 3rd to Mr. Hall, who had been ill several days. Both died on the 6th, and were very yellow after death; and Mr. Hall had a black vomiting on the day he died.”

The disease was confined chiefly to the district of Southwark and Kensington for several weeks, though in September and October many cases occurred in the city, most of them traced to the above sources. After the first week in September, there were no diseases to be seen but yellow fever. In that part of the town which is between Walnut and Vine Streets it was uncommonly healthy. It rained during the greatest part of the day on October 1st; and on the 10th it became cool. On the nights of the 12th and 13th there was a frost accompanied with ice, which appeared to give a sudden and complete check to the disease.

I shall give the Meteorological Tables from Rush, that they may be compared with those of 1793, noting the days on which rain occurred. It will be observed that the temperature was much more moderate, and the rains frequent,—circumstances perhaps connected with the fever assuming occasionally a chronic form.

	Thermom.				Thermom.		
Aug. 1	73°	75°	Rain.	Sept. 7	56°	76°	
2	72	76	Rain.	8	54	65	
3	72	78	Rain.	9	56	65	
4	72	78	Rain.	10	58	63	
5	74	79	Rain.	11	53	64	
6	73	76		12	51	62	
7	70	76	Rain.	13	56	67	
8	72	76	Rain.	14	64	70	
9	72	76		15	66	73	Rain.
10	69	73		16	62	70	
11	70	74	Rain.	17	56	67	
12	71	74	Rain.	18	58	63	Rain.
13	73	75	Rain.	19	55	63	
14	70	74		20	47	63	
15	56	60		21	46	60	
16	60	64		22	56	65	Rain.
17	60	65		23	56	66	
18	68	75	Rain.	24	52	66	
19	72	78		25	57	68	
20	70	77		26	58	68	
21	74	76		27	48	63	
22	68	76	Rain.	28	48	63	
23	71	76		29	54	63	
24	71	75		30	60	65	Rain.
25	70	75	Rain.	Oct. 1	55	65	Rain.
26	70	75	Rain.	2	55	66	
27	68	76		3	60	70	
28	64	75		4	60	70	Rain.
29	59	70		5	46	60	White frost.
30	70	76	Rain.	6	55	65	White frost.
31	68	74		7	56	76	Rain.
Sept. 1	73	80	Rain.	8	56	70	
2	79	80		9	50	60	
3	68	74		10	40	58	Frost.
4	60	74		11	38	56	
5	58	73		12	34	52	Ice.
6	58	72	Rain.	13	35	55	Ice.

In August 1793 there were twenty-six days in which the thermometer at 3 P.M. stood from 80° to 90°; and rain only fell once copiously through-

out the month ; viz. on the 25th, and very partially only on the 8th, 14th, 24th, and 31st.

In September there were twenty days in which it stood from 72° to 89° ; and slight rain only fell on the 9th.

From the 1st to the 13th of October it stood from 64° to 80° ; and rain only fell on the 12th.

Rush found that bleeding was not generally applicable in the fever of 1797 after the first day ; and it would appear that this was owing to the force of the congestion, which characterized the early stage. He says that the powers of the system were sometimes depressed below the return of active fever, and the patient sunk away by an easy death, without pain, heat, or a quick pulse. This is an evident example of what Dr. Armstrong called congestive fever ; and it will appear that the epidemic presented other examples of it, besides many referable to his simple-inflammatory and congesto-inflammatory or mixed forms of fever.

Rush enumerates the following states :

1. "There were a few cases in which the skin was universally yellow, but without more pain or indisposition than usually occurs in the jaundice. They were very frequent in 1793, and prevailed generally in autumn in all places subject to bilious fever."

2. "Cases so slight, that patients were said to be neither sick nor well, or, in other words, they were sick and well half-a-dozen times a day. Such persons went about, but complained of dullness and occasionally of shooting pains in their head, and of

night sweats. They were sometimes affected with sickness, or diarrhœa, or constipation; and purgatives elicited black stools. The pulse was quicker than natural. By neglect or mismanagement these cases assumed a higher grade and became fatal, but more commonly yielded to nature or a single dose of purgative medicine."

3. "There were what Dr. Caldwell happily called *walking cases*. The patients were flushed or pale, had a full or tense pulse, but complained of no pain, had a good appetite, and walked about as if but little indisposed, until a day or two, and in some instances until a few hours, before they died. The impression of the remote cause of the fever in those cases was beyond sensation; for upon removing a part of it by bleeding or purging, the patients complained of pain, and the excitement of the muscles passed so completely into the blood-vessels and alimentary canal as to convert the fever into a common and more natural form. These cases were always dangerous; and, when neglected, generally terminated in death. One was cured by the loss of upwards of one hundred ounces of blood, and a plentiful salivation."

I have quoted the language of Rush, which will not be objected to. These cases are evidently analogous to those forms of typhus described by Dr. Armstrong as commencing with slight, and ending in an overwhelming shock of congestion, or in reaction, dangerous in proportion to the impression made by the degree or duration of the previous oppression.

4. "In a few cases the miasmata produced death in twenty-four hours, with convulsions, coma, or apoplexy."

5. "There were *open* cases, in which the pulse was full and tense, as in a pleurisy or rheumatism, from the beginning to the end of the fever, generally attended with a good deal of pain."

6. "There were *depressed* or *locked* cases, in which there was a season of great debility, but little or no pain; a depressed and slow pulse; cool skin; cold hands and feet; and obstructed excretions."

7. "There were divided or *mixed* cases, in which the pulse was active until the fourth day, after which it became depressed, when all the other symptoms of the locked state of the fever accompanied this depressed state of the pulse."

Rush says very sagaciously, that during his attendance on this fever, he was struck with the analogy between this *mixed* form and the malignant state of small-pox. "The fever in both continues three or four days, without any remission. They both have a second stage, in which death usually takes place if the diseases be left to themselves. By means of copious bleeding in their first, they are generally deprived of their malignity and mortality in their second stage. This remark, so trite in the small-pox, has been less attended to in the yellow fever. The bleeding in the first stage of this disease does not, it is true, destroy it altogether, any more than it destroys an eruption in the second stage of small-pox; but it weakens it in such a manner, that the patient passes through its

second stage without pain or danger, and with no other aid from medicine than what is commonly derived from good nursing, proper aliment, and a little gently opening physic."

8. "There were *chronic* cases of this fever."—"It is," he says, "from the want of observation that physicians limit the duration of the yellow fever to certain days. I have seen many instances in which it has been protracted into what is called by authors, a slow nervous fever. The wife of Captain Bell died with a black vomiting, after an illness of nearly one month. Dr. Pinckard informed me he had often seen the yellow fever put on a chronic form in the West India Islands."

9. "There was the *intermitting* form, which often deceived the patient, by leading him to suppose his disease was of a common or trifling nature."

10. "There was a form in which it resembled the mild remittent of common seasons,—chiefly distinguished from it by the black colour of the intestinal evacuations."

"In many cases," Rush says, "it appeared as a remitting and intermitting fever; the most common of these forms being the quotidian and tertian, though in one case it appeared as a quartan. It frequently assumed the character given of the same fever in Charleston by Dr. Lining."—"It came on without chills, and continued without any remission for three days, after which the patient believed himself to be well. On the fourth or fifth day the fever returned, and unless copious evacuations had been used early, it generally proved fatal. I have been much puzzled to distinguish a crisis of the

fever on the third or fourth day, from the insidious appearance which has been described. It may be known by a preternatural coolness in the skin and languor in the pulse; an inability to sit up long without fatigue or faintness; a dull eye; great depression of mind, or such a flow of spirits as sometimes to produce a declaration from the patient that he feels too well. Where these symptoms appear, the patient should be informed of his danger, and urged to the continuance of such remedies as are proper for him."

I have already mentioned that Rush did not find bleeding advantageous in this fever after the first day; though, in 1793 and 1794, it was frequently effectual when used for the first time after the second day, and often useful in the advanced stages of the common bilious fever. He began the cure, in most cases, by bleeding when called early, and the quantity drawn was proportionate to the violence of the fever. He cured many by a single bleeding, and from others took upwards of a hundred ounces of blood; and quotes the authority of five of his medical brethren who drew from one hundred and three to one hundred and seventy-six ounces with success. "It is common," he says, "with those who object to bleeding in the yellow fever, to admit it occasionally in *robust* habits,—a rule which leads to great error in practice. From the weak action of predisposing or exciting causes, the disease often exists in a feeble state in such habits, while it appears in great force in persons of delicate constitutions, from the protracted or violent operation of the same causes. A physician,

therefore, in prescribing for a patient in this fever should forget the natural strength of his muscles, and accommodate the loss of blood wholly to the morbid strength of his disease."

He found the usual good effects from calomel purges ; but remarks that however powerful bleeding and purging were in the cure of the fever, they often required the aid of a salivation to assist them in subduing it. This effect did not take place in some cases till the solution of the fever, more especially in those forms in which there were no remissions or intermissions. "It has been said," he remarks, "that mercury does no service unless it purges or salivates. I am disposed to believe that it may act as a counter-stimulus to that of the miasmata of the yellow fever, and thus be useful without producing any evacuation from the bowels or mouth ; but it more certainly acts in this way, provided blood-letting has preceded its exhibition. I have supposed the stimulus from the remote causes of the yellow fever to be equal in force to five, and that of mercury to three. To enable the mercury to produce its action on the system, it is necessary to reduce the febrile action, by bleeding, to two and a half, or below it, so that the stimulus of the mercury shall transcend it. The safety of mercury, when introduced into the system, has three advantages over that of the matter which produces the fever. It excites an action preternatural only in force, and does not derange the natural order of actions, determines them chiefly to external parts, and fixes them, when it affects the mouth and throat, upon

parts which are capable of bearing great inflammation and effusion without danger to life. The stimulus which produces the yellow fever acts in a reverse way. It produces violent, irregular, or wrong actions, determines them to internal parts, and fixes them on viscera which bear with difficulty and danger the usual effects of disease. Dr. Fabre ascribed to diseases a centrifugal and a centripetal direction; and it would seem the former belongs to mercury, and the latter to yellow fever."

Rush, therefore, was no advocate of the exclusive mercurial treatment of yellow fever,—a practice inconsistent with the nature of the disease, and the mode of action of the supposed specific.

Of the epidemic to which his observations apply, I have only to remark that it differed in character from that of 1793, as the season in which it occurred did from that truly tropical year. While, in the cool autumn of 1803, at Wilmington, typhus prevailed to the exclusion of the usual periodical types of fever; in Philadelphia, in 1797, we find all forms, from the intermittent and mild remittent to the yellow fever, and the slow nervous fever protracted nearly to a month and still fatal. That all these forms of fever arose from one remote cause, and that that cause was the same as gives rise to the usual endemic, I cannot doubt, as we find they appeared simultaneously in the autumn, and ceased suddenly on the occurrence of cold weather.

It was a year very fatal to the medical practitioners of Philadelphia, nine of the twenty-four who attended patients in the disease having died of it, and eight of the survivors having been affected with the

fever. "This extraordinary mortality and sickness," Rush justly remarks, "must be ascribed to their uncommon fatigue in attending the sick, and to their inability to command their time and labours, so as to avoid the exciting causes of the fever."—Among those who died was Dr. Way, an early and cherished friend of Rush, whom this admirable man laments in a strain of the most affecting tenderness. "Had I met," he says, in alluding to his friend's death, "with no other affliction in the autumn of 1797, than that which I experienced from this affecting scene, it would have been a severe one; but it was a part only of what I suffered from the death of other friends and from the malice of enemies. I beg the reader's pardon for this digression: It shall be the last time and place in which any notice shall be taken of my sorrows and persecutions in the course of these volumes."

Sydenham, who has justly been termed the English Hippocrates, suffered in a vandal age similar persecution from men whose names have sunk into oblivion, or are remembered only in the indignation and scorn of posterity; and Rush, who may with the same justice be styled the American Sydenham, had the equal glory of owing his sufferings to the gigantic superiority of his genius and virtue.

The year 1798, in Philadelphia, was as fatal a one from yellow fever as 1793; for the deaths amounted to more than 4000*, though the number affected by it was four times greater in 1793, from the city being nearly deserted in 1798; a dispro-

* History of the Pestilence, August to October 1798, by Condie and Folwell: Philad. 8vo.

portion of deaths to the number of the sick, which Rush attributes to the general and liberal use of the lancet in 1793, and to the fears and prejudices excited against it in 1798, by the publications of the preceding year. Many who had recovered in former years by the use of depleting remedies, deserted the physicians who had prescribed them, and put themselves under the care of persons of opposite modes of practice;—most of them died. Two had been the patients of Rush, one of whom he had recovered of a third attack. “It is worthy of notice,” he remarks, “that the business and reputation of the physicians during this epidemic were in the inverse ratio of their success.”

I shall merely remark of this fever, that, like that of 1797, it appeared under different forms, and, as an epidemic, was confined to August, September and October. That cases occurred approximating in some respects to typhus, will appear from Rush's description of it. “The pulse was in many cases less active in the beginning of the fever than in former years, and resembled that which occurs in the first stage of the common gaol fever. Costiveness and vomiting were general—the stools occasionally green, dark-coloured, black, or natural; the black vomiting more common than in former years, in all the forms of the fever; sometimes it was suspended for several days before death, and hopes were entertained of a recovery;—in one case it ceased ten days before death; sometimes was succeeded by delirium and coma, or more commonly left the patient free of pain, and in the pos-

session of all the faculties of his mind. Many passed through every stage of the disease without any complaint of pain. In one fatal case, it was felt only in the calves of the legs, and in another only in the toes. In many cases the whole body was affected with a morbid sensibility to touch; redness of the eyes was general, and few recoveries took place, unless it was removed. The forms of the fever were nearly similar to those of 1797, and several were tertians, one of which was fatal. In many cases the system was prostrated below the point of inflammatory reaction; and these were called by some typhus fevers, and were the most dangerous and fatal examples of the disease. In two patients it was protracted to nearly the thirtieth day.

“Though the pulse was less active in this fever than in those of former years, it was seldom so feeble as to forbid bleeding. In one case it called for the loss of one hundred and sixty-two ounces, and in another of two hundred ounces by successive bleedings, before it was subdued. Such cases were not common; for in most the pulse flagged after two or three bleedings. But there were cases in which the lancet was forbidden altogether, where the system appeared to be prostrated below the point of reaction,—a state manifested by a weak, quick, and frequent pulse, languid eye, sighing, great inquietude, or insensibility. However unsafe bleeding was on the first day, when these symptoms appeared, a spontaneous hæmorrhage from the gums, to the extent of several pounds, often occurred on

the fourth or fifth day, with the happiest effects, apparently after the revival of the blood-vessels from their prostrated state."

Rush had found emetics injurious in the epidemics of 1793 and 1797; but from the conviction that the system was only depressed in these cases, and finding that it did not rise on blood-letting, he determined to try them, with a view of exciting and equalizing the action of the blood-vessels, and he found them useful,—so much so, that in the forming state of fever they often seemed to effect an immediate cure. He was regulated in their exhibition by the state of the pulse. If this was languid on the first day, he gave the emetic at once; but if it was full and tense, the emetic was deferred till the pulse was reduced by bleeding and purging; and he found that mercury affected the mouth more speedily where an emetic had been administered, probably, as he says, from its awakening by its stimulus the sensibility of the stomach, the torpor of which in two cases was so great, that in one ten grains and in the other thirty grains of tartar emetic did not operate even to the slightest degree of nausea.

Calomel purges were as useful as formerly, but a salivation was found to be the most certain remedy, though it was difficult to excite it in many cases, from the mercury being rejected by the stomach, or passing off by the bowels, or "by its stimulus being exceeded by the morbid action of the blood-vessels." In these cases, he attempted the cure, after bleeding, by means of copious sweats, which succeeded where no other remedy promised any relief. He found in the intermittent form, un-

like the epidemics of 1793 and 1797, that bark was used with advantage; and "I gave it," he says, "in all those cases where the fever put on the type of the slow chronic fever."

From the history of the symptoms, treatment, and prognosis of this fever, he adds, "we see how imperfect all treatises on epidemics must be which are not connected with climate and season. As well might a traveller describe a foreign climate by the state of the weather and the productions of the earth during a single autumn, as a physician adopt a uniform opinion of the history, treatment, and prognosis of a fever, from its phænomena in any one country, or during a single season."

One case of yellow fever occurred this year, as early as April 7th, in a gentleman, "lately from the State of Georgia," which was fatal on the third day. On the 1st of May the thermometer rose to 84°, and the weather during this month and June was very dry. One fatal case is mentioned in June, and about a dozen occurred between the 2nd and 20th of July. The weather was so cool on the 19th of July, as to render winter garments comfortable. In August the disease appeared in various parts of the city. The weather was hot and dry in that month and September;—peaches ripened three weeks sooner than in ordinary summers; many fruit-trees blossomed in October, and a second crop of small apples and cherries were seen in November, near the city. On the 29th of September there was a white frost, and its effects upon the fever were obvious and general. It declined in every part of the city to such a degree as to induce many peo-

ple to return from the country. In the beginning of October the weather became warm again, and the disease revived. It was observed that all great changes from heat to cold, short of frost, and also of cold to heat, increased the mortality of the fever, which spread most rapidly in moist weather*.

The winter of 1798 and 1799, and the spring following was cold, though the weather moderated so much about the middle of January as to open the navigation of the Delaware. The river was frozen however a second time, and was crossed near its origin on the ice as late as the 15th of April.

The diseases which succeeded the fever of 1798 were highly inflammatory; and in the latter part of January 1799, Rush met with two cases of malignant cholic, and one of yellow fever; and he mentions that Dr. Physick, who attended this case with him, informed him that he had nearly at the same time attended two other persons with the same disease. The weather was very cold, and bilious pleurisies were common during the latter part of February. In April the diseases, though fewer than in the winter, were bilious and inflammatory; and Rush was called to a case of yellow fever which yielded to copious bleeding and evacuant medicines. May was colder than usual, but very healthy. In the first week of June several cases of highly bilious fever occurred, one of which exhibited the symptoms of the highest grade of that fever, and several others were met with between the 13th and 29th, and in the month of July. But to-

* See observations on this fever by Dr. Pascalis, *Med. Repos.* vol. iii. p. 344.

wards the end of July and in the beginning of August, the disease gradually disappeared from every part of the city,—a circumstance, Rush remarks, which deserves attention, as it shows it did not spread by contagion. The weather was dry in August and September, to the injury of the crops of grass, fruits, and vegetables; and towards the middle of August the disease revived, and appeared in different parts of the city. The type of it was nearly the same as in 1797. It now and then appeared in the form of a quartan, and was then generally fatal. It appeared with rheumatic pains in one person, and one of the worst cases was accompanied with cholic. The arterial system was in most cases active, and there were few cases that did not indicate bleeding. The same benefit was derived from emetics as in 1798; but they were never administered, except on the first day, before violent action had taken place in the system, or after it was moderated by bleeding. In those cases in which the fever was protracted to the chronic state, bark, wine, laudanum, and æther produced the most salutary effects. Life was recalled in several cases in which it appeared to be departing, by frequent and liberal doses of æther. The bark was given with advantage, after the seventh day, when the fever assumed the form of an intermittent. “There were two opinions given to the public on the origin of this fever,—the one by the Academy of Medicine, and the other by the College of Physicians. The former declared it to be generated in the city from putrid domestic exhalations, because they saw it only in their vicinity, and discovered no channel

by which it could have been derived from a foreign country; the latter asserted it to be 'imported, because it had been imported in former years.'

We have an account of fever "in the autumn and winter of 1799, in Bald Eagle valley," situated two hundred miles N.N.W. of Philadelphia, in Mifflin county, at the foot of the Alleghany mountains. It abounds in ponds of stagnant water, which, from the dryness of the season, became very offensive; and near these the fever prevailed with great malignity. "It was ushered in by chills, with pains in the back, limbs and head, which, in forty-eight or sixty hours, carried off the patients. They discharged vast quantities of matter from the stomach, of the consistence and appearance of coffee-grounds, so offensive as to produce nausea and vomiting in the attendants. The fæces had the same appearance. In many the disease terminated by profuse discharges of blood from the anus and vagina. In these cases bleeding appeared to afford no relief. Bark and tonics, with the liberal use of alkalis, were of the utmost service*.

I have in no case alluded to the opinions or to the facts bearing on the subject of the importation of the contagion of yellow fever into the sea-ports, because I have wished to rest the evidence of the nature of the disease on its general character, as associated with the common intermittent and remittent fevers so universally endemic in all the parts of America hitherto noticed. I can find nothing satisfactory in the detail of circumstances connected with the arrival of vessels supposed to communi-

* Letter from Dr. Harris, Med. Repos. vol. iv. p. 75.

cate the germ of the disease; for in some instances I meet with cases of the fever recorded weeks before any such arrival, or no fever mentioned as existing till weeks subsequent to it, and medical men of opposite sentiments with regard to the doctrine of contagion, drawing as opposite conclusions from the same facts. I disclaim, therefore, any wish to mislead others upon this subject by omitting to notice assertions or suspicions or inferences connected with the idea of foreign contagion. Believing as I do the endemic origin of yellow fever, and having shown by a patient detail of many different epidemics its existence in inland situations, where foreign communication is at least improbable, if not impossible, and that it is a disease which cannot be defined by fixed and invariable symptoms, I would leave others to amuse their leisure in hunting it from one country to another, and in undermining the pyramid of evidence against its contagious nature which has been raised by the zeal and industry of Bancroft. They will find that while units out of thousands of the profession in America adhere to the idea of its being derived from the West Indies, the Spanish physicians* in Cuba ascribe its yearly appearance in that island to their intercourse with North America; and they will meet with an universal admission on the part of the American contagionists that, though imported invariably from abroad, it as invariably proves insusceptible of being communicated in the

* Oyarvide (*Discurso Apologetico*, 4to, Havannah 1801,) contends it is imported into the Havannah by the Anglo-Americans. See Med. Repos. vi. 52.

United States when removed from the limits of the impure air where it prevails ; and that even in hospitals situated in healthy districts, and crowded with patients, the disease is never imparted to the attendants of the sick.

It is to be regretted that Rush has not accompanied his general account of the epidemics of different years with the particular details of individual cases, that we might know in what respects the occasional examples of yellow fever in winter agreed with or differed from those of autumn, the season most naturally associated with this form of disease. He considered it as the highest grade of the common remittent, and in every epidemic included all cases of that type, and even of the intermittent attended with aggravated symptoms, as examples of yellow fever ; and in the year 1795 also those cases of bilious pleurisy which occurred in the winter and spring. In the epidemic last described he mentions having met with a case of yellow fever in January, and that Dr. Physick, who attended that case with him, had also met with two others ; and immediately after he states that bilious pleurisies were common during the latter part of February. It would seem from this that these cases of bilious fever were not alike ; for if pleuritic symptoms had occurred in those which he denominates yellow fever, he would as usual have termed them pleurisies. These pleurisies were associated in his judgement with yellow fever, because both were bilious fevers, and had some symptoms in common. They arose out of one and the same remote cause, only called into action by different

exciting causes, and were consequently modified in character by the influence of season, temperature, and other circumstances. Yellow fever in autumn was a fever of periodical type generally, but not necessarily; for some cases were examples of pure congestive fever, fatal without any symptoms of reaction; or a fever of intense excitement, which continued three days without any remission, and perhaps fatal before any occurred, or immediately after it occurred. Its duration was brief, limited to the third, or fifth, or seventh day in the more rapid examples, or protracted into a chronic fever, which terminated favourably or the reverse as late as the twentieth or thirtieth day. As an epidemic it ceased on the first occurrence of cold weather, frost, heavy rains, and high winds; but these changes did not extinguish the disease, for it appeared occasionally still as a bilious fever, but with pleuritic or pneumonic symptoms, apparently from the change of temperature from heat to cold, acting as an exciting cause of fever in a system impregnated with malaria. This form ceased as soon as the cold of winter became fixed and uniform: but in the early spring, or in the first changes of winter into spring, when the temperature varied from cold to heat, it revived, generally as a pleuritic fever, but attended with bilious symptoms, as a red eye, frequent vomiting, dark-coloured evacuations from the bowels, requiring copious calomel purges. This we have seen is frequently the progress of the bilious fever in America, from summer and autumn through the ensuing winter to spring, when sooner or later all traces of it disappear, till they are revived in the

mild or more aggravated form by the summer and autumnal heats and exhalations. But Rush, in 1798, speaks of yellow fever occurring in January; and it is to be regretted that he has not left us details of such cases, that we might see in what respects they differed from the yellow fever of autumn,—whether they were fevers of periodical type, or continued, and rapid or protracted in their course. It might be supposed that they were analogous to the bilious pleurisies, except that the pectoral symptoms were absent or slight, from the disordered action being concentrated in the stomach and liver: and there can be no doubt that a case of bilious fever occurring in winter with symptoms of diseased action in the stomach, bowels, liver, head, &c., would be considered by him analogous to yellow fever, and consequently, in all probability, called such.

I find a case of “febrile disease attended with malignant symptoms” recorded by Dr. Seaman in the ninth volume of the *Med. Repos.* p. 395, which perhaps is analogous to those mentioned by Rush. It occurred at New York in the early part of January 1806, after an epidemic yellow fever which prevailed in the September and October preceding;—about 600 cases having been reported to the Board of Health, and 300 deaths.

“On the 11th of January 1806,” Dr. S. says, “I first visited S. G. aged about seventeen years. She was then affected with almost continual chills and shiverings; constant ejections of great quantities of bitter yellow bilious matter from the stomach; her bowels rather constipated; some headache,

and considerable, though not very severe, pain in the left hypochondrium. Her eyes appeared in no respects disordered; her skin was dry; tongue natural; pulse a little accelerated. On the next day the sickness at stomach still continued, accompanied with shiverings at times, or a general tremor, without any sense of coldness. She uniformly vomited after swallowing anything, either medicine, food, or drink.

“On the third day the sickness at stomach was somewhat abated, the chills and tremor very much moderated, and the pain in her side nearly gone; but she complained of a general painful sensibility of the skin over the whole surface. During all this time, from the commencement of her disease, there appeared to be but very little commotion excited in the sanguiferous system; the pulse was somewhat frequent; but that seemed rather like what might be attributed to the general agitation caused by the affection of the stomach, than to any regular ordinary effect of fever. The day after, however, being the fourth, her skin became hot, her pulse more frequent and quick, with some tension, and her tongue a little furred; she now also complained of some difficulty in passing her urine. From this time her disease, as evidenced by the tongue, skin, pulse, &c., exhibited every mark of *typhus*, until the seventh day, when, with great prostration of strength, her pulse lost all its preternatural frequency, became soft and regular, the skin soft and of a natural temperature; its appearance, however, which was not naturally very fair, became evidently tinged with an unusual yellowness; her eyes were yellow; and

blisters that had been drawn upon her arms discharged a very yellow serum. In the afternoon of this day her sickness at stomach returned, and she brought up a great quantity of black matter mixed with mucus. In the course of the next day the yellowness rather increased, and she regularly vomited the black matter upon taking anything into the stomach: her dejections also, which had not before exhibited any preternatural appearance, were now as black as soot; her pulse became more frequent, weak, and quick; her mind deranged; subsultus, with which she had been more or less affected from an early stage of her complaint, was now greatly increased, with frequent turns of hic-cough. She died on the evening of the tenth day from my first seeing her.

“Without making any comment on the above case, I shall only observe, that the patient had not been in town for a considerable time previous to the commencement of our late autumnal fever; nor did she come in till some weeks after the general return of the inhabitants and the entire extinction of the epidemic. She had been on board no vessel, nor had had communication with any person sick of fever. The respectable family with whom she lived are exceeded by none in respect to neatness and cleanliness about their house, which is situated in a healthy part of Pearl Street; and *she* was remarkable for neatness and attention to her own person. At the time of her being taken sick, the earth was locked up by frost and covered with snow. The matter discharged from her stomach was not exactly like the coffee-ground vomit of

yellow fever ; it appeared rather like soot mixed with mucus. The black vomiting could not have been owing to anything she had swallowed, she having taken no chalybeates or anything else that could have given it that colour ; nor could it have originated from a mortification of the stomach, as it was not fœtid ; nor did the corpse after death evince anything of that kind, it not being anywise particularly offensive."

In this case we have fever, not attended by symptoms of regular reaction or excitement till the fourth day, then assuming all the marks of typhus, and followed by yellowness of skin, black vomiting, black stools, subsultus, hiccough, and death on the tenth day ; though from the observations of Dr. Seaman respecting the movements of his patient, we cannot refer the disease to any taint derived from the air of the city during the preceding epidemic. I can only explain it by her having been exposed to a malarious district in or out of the city ; for I see none of the difficulty attending it removed on the supposition of its having arisen from any undiscovered obscure source of contagion. It is well known that some of those who fly from a city during the prevalence of yellow fever often fall victims to it on their return, after the epidemic has ceased ; and if this depended on contagion, such cases among the thousands who remove into the country and return to the city would be far more numerous than they are ; and we know that those who remain and prove insusceptible of the disease during its prevalence, manifest the past or present influence of the remote cause, when changes of

temperature towards the beginning or decline of winter excite in them a bilious pleurisy, which only occurs in persons who have been exposed to marsh effluvium. We also know that it is an axiom with many of the highest authorities in medical literature, that diseases are often generated in one season and developed in another,—at least those which depend on marsh effluvium; and as the case of Dr. Seaman would have passed current as one of yellow fever had it occurred in ordinary seasons,—and actually forms no anomaly, considered as such, occurring even in winter,—I am not disposed to doubt its analogy with those mentioned by Rush.

Dr. Pascalis, in some speculative observations on the sedative effects of septic gases on animal irritability, (*Med. Repos.* iv. 16,) says: “Some facts seem to prove that there must be a certain interval of time between the action of the air and the breaking out of the yellow fever. During the late epidemic (1799) we observed that the greater the heat after rain the greater was the number of the sick, but progressively during ten or fifteen days. We observed likewise that some days previous to an attack of the fever many people will complain of headache and disordered bowels, and others will have convulsions, &c. Finally, we know that at the close of the season, and even one or two months after frost has begun to appear, when very little effluvium can be exhaled, a number of genuine cases of yellow fever will occur; and these have been ascertained in December 1798, and in January 1800, in Philadelphia. These collected facts give the best presumptive proof that a period of time must precede the attack

of a malignant fever, after the impression received from septic gases ; and this must be the reason why few of our exiled fellow-citizens have been its victims after they had removed from the seat of the epidemic."

I have taken no notice of the occasional occurrence of yellow fever as a *sporadic* disease in Philadelphia. It existed as such in 1795, 1796, 1800, 1801, and 1804.

In 1800, Rush says that January was not so cold as usual, and that catarrhs, croup, and bilious pleurisies were prevalent in every part of it, and that a few cases of yellow fever occurred. The city was healthy from March to June, except that a few intermittents appeared in the latter month, which yielded readily to bark ; and one case of yellow fever was met with on the 16th. During these months there fell frequent and plentiful showers, which rendered the crops of grass luxuriant. In July, *cholera infantum*, some cases of dysentery and bilious fever, and one case of yellow fever, fatal on the fifth day, occurred. In August, dysentery was the principal form of disease in the city, though one case of yellow fever was fatal on the 23rd; on the 28th and 30th there fell an unusual quantity of rain ; on the 11th and 12th of September two persons died of the yellow fever. On the night of the 21st there fell a plentiful shower of rain ; and about this time twenty-one cases of yellow fever appeared in Spruce Street, all in the neighbourhood of putrid exhalations, fourteen of which were fatal. "No one of the above cases of malignant fever could be traced to a ship or to a direct or indirect intercourse with

persons affected with that disease." November and December were uncommonly healthy.

In 1801, January was intensely cold, but February more moderate. Catarrhs and a few pleurisies occurred during the two months. An unusual quantity of rain fell in March and April;—June was dry and healthy. The weather in every part of July was warm and dry; so that there was no second crop of grass, and the summer fruits and vegetables were scanty. On the 8th a case of yellow fever occurred, and about the 15th a patient died of it in the Pennsylvania hospital,—and two other cases were met with. The winds blew, every two or three days, from nearly every point in the compass, and were less steady than they had been for seven years. On the 4th of August there fell a considerable quantity of rain, which was succeeded by cool and pleasant weather. Cholera was frequent both among adults and children, and dysentery in several of the adjoining counties.

"A number of emigrant families arrived this month from Ireland and Wales, who brought with them the ship fever. They were carefully attended, at the Lazaretto and the City Hospital, in airy rooms, by which means they did not propagate the disease. *Contrary to its usual character, it partook of the remissions of the bilious fever*, probably from the influence of the season upon it."

In September there were a few extremely warm days. In the beginning and middle of the month a number of mild remittents occurred, and about the 22nd there were five or six cases of yellow fever in Eight Street, in two houses ill-ventilated and

exposed to a good deal of exhalation. One of the persons who was ill of this fever vomited black matter a few hours before he died, as Rush sat by his bed-side.

After enumerating several places where yellow fever occurred this year, especially New York, he adds, "It will be difficult to tell why the fever appeared only in sporadic cases in Philadelphia. Perhaps its prevalence as an epidemic was prevented by the plentiful rains in the spring months,—by the absence of moisture from the filth of the streets and gutters, in consequence of the dry weather in June and July,—and by the variable state of the winds. If none of these causes defended the city from more numerous cases of yellow fever, it must be resolved into the want of a concurring inflammatory constitution of the atmosphere with the common impure sources of that disease."

The fact of the ship fever, or typhus of Great Britain, changing in the month of August, at Philadelphia, to a remittent fever, is too curious and interesting to be passed over in silence. Two explanations of this change of type may be offered.

1. That the fever originating in Ireland, Wales, or on ship-board, from contagion, according to the commonly received opinion of the source of typhus, remained as such so long as no other remote cause of disease existed; but that, on the arrival of the patients in Philadelphia, they became exposed to the operation of malaria, which gave rise to a new type of fever, viz. the remittent.

2. That the typhus, originally a disease of malaria, changed, on landing, from a continued to a

remittent type, from the influence of climate, and of those circumstances which contributed to improve the condition of the sick, and consequently to restore them gradually to health.

The idea of two distinct causes, viz. a specific contagion and marsh effluvium, uniting to produce a compound fever, has been entertained by Pringle and other authors ; and it arose from the circumstance of fevers occasionally exhibiting the characters of typhus and marsh fevers,—beginning as the former and ending as the latter, or the reverse ; and from the belief that neither of the causes alone could give rise to the conjoined symptoms.

If it can be shown that in situations obnoxious to malaria, and where no source of typhus contagion exists or can be reasonably suspected to exist, a fever appears, exhibiting the intermittent, the remittent, and the continued or typhoid character, and that the milder form passes into the more severe, or the severe into the milder, it is almost a necessary inference that these types are effects of malaria, and consequently no great surprise would be felt at the fact of typhus changing to a milder form of fever, from the sudden influence of such favourable circumstances as patients labouring under it on ship-board experience when they are landed in a genial season, placed in clean and airy apartments, their wants and comforts zealously attended to, and their minds cheered by the termination of the voyage, &c. It is well known that continued fevers have a certain duration ; and that when once formed they must, under the same cir-

cumstances of situation, go through a regular rise, progress, and decline ; and we could not, therefore, expect an immediate termination to the ship fever on its arrival in Philadelphia. But though it did not cease, it put on a milder character, or at least it remitted, so that the chain of febrile action was broken ; and Rush admits that no proofs of contagion were manifested.

I have already shown that typhus has appeared in different places in America where malaria abounds, and where the periodical types of fever are the usual consequences ; and I would especially refer to the epidemic at Wilmington, and to the consideration of those slow nervous or chronic states of fever which Rush frequently mentions as arising out of yellow fever, or co-existing with it. These I cannot but consider as very analogous to, if not identical with, the typhus of Great Britain ; and if these indigenous fevers of America sometimes arise out of, or pass into, a periodical type, I see nothing anomalous in a similar fever imported from Ireland or Wales exhibiting a change from a continued to a remittent fever.

Dr. John Clark, as early as 1773, clearly saw that these changes of type did not imply anything more than a change of state in fever. His mind had been enlarged by the observation of nature,—not as she exhibits the phænomena of fever in a single city or a single country, but in remote and different climates ; and it is remarkable to observe the advance in the knowledge of febrile diseases which he and other wandering members of the profession, belonging to the navy and army of this coun-

try, exhibit before those learned professors of the schools, who have so long and so unfortunately been considered authorities on medical subjects.

“After many years’ careful attention,” he says*, “to the symptoms and nature of fevers, as they have occurred in practice in different climates, and after reading many authors, I am thoroughly convinced that though many varieties happen, according to difference of constitution, season, situation, climate,—yet in every part of the world the disease is essentially the same, or, in other words, consists only of one genus; and the only species that can be ascertained are the intermittent, remittent, and continued. The continued does not differ more from the remittent, than the remittent from the intermittent type; and their frequent changes into each other, and perhaps again to their original form, prove them to be the same genus. Thus, the intermittent will in some cases assume the continued form: the remittent for several days will run on with unabated violence; and often, after the most sensible remissions, terminate again in a continued fever. Thus, also, every continued fever has alleviations and exacerbations, and therefore in a strict sense may be considered as a remittent.

“But fevers are not more alike in their essential symptoms, and their tendency to change their forms, than in the causes which produce them. They are all the offspring of heat and moisture, of exhalations from corrupted animal or vegetable sub-

* Clark—*Diseases in long Voyages to Hot Countries*. Third Edition; London; p. 105: 1809. The first edition was published in 1773.

stances, of confined air loaded with human effluvia ; or they sometimes proceed from some internal degeneration of the habit. They all are apt, also, to become contagious."

I should have preferred the terms species and varieties to those of genus and species, in the above extract, though they are not to be considered as taken in a strict sense. If we are to admit the truth of Dr. Clark's observations, that fever from corrupted exhalations, and from confined air loaded with human effluvia, or from contagion, all exhibit changes of type,—it will not be considered improbable that the ship fever at Philadelphia put on the remittent form in consequence of the favourable circumstances the patients were placed in on being landed ; and there will be no absolute necessity for referring the new type to a new cause, and considering it as a new disease.

That this is the more probable explanation, I think will appear from a fact of a directly opposite character, viz. of persons taken from a prison, where they had suffered from intermittent fever, which, on their being put on board of ship, assumed a continued form. I can only quote the fact from my own notes, as the volume is not before me ; but it may be found in "Dr. Burnett's Report of the Fever in the Ship Bann, p. 47 : London, 1824."

"While the Bann was lying off Chagre (Columbia), she received forty men for a passage to Jamaica. They had been confined to hard labour in prison, at Panama, for some months. Most of them had had intermittents, and were weakly and

emaciated. A few days after they came on board intermittents began to appear, and soon assumed a continued form; and before they could be landed at Port Royal, thirteen died, some having black vomit, and all intensely yellow. The smallness of the vessel prevented the sick from being separated from the crew, yet the latter continued in their previous state of health; nor could a single instance of the disease be traced to contagion."

Dr. Burnett mentions also, that he has seen the typhus of cold climates change, in several instances, into an intermittent fever: the intermittent of Walcheren become remittent; and during the late war, the remittent in the prison-ships at Portsmouth assume a typhoid character, with all the symptoms of a continued fever. Idiopathic fever, therefore, he thinks in different places is not so entirely a different disease as nosologists have taught, though from climate, locality, habit, treatment, &c., some difference of symptoms may occur,

"facies non omnibus una

Nec diversa tamen—qualem decet esse sororum."

In 1802 the yellow fever occurred in Philadelphia, towards the middle of July, in August and September, but ceased early in October. Rush says that he saw few cases of it, but a number of less violent grade,—the inflammatory, bilious, mild remitting, chronic, intermitting fevers, and the febricula, which appeared in some instances distinct from each other, but generally blended their symptoms in their different stages. "The yellow fever often came on in the mild form of an intermittent, and

even a febricula, and as often after a single paroxysm ended in a mild remittent or chronic fever. When it appeared in the latter form, it was frequently attended with a slow or low pulse, vomiting, and hiccup, such as attended the yellow fever. This diversity of symptoms, with which the summer and autumnal fever came on, made it impossible to decide upon its type on the day of its attack. Having been deceived in one instance, I made it a practice to watch every case with double vigilance, lest it should contract a malignant form, without my being prepared to meet it. Of the five original and obvious cases of yellow fever to which I was called, I saved none; for I saw but one of them before the last stage of the disease. In many others I have reason to believe I prevented that malignant form of fever by the early and liberal use of depleting medicines."

In 1803, during January and February,—in the former of which the weather was uniformly cold, and in the latter a general thaw took place,—Rush says bilious pleurisies occurred in a tertian type, the pain of the side being most sensible every other day. In May and June intermittents were common. There were a few cases of cholera in June; and towards the close a patient died with many of the symptoms of yellow fever. The weather in July was variable as to heat; a few tertians were met with which readily yielded to bark; and between the 25th and 31st three deaths took place from the yellow fever. In August, mild remittents and *cholera infantum* were common, and there were several cases of yellow fever, which appeared also in Sep-

tember, chiefly in Water Street. "It had different appearances in different parts of the city, was most malignant in Water Street, but in many instances became less so as it travelled westward, so that about Ninth Street it appeared in the form of a common intermittent. In every part of the city it often came on, as in 1802, in all the milder forms of autumnal fever formerly enumerated, and went off with all the usual symptoms of yellow fever. Again, it came on with all the force and malignity of a yellow fever, and terminated in a day or two in a common remittent or intermittent. These modes of attack were so common, that it was impossible to tell what the character or probable issue of a fever would be for two or three days."

Rush found this fever curable by moderate bleeding, purges, emetics, sudorifics, and the application of blisters to the wrists as early as the second and third days, without the necessity of resorting to salivation. "From the symptoms of this fever, the less force of medicine necessary to subdue it, the advantage of blisters in the early stage, and the small proportion which the deaths bore to the number of those who were affected,—being seldom more than five in a hundred, including all the grades and forms of the disease, in the practice of most of the physicians,—it is evident," he remarks, "this fever was of a less malignant nature than it had been in most of the years in which it had been epidemic. There was one circumstance which proved its diminution of violence, and that was a more feeble operation of its remote cause. In 1802, nearly all the persons who were affected with the fever in the neighbour-

hood of Vine and Water Streets, and in Water Street between Walnut and Spruce Streets, died. This year but two died, of a great number who were sick in the former, and not one out of twelve who were sick in the latter place. The filth in both parts of the city was the same in both years. This difference in the violence and mortality of the fever was probably occasioned by a less concentrated state of the miasmata which produced it, or by the cooperation of a less inflammatory constitution of the atmosphere."

In 1804, while Philadelphia and the sea-coast generally were comparatively healthy, the interior of the country was visited by a severe epidemic fever. In the city, bilious pleurisies were common in February, March and April. On the 7th of June, the father of the celebrated Dr. Physick died of "a bilious fever," with a red eye, hiccup, and black vomiting. In July four cases of yellow fever occurred, two of which were fatal in the Pennsylvania Hospital. Remitting and intermitting fevers were likewise common. In August an unusual number of children died of cholera, and the fevers assumed a chronic form. September was uncommonly healthy. In October, intermittents were very common between Eight Street and the Schuylkill; and one case of yellow fever was met with on the western bank of that river.

"While Philadelphia and all the cities of the United States, except Charleston, were thus exempted from the yellow fever as an epidemic, the western parts of all the middle and several of the southern States were visited with the bilious fever

in all its different forms. In Delaware County, New York State; at Mill River, Connecticut; and in several of the middle counties of Pennsylvania, it prevailed in the form of yellow fever; in other parts chiefly as a highly inflammatory remittent. It was so general that not only whole families, but whole neighbourhoods, were confined by it. Many suffered from the want of medical advice and nursing, and some from the want of even a single attendant. In consequence of the general prevalence of this fever in some parts of Pennsylvania, the usual labours of the season were suspended. Apples fell and perished on the ground, no winter grain was sowed, and cows passed whole days and nights without being milked. This disease was observed very generally to prevail most in high situations, which had for years been distinguished for their healthiness; while the low grounds and the banks of creeks and rivers were but little affected by it. The unusual quantity of rain which had fallen during the summer months, had produced moisture in the former places, which favoured putrefaction and exhalation, while both were prevented in the latter places by the grounds being completely covered with water."

The only reports I have met with of this fever in the interior of Pennsylvania, are those by Dr. Agnew of Adams County, and Dr. M'Dowell of York (Med. Repos. vol. viii. pp. 345, 367,); and from the description of these gentlemen and the rate of mortality, neither of the epidemics can be said to have risen to the grade of yellow fever, considered as the highest degree of the bilious remit-

tent. Both were connected with an unusual wet spring and summer. Rush describes the weather at Philadelphia as "cold and rainy" in April, "wet and cool" in May, and "rainy" in June; and says the crops of grass were luxuriant, but that it was remarked the milk of cows, fed on it, yielded less butter than usual; and that horses sweated profusely with but little exercise. It would seem, from these observations, that the spring was remarkable for being cold and wet, yet no sickness followed of any note. He mentions only six cases of yellow fever,—one in June, four in July, and one in October; that intermittents and remittents were common in July, assumed a chronic form in August, but that in September the city was "uncommonly healthy."

It will be seen by a reference to the Reports of fever at Philadelphia, in the years 1802 and 1803, that Rush repeatedly observed the intermittent pass into yellow fever, and this end in the intermittent,—and that in 1803 he gives a remarkable instance of a difference in mortality in two localities, where nearly all affected with fever died in 1802, and where, in the subsequent year, all but two recovered. This inconsistency and variableness, both as to the grade and effects of marsh fever, is one of its most remarkable characteristics,—and its desultory occurrence, prevailing in particular spots, to the exemption more or less of places apparently as obnoxious to it, is another. It has been remarked that yellow fever is especially the disease of cities; and the greater frequency and mortality of it in Vera Cruz, Charleston, Norfolk, and Philadelphia,—

places which have passed under our notice hitherto,—certainly confirm the truth of the remark, considered as an endemic disease; some additional causes must therefore exist in cities to what exist in the country, to give aggravation to it; and I have already alluded to three or four causes, as probably connected with it; viz. a higher degree of heat, closer air, a much greater predisposition in the subjects attacked, and a more concentrated miasm. Still, all these cooperating may be supposed to exist annually in a climate like that of Vera Cruz, and yet the disease, according to Humboldt, has been absent for several successive years; and they may reasonably be imagined to be present in every degree in a city like Philadelphia, situated between two rivers,—not like Vera Cruz, on a sandy plain; and yet we have found only two years, 1793 and 1797, remarkable for their sickliness and mortality. We observe the same variableness of effect in fever of a lower grade in the interior of America, generally connected with some unusual character of season, as heavy rains overflowing rivers, creeks, and inundating low lands, followed by dry, hot weather. But as these are ordinary phænomena in many of the water-courses and mountainous valleys of North America, the summers of which are often hot, and as general and aggravated epidemic fevers are only occasional in such situations, we are obliged, from our ignorance of any sufficient known cause, to resort to the supposition of some secret atmospherical distemperature, contributing its share in the production of these diffused and aggravated effects.

I shall briefly notice the papers descriptive of the

two epidemics of 1804, in the interior of Pennsylvania, that their character and the causes to which they were ascribed may be compared with those of other situations. If the continuance of a high degree of medium heat be essential to the production of yellow fever, it will not be a matter of surprise that it did not occur decidedly as such in either of them.

Dr. Agnew, who resided at Gettysburgh, in Adams County, says, that the country since its settlement was never visited by so prevalent a disease. The spring was unusually cold, and the quantity of rain that fell in it and the month of June was greater than was ever known to fall in the same time. The streams were overflowed to a much greater distance than usual, and the hay destroyed. The weather was warm, with frequent showers, from the 3rd to the 19th of July, but from this to the 26th it was so cold as to make fires comfortable in the evening;—"the nights foggy, dews heavy, and the days smoky, resembling what is called Indian summer." This was succeeded by sultry, dry, clear weather, till the 5th of August;—"the ground hard, roads dusty, and vegetation suffering much." It rained from the 5th to the 9th;—"waters high, and grounds very wet;" warm and clear to the 13th, with frequent showers; from the 14th to the 26th, sultry and cloudy, with frequent drizzling rains, and three or four cool days to the 30th; very sultry to September 3rd, when a tremendous thunder storm took place, with high wind and heavy rain, followed by moderately cool weather, and but few showers to October 9th. On the morning of September 30th

there was a considerable fall of hail and snow, with rain; and the nights about this time were cold and frosty, especially in and after the second week of October.

The country was healthy until July; on the 3rd a case of intermittent occurred, and on the 13th one of cholera. On the 16th, a little girl, three years old, complained of lassitude, chilliness, pains in the head, back, and extremities, which symptoms attacked her in a more aggravated manner on the 18th. The family in which she lived resided at a grist mill, the dam of which was near the house. The water covers a large flat, overgrown with weeds, but at this season had subsided, leaving a large portion of ground exposed to the sun. Every individual belonging to the house, which contained two families, was attacked with the intermittent; and even the friends of the proprietor, who came to visit him, were all the subjects of the same complaint. The number of intermittents increased daily, and generally the first applications were from persons in the vicinity of water or low grounds. "On the 22nd I was called to a woman who was attacked on the 20th;—her family consisted of six persons, five of whom were seized in the course of a few days, four with the bilious remittent and one with intermittent fever. There was a large meadow near the house covered with water, which daily subsiding, from the exhalations of a warm sun, may have been the cause of so universal and early an attack in the family." Towards the end of August the fever had become epidemic, "carrying distress into every family, almost without exception. About

the 1st of September the intermittent began to yield to the domineering influence of the bilious remittent. The former became more continued, approximating, especially on the first days, to the more malignant features of the latter. In many cases there were but very short intermissions, the cold fits very irregular, and scarcely perceptible, while the hot stage would continue with very little abatement for several days. By pursuing the depleting system at proper times, they would be brought to the *shaking form*."

"On the 6th of September, I made the following note:—Fevers have been more frequent since the warm weather, at the beginning of the month. The *remittent* form, with the *continued* in some instances, is more aggravated and frequent. I have had, since the 22nd of July, nine cases of the bilious remittent, and forty-eight of the intermittent."

September was the period in which the epidemic had its greatest dominion, and he administered in all to about one hundred and fifty patients, a third of which were affected with remittent fever, showing the increasing severity of the disease during the autumn.

The premonitory symptoms were, a general lassitude and aversion to exercise; dull pain in the head, back, or extremities. To these succeeded generally a rigor; alternate chills and flushes of heat; violent pain in the head, neck, and back; nausea; thirst; dry hot skin; oppression of the præcordia; hurried respiration; suffused face; vessels of the adnata turgid; light distressing to the eye; pulse hard, full, and frequent; and bowels often consti-

pated. Sometimes the head was nearly free of pain, and the back particularly suffered, and *vice versá*, or the stomach and bowels were the seat of the greatest ravages. The stomach in the first stages was generally much distressed with nausea. In many cases the brain was primarily affected, producing delirium, especially during the paroxysm. In one case the pain appeared to be concentrated in the left great-toe and foot, preventing their motion without excruciating pain; and the head was entirely free of pain. In females there were hysterical symptoms connected with the disease. During October hæmorrhages were frequent, particularly from the nose. "I never felt uneasiness at this, as I considered it rather a salutary evacuation to relieve the vessels of the brain of turgescence and congestion. It generally occurred in an advanced stage of the complaint, and in persons of a lax fibre. From the 9th of October the weather became cold; and few, if any, cases of fever occurred after. But although the epidemic lost its dominion, it caused many to be its victims during the winter months."

There was nothing peculiar in the treatment of this epidemic. The intermittent form was cured by bleeding, an emetic, and bark: the bilious remittent by bleeding, repeated in some cases as often as five or six times; an emetic, combined with carbonate of potash, calomel, and jalap; blisters; and in obstinate cases by salivation. Dr. Agnew says he "lost only three patients simply of the fever;" one a man above fifty years of age, whom he "considered much better after the third day; but the

fever directed its action upon the first passages, producing a hæmorrhage from the anus: the brain and nerves finally became affected, producing delirium, *subsultus tendinum*, and coma."

He adds that the disease proved much more mortal in the adjoining counties, and that it extended about 150 miles south of Adams County to lat. $36^{\circ} 30'$.

We find in this epidemic the same law of gradual increase and intensity from summer to autumn as in those of the sea-ports,—that, like them, it yields at once to the influence of cold and frost; and, notwithstanding its milder character, and consequently the absence of the more formidable symptoms of yellow fever, it is impossible not to recognise the general affinity it bears to that disease, and to suspect with reason, that if the summer and autumn had been hot and dry, a much nearer approach would have been made to it both in symptoms and fatality.

Dr. M'Dowell of York gives a similar account of the heavy rains and floods in April, May, and June, and of the loss of the early crop of clover. The rains were so heavy as to make the Cadorus Creek, a tributary of the Susquehanna River, overflow its banks several times; and every rivulet was often swelled into a formidable stream.

Near the creek are eighty acres of *natural meadow ground*, a large portion of which is overflowed at high water; and on the northern verge of this flat are three farm-houses, in two of which, about the middle of July, he first met with the fever that in a short time became epidemic in town and

country. "A few yards from the door of one of these houses was a large mass of vegetable matter, conveyed by the high water, which, when acted upon by the hot weather of July and August, became a noisome collection of putrescence, the effluvia of which after sunset were extremely offensive.

"The fever was most prevalent in those parts of the town adjacent to the creek; but the most elevated situations, which in former years secured their inhabitants from autumnal fevers, did not protect them from the prevailing fever this year. The luxuriant growth of vegetables during the spring months seemed to render them incapable of bearing the heat of July and August. The cabbage in most of the gardens rotted very much in August. An intelligent farmer, whose house stands on an eminence, informed me that he never walked along the fences of his farm in August but he felt the unpleasant smell of putrefying vegetables. There was not a stagnant pool of water on his farm, yet all his family had the prevailing fever."

The first symptom in many cases was vomiting, or a severe pain in the fore part of the head; in some, confined to the eyes. One man complained most of pain in the bones of his leg. The loss of eighteen or twenty ounces of blood reduced the fever to the intermittent form in some instances; but in others it was necessary to bleed a second and third time before it yielded.

He was called to one case, in July, of a young woman in the eleventh day of her disease, and he remarks; "I found her comatose, and her skin

very yellow. The *tunica adnata* did not present a shade of its native colour: her pulse was small, quick, and feeble; her breathing laborious. She died the next evening. As this young woman's disorder bore so much resemblance to yellow fever, I was anxious to be informed of its closing scene. Her mother informed me that on the day of her death she had frequent dejections of a dark, foetid, flaky substance, but no vomiting. Her disorder, however, would probably have been pronounced yellow fever if she had died within reach of the *contagion*-bearing ships." Two or three white frosts put a stop to the occurrence of new cases.

I have given repeated instances of the confined locality of all the forms of marsh fever,—a circumstance connected with them which is unaccountable on the idea of their propagation by contagion, and only explicable on the supposition of the limited range of the essential remote cause on which they depend. There are many very remarkable proofs of this confined limit to the diffusion of malaria, and of its effects, scattered through the records of medicine in all climates, some of which I shall recall to the recollection of the reader before I have done with the subject. Rush in 1803 speaks of the fever of that year in Philadelphia having different appearances in different parts of the city; being most malignant in Water Street along the river; becoming less so as it travelled westward, till about Ninth Street it assumed the form of a common intermittent.

Dr. Caldwell has given a very interesting history of the progress of this fever in Philadelphia, (Med.

Repos.vii.143,) which I shall abridge, in illustration of the fact.

“March and April were cooler than usual, with north and east winds; and the same weather continued through May and June, but was succeeded in July by oppressive calms, and the humid and sultry south wind. The thermometer was seldom below 80° for several hours in the day, and sometimes rose to 90° ; and under such heats the citizens began to complain of languor and debility. On the 19th two cases of fever occurred in females under sixteen years of age, at the corner of Chestnut and Water Streets, one of which was fatal on the fifth day; and both exhibited unequivocal symptoms of malignant fever. “It is worthy of remark, that adjoining to the houses where those persons resided there was a yard and private alley containing stagnant water and putrid substances, which for a week or ten days had emitted a smell highly offensive to the neighbourhood. The families where the sickness occurred did not hesitate to attribute their misfortune to this stench. From the 28th of July till the 5th or 6th of August, four other cases of malignant fever appeared in the same neighbourhood, three of which terminated fatally. The persons attacked never had the slightest intercourse with each other, nor with any common source, beyond the atmosphere of the place where they resided; a knowledge of which induced most of the citizens to consider their disease as nothing else than a high grade of autumnal fever, or what was emphatically afterwards denominated the *Water Street fever*,—a name bestowed on the disease by a physician who

is ostensibly an orthodox importer. But the neighbourhood of Chestnut and Water Streets was not the only place where malignant fever existed at this time. A very decided case made its appearance on the 23rd of July, and terminated fatally on the 27th, in a woman who resided in Water Street near South Street, upwards of a quarter of a mile from the former situation, and who had not been out of her own neighbourhood for several weeks previous to her illness. There existed another case in Water Street near Race Street, about a quarter of a mile in an opposite direction from Chestnut Street, and more than twice that distance from South Street, in a man who sickened on the 28th and died on the 31st, with symptoms of high malignity. Between the 1st and 10th of August six other persons in the same neighbourhood, but who had no intercourse with each other, were attacked by the same disease, one of whom died on the fourth day. Thus there were three points in the city distant from each other where malignant fever made its appearance within nine days of the same time. As yet all parts of Philadelphia, except Water Street, which must be regarded as the low ground of the river Delaware, enjoyed an unusual exemption from disease.

“On the 12th of August we had a heavy fall of rain, which was succeeded by a remarkable change in the temperature, the mercury sinking upwards of ten degrees. From this till the 22nd there was a prevalence of northerly winds, accompanied by cool and serene weather. During this interval of ten days the city remained free from any malignant

disease. On the 23rd the wind shifted to the southward, and the atmosphere became humid, warm, and oppressive. On the morning of the 25th, a fire broke out in Water Street near Market Street, which as usual drew a vast concourse of people together. Of these some were engaged in violent exercise, while others were standing idle in the streets, on the tops of houses, or at windows, many of them only partially dressed. Such a scene was well calculated to act as the exciting cause of disease. In the course of two or three days eight or nine persons immediately adjacent to where the fire raged were attacked by malignant fever. Not one sickened who had not been more or less exposed at the fire. The disease appeared suddenly and nearly at once in five or six families, the individuals of which had probably never exchanged a visit. From this time the number of the sick continued daily to increase. During the first week in September the disease renewed its attack in all those neighbourhoods where it had made its appearance in preceding parts of the season. Indeed there were now scattering cases of it in most parts of Water Street between Race and Almond Streets, a distance of more than a mile. But the district extending from Market to Walnut Streets, and from the east side of Front Street to the river Delaware, was the principal theatre of its ravages. With such violence did it rage within these limits, that on the 12th the Board of Health thought it right to advise the inhabitants to remove, and to interdict all unnecessary intercourse with the sickly neighbourhood.

“Throughout September, and till near the close of

the first week in October, the disease continued by feeble efforts to advance slowly from the low ground of the river towards the more elevated parts of the city. Except, however, in alleys and other filthy places, inhabited by the poor, it did not make its way across Second Street; nor did it, save in a few places, advance even so far. It may be confidently asserted, that that portion of Philadelphia which lies to the westward of Second Street never enjoyed a higher exemption from disease than during the late season. As the fever receded from the low ground and malignant atmosphere of Water Street, it became more mild and manageable, till its evanescent shades in Second Street were in many instances much lighter than the common remittent of the country. My own family furnished ample testimony of the truth of this remark. Five persons in my house were attacked in the course of two days by the prevailing complaint, but so slightly that the aggregate amount of all their indispositions was not equal to one severe case of common autumnal fever. After the 10th of October the disease was no longer spoken of as alarming; and before the 20th there was scarcely a case of it existing in the city."

CHAPTER IX.

FEVERS OF THE CITY AND STATE OF NEW YORK.

I SHALL now turn to the fevers of the City and State of New York, among which we shall find examples

of yellow and typhus fevers ; the last appearing, as at Wilmington in Delaware, in those years when the state of the atmosphere was not such as to give rise to the former modification of fever. I shall confine myself chiefly to the years which correspond to the epidemics of Rush. It will be found that yellow fever has never prevailed in New York to the extent which we have seen it in Philadelphia, and that the mortality from it has consequently been much less in the former city.

I have already remarked, that if malaria be the primary origin of typhus as well as of the common remittent and yellow fever, and that if a continuance of high heat be essential to the latter, we might expect, in a country of such vast extent as North America, to find, as we examined the character of fever progressively from the southern to the northern portions of the continent, that yellow fever, which is annually endemic at Vera Cruz and New Orleans, would be represented by some other form in those places where the mean temperature from latitude would be too low to give that irritability to the animal organs, or that concentration and intensity to malaria, which are considered essential to the full development of it. It will be seen that this change of type actually occurs in different years; and that New York, which is situated in lat. $40^{\circ} 42' N.$, is the last place in this progressive inquiry from South to North in which we meet with any frequent examples of severe and extensive epidemics of yellow fever.

The earliest account, with which I am acquainted, of the epidemics of this great commercial capital of

the United States, is contained in a paper entitled "Remarks on the Yellow Fever of New York in 1741 and 1742, by the Hon. C. Colden," written in 1743, and published in the fourteenth volume of the Med. Repos.

The object of these remarks was to call the public attention to the filthy state of the city, and the noxious exhalations of the low grounds on which a part of it was built, which were considered by the author as the sources of the fevers that had prevailed there. To enforce his own views, he gives an account of the fevers described by Lancisi. "No man," he says, "who has any share of humanity, or regard for the welfare of the society wherein he lives, can with indifference observe or hear of the mortality which has prevailed among the inhabitants of the city of New York these two last summers, but will be desirous to give what assistance to his neighbour he can, by any information which has come to his knowledge, or by any other means in his power. When any disease yearly returns in a particular place, while the country around remains free from it, people naturally conclude that it is owing to something peculiar to that place; and in order to discover whether anything peculiar to the soil or air may reasonably be supposed to be the cause of these epidemical fevers in New York, I shall make an abstract from a book which I have by me, on the subject of malignant and pestilential fevers occasioned by a faulty air or soil in particular places, written by Lancisi, Pope Clement the XIth's physician."

Mr. C. then gives a general character of these

fevers, collected from several parts of Lancisi's book ; and as he does not describe those of New York, it may be supposed that the Italian fevers corresponded with the epidemics of 1741 and 1742 ; for if any great difference existed between them, he could not have argued for a similarity of cause.

" These fevers," he says, " recur yearly in the summer, from the time the weather begins to grow hot, till the end of September. They commonly cease during the winter cold. They are milder at their first appearance, but grow more and more malignant as the season advances. They are at first commonly of the intermittent kind ; but more frequently, especially as the hot weather advances, the paroxysms only remit ; and at the same time many have continued fevers, with frequent exacerbations, rather than remissions. The sick contract a dead dusky yellow complexion ; and before they die, purple eruptions frequently happen on the skin. The intestines are almost always affected, and have been found generally sphacelated in the bodies which have been opened. The brain often is affected, and all the worst symptoms of fever generally attend these before death ; though sometimes the fever appears so mild, that the sick is not thought in danger till apoplectic or comatose symptoms appear, which declare him past recovery."

The author quotes instances, from his own observation, of malignant fevers arising from the air of marshy grounds, especially on the banks of the Paltz River, or Wallkill, in Ulster County, the inhabitants of which were yearly afflicted with inter-

mittent fevers, which had different degrees of malignity in different years, and which had been more malignant the two last years than usual. He applies cases of this kind to New York, where he says it is well known that the part of the town chiefly afflicted with the epidemical distemper the two last summers is built upon a swamp, or moist slimy ground; and that the moisture of these grounds is to be observed in every cellar of the houses built upon them; that no person, walking near the docks, but is sensible of the filthy smell there, especially in the slips; that there is no sufficient care of the drains by which the cellars are freed from stagnating water, and that they are seldom or never cleaned after the settling of the corrupted slime; that these parts of the town have always been subject to epidemic disorders every summer, towards autumn; and he enforces the necessity of draining and cleanliness to remove their cause.

The early date of this publication renders it interesting, as it preceded the first American treatise on yellow fever, by Dr. Lining of Charleston, South Carolina, by twelve years; and we find, fifty-three years after its appearance, the Health Officer of the city distinctly referring the yellow fever to the very sources so clearly pointed out by Mr. Colden*.

I am not aware of any Reports of fever in New York, from the date of Mr. Colden's paper till 1791, in the autumn of which year "the yellow

* See Bayley's Letters, 1796; Med. Repos. vol. i. 119. and vol. ii. 285.

fever was considerably prevalent in a part of Water Street, by Peck Slip, noted at that time for having the docks near it loaded with every kind of filth that could be scraped up out of the adjoining slips, which had been long collecting every species of corruptible materials that the citizens wished to get rid of*."

This was two years before the memorable epidemic of Philadelphia; and it is remarkable that the latter city did not suffer from the disease in 1791, nor New York in 1793. Dr. Seaman says, "In 1793 the alarm of yellow fever was not heard of among us, except from a few cases imported from Philadelphia, and this was lost in the fate of the unfortunate individuals who had brought it from its source, without the least injury to the health of our citizens, either in the capacity of friends, nurses, physicians, or neighbours."

I have already noticed the same exemption from a propagation of the disease at Wilmington, where Dr. Vaughan says, in speaking of the epidemic of 1798, "If the yellow fever be of foreign origin, and contagious, why did it not spread here in the summer of 1793 and 1797, when the Philadelphians were admitted, nursed, and buried without restraint? Not a single instance of communication happened."

It would be fatiguing to go over the details of the different epidemics in New York, from the year 1791, as I have dwelt so long on those of Philadelphia and other places. My object has been to trace yellow fever and its associated modifications

* Seaman—Inquiry into the Cause of Yellow Fever in New York; Med. Repos. i. 303.

to the operation of malaria ; and, from the general character of the fevers of North America, to endeavour to reflect some light on the obscure and disputed question of the origin and nature of the typhus of this country. The evidence I have already adduced of the existence of malaria in those places in the United States where fevers have prevailed, is as full and conclusive, I think, as can be desired ; and the inferences I have drawn, of its being the essential remote cause of all the modifications of these fevers, are justified by the seasons and the circumstances under which they have appeared. I shall avail myself of such facts, in support of these views, as I think may contribute to establish their probability or truth, from the histories of the different epidemics in New York, without noticing all the particular circumstances connected with each of them.

The first severe epidemics appear to have been in 1795 and 1798. Of the first I know of no report. In 1798,—a year very fatal, as we have seen, at Philadelphia, and Wilmington in Delaware,—there died of yellow fever in New York 2,086 persons, from August to November. The disease existed there slightly in 1794, 1796, and 1797, and of course gave rise to disputes as to its foreign or indigenous character. A committee of the Medical Society reported, in 1798, that it might be generated in New York as readily as in the West Indies.

Mr. Bayley, in his "Letters from the Health Office to the Common Council of the City," advocates also its indigenous origin. In 1798, he says, the disease appeared in Front Street, between the

1st and 7th of August, but was checked in that quarter by the offensive lots being covered with clean and wholesome earth. He gives a list of cases occurring in other parts of the city, and shows that "the yellow fever made its appearance in different places on the same day; and in the course of six or eight days in different streets remote from one another."

On the 8th of August the Thermometer at 2 P.M. was 91°

9th.....	96
10th.....	90
11th.....	89
12th.....	86
13th.....	83
14th, very heavy rain	78
15th.....	82
16th.....	85
17th.....	90
18th.....	90

This high degree of heat, with the nature of the ground where the sickness prevailed, and the accumulation of impurities, the flooding of cellars and low grounds, &c., will sufficiently explain the extension of yellow fever. By the 22nd "upwards of twenty persons in Cliff Street were seized with slight indispositions, which they attributed to sleeping with open windows during the preceding hot and moist weather; but which appeared rather as the forerunner of yellow fever; for not only the persons thus indisposed, but a number of others in the same street, had that disease in a few days. From this period it became more general; but its fatality was principally felt in Cliff Street and its neighbourhood; at Catherine Slip; in Water Street;

and on the unfinished grounds in the southern part of the city.

“Now, having seen that the yellow fever has made its appearance in New York every year for several years past, but has prevailed in very different degrees, it becomes a matter of great importance to determine why the disease was so generally prevalent on the low new-made grounds in this city in 1795, whilst it was scarcely felt in the more elevated situations; why in 1796 and 1797 its appearance was limited to particular spots; and why in 1798 it not only prevailed on all the new-made grounds, but also in parts of the city which had before been exempted from the disease.

“It is well ascertained that in 1795 there was an unusual degree of heat and moisture in the atmosphere during the warmer months, that the thermometer was higher than in 1796 and 1797, but that in 1798 the heat greatly exceeded that of 1795. Now, as heat and moisture are powerful agents in *producing* pestilential diseases, so must the same causes necessarily promote the *extension* of them. In 1798 there were *local* causes of fever which did not exist in the other seasons. I refer to quantities of spoiled beef, fish, &c. stored in different parts of the city. About the 20th of August a report was made to the Health Office that great quantities of spoiled beef were stored in Pearl Street, between Burling and Beckman Slips. The stench which issued from some of the cellars was very offensive, and became a subject of general observation. Letters from the Health Office were addressed to the owners; the barrels were opened, and the putrid

pickle was thrown into the gutters, which conveyed it to Burling Slip sewer. The relative situation of this sewer and Cliff Street is such that the south and south-east winds force a current of air through the sewer, carrying with it the exhalations arising from the noxious matters collected together in that place, having a direction to pass more immediately up Golden Hill and Cliff Street; and every person in that neighbourhood agrees as to the offensive smell of the air previous to the appearance of the fever. On the 20th of August the wind, which had been blowing from the north and west some days, shifted to the south-east, and continued to blow from that quarter for some time. In forty-eight hours after this, there was scarcely a house in Pearl Street, near where the spoiled provisions were stored, in the lower end of John Street and in Cliff Street, which did not contain sick. The sudden appearance of the fever in this part of the city, and the great number which were affected in so short a time, proves the local nature of the cause; and to the one I have mentioned I have no hesitation in ascribing all the effects which were experienced."

In his letter of 1796 to Governor Jay, in answer to those who urge that the city has remained for many years exempt from any particularly fatal diseases; that there is no greater reason now to suppose it more liable to sickness than formerly; and that if malignant diseases should prevail, some foreign source must be looked to as their origin, Dr. Bayley says: "The state of things is every day changing: the city is extending; the houses be-

coming more compact; the inhabitants increasing in number; and more especially the mode of making *new ground*, which renders a considerable part of the city a *low level*, are changes which place us in a situation different from any previous period."

In 1799 and 1800 the yellow fever appeared slightly in New York. In the latter year "in those parts of the city which are chiefly low, damp, and filthy, the usual diseases of the summer and autumn prevailed to a great degree. Dispersed among these, and confined within the same local boundaries, there appeared here and there cases of a more malignant grade, terminating fatally after an illness of a few days, with the symptoms of yellow skin, black vomitings and stools, hæmorrhages, convulsions, &c.* In many of the cases of mild remittent fever which terminated in three and five days, and in the most favourable manner, the tendency to malignity was indicated by the suddenness and violence of the attack; by hæmorrhages more frequent than usual; by copious black stools; by a sudden subsidence of the force and activity of the arterial system after violent excitement of a few hours, and a reduction of the pulse in many instances to forty beats in a minute; and by uncommon debility, greatly disproportioned in degree and duration to the preceding appearances of the disease.

"From a journal regularly kept, it appears that upwards of fifty persons died of the yellow fever in the course of the late season. Besides these, we

* See Dr. Seaman's Report of this fever, *Med. Repos.* iv. 248.

find many more fatal cases reported under the title of bilious and malignant fevers, which no discerning person can hesitate to add to the former catalogue. Under this mode of computation then it will appear, that from seventy-five to eighty persons, whose cases were carefully observed and recorded, exclusive of all such as escaped notice, must have perished of the malignant disease called yellow fever.

“These malignant cases, though nearly all occurring in the low and filthy parts of the town, were remarkably detached from one another. Of the whole number only two examples are to be found of more than a single case existing in the same family; and admitting that the cases which everybody agrees to denominate yellow fever, did not much exceed fifty, it will appear on inspection of the Reports, that this number of cases was distributed through at least twenty-five streets. It has been contended that the origin of these malignant cases may be found in the awakening of the residual fomites of last year's epidemic. If this had been the case, we should expect to find the disease reappearing in the same houses and families, where it raged last year. But only a single instance of such reappearance in the same house is found, and this attended with circumstances which prohibit every suspicion of dormant contagion. No attempt has been made to point out any channel by which the disease might have been imported from abroad. No propagation of the disease, by contagion, is pretended to have occurred beyond the limits of that portion of the atmosphere of the town, allowed

by everybody to have been contaminated by the exhalations of putrefaction; and within such limits it is well known that an *adequate* cause is constantly in operation, independently of contagion.

“As it is impossible to trace a line of demarcation between them, the whole assemblage of epidemic diseases of the summer and autumn of the present year, whether mild or malignant, must be referred to the same cause. If it be contended that the cause is of foreign growth, the consequence will go *further* than the importers of contagion are willing themselves to believe; for it must then follow, that we import from abroad our mild as well as pestilential, our common as well as our extraordinary diseases. The irregular ascent of our former epidemics in this city, up to the malignancy of that of 1798, and the gradual declension since, altogether militate against the doctrine of imported contagion, and can only be accounted for from such varieties of seasons as are partly cognisable by our senses, and partly occult and unknown*.”

In the southern climates of America, from the great heat of the spring and early part of summer, it is not unusual, especially in sickly seasons, to meet with cases of yellow fever in those early periods of the year; and perhaps it would be found that traces of its epidemic prevalence have generally occurred earlier even in Philadelphia than in New York, from the one being situated inland, and the other being exposed to the refreshing and cool breezes of the ocean. Rush mentions four cases of it having occurred in 1801, in Philadelphia, as

* Med. Repos. vol. iv. p. 207.

early as the middle of July, but in New York it did not appear till about the middle of September. "The moderate state of the weather in July and August was, in all probability, the cause of the later appearance of the disease than common. From the beginning to the 10th of September, the heat became violent and steady, and about the middle of the month several instances of the disease were observed in the city, and they continued to appear in greater or smaller number till November, when it was suddenly terminated by a sharp frost. About one hundred and forty persons died of it in the city, and about thirty persons, chiefly seafaring men, vagrants and paupers, were sent to the Marine Hospital, on Staten Island, of whom a considerable portion died. The disease chiefly attacked foreigners or persons from the country; and in the few cases of its attacking natives and residents, it might easily be traced to the effects of some violent exciting cause, such as cold, fatigue, intemperance, &c. It also chiefly invaded persons living in or frequenting certain spots of the town, which were remarkable for filth, for extensive portions of newly made ground, or for the indigence, crowdedness, and uncleanliness of the inhabitants.

"Though the disease was rather sporadic than epidemic, as much virulence and malignity appeared in the symptoms and rapid course of it, as we ever observed in the epidemic of 1798*."

The editors of the *Med. Repos.* insinuate that, in the absence of all other evidence of importation, the fever was said to have been brought from Scot-

* *Med. Repos.* vol. v. pp. 222 and 227.

land. The first cases which occurred, were those of four men, who arrived on the 1st of September, in the brig Rambler, from Leith, after a passage of forty-nine days, during which the health of the crew was perfect. The case of one of them is reported at length by the apothecary of the New York Hospital. He sickened on the 9th, and died on the 12th, of yellow fever. These men arriving just as the intense heats of autumn had set in, and lodging in the low part of the city, where the fever afterwards prevailed, would naturally present the predisposition of an unseasoned constitution, to be acted upon by the joint effects of heat and malaria; and this predisposition apparently rendered them the first victims of the disease, for the gentleman above referred to, remarks, "At the time of the arrival of the Rambler her crew were healthy, and the inhabitants of the city, too, were remarkably healthy; yet here are four decided cases of fever, without any connexion, directly or indirectly, with sick persons here, or with any person or thing from the West Indies." The causes which gave rise to the fever in these strangers would operate on others, and from the time of their seizure, which corresponds with the sudden and high heats of autumn, the disease took its rise, and prevailed partially till the occurrence of frost.

In 1803, from the intense heat of July, yellow fever appeared in New York about the middle of that month, and prevailed more or less till the end of October, the deaths amounting to between six and seven hundred. "With the exception of five or six days, July was more intensely and uniformly

hot than we ever remember before to have experienced for the same space of time. The thermometer was very frequently upwards of 90° , and seldom fell below 80° , for many hours in the day. The nights produced so little abatement of this high temperature, as rarely to afford much relief. About the 18th of July, cases of malignant fever began to excite the apprehensions of the public. Before this time, instances of suspicious fevers had been observed in various parts of the town, which exhibited the strongest marks of malignity, but which, from their dispersed and sporadic appearances, and the general conformity of their symptoms to the more usual diseases of the season, passed under the popular denomination of bilious fevers. In regard to mildness and malignity, every grade was exhibited in the progress of this epidemic.

“All the facts tending to evince the non-contagiousness of yellow fever, were displayed throughout the late season. A large proportion of the epidemic consisted of instances in which an individual only was attacked in the midst of a family, the members of which assiduously attended the patient without contracting the disease. Many aged and very young persons, whose conditions imposed confinement in their houses, without the occurrence of any preceding case in their families, were attacked with the disease in its most virulent form. One person was attacked in the debtors' prison, who for three months before had not been beyond its walls, and no other person in the prison was previously or subsequently affected with the

disease. Many who had fled from the city were attacked with it and died, not only in all the surrounding country, but at Newark, Elizabethtown, Brunswick, &c., without communicating infection in a single instance. But one of the most decisive proofs of the non-contagiousness of yellow fever is derived from the absence of all contagious influence from our yellow fever hospitals. Those of New York and Philadelphia are here chiefly alluded to, as being best known to us. These asylums are generally erected within two or three miles of the cities to which they belong, but entirely beyond the range of atmosphere contaminated by the local miasmata of the city. Neither in New York nor in Philadelphia is there a *single* example of a person employed in these hospitals being attacked, unless he had previously passed some time within the limits of the sickly city*."

Dr. Ramsay affords the same evidence. "There was no disease," he says, "in Broadway, a wide, well-built street. It raged in narrow streets near the wharfs, where numbers of ill-fed and irregular people were crowded together. The robust chiefly were sufferers. Old people, children, even feeble people, I think, escaped fever. The French people and the negro lived in diseased streets with impunity. No physician or nurse, not even strangers, under the influence of fear, who visited me in the dissecting-room at the hospital, three miles from town, were attacked with fever. The notion of dilution can scarcely be admitted, as I not only sat by the bed, three days and nights, of a patient in

* Med. Repos. vol. vii. p. 178.

one of the worst cases, and was continually in the nearest contact with all the patients which nursing or attendance could occasion, yet I had no attack of fever. No case, however virulent, taken from the infected streets to the country, ever conveyed the malady to attendants*.”

I have noticed two years, 1801 and 1803, in which the first cases of yellow fever in New York occurred, in the one instance about the middle of September, and in the other about the middle of July. In 1805 the appearances of an epidemic were declared in June. “May and the principal part of June were in no respect remarkable, otherwise than the weather might be considered as rather more cool and moist than usual. Towards the end of June the heat began to increase to an oppressive degree, and from that time till about the 20th of July was severely felt. Early in June a case of malignant fever occurred in a common labourer, who was attacked with remittent symptoms and delirium of several days continuance, to which was added a deep yellowness of the skin. He was removed from the foul air in which he had sickened, to the Marine Hospital, where he slowly recovered. His case was isolated and solitary. The effect of the high heat soon became perceptible in its morbid influence. A man lately arrived from England, employed as an ostler, was attacked with fever on the 9th of July, which, after proceeding insidiously for some days, disclosed at length a very malignant

* Edinburgh Medical and Surgical Journal, vol. viii. p. 422. Dr. Ramsay speaks of the *walking cases*, the seat of black vomit, and the diseased state of the lymphatic system.

character. On the fifth day of his disease he became extremely yellow; on the ninth day he was attacked with black vomit, and continued occasionally to eject from his stomach a dark-coloured fluid till his death on the thirteenth day. He was several times attacked with hæmorrhage, and just before death was seized with convulsions. Two other persons belonging to the same stable, also lately from Great Britain, were taken ill, obviously affected with a lower grade of the same disease.

“The next case which excited any great public attention was that of a Mr. Dougherty, a young man from Ireland, residing in Water Street, who was seized with fever on the 24th of July. He died on the 30th with all the unequivocal symptoms of yellow fever.

“August was as hot as July. It seldom happens that heat and drought proceed to such extent as they did in these two months. While the weather remained so warm and dry the number of cases of malignant fever did not rapidly increase. It was indeed surprising to observe the gradual manner in which they became more numerous and malignant. Several occurred in July and August (exactly similar to the first case in June), which after the termination of the febrile symptoms assumed a chronic appearance and produced a tedious confinement. The season of great heat and drought, with the occurrence of cases of malignant fever every few days, continued till the 28th of August, when there was a moderate fall of rain, which revived the appearance of vegetation. But the effects of this moisture on the health of the city were immediately per-

nicious. The rain had scarcely fallen forty-eight hours when the number of cases of fever was alarmingly increased in most parts of the city; and though a large proportion of these proved to be mild, many of them assumed a malignant character, and terminated fatally. In the first week in September the disease might properly be pronounced epidemic. From this time till the end of October it continued with more or less severity according to the different states of the weather. At that period the season became so cool, and the cases so few and mild, that public apprehension subsided.

“The early cases were much dispersed over the city, and chiefly consisted of foreigners. After the commencement of the epidemic the great mass of cases for more than two weeks were mostly observed on the eastern side of the town, on the low and made grounds, and in the same situations where pestilential sickness had most frequently arisen in preceding seasons. Before the 20th of September the disease began to spread on the margin of the North River.

“The phænomena of the disease were not materially different from those of preceding epidemics. In many cases the attack began with high inflammatory symptoms, or with those of prostration and malignancy, which soon hurried on the fatal event. Sometimes it approached under the type of an intermittent, without exciting alarm till an advanced stage; and sometimes, after beginning with very slight appearances of indisposition, and showing very little of the character of fever, it only disclosed its pestilential aspect a short time before death.

Dysentery, in some occasions, degenerated into yellow fever, and the latter occasionally into the former. About six hundred cases were reported to the Board of Health; and the number of deaths amounted to about three hundred in the city and hospitals.

“The more pestilential quarters of the city were early deserted by the chief part of the inhabitants: they were so thinly peopled, and those few had so little intercourse, especially with the sick, as to convince any impartial observer that the disease did not spread by contagion. In the other quarters, where a great number of inhabitants remained, the cases were also scattered; the chief part were single in a house; and in a considerable proportion of the streets, viz. forty, only one death in each took place; and in thirty-one streets, only one case of sickness in each. No spreading of the disease was observed beyond the range of the vitiated atmosphere in the city. The breathing of this, without the least exposure to the effluvia of the sick, was sufficient to produce disease; while on the other hand, the greatest possible exposure to the effluvia of the sick, without breathing this impure air, was in no instance capable of communicating fever. At the hospitals of Bellevue and Staten Island, where cases of the highest malignity were collected, nothing like contagion occurred. Physicians, nurses, visitors, servants and attendants of every description, had unreserved intercourse with the sick, without an individual contracting the disease*.”

The Health Officer of New York, in a letter from

* Med. Repos. vol. ix. pp. 114 and 211.

the Quarentine ground, published by Rush, (vol. iv. p. 98,) in speaking of this epidemic, says, "What do people say now of the origin of the disease? Not a single vessel, on board of which any person has died with any disease, while in the West Indies or on the voyage home, has gone up to the city during the whole season. And all the cases of fever that have come down as from the city have been all people of and belonging to the city, and unconnected with the shipping, excepting one, a sailor, who had no connexion with any foul vessel. There is not a shadow of proof or suspicion that can attach to the Health Office or to infected vessels this season."

In 1809 New York was free from yellow fever; but it prevailed at Brooklyn on Long Island, opposite the city; and about twenty persons, who had been exposed to the noxious air there, died in the city without communicating the disease to others. This local epidemic, in a small village so immediately in the vicinity of a large commercial city which remained free of fever, gave rise to great contention and difference of opinion as to the cause. I can see nothing anomalous in it on the supposition that the fever arose from local causes at Brooklyn; while there appears the greatest anomaly in the idea of contagion imported from the West Indies, as no extension of the disease occurred in New York, though the fever itself was taken there by persons who had been exposed to the infected air of Brooklyn. If contagion could be conveyed from the Havannah to Brooklyn, surely it ought to have been imported from Brooklyn to New York. But though several deaths occurred in the

city, all referable to Brooklyn for their origin, the disease ended with those who brought it from the sickly district. This singular locality of prevalence in marsh fevers is one of their most remarkable characteristics, and evidently points to a local cause. We have seen in the epidemic of Frederick County, Maryland, 1804, as described by Dr. Duvall, that while the western part of the county was severely and extensively visited by sickness, the eastern section, separated only by the Monacasy River, was remarkably healthy. In Philadelphia in 1805 the suburb of Southwark was grievously affected by yellow fever, the deaths amounting to between three and four hundred; while in the city itself only "a few cases appeared, most of which were in persons who had resided in or visited Southwark*." The sickness in the suburb of Philadelphia was traced, Rush says, to a large bed of oysters, which had putrefied on Catherine Street wharf, and which had emitted a most offensive exhalation; and the Brooklyn Committee of Health, in their Report, say, "The late calamitous situation of this village points out the absolute necessity of removing nuisances of every description. With respect to the nature or origin of this disease, your Committee do not conceive themselves qualified to determine. It may not, however, be improper to observe that the machine for cleansing slips, &c. was about the beginning of July employed in cleansing the New Ferry slip, and the contents thereof exposed to the direct rays of the sun, which for some days emitted so great a stench as to become extremely offensive to

* Rush, vol. iv. p. 96.

the neighbouring inhabitants, and compelled them to apply to the corporation of New York for its immediate removal: and also that several lots and cellars, situated in low places near the New Ferry, were filled with stagnant water, which, from its stench and appearance, must have been collecting for months. With one or two exceptions, those persons who were the first victims to the disease were such as lived or worked in the vicinity of the above-mentioned nuisances, and who were generally exposed to the heavy rains which fell at that period."

It would seem from this Report that these local causes contributed to the aggravation of the usual autumnal disease, in a year not calculated of itself to give generally full intensity to it. The summer was remarkably moderate and cool. "After a backward spring, the month of June continued remarkably cool till towards the latter end of it, when a few warm days occurred, which were not exceeded by any in the subsequent stages of the summer. The heat of July was very moderate in general; and many days, particularly those which followed the deluging rains on the 17th, 18th and 19th, were unusually cool. Frequent rains took place in August, which was likewise a month of very moderate temperature. September was throughout pleasant and mild, but extremely dry, and vegetation suffered much in consequence. In October some unseasonably warm days were felt; but in the greater part of it the weather was cool. As the prevailing character of the summer was cool and rainy, it will excite no surprise that the inflammatory diseases of the spring were protracted to a much later period than com-

mon, and that scarcely any part of the season was entirely exempt from the marks and tendencies of that diathesis. The city of New York, as might naturally be expected from the moderate season, remained singularly free from malignant fever. In the neighbouring village of Brooklyn, this disease appeared early in July, and continued in a greater or less degree till late in September. Between thirty and forty persons are stated to have died of it. Nearly twenty persons who had been exposed to the noxious air of Brooklyn, were attacked with the disease in this city, to a large proportion of whom the disease proved fatal. Nothing but an extraordinary assemblage and concentration of nuisances in Brooklyn can account for the prevalence of this disease in a season of such unprecedented mildness. The fact of these nuisances is established beyond the reach of doubt. All that portion of the village on or near the water, between the new and old ferries, is remarkably filthy; water had been suffered to collect in many low and sunken places; great quantities of decaying animal and vegetable substances had been thrown or washed into them; and these pools, filled with this mass of corrupting materials, became so foetid as to render all the adjoining situations very uncomfortable*."

Dr. Kissam of Huntingdon, on Long Island, relates a solitary case of yellow fever, which occurred there this year.

"The following," he says, "is an account of the manner of life and places of abode of Mr. Jones,

* Med. Repos. vol. xiii. p. 196. See Gillespie, Med. and Phil. Reg., New York, vol. i. p. 101, for a counter statement.

about four weeks previous to his illness. He was part owner of the sloop *Fanny* of Huntingdon, and sailed from Edenton, North Carolina, on the 5th of June, for New York; arrived on the 14th; discharged lading partly at Brooklyn and partly at George's slip; afterwards returned home; remained there about ten days; from thence went to New York; lay in Rutger's slip about a week; then went up the North River a little above Tappan. On July 8th, about noon, was taken ill while lading with dock stone; had no medical aid till the 13th, when I was called to visit him. He complained of tightness about the region of his stomach; his countenance was very yellow; pulse slow; extremities cold; tongue covered with white scurf. Very early in the morning of the 14th had hiccup, followed by the coffee-ground vomit, and frequent discharges of black stools of a tar-like appearance. About noon his tongue became more dusky; slight delirium supervened; pulse more frequent; extremities warmer; and tremors came on, with a swollen countenance; and he died about two at night*."

In 1802, 1804, 1806, 1807, and 1808, there is no mention of yellow fever in New York, the exemption from this form of disease probably depending on the mean temperature of the summer and autumn being too low for its development. We have not, however, precise data in these years to justify a positive conclusion on the subject, at least I am not aware of any existing; and I can only offer such testimony in support of it as I find in the Reports of the general character of the seasons,

* Med. Repos. vol. xiii. p. 199.

which are represented as moderate, and not favouring the epidemic prevalence of disease, in some years, throughout a very large portion of the United States. But though yellow fever was not excited, we find typhus supplying its place in the bills of mortality, sometimes under the name of typhus, or of putrid and nervous fevers; and I shall be able to show that in one year, at least, this form of fever arose out of the remittent type; and that in all it existed at the same time with intermittent fever.

I have alluded to the proofs given by Humboldt of the connexion existing between temperature and *epidemics* of yellow fever at Vera Cruz; and if a mean heat of 75° Fahrenheit be essential to them in so southern a climate, where strangers alone are obnoxious to the disease, we can understand why, in so variable a climate as New York, it should be generally absent in years remarkable for a low or moderate temperature.

“In temperate climates,” he says, “results drawn from the greatest and smallest elevations of the thermometer, at certain periods, give us no information respecting the mean temperature.” A true epidemic never develops itself at Vera Cruz but when the heats of summer begin to be felt, and when the thermometer frequently rises above 75° .—“I am far from considering an extreme heat as the only and true cause of the *vomito*; but how can it be denied that there exists, in places where the disease is endemical, an intimate connexion

* Humboldt—Political Essay on New Spain, vol. iv. 164, 167.

between the state of the atmosphere and the progress of the disease?"

In 1802 I find it mentioned at New York, that "the last summer and autumn has been generally very favourable to the cities of the United States. The constitution of the atmosphere was such, in most places, as to give little disposition towards the origin and spreading of malignant diseases. Hence, the ravages of the yellow fever were inconsiderable in several places where it appeared, and where the dispersion of the inhabitants was not great or early enough to account for the small number of the victims."

No allusion whatever is made to any fever existing in New York; but on referring to the bills of mortality, I find the following diseases mentioned* :—

Bilious fever	7	}	17
Intermitting fever	6		
Yellow fever	1		
Malignant fever	3		
Nervous fever	15	}	22
Putrid fever	5		
Typhus fever	2		

In 1804 it is remarked that "the effects of temperature and of a particular local constitution of the air were scarcely ever more forcibly exhibited than in the course of the late season. In the eastern, northern, and middle parts of the United States, the summer was unusually mild and pleasant; while in South Carolina and Georgia the

* Med. Repos. vol. vi. pp. 340 and 444.

heat was felt with uncommon severity. The appearance of pestilential diseases corresponded very remarkably with these varieties of temperature in the places mentioned. The sea-port towns of all the eastern and middle States, where this mildness of summer heat was experienced, have, without exception, been so fortunate as to escape the ravages of yellow fever. In South Carolina, Georgia, and New Orleans, where the heat was violent, the yellow fever destroyed many lives." "Intermittents were extremely prevalent in New York and its vicinity, during the spring and throughout June. With July the dysentery appeared, and continued to be more or less epidemic till the middle of September. The common observation, that the cholera and diarrhoea of infants are most apt to prevail in seasons when the yellow fever is absent, was strongly verified in the late season, the mortality from them having been very considerable*."

In 1806, the same general exemption from yellow fever was remarked in all the Atlantic sea-ports, not even excepting New Orleans. But in New York a few cases of the disease were met with, together with typhus, though the affinity between the last and the endemic of the poor in this country is denied by the Editors of the Medical Repository. The passage is too interesting to be omitted.

"If proofs of the connexion between weather and the production of yellow fever had ever been wanting, the late season would have presented enough to satisfy the most careless observer. The heat of sum-

* Med. Repos. vol. viii. p. 220.

mer and autumn was so moderate as to render them singularly pleasant, as well as healthful. Though nothing approaching to an epidemic took place, several cases of yellow fever were observed, from June to November, in this city, and served to show what might have been reasonably apprehended from a more unfavourable course of the weather. In different parts of the country, intermittent and remittent fevers of a malignant character, and dysenteries were found to prevail.

“ The miasmata which were let loose in our atmosphere, though not sufficiently active and virulent to produce many instances of that deadly and rapid form of malignant disease which is called yellow fever, gave rise to numerous cases of illness, which erroneously passed under the name of *typhus*. It is scarcely necessary to observe, that this disease was totally different, both in its origin and symptoms, from that which is generated among the poor, exhausted, and miserable classes of the people, dwelling in low, crowded, ill-ventilated, filthy habitations, which generally occurs in winter, and which is properly denominated typhus. In every leading particular the disease in question differed from typhus. It attacked persons living in the most commodious and comfortable circumstances,—prevailed at a season when houses were freely ventilated,—seldom seized more than an individual in a family,—and never excited apprehensions of contagion. In many districts of the country it prevailed as much as or more than in this city. The relation it bore to the yellow fever was manifested by its tendency to affect the stomach in a

similar manner, and by the appearance of yellow skin, and dark-coloured vomitings which were occasionally observed. A disease of exactly the same character has been frequently noticed in former seasons when yellow fever had prevailed, at the decline of the epidemic, and when the approach of frost had weakened the force of miasmata to such a degree, that they were no longer capable of producing the more virulent forms of the distemper. Thus we see, that while the higher grades of noxiousness, in the miasmata of summer and autumn, generated by the heat and humidity of a season approaching to the tropical degrees of intenseness, will produce an *acute and rapid yellow fever*, proving fatal in a few days, attacking a large proportion of the community, and often displaying all the characters of pestilential malignity; the lower grades of noxiousness in such miasmata, exhaled in a milder season, or robbed of former activity by cold weather, will produce what may not inaptly be called a *mild and chronic yellow fever*, protracted to two or three weeks, seizing a small proportion of the community, and only occasionally exhibiting the worst features of malignity. In these instances the effect is so exactly proportioned to the cause, the irregularity springs so directly from the fluctuations of the source, that all the varieties which have been noticed serve only to establish the identity of their origin, and to prove the wide prevalence of the principle which produces such diversified aspects of disease*."

* Med. Repos. vol. x. p. 214.

The error, I conceive, that runs through this passage is in the learned editor (whom I suppose to be Dr. Miller, the author of the celebrated Report on the yellow fever of 1805 at New York, published in the third volume of the Edinburgh Medical and Surgical Journal, p. 276, which called forth Dr. Chisholm's Letter to Haygarth in 1809,) not sufficiently taking into consideration the effect of temperature on the organs, modifying as it does the character of fever in all countries, though springing from one and the same remote cause. That what he calls "*the mild and chronic yellow fever,*" and which others around him called "*typhus,*" did differ in some respects from the common endemic fever of this country I have no doubt, because it occurred under circumstances of climate, season and temperature, which are not exactly, perhaps, to be found in this country: but such differences do not constitute an actual difference in the nature and origin of the two diseases; for it is well known that the typhus of Great Britain varies essentially in different cases, and in different seasons and different years: but no one now considers these variations of character to indicate any essential difference of nature in the disease itself. We occasionally meet with examples of it that would probably prove identical with the disease noticed by the editor; and these are acknowledged by the exclusive advocates of contagion to be so like yellow fever that they might be called so. Dr. Graham, in his "*Observations on the Epidemic at Glasgow in 1817 and 1818,*" says that he had cases which in colour and symptoms might almost warrant him calling

them yellow fever*; and Mills distinctly says, in speaking of the typhus of Ireland, that his Hepatic fever is the same as yellow fever; and at page 145 he gives a case which occurred in August with symptoms of "pain in the eye-balls, yellow skin and eye, hiccup, and coffee-ground vomiting†." I cannot doubt, therefore, that the disease in New York was analogous to the typhus of this country; and the interest and importance I attach to the above extract is the proof it contains of that disease arising from malaria, and exhibiting nothing like a contagious character.

We have seen at Wilmington in Delaware, in 1803, that the fever of that year was typhus subject to the same laws as yellow fever, and that in Philadelphia the same chronic or typhoid form was observed by Rush, as it was at New York; and the difference observable in the epidemics of the last city, as compared with those of the former, is, that yellow fever is less frequent and less fatal in New York; and I know of no other probable explanation of the fact than is to be found in the difference of latitude, and consequent difference of temperature. The whole mortality in New York from yellow fever in 1791, 1798, 1800, 1801, 1803, and 1805, does not equal that which occurred in Philadelphia in 1793 or 1798; and, indeed, from 1791 to 1809 there does not appear to have been more than two severe epidemics in New York, viz. in

* Practical Observations on Contagious Fever, Glasgow 1818, by R. Graham, M.D., p. 39.

† Essay on the Utility of Blood-letting in Fever, pp. 126 and 145, by T. Mills, M.D., Dublin, 1816.

1795 and 1798; and the last, which Bayley speaks of as the most fatal, destroyed only 2086 persons, or about one half the number that died of yellow fever, in either of the two years mentioned above, at Philadelphia. This comparative infrequency of yellow fever at New York is associated with a large proportion of cases bearing a very close analogy to typhus, as we shall see by the Bills of Mortality* for 1804, 1805, and 1806. It will be recollected that in 1805 yellow fever existed in the city, and that the deaths were stated to be about 300.

The deaths in 1804 were 2064

1805 . . . 2352

1806 . . . 2225.

The mortality from fevers in each year was

	1804.	1805.	1806.
Intermittent	5	4	7
Remittent	9	0	9
Bilious	8	22	11
Malignant	0	270	2
Typhus	20	56	81
Nervous	27	19	12
Putrid	6	3	3
	22.	296.	29.
	53.	78.	96.

It appears from these tables, that in 1804 there were 22 deaths from fevers of a periodic type, and 53 from continued fever: that in 1805 there were 296 deaths from the former (principally yellow fever), and 78 from the latter: and that in 1806 29 deaths from the one, and 96 from the other: that in 1804, when no cases of yellow fever occurred, out of 75 deaths 53 were from typhus; and

* Med. Repos. vol. xi. p. 32.

that in 1806, when only 2 cases of yellow fever occurred, out of 125 deaths, 96 were from typhus.

The cases of yellow fever in 1805 are entered in the Bills as malignant fever; and we observe that no such disease is mentioned in 1804, and only 2 cases in 1806. I am perfectly aware of the hazard of reasoning on the nature of diseases taken from names recorded in Bills of Mortality; but I presume that unequivocal cases of yellow fever would generally be recorded as such in New York, if they occurred, from that disease exciting such general attention there: and if it be recorded under different names, as Bilious, Remittent, Nervous, Putrid, Typhus, it only shows that cases were met with which embarrassed the reporter as to nomenclature; and this very confusion of names might be used as an argument in favour of the very variable character of marsh fever.

In 1807 "the summer was nearly as mild as that of 1806; June was singularly cool. The same state of the weather continued, with little variation, till about the middle of July, when the heat rose to a considerable degree, and remained high for ten or twelve days. After this it resumed its former moderation, and continued to be unusually mild and pleasant throughout August and September. An epidemic ophthalmia prevailed during June and July, followed by influenza towards the latter part of July, which raged with great violence in August. It has rarely occurred that so large a proportion of the inhabitants had been confined by illness at the same time as on this occasion. Only a very few sporadic cases of yellow fever were observed in

New York. The whole number could not have exceeded twenty, and we doubt whether they amounted to so many. Most of the cases occurred in September or early part of October. Four of them were distinctly observed in the New York Hospital*."

In 1808 "June was generally mild, except a few very warm days towards the close. A great part of July was hot, and during many days the mercury rose to an unusual height; but at the close of it the weather underwent a total change, and assumed a degree of mildness which can rarely be looked for at that period of the year. So cool and uniformly pleasant a month of August was scarcely ever remembered in this part of the United States. The intermittent and remittent fevers were singularly mild. Nothing very uncommon appeared in the weather or diseases of the autumn, except that the air during a considerable part of September was warmer than in August: but the weather changed suddenly on the 20th, and became cool, and was followed by frost. October and November were attended with frequent alternations of frost and rain. In the last was a course of dry smoky weather, long known by the name of Indian Summer. No decided cases of yellow fever were seen in the city. In November there occurred frequent instances of *remitting* and *typhus* fevers; and some, particularly of the latter, proved fatal, and also a case of intermittent†."

The Bills of Mortality for these two years will show that typhus prevailed, in the absence of yellow

* Med. Repos. vol. xi. pp. 190, 195. † Ibid. vol. xii. pp. 95, 187.

fever, more than in the years I have previously alluded to*.

The monthly deaths were,

	1807.	1808.
January . . .	158 . .	162
February . . .	166 . .	172
March . . .	180 . .	224
April	215 . .	177
May	145 . .	137
June	127 . .	131
July	195 . .	179
August . . .	328 . .	184
September .	286 . .	180
October . . .	172 . .	133
November .	158 . .	151
December .	182 . .	184
Total . .	2312	2014

The deaths from fever were,

	1807.	1808.
Intermittent . 3	} 15.	5
Remittent . . 3		10
Bilious 9		3
Typhus . . . 162	} 164.	120
Putrid 2		3

In the passage quoted from the Med. Repos. x. 214. typhus is said to occur only in winter; and an inference is drawn from this assertion that the disease termed "*chronic yellow fever*" is essentially different from it, because the last occurs in the autumn, when there is free ventilation. An appeal to facts, however, shows that marsh fever, whether

* Med. Repos. vol. xiii, p. 335.

intermittent, remittent, or typhus, occurs at all seasons; and we have seen that cases resembling yellow fever were met with by Rush frequently in Philadelphia in winter, one of which has been quoted in detail from New York, in January 1806. These apparent anomalies are to be explained by these different forms of fever requiring in some individuals a longer time, and the cooperation of peculiar exciting causes for their development; and it is well known that diseases attributable to malaria are generated in one season, and excited into action another. If intermittent and remittent fever occur in winter, the mere circumstance of season does not invalidate the proof of their springing from marsh exhalation imbibed in the preceding autumn; and the same is true of chronic yellow fever and typhus, which we find are generally autumnal diseases, associated with places where malaria abounds, and with those periodical types of fever which are almost universally attributed to it.

The diseases of 1810 at New York show the intimate connexion between intermittent, remittent, and typhus fever, and that they were met with in all seasons*.

		7 A.M.	3 P.M.	7 P.M.
January.	Average height of Thermometer.	28°	36°	30°
February	.....	29	39	35
March	.....	34	43	38
April	.....	50	62	57
May	.....	56	71	64
June	.....	64	75	66

In January "some cases of typhus occurred." In March "several instances of remitting fever,

* Med. and Phil. Register, New York, vol. i. pp. 132, 288, 404.

assuming the typhus character, appeared." In April "intermitting fevers were frequently met with, and some few cases of remittents, ending in a tedious typhus." In May "intermittents and remittents occasionally appeared." In June "some few cases of intermittent, remittent, and typhus fevers were occasionally noticed."

The average temperature of July, August, and September, is not stated, but the season was generally temperate, cool, and wet. "The diseases consisted chiefly of intermitting, remitting, and typhus fevers; colic, cholera, diarrhœa, and dysentery, and inflammatory complaints. Intermittents have appeared in all their variety of forms. Remittents also assumed their varied character according to the constitution in which they occurred. In some they manifested all the symptoms of the true bilious remittent, while in others, especially those of a sanguine temperament, or recently from a more northern latitude, it exhibited all the characters of the '*ardent fever*' or '*causus*.' This form of fever, from the violence of its symptoms and shorter duration than the ordinary bilious remittent, is frequently confounded with the yellow fever of the tropics; and it must be acknowledged that in many of its symptoms it bears a greater resemblance to that species of fever than to any of the indigenous fevers of the United States. In many instances the remittents of the season have terminated in typhus, and in some cases proved fatal. We are, however, happy to add that our city has enjoyed a total exemption from the yellow fever.

"The diseases more especially belonging to the

summer season,—diarrhœa, dysentery, cholera, intermitting, remitting, and typhus fevers,—continued to prevail throughout the greater part of October; but as the season advanced, inflammatory diseases appeared, and have been more than usually prevalent.”

The *causus* here alluded to is referred to the inflammatory remittent of Dr. Norcom; and as the disease is considered to be of a remittent type, I have already said that it cannot be ascribed to the exclusive influence of heat.

I shall content myself with referring to a few reports of fever as it has occurred in the interior of the State of New York. I have already quoted Dr. Coventry's testimony as to the Lake fever being the same as the yellow fever of the sea-coast. I am not aware of any detailed descriptions of this fever. Dr. Scott* gives several very interesting examples of yellow fever in Saratoga county, in the Genesee country, and in Orange county; and his authority is the more to be relied upon, as he saw the epidemic yellow fever in New York in 1805. He describes a malignant fever at Queensborough in 1801, which, in one case, with yellow inflamed eyes and incessant vomiting of dark foetid matter, “exactly resembling what I saw people throw up in New York when they are said to have the yellow fever,” had “the delirious and stupid aspect of a person in *typhus gravior*.” The case seemed, like some fevers described by Sydenham, as if nature attempted an intermission or crisis by sweat, but unsuccessfully; and as if it were a compound of the intermittent and continued fever. Dr. Scott

Med. Repos. vol. x. p. 240.

says, "Before bleeding, when under high febrile action, full sweat would burst from the pores, and continue for fifteen minutes, and disappear as suddenly as it appeared." "The cases in all were about fifty, and eighteen died. I can certainly see but little difference between this fever and that in our city, except that the latter extinguished life a day or two sooner. About the mine and spring (on the margin of a large swamp,) the symptoms were more virulent, and the deaths proportionately more numerous; while people who lived in the vicinity of natural swamps and pools had only a regular intermittent fever, but of the most obstinate kind I ever met with. Those who lived on dry land abounding with mines were attacked with fever and ague only; and those who lived on dry land destitute of ore were perfectly healthy, and their neighbours sickly in every direction around them."

Dr. Arnell, in his *Topographical History of Orange County**, says that "in autumn the tertian intermittent, remittent, and typhus fevers generally prevail in a great degree."

In a long and highly interesting paper, descriptive of a malignant yellow fever in the summer and autumn of 1803 at Catskill, lat. $42^{\circ} 14'$, on the river Hudson, by Dr. Dwight†, we find typhus associated with it. Some cases are reported with all the usual decided symptoms of yellow fever, fatal on the fifth and the third day; and out "of forty, or more properly thirty clearly marked cases," eight died. One of the cases was of a man who had complained in August, but who had become convalescent, so as to

* *Med. Repos.* vol. xii. p. 313. † *Ibid.* vol. viii. pp. 105, 232.

be able to hunt. He was seized with fever at 4 P.M. on September 11 ; his eyes were yellowish red ; entire suppression of urine took place on the 12th ; on the 13th he was seized with black vomit to a great degree, and threw up an enormous quantity of it the next morning. At 11 A.M. his eyes were very yellow ; his countenance had assumed to a remarkable degree that tawny hue so frequent in yellow fever ; his extremities were cold ; he was affected with *subsultus tendinum* ; and died shortly after. A woman who had resided in the same house with this man was taken ill with a fever, which lasted four or five weeks without intermission, and "was considered by Dr. Croswell as a very decided case of *typhus gravior*." "I saw her a few times during her sickness, and had the same opinion of its nature. Just before her death I was sent for, and found her vomiting matter which very strongly resembled coffee-grounds."

I must refer to this very interesting paper for the evidences in favour of the local causes giving rise to this epidemic. If they should prove unsatisfactory to the advocates of contagion, and it should be contended that the cause was imported into Catskill, how are they to explain the contagion of yellow fever giving rise to typhus, as in the case just reported? Dr. Dwight naturally asks, "if from *the facts* we may not infer that the jail and yellow fever are species of the same genus, and that the miasmata producing yellow fever may, according to circumstances, produce jail, or yellow, or some other fever?" It would have been more correct to have said varieties of the same species.

CHAPTER X.

FEVERS OF THE EASTERN STATES.

IN taking a view of the fevers of the New England States, I shall confine myself to a few places, and to a brief notice of their epidemics; for the medical literature of this part of North America, in those years to which I have limited this inquiry, abounds in few details relative to yellow fever, from its being a rare and only an occasional form of disease in that portion of the United States. It will be found that when it has prevailed it has generally been associated with an unusual prevalence of heat, and limited to particular spots, as well as frequently referred to accidental sources of putrefactive exhalations.

It is impossible not to ascribe the aggravation, at least of the summer and autumnal forms of fever, to these local causes, when they are found very decidedly offensive, and concurring with the seasons and the temperature naturally adapted to the development of yellow fever. At least their co-operating influence has forced itself on the mind of the medical men of North America; and we consequently find that putrid coffee, rotten cotton seeds, offensive heaps of oysters, spoiled beef, fish, and fruit, heaps of putrefying animal and vegetable substances, are frequently noticed as the remote or exciting or aggravating causes of particular fevers. That they are not essential in all situations to the existence of fever is proved by its prevailing sometimes over a wide district of country, where no re-

mote cause can be assigned for it, of so limited a character; and sometimes in towns and cities where no particular local mass of putrefaction is stated to exist. The fevers of Vera Cruz* prevailing over an arid sand, chequered with stagnant pools or swamps,—those mentioned by Dr. Ferguson† in the plains of Estremadura, along the Guadiana, at a time when the country was so dry that the river was a line of detached pools,—those in the Alentejo, on the Tagus, opposite Lisbon, and in the open country near Ciudad Rodrigo, where the earth was as dry as a brick ground, and the vegetation burnt up,—are proofs that in many situations at least putrefaction, under any sensible form, is not essential to pestiferous miasmata. Yet we have other striking proofs that local and visible sources of impurity are evidently connected with the development of fever; and we may conclude that different degrees of intensity in the remote cause, aided by similar states of predisposing and exciting causes, especially temperature, will equally lead to the development of disease.

The most unequivocal examples of these local sources of fever are found in foul ships, either connected with the gradual accumulation of filth about the ballast, or the putrefaction of vegetable and animal matter stored as cargo or for food.

The fever at Perth Amboy in New Jersey, in September 1811‡, quoted by Dr. Chisholm as a

* Humboldt, Political Essay on New Spain, vol. iv. p. 155.

† Ferguson on the Nature of Marsh Poison; Trans. Roy. Soc. Edin., vol. ix. p. 273.

‡ Edinburgh Medical and Surgical Journal, vol. viii. p. 165.

proof of the importation of yellow fever, was apparently an example of the usual endemic of the autumn, aggravated, in a few instances, by the bilge-water from a vessel lately from the West Indies. One of the victims, a female, resided within fifty yards of the wharf, and "upon one of the vessels having the bilge-water pumped out, she was made very sick by the smell of it, the wind blowing directly towards the house and into her apartments, and she frequently declared, during her illness, that she had thus taken the disease." The committee who was sent to investigate the source of this fever, and who decided on its importation, after an investigation into the proofs, came to the following conclusion, that "it has been *satisfactorily traced* to one of the two last-mentioned vessels arriving from the West Indies, and that it has *most probably* been derived from the ship Favourite, from the Havanna." Now, when it is taken into consideration that the crew of these vessels were healthy on their voyage from the West Indies, that the bilious remittent existed with the yellow fever at Perth Amboy, that there were local causes to give aggravation to those cases which assumed the higher grade of yellow fever, proceeding from the offensive bilge-water discharged from the vessels, and that the *satisfactory* tracing of the contagion to them amounted to a *probability* of its having been derived from one or the other,—I think few candid minds will consider that this fever presents any anomaly to others which have existed from similar combination of seasons and endemic and local causes.

It might as consistently be said that yellow fever

was imported into New York in 1803 by the British ship Hibbert, from Portsmouth, as this vessel arrived from England in a very foul state, and persons who worked on board of her were seized in July with yellow fever. This vessel of six hundred tons had been used as a transport for soldiers. In October 1802 she sailed with a regiment from Portsmouth to Halifax; thence she carried another regiment to the Bahamas, and from that place conveyed a third regiment to Portsmouth, from whence, in 1803, she was dispatched to New York in ballast. About the 20th of July, while lying in New York, the people were employed in clearing away the rubbish between decks and below,—her ballast had not been changed for years; the lower and middle decks were scraped and overhauled, and the timbers were found overspread with all manner of corrupt and excrementitious materials; the stench was intolerable, and the men employed were obliged to resort to the port-holes and hatches for fresh air. Several persons on board were taken sick; one of the seamen, after two days illness, had hæmorrhage and black vomit, and was sent to the Marine Hospital, where he died,—and another died on the fourth day with similar symptoms. A physician who went on board could, with difficulty, refrain from vomiting*.

Dr. Dickson† gives two very instructive examples of fever on ship-board, arising from a local cause. “In April 1807, a fever,” he says, “pre-

* Med. Repos. vol. vii. p. 86.

† Edinburgh Medical and Surgical Journal, vol. xiii. pp. 36, 48.

vailed in the Dart guard-ship, at Barbadoes, which at first was attributed to land influence, and irregularities committed by the men on shore; but as it continued to attack new comers, especially after sleeping two or three nights on board, an internal cause was suspected. The ship was divided into compartments below, so as to allow of the water being carried in large tanks, and these having been disused in harbour, their bottoms were found to be covered with an offensive deposition of slimy mud. On the 17th of May, cases of fever still supervening, I find by my notes that this evil had been detected and remedied, and communications between the divisions had been opened, so as to allow a free circulation of the air below; and on the 24th I find it stated, "For the last week no fresh attacks of fever have occurred. The fatal cases terminated at the hospital with the usual symptoms of yellow fever." "The Circe frigate, after having been several times at Antigua, and escaping with a limited number, or only individual instances of yellow fever, by putting to sea before it became general, entered English Harbour, which was then healthy, on the 4th of January 1808, no man requiring medicine. In five days afterwards the fever appeared, and from being engaged in the unwholesome duty of clearing the hold and heaving down, between that period and the 2nd of February one hundred and forty-six men were sent to the hospital, of which number twenty-two died with black vomit, although it was then the healthiest season of the year, and the ship had been nearly two years and ten months in the West Indies."

I find an example of fever on board the United States frigate, General Greene, in 1799, which evidently arose from internal causes, referable to the state of part of her stores, and probably that of her ballast, consisting "partly of iron and earth from a clay shore, intermixed with soft clay, stone, shells, and marine vegetables;" and it is the more interesting, from the circumstance of her being a new vessel on her first voyage: she sailed from Newport, in Rhode Island, on the 3rd of June, for the Havannah, with a crew of two hundred and fourteen men, all apparently healthy. She was leaky, having been caulked in winter, from her seams opening as the warm weather advanced. After being six days out she experienced a severe gale, which increased the leakage and damaged part of her provisions. This storm was followed by very hot weather, and the air in the hold was so contaminated by the putrefaction of salt fish, as to extinguish candles. The fish was thrown overboard, and every means of cleansing and purification resorted to, but on the 18th of June, a midshipman, whose duty obliged him to frequent the hold, was seized with symptoms of a highly inflammatory bilious fever, violent pains in the head and bones, suffusion of face and eyes, hard pulse, prostration of strength, great thirst, vomiting and costiveness; and his case was followed by four others. They however recovered. On the 4th of July she arrived off the Havannah, when a lieutenant was seized at once with delirium and incessant vomiting of a dark-coloured fluid. He was seen by Dr. Halliday of the Havannah, who pronounced it yellow fever.

“ Until this period no suspicions had been excited of the nature of the disease, nor had they deemed it other than the necessary consequence of so sudden a change of climate. No intercourse had occurred with the town, or vessels in the harbour. The principle of disease seemed to have been generated on-board, and to have gradually acquired virulence and activity as they approached the place of their destination. After this period, three, four, and five new cases occurred daily. No deaths had as yet taken place. On the 10th of July she sailed for the United States, and on the 12th the first fatal case occurred with vomiting and delirium. Of forty cases, twenty were fatal, most within twenty-four hours from seizure, and all within five days, except two. The surgeon and purser were the last who died, and like the others with excessive delirium and black vomit. After passing the Capes of Virginia, there was an obvious mitigation of symptoms, and the disease gradually became milder as they approached Newport, in Rhode Island, lat. $41^{\circ} 29'$, which they reached on the 27th. The invalids of every description, about forty, were sent to the hospital. Being requested by the town council to accompany Dr. Senter in attending the hospital, we visited them as soon as they were landed; we found but four or five cases of recent disease; the others were convalescents from fever and salivation; there was an uncommon number of ill-conditioned ulcerated legs, and some with venereal complaints. The new cases of fever appeared of the bilious inflammatory type, but had nothing formidable in aspect. There was nothing singular in the pro-

gress of the disease, but the ease with which it was controuled, and the rapidity of recovery in this pure air, and under new regimen; even the sore legs almost immediately assumed a more healthy aspect. The ship was cleansed and whitewashed throughout; still new cases occurred on board for nearly two months. Some days two, three, or four were sent off to the hospital, which would seem to indicate the retention of some portion of this noxious principle, which was lodged beyond the reach of the cleansing process. Not one out of a hundred who were sent to the hospital died*."

Whether this fever be considered as the inflammatory endemic of Dickinson, the product of heat alone, or as yellow fever, the product of its conjoint influence with a local contamination of air,—it is interesting in one particular, as showing the amelioration of symptoms which took place on a change from the tropical heat of Havannah to the cooler latitudes of Virginia and Rhode Island; and a similar amendment from the same cause is observable in the fever on board the Hussar frigate, quoted by Sir Gilbert Blane in his letter to Baron Jacobi, and noticed by Bancroft in his *Essay on Yellow Fever*, p. 288. That it did not depend on heat alone would appear probable, from the cases continuing to occur at Newport; but Dr. Kollock remarks, that no medical register was kept from which an accurate account of the disease could be collected, and that for the sketch he has given of it he was

* Dr. Kollock's letter, *Med. Repos.* vol. iv. p. 1. It is also noticed by the medical faculty of Baltimore, p. 353; and by Rush, *Medical Inquiries*, vol. iv. p. 148.

indebted to the cursory recollections of the officers, and the little he saw of the sick after their arrival in port. Dr. Waring* has noticed briefly a second occurrence of fever on board the General Greene, in July 1800, after a long cruize in the West Indies, and off the mouth of the Mississippi. Several cases occurred at Newport, Rhode Island, in persons who had worked on board; and he adds, that "after the offensive filth which collected between the ship's ballast was removed with it, and the ship properly cleansed, no instance of the fever occurred on board of her." Lind thought that crews in new ships were often obnoxious to disease, from the state of the timbers.

The only notice of the fevers of Rhode Island, that I am acquainted with, is in a very sensible paper, by Dr. Wheaton, on the diseases and topography of Providence†; and by Dr. Willey, on a fever in 1801, on Block Island‡.

Providence is situated in lat. $41^{\circ} 50'$. Dr. Wheaton says, "Of febrile diseases the most usual is *typhus mitior*. Cholera infantum is not uncommon in summer. Diarrhœas, degenerating into dysentery, are sporadic in autumn; as are pulmonic inflammations in winter and spring. Intermittents and bilious remittents have been unknown for the last fifty years. The town has experienced three visits from the yellow fever, in 1797, 1800, and 1805. It has uniformly made its appearance, and committed its principal ravages, in the south part of Water Street, or the lanes and alleys adja-

* Med. Repos. vol. iv. p. 234.

† Ibid. vol. x. p. 329.

‡ Ibid. vol. vi. pp. 123, 381.

cent ; and those solitary cases which have occurred elsewhere could, with very few exceptions, be traced to this devoted spot. The portion of Water Street which has been thus repeatedly the seat of yellow fever is less than a hundred rods in length. The houses on the water-side are built as near as possible to the natural bank of the river. The summer of 1797 had been remarkable for a long-continued drought. On the last days of July and the first of August there was a sudden transition to damp easterly weather, with frequent and abundant rains. These were succeeded by an intensely hot sun, the thermometer ranging from 86° to 91° . The yellow fever made its first decided appearance on the 13th of August. There had been, however, in the course of the season six or seven extraordinary cases of highly malignant fever, most of which proved mortal, and which the physicians who attended them, and who were afterwards conversant with the yellow fever, considered to be the same disease. It continued to rage from the 13th of August to the 30th of September. Its early disappearance may be partly ascribed to the general, not universal, desertion of this part of the town,—to the unusually cool, not frosty, weather which succeeded during the first week in October,—and especially to a change in the atmosphere, from a very heavy rain and tornado on the 8th of this month. During the season, one hundred and two persons had the disease, and forty-five died.

“ In 1800, the first case of yellow fever occurred on the 15th of August, and it prevailed till the 5th of October. There were eighty-three reported cases,

fifty of which were fatal. In 1805, it made its appearance as early as the 25th of July, after a very unusual duration of hot and dry weather. As the Town Council directed an immediate and complete evacuation of this part of the town, it soon subsided, and on the 10th of August had disappeared. The people, however, being impatient to return to their habitations, several new cases occurred in September. Thirty persons, only, had the fever, ten of whom died : the disease assumed a milder character, and in cases which proved mortal the black vomit, in particular, was a less conspicuous symptom. If to this account we add ten cases which have occurred at intermediate periods, the total number of persons affected with the yellow fever in this town, since its first appearance in Philadelphia, in 1793, will appear to be two hundred and twenty-five, of whom one hundred have died. Of the few scattered cases which occurred at the intermediate periods, some have been residents in the sickly district above noted, or persons who had recently arrived from New York or Boston, already charged with the disease. Here, as elsewhere, it has not been propagated by the sick in situations otherwise healthy ; or, in other words, has not been found contagious. Of a great number removed to the hospital, in an airy situation, there has been no instance of the disease taken by the attendant physicians or nurses."

It appears from this Report, that the common fever of Providence is the *typhus mitior* ; and that in twelve years only three epidemics of yellow fever had occurred there, each limited to a particular

part of the town; and that the total mortality from the disease has not exceeded a hundred, among a population of, perhaps, eight or ten thousand. I am not aware of the population in the years specified; but in 1830 it amounted to 16,832. It is remarkable, according to Dr. Wheaton, that intermittents and remittents have been unknown for half a century in Providence, though the occurrence of typhus and yellow fever there would naturally lead to the expectation that both the former types of fever would occasionally occur. The disappearance of intermittents, however, in old settlements in New England*, has been generally remarked, though so common at this period in New York and Philadelphia; and it is well known that they do not occur in many parts of Great Britain where typhus is a common disease. In the time of Sydenham they prevailed in London, from 1661 to 1664,—did not appear again till 1671, and then very transiently,—and are not noticed by him again till 1678.

Block Island is an appendage to the State of Rhode Island, and lies about ten miles from it, in lat. $41^{\circ} 10'$. A chain of large ponds extends from the north end to near the centre. It contains about seven thousand acres, one-seventh of which consists of these ponds; and the number of the inhabitants is about 714. Dr. Willey says, the fever in

* Dr. Mann, (Medical Sketches, p. 110,) in speaking of the Eastern States, says, "The first settlers, if historians and the old inhabitants are to be credited, were subject to the same diseases which are now endemic in the north-west territories. Intermittent fevers, a hundred years ago, were common in the lower towns of Massachusetts, where a single case has not been known to have originated within the last fifty years."

1801 “put on all the intermediate forms between a mild remittent and a *typhus gravior*.”—“The weather was uncommonly hot and dry in August, and had been so during several of the preceding months. Little or no dew was perceived, vegetation was greatly injured, and the water drying from the ponds left a considerable portion of their bottoms exposed to the action of heat. From these and the moist grounds were constantly rising noxious miasmata, affecting the olfactory organs to a great distance. By the 2nd of August ten persons were sick of the yellow fever; one of them died a few minutes after the arrival of myself and attendants on the island, and another on the 6th: new cases were daily occurring, and the fever continued to prevail till the middle of November, when it disappeared; but a few days of uncommonly warm weather excited two cases in the fore part of December.

“The disease put on all the intermediate forms between a mild remittent and a *typhus gravior*. In general it had three stages, the duration of which depended on the constitution, age, violence of the disorder, and state of the atmosphere;—that of the first was commonly from three to ten days; of the second, from three to twenty-five; and of the third, not more than twelve hours.

“In the first, or *synochal* stage, there was pain in the head, vertigo, and soreness of the eye-balls; pain in the neck and bones; soreness of the flesh; rigors, succeeded by sudden flushes of heat; costiveness; dry skin; or in a few cases, diarrhœa and diaphoresis. The eyes and skin were of a yellowish

hue; there was aversion to light; vigilance, and great dejection of spirits; in several instances a remarkable loss of energy, and a constant tendency to leipothymia; sometimes retching and vomiting, most frequent in August. The matter ejected from the stomach was frothy, black or green, highly bilious and acescent. The pulse for the most part was small and tense; sometimes full and hard; rarely soft. Respiration hurried; oppression at the præcordia, with a burning sensation in the stomach; great heat; thirst; tongue commonly moist, and covered with a thick fur. In August this fur was purple or black; sometimes yellow; rarely white. In September it put on a more uniform yellow or white appearance: in one instance the tongue was of a fiery red, interspersed with white specks. In several cases a confusion of intellect, but never a complete delirium. These symptoms were exacerbated towards evening. If the fever was not dissolved in this stage, it was sooner or later succeeded by the *second* or *typhoid* stage, in which the vigour of the system suffered a rapid declension. The pain in the head and other parts subsided; the pulse became weak, soft, and small; sometimes full and sluggish: the face less florid; with retching, and an increased ejection of bilious matter from the stomach, in two instances intermixed with blood. Flatulent distentions of the stomach and abdomen came on: the tongue became more livid, or black; generally dry and cracked; sometimes glazed; cold sweat about the neck and forehead; faltering speech; turbid urine; lips and fauces generally dry and starchy; increased confusion of intellect; sigh-

ing; a deadly aspect, and great debility. If the disorder did not come to a favourable termination, it passed into the *third* or *sinking* stage; the pulse was feeble and fluttering; the heat greatly diminished, except about the *scrobiculus cordis*; the extremities cold and livid; a cold clammy sweat burst from every part of the body; the eyes appeared extremely glazy; the vigour of the system underwent alternate risings and fallings, with *subsultus tendinum*; great inquietude; lying chiefly on the back; sliding down in the bed; sometimes feeble efforts to rise; laborious respiration, with frequent intermissions; impaired deglutition; and an involuntary discharge of *fæces*."

Dr. Willey does not mention the mortality from this epidemic; but out of the 714 inhabitants of the island "eighty were confined to their beds during a regular and severe course of the fever, besides a greater number who, by an early application, had it arrested in its first attack." He says that the fever was generally believed by the inhabitants to have been imported about the beginning of April, but he thinks it was indigenous. It would seem to have varied in duration from six to thirty-five, or from thirteen to twenty-eight days, as a remittent and continued fever; and though considered as an example of yellow fever by Dr. Willey, his account of it approaches much nearer to *typhus gravior*. In a more southern latitude I think there can be no doubt that the causes specified would have rendered the disease in intensity of symptoms and rapidity of progress a true yellow fever; and its chronic character, in many instances at least, is

to be referred, not to any difference in the nature of the remote cause, but to the modifying influence of a comparatively low medium temperature. The epidemic apparently began with slighter cases, reached its height in August; and declined in November, observing that obedience to season which is characteristic of marsh fever. In 1802 Dr. W. met with a few cases of fever in August, of the same kind, one of which was fatal on the eighth day; and a second, promptly arrested by bleeding, was followed by yellowness of the skin in convalescence.

Of the general character of fever in the State of Connecticut I know nothing. In the first volume of the Medical Repository, p. 512, there is a very brief reference made by the Rev. Mr. Backus to an epidemic in 1750, at Bethlem, situated about lat. $41^{\circ} 39'$. "In 1748 an individual built a dam across the central valley of the town, in order to kill the timber of a flat in the north part, containing about fifty acres. In this swamp,—producing little vegetation, some black alders and sumach,—a pond stood till the spring of 1750, when it was let out, and with its stream the pestilence issued, which carried off between thirty and forty of the most hale and robust inhabitants. Dr. Bellamy, (a clergyman,) in his records, says it was a nervous, long, but very malignant fever; and that the well were not sufficient to tend the sick. The old people tell me that the neighbouring physicians called it the plague. Dr. Bird informs me that the symptoms were a wire pulse; coma in a few hours after being taken; loss of reason, and most gene-

rally the loss of speech for twenty days in those that recovered ; sores, the bigness of a dollar, on various parts of the body. 'The length of so malignant a disease,' says the Doctor, 'was something I could not reduce to theory ; the faculty generally pronounced it *sui generis*.'

"In 1760 the same low ground was again overflowed ; and after letting out the water, another wasting sickness began in the month of November, and carried off about forty inhabitants : this was called a *malignant pleurisy*. The sick generally died the fourth or fifth day,—some in twenty-four hours. The whole town was afflicted with a hard influenza."

However imperfect these details are, it is evident that the malaria arising from the drained pond was the source of the "*nervous long-malignant fever* ;" and we have seen that a similar origin to malaria, in more southern latitudes, has given rise to malignant remittent fevers. It is highly probable that the cases of malignant pleurisy in 1760, during the prevalence of influenza, were equally referable to the same cause, as we have found them frequently to prevail in winter, in places obnoxious to similar exhalations ; and it is mentioned in the paper above referred to, that "in 1789 the influenza had an universal run, and was repeated with still greater severity in 1791. This could not be attributed to the old box of Pandora, the pond, which for these twenty years had been drained and reduced to a meadow."

In New London, Connecticut, lat. $41^{\circ} 22'$ yellow fever prevailed from August to October 1798 in a

season of intense heat, associated with local impurity of air from putrid fish, &c*.

The Rev. Mr. Channing says, "As we have not even a shadow of ground to suppose the disorder was not of domestic origin, we are urged critically to investigate the cause within ourselves. I confess that at the time when my fellow-citizens began to take the alarm, I could not admit the idea that a pestilential disorder could originate and progress in a place so happily situated as this; for, added to an elevated situation, with scarcely any low grounds to generate marsh miasmata, we have a deep spacious harbour, near the sea, from which we are favoured with refreshing sea breezes through the summer; and this city has ever been famed for the purity of its air and health. But I have been constrained to admit, that under the influence of summer heats, exceeding in intenseness and duration†

* Med. Repos. vol. ii. pp. 372, 377; and vol. iii. p. 292.

† The thermometer in the shade stood as follows.

	Merid.	1 P.M.	3 P.M.
July 28	92°	95°	88°
29.....	89		
August 3 to 7, intense heat.			
8.....	89	3 P.M.	5 P.M.
9.....	93.....	97.....	93
10.....	92.....	92.. at 2 P.M.	94
	10 A.M.		
11.....	90.....	87	
		Merid.	3 P.M.
12.....	86.....	89.....	89
13.....	85.....	92.....	87
14 and 15, heat not so intense: showers on the 15th.			
	10 A.M.	Merid.	3 P.M.
16.....	86.....	87.....	86
17.....	85.....	91.....	87
August			

what has ever been experienced by the oldest inhabitants, some latent cause has been brought into action and generated a disorder new and truly alarming. We ascertained, with a precision to be relied upon, that the whole number of persons, whose complaints clearly indicated the pestilence,—or, as it is called, the yellow fever,—did not exceed 246; and I give it you as a very important fact, on which you may rely, that 231 cases were clearly traced to the spot where the sickness commenced. The part in which the septic gas appears to have been so highly concentrated, extended sixty rods north and south, about thirty rods each way from the house first affected, and about twenty rods west, being bounded easterly by the harbour. Scarcely a single person escaped the disorder who resided in that part of the city.

“It appears there was a large quantity of fish*

	10 A.M.	Merid.	3 P.M.
August 18.....	85°	87°	88°
19.....	80	86	89
20.....		82	
21.....		87	
22.....		87	84
23 }		78	
24 }			
25.....		88	2 P.M.
26.....	87	92	94
27.....	80	82	87
28.....		82	

The excessive heat of the summer was attended with an unusually dry atmosphere, no thunder showers, light winds, calms in the day, and calm nights for five or six weeks successively, with a few exceptions.

* Dr. Coit says, in speaking of this epidemic, “I have inquired of those whose business it was to examine every place

in a bad state in four or five stores, within twenty or thirty rods of each other, and all in the limits referred to. These fish were taken in the straits of Belisle, which, being a high northern latitude, were cured with a much less quantity of salt than usual. They were brought to this port in the autumn of 1797. The heat of the summer having been very great, they were found to be in a moist slimy state early in August. From a quantity lying in bulk in a store occupied by Mr. Jones, who fell a victim to the epidemic, a green and yellow purulent matter ran upon the floor. They were spread for a considerable distance in the street and wharves; and while thus exposed to the excessive heat of the sun, the effluvia was very offensive. It was also noticed at other times, that people were assailed with a very nauseous stench in passing through that part of the city.

“I would mention a particular case which may be considered as very clearly pointing to the fish as a principal, if not the only cause of the epidemic. A captain of a coasting vessel, belonging to this place, took in about twenty quintals of the fish on the 21st or 22nd of August, and sailed for Hartford. He had them packed in hogsheads there, and delivered on the 3rd of September on board a boat bound to a town in Vermont. The fish were very soft and moist, and were very disagreeable while in the vessel. On the 8th of September, in

where there was any collection of filth, and could discover nothing more within that space than in other parts of the town, except a large quantity of imperfectly cured cod-fish. In one store only, within fifteen yards of Bingham's house, fifty quintals were found in a state of fermentation, emitting a very disagreeable odour, about eight or ten days before the appearance of the fever.

the night, he was taken ill, and reached home on the 9th, and his illness proved a serious attack of our pestilential fever."

Mr. Channing, on further investigation of the sickly district, was induced to refer a part, at least, of the stench "to the overflowing vault of an old privy belonging to the house where the first patient died." Yet, "I still think," he adds, "that the putrid fish in a store within one rod of the privy, and in other stores within twenty-five or thirty rods of it, were the most powerful causes in producing the deleterious effects experienced. A person, for many years acquainted with the state of fish, in the different stages of curing, passed through the street in August, when the fish was spread out to dry; he remarked a very disagreeable effluvium, different from what he had ever observed from fish before. His health soon failed, and for four weeks he felt unusually affected, and was persuaded his complaint proceeded from the smell of the fish: and a medical man attending an auction where the fish were spread in the open air, was seized with nausea, and obliged to leave the spot."

"A short account" of this fever was published by Mr. Holt, at New London, 1798, which I have not seen. It is noticed in the *Medical Repository*, vol. ii. p. 304, and vol. iii. p. 292; by which it appears that from the 24th of August to the 28th of October, there died eighty-one persons; that the sickly district was comprised chiefly within one hundred rods of the market; that in a defined space below the market, excluding the buildings which were evacuated, and the people who fled, there were

fifteen houses, shops, and stores, in which lived or were employed ninety-two persons, of whom ninety had the fever, and thirty-three died; the deaths above the market were not in so great a proportion. The disease was indigenous, and not contagious.

If we are to consider the local impurities, so distinctly pointed out by Mr. Channing and Dr. Coit, as the remote or the aggravating cause of this epidemic, it will serve to explain the general malignancy of the fevers of cities, as compared with those of the country; and to establish as incontrovertible the fact of visible sources of putrefaction being concerned in the generation or in the aggravation of fever. I confess the influence of these putrefactive emanations seems to me established by this unusual development of fever in a city so remarkable for health as New London is said to be. Still it might be contended that they operated only as exciting causes. The site of the fever was apparently in a district of the city near the water, where malaria might be generated. New London is situated on the west bank of the river Thames, about three miles from its entrance into Long Island sound, and its harbour is said to be large, safe, and commodious, with five fathoms of water. It might be urged, if the malaria, naturally ascribed to the alluvial banks of rivers, especially under such unusual heat as prevailed in the summer of 1798, was the sole remote cause of the epidemic, why did it not give rise to fever generally along the river? Had any unusual sickness occurred, with symptoms and mortality proportionate to the fever in New London, it could not but have excited attention and

been noticed in the communications of Mr. Channing and Dr. Coit, which are dated in January and February 1799 ; and the absence of all allusion to any other sickness would imply that it was limited to the confined spot where the atmosphere was so accidentally contaminated.

Out of the two hundred and forty-six cases, Dr. Coit says, " we could not find any sick of the fever (two cases excepted,) but those who had frequented the spot from whence the infection originated." No allusion is made to any foreign source of infection ; and the limited range of the disease clearly points to a local cause. Mr. Huntington, in a letter on the subject, dated December 10, 1798*, says, that there were in all one hundred and twenty quintals of the fish ; that when it was in a pile, a yellow juice oozed from it like pus ; and that, even after it had been spread out in the air, it was so rotten as nearly to have lost the texture and taste of fish. He also refers to the effluvium from the privy, and to an offensive smell in the part where the fever broke out, though " the ground there is, in the nature of it and from long experience, proved to be very healthy, being elevated and dry, and open to the land and sea breezes." He speaks also of a parcel of damaged clams having been thrown out on a wharf contiguous, a few days after the first death, which emitted such a stench, that persons in a house close by were obliged to quit their places ; and, after alluding to the filth which naturally accumulates in very hot seasons, from the general

* Med. Repos. vol. ii. p. 447.

scarcity of water, he adds, "All these might not have been powerful enough to produce any contagion; yet, in cooperation with the fish, (if that article could produce it, as our best informed citizens and physicians are confidently of opinion,) they doubtless aided a more inveterate infection; still it is probable, that the effluvium of the fish, with all its auxiliaries, might, in common seasons, have been harmless. Our weather was uncommonly hot and dry, the mercury being from 95° to 97° for several days in succession."

No account is given of the symptoms of this fever. It will be recollected that yellow fever prevailed very fatally in 1798, in Wilmington, Philadelphia, and New York; that in New York a *similar cause* was assigned for it as for the epidemic in New London; and it will be seen that the same combination of apparent cause and effect occurred in Boston. The epidemic at Wilmington was distinctly traced to a fog, arising from a marsh, driven by the wind over that part of the town where the fever prevailed; and no other source is assigned. This, which may be truly said to have been marsh effluvium, gave rise to yellow fever; while, at the same moment, the same disease was excited in New York, New London, and Boston, by a contamination of air, as distinctly referable to visible sources of animal putrefaction. If therefore, as I think has been shown in the progress of this inquiry, yellow fever and typhus are modifications of the same disease, depending on the different effects of temperature, and both of them arise from marsh exhalations and from putrefactive emanations; we

may explain the frequency of their occurrence among the crowded inhabitants of cities as compared with the scattered residents in the country, and why their locality is so generally confined to the filthy habitations of the poor. A high temperature, however, would appear to be the great predisposing cause to disease,—both by its exalting the irritability of the animal organs, and giving intensity to the remote cause of fever; whence, in those latitudes of America where typhus is the common form of autumnal disease, it is comparatively less frequent in its occurrence, less extensive in its prevalence, as well as less fatal in its effects than yellow fever, which, always associated as it is with great heat, is extensively destructive where it prevails epidemically. Fever, therefore, is comparatively rare in the northern latitudes of the United States to what it is in the southern; and while in the latter the intermittent, common remittent, and yellow fever are its ordinary forms, in the latter they are the intermittent and typhus; the one more common in the country, from a weaker cause conspiring to produce it; the other, in towns and cities, from a more concentrated miasm acting on a more favourable state of predisposition.

It is well known that typhus is often the pest of armies and of navies, where the temperature favours the existence of this form of fever; and that it is frequently accompanied with dysentery. It is highly probable that the filth unavoidably accumulated about camps, where a large number of men are thrown together, without means to rid themselves of those excretions and refuse, which are easily con-

veyed away by the drains and sewers of cities, contributes its effects in the generation of fevers. Dr. Mann, in his "Medical Sketches of the Campaigns of 1812-14," on the borders of Canada, distinctly refers the typhus and dysentery, which prevailed among the United States' troops, to this cause among others. The diseases they principally suffered from were intermittents, typhus, diarrhœa, dysentery, and pneumonia, the last bearing a great resemblance to the bilious pleurisy noticed by Rush, Vaughan, and the medical authorities of the Southern States; and it prevailed, like it, on the sudden accession of cold weather, or in the early spring. This combination of diseases, like those we have found prevailing in the Southern States, with the exception of the remittent and yellow fevers, which in the higher latitudes are represented by typhus, but in an infinitely less degree, affords an additional proof of these forms of fever being modifications of the same disease, influenced in its character by differences of temperature. I shall make a few extracts from Dr. Mann's work, to show that the intermittent fever, dysentery, and typhus were occasionally so blended together, that it was difficult to affix the name of either exclusively to the disease.

In the campaign of 1812, the order of diseases was "dysentery, diarrhœa and fever, in July, August and September; diarrhœa and pneumonia in October and November; *pneumonia notha* and severe pneumonia in December, and January and February 1813."—"The most prominent diseases among the troops in summer were diarrhœa and dysentery; the latter assuming a typhoid form in

some instances, when the patient at its first appearance was destitute of medical aid. Intermittent fevers, of the tertian type, were sometimes connected with these complaints in the troops from the south of Hudson River, who, previous to leaving their first rendezvous to join the army, had been seized with the disease, but relapsed while on their passage up the Hudson in crowded vessels. Their condition had become bad, the type of the fever changing from an intermittent to a continued form."

In 1813, from May to October, on the Niagara frontier, subsequent to the attacks on Little York and Fort George, it is remarked that many of the troops wounded at Little York died with typhus fever accompanied with diarrhœa. After the attack, and when the army had re-embarked, they were exposed a number of days on the decks of the vessels to a violent storm, and soaked with rain. "Under these circumstances, diarrhœas supervened most universally. After landing at Niagara, lat. $43^{\circ} 5'$, the men in many instances were attacked with typhus fever, which became more frequent after the capture of Fort George. Subsequent to the retrograde march of the army from Stony Creek, a combination of typhus fever and diarrhœa was very general. The productions of animal putrefaction and excrementitious materials were also sources of these diseases. Armies always accumulate these noxious principles about their encampment. One of the efficient causes of the sickness at Fort George, assigned by myself at that time, was the effluvia from the sinks. The general repeatedly

called the attention of the officers to the necessity of daily covering the sinks with earth. Nevertheless the exhalations from them were very offensive. During the month of August, more than one third of the soldiers were on the sick reports, and the officers shared with the privates in the prevailing diseases."

Dr. Lovell, who was attached to the army at Fort George, says, that "from June to October it was encamped on the bank of the Niagara, extending from the fort to the village, nearly on the lake shore. In June it rained almost incessantly, while the latter part of July and the whole of August were extremely hot; September remarkably mild and pleasant. After having been wet for nearly a month, the troops were exposed for six or seven weeks to intense heat during the day, and at night to a cold and chilly atmosphere, in consequence of the fog arising from the lake and river. The diseases consequent to this alternate exposure to a dry, hot, and cold, damp atmosphere, were typhus and intermittent fevers, diarrhœa, and dysentery. A detachment near the lake was particularly exposed to the heat of the day and dampness of the night, and suffered much from typhus and intermittents."

Dr. Purcell, in speaking of the diseases among the troops in the autumn of 1814, at Burlington, Vermont, lat. $44^{\circ} 29'$, says, "Many were labouring under fevers of different forms. Typhus, dysentery, and diarrhœa, in most cases were so combined, it was with difficulty determined which was the predominant disease. In cases where dysentery was the prevalent symptom, the patient had more or less

fever. As the disease progressed, the fever assumed a typhoid type, with parched brown tongue, sordes on the teeth, increased heat of skin ; and in the last stage, sores on the nates, hips, and os sacrum, so deep as to expose the bones in some cases. Where typhus fever made its appearance unconnected with dysenteric symptoms, there was more or less simple diarrhœa."

Dr. Mann, speaking of the diseases of 1813, remarks, that "typhus fever, dysentery, and diarrhœa, and these variously combined, were the prevailing diseases from May to August ; and that *intermittent* and *synochal* fevers appeared in September and October." These synochal fevers seem to have been intermediate between the intermittent and typhus, either an intermittent passing through the remittent form to the continued, and brought to a remission by bleeding,—which is probable from his associating them with the intermittent type,—or a continued fever, attended with more ardent excitement than was common in typhus, brought to a remission by the same treatment. He describes them as "accompanied with pain in the head, increased heat, fullness and hardness of pulse, all of which indicated an excess of excitement that demanded bleeding and an antiphlogistic regimen. In most cases these removed the excess of excitement, and placed the patient in a condition in which antimonials in small doses removed the remains of diseased action. About the same period a case called my attention which had been of some duration, perhaps twelve or fourteen days; what the symptoms were at the onset I did not learn. The patient was extremely

debilitated; the pulse contracted, quick, and hard; the skin dry and cool in the mornings, but hot in the evenings. These symptoms were attended with delirium and inflammation of the eyes. A blister was applied on the neck; one grain of calomel night and morning, and one fourth of a grain of tartrite of antimony every four hours were prescribed. The delirium continued with watchfulness, and the above medicines were directed the second and third day. The disease remained *in statu quo*. Bark and wine were proposed by a surgeon of the army. As I anticipated, the febrile symptoms were all aggravated, the remissions shortened, and the fever assumed a more continued form. A cathartic was administered, and the antimonials continued in small doses. The paroxysms of fever daily lessened and gradually disappeared, with an abatement of delirium and return of appetite. The practice of administering bark during remissions of fever is in conformity with that of Cullen. Long experience has convinced me that bark and wine, given as soon as there is a remission of fever, will not generally succeed in the autumnal *mixed* fevers as they appear in the Eastern and Northern States."

This is the only notice I have remarked in Dr. Mann's work of this *mixed* form of fever, which is probably to be considered as a remittent. It is evident that nothing like the intensity and rapid progress of yellow fever occurred during the campaigns; and its absence, or that of those forms of fever so closely approximating to it, which we have seen endemic in the interior of the Southern States, can only be accounted for by the difference of lati-

tude; for the situation of the army on the borders of Lake Ontario, of rivers, and in a country more or less cultivated, notoriously obnoxious to malaria, which gave rise to intermittent, mixed and typhus fevers, would undoubtedly, under the influence of a high and long-continued heat, have exhibited fevers like those of similar situations in the South. That these western portions of the Eastern States do, in particular years, exhibit fever closely resembling yellow fever, is proved by the observations of Mr. Coventry, which I have already quoted; and the *Lake fever* is probably a malignant remittent, which partakes more or less of the combined character of yellow and typhus fever,—the symptoms of the former being more apparent in seasons of unusual heat.

Of the general character of fever in the State of Vermont, lying between lat. $42^{\circ} 42'$ and 45° N., we have an elaborate account in the “Sketches of Epidemic Diseases” in that State, by Dr. Gallup, published in 1815,—the only general work on fever that I am acquainted with from the New England States. I shall make use of it to show the types of fever that commonly prevail there.

Vermont is intersected by a range of mountains running north and south, diverging in the upper part of the State in an easterly direction; and the waters which flow from them run westerly into Lake Champlain, and easterly into Connecticut River. The only extensive tract of level country borders on Lake Champlain; and this, on which Burlington is situated, above referred to in the observations taken from Dr. Mann’s work, is obnox-

ious to intermittents. The soil is generally of a deep and dark colour, moist and loamy, particularly in valleys and meadows. For a great part of the year the air is dry, pure, and serene,—not attended by fogs or mists. The summer rains set in about the 20th of July, and the autumnal ones about the 20th of October. Frost commonly ceases about the middle of May, and commences about the 10th of September. Snow falls sometimes in October,—more frequently in November,—but not usually, to continue through the winter, till the middle of December. From observations made at Burlington, from 1803 to 1808, the wind, in 1682 observations, was—

From the North 739 times.

South 826 —

East 19 —

North East. . . 11 —

South East. . . 1 —

West 43 —

North West . . 18 —

South West . . 25 —

The eastern part of the States is more exposed to north-east winds.

The mean temperature of the climate for five years was, at Burlington (lat. $44^{\circ} 29'$), $43^{\circ} \frac{1}{3}$; and at Rutland (lat. $43^{\circ} 35'$), $43^{\circ} \frac{1}{2}$; and by months—

January $14^{\circ} \cdot 4$

February $18 \cdot 9$

March. $28 \cdot 5$

April $39 \cdot 5$

May $56 \cdot 3$

June. $66 \cdot 6$

July	68 ·2
August	67°·6
September	57 ·1
October	45 ·2
November	33 ·5
December	24 ·7

Humboldt remarks, that at Vera Cruz, where the mean temperature of the year is 77° , the yellow fever only begins to rage when the mean temperature of the month reaches 75° : and at Philadelphia, Mr. Evans found, from observations made from 1793 to 1809, that the yellow fever had never been epidemic there, when the medium heat of June and July had been below 79° , except in 1802, when it was 78° , and then only two hundred persons died of it. It will not be expected therefore, in a State like Vermont, where the annual temperature is only $43\frac{1}{2}^{\circ}$, and the highest mean temperature of the hottest month in the year is only 68° , that fever, so intense in its general character as yellow fever is, should be developed. On reference to the observations of Dr. Gallup, on the epidemics of the State from 1776 to 1814, I find no account of any fever approaching yellow fever, but typhus often recorded; and I shall quote some of the remarks to show that this is the common endemic of the country.

In speaking of the years 1787 and 1788, he says, "The common and various diseases of the country continued to prevail as usual; such as pleurisy, inflammatory fevers,—some partaking more distinctly of the typhus character, others bilious or intermittent; dysentery, &c."

In 1793, the year of the first great epidemic of

yellow fever at Philadelphia, he remarks, " Diseases of various descriptions began to assume a more serious aspect this year than for some years past. Inflammatory fevers, or what were called by some bilious, were considerably frequent ; " and in 1794," he says, " all diseases of pyrexial character became more severe than they had been a few years past. A few cases of sporadic fever, with anomalous symptoms, terminated fatally in a short time. Typhus prevailed near Bennington and adjacent places. Perhaps here (Woodstock) at that time fevers might as well have been called typhus. They were often denominated nervous or slow fevers ; but when they prevailed very considerably, they are said to be contagious. This circumstance has deceived people in all ages."

1797. " Fevers which had formerly been called inflammatory, bilious, or remittent, seemed to assume a more formidable aspect. They were now called by some, typhus ; by others, putrid. In some instances the patients would be affected with a yellowness of the skin, and without any particular affection of the region of the liver. This yellow colour was not so often an attendant of severe cases as of the more mild. It was sometimes discoverable in persons so slightly indisposed as to be able to go about. But a small proportion, however, of those affected with fever had the yellow colour. The head and stomach were most affected, often attended with delirium, and afterwards with vomiting. The fever, though generally pretty severe at its commencement, had a strong tendency to procrastinate its period of termination ; it was therefore

called slow or typhus fever. This fever appears to be of the same character with that mentioned by Mr. Webster as affecting Windsor, Hanover, and Royalton, in 1798. Bethel is on White River, four miles west of Royalton ; and the fever prevailed in all that vicinity this year and in 1798. It did not arrive at the height of its greatest severity in this region till 1800, but has continued every year, and with much severity in 1803, and more or less until the present time (1815), affecting different towns with different degrees of severity. Since 1807 and 1808, common typhus has been less frequent, though a pretty constant attendant."

In 1798 and 1799 typhus and dysentery prevailed. "The summer of 1800 seems to be the period of the greatest severity of typhus fever in this vicinity, particularly at Woodstock, where I then lived. It prevailed with its greatest force in July, August, and September, but was frequent in the beginning of winter. It showed a strong tendency to affect the stomach and bowels, by producing severe vomiting and intestinal discharges of blood. In some cases the access of the fever would be violent; more commonly the fever would be four or five days in forming. Dysentery and cholera frequently appeared in summer."

1801. "Typhus and dysentery prevailed more or less. Intermitting and remitting fevers are very common in the western part of the State, adjoining Lake Champlain. They extend but a little way from the lake, unless in the vicinity of low and wet land. They are not so common as in former years, soon after the clearing of the land."

1803. "As steadily as the seasons return have typhus or *mixed* fevers and dysenteries returned, for several years in succession. Their obstinacy and frequency this year has hardly been surpassed during this pestilential period. The fever and dysentery prevailed in the same neighbourhood at the same time. In the same patient it would sometimes be fever, and sometimes dysentery."

1805. "Some dysenteries, but principally typhus. The fevers of this autumn and winter not inferior in obstinacy to any we ever had. They were not so frequent in those neighbourhoods that had been formerly afflicted. In the north part of Hartford, typhus was very severe, and continued through September and October to February. About one in ten died."

1807. "A severe and very extensive influenza prevailed all over the United States and Canada: it seemed to have a moderate progression. The Supreme Court commenced its session at Woodstock on August the 18th. The disease was almost universal in this and the second week of the session. Some places were afflicted with fevers, which some called bilious,—others typhus."

1808. "Fevers began in July, and continued through August, September, and October. Treated early with frequent and full bleeding, &c., the disease was arrested, and almost every case restricted to one or two weeks; whilst others, treated by opposite measures, were sick the usual time. I was attacked in the latter part of July, but depletion so far averted the disease as not to confine me. Again, in August another attack was averted by similar

measures ; and in the fore part of September a third attack, after fatigue and exposure, confined me four weeks with a serious disease."

1809. "This year was not remarkable for any severe epidemic in Vermont ; the common routine of sickness continues. Previous to this year, the greatest proportion of sickness from epidemic diseases had occurred in the summer and autumnal months, very constantly. Since, the proportion has been reversed ; and perhaps two thirds of the sickness has happened in the winter season of different years, to 1815."

This observation of Dr. Gallup refers to the prevalence of the bilious pleurisy and the memorable *spotted fever* which prevailed so mortally in many parts of the New England States from the year 1806, but with a frequent irregularity in respect to season, and with a capriciousness as to locality, and a slow progression from one part of the country to another, that, like the late spasmodic cholera, baffles all attempts to explain the combination of causes on which it depended. I am but imperfectly acquainted with the history of this remarkable disease, the spotted fever, which affords one of the most striking examples of what Dr. Armstrong called congestive fever. It assumed at times, in particular instances, symptoms like the bilious pleurisy, or *peripneumonia notha*, which I have repeatedly noticed in this inquiry ; or those of plague or typhus, and in some cases of the black vomit of yellow fever ; and in others it approached, in some respects, spasmodic cholera. The first notice of it which excited any alarm was at Med-

field in Massachusetts, in 1806. It did not prevail in Vermont till the winter of 1810 and 1811. Dr. Hale, in his admirable Report of it, shows that it did not reach Gardiner in Maine till February, 1814. I cannot recollect a single medical authority who thought the disease contagious, or who conceived that its progress was to be explained by contagion. It would occupy too much space to enlarge upon it here; and I shall merely quote a few observations from Dr. Gallup, and refer to such works upon the subject as I am acquainted with*.

"Spotted fever," Dr. Gallup remarks, "seems to be generally the offspring of cold climates and cold seasons. With a few exceptions it has broken out in the coldest seasons, and spread most alarmingly at such times, in the different places it has visited. January and February have oftenest given rise to it. When it rages considerably, it continues to the middle of May, and then passes off gradually."

* "History of an Epidemic Fever called Spotted Fever," by E. Hale, Jun. M.D.; Boston, 1818.

Gallup's "Sketches of Epidemic Diseases;" chap. vi. on Spotted Fever.

"Treatise on a Malignant Epidemic called Spotted Fever," by E. North; New York, 1811.

"Report of Massachusetts Medical Society, 1810, on Spotted or Petechial Fever."

"Information relative to the Spotted Fever in Worcester County, Massachusetts."—Med. Repos. vol. xiii. p. 391, by Dr. Wait.

"Remarks on Spotted Fever in Connecticut," by Dr. S. Woodward; Med. Repos. vol. xiii. p. 42.

"Stuart—Dissection of a Body dead of Spotted Fever, 1811." Med. Repos. vol. xv. p. 23.

Dr. Powell, of Burlington, Vermont, says that the malignant pleurisy, or peripneumony, commenced in January 1810, and disappeared in April; that at the northward a number of cases of spotted fever occurred with it, but only one or two cases in his neighbourhood; and he conceives that both diseases originate from the same cause, differing from each other in the degree and seat of the urgent symptoms.

1811. "Spotted fever made its first appearance in this town (Woodstock) and vicinity this year, in January. It appeared in a decided form about the 23rd: though some cases happened a few weeks previous, showing a petechial character. At this time the earth was fixed in frost, with steady moderate cold weather, and a fine serene air. The disease continued very severe through April, which was milder than usual. For two months the greatest proportion of cases were confined to the village where it began, and to the more distant neighbourhoods after the 20th of March. The adjoining towns suffered the most severely the following year. The number of new cases, perhaps thirty-five, were about the same each week, until about the 23rd of March. The snow began to melt about February the 26th, by the moderate warmth of the air and mild rays of the sun; and this state of air, for the most part, continued with unusual pleasantness and moderate south breezes till the 21st of March, when the snow was gone, except in the woods. The frost so far left the ground, that I saw people ploughing green-sward on the 28th of March,—a rare occurrence in this place. The week

previous to the 23rd of March was attended with the greatest number of deaths ; and the proportion of deaths, in five months, about sixty or sixty-five out of five hundred and fifty or six hundred cases."

1812. "More severe cases of spotted fever occurred in the south parish of Woodstock this winter than the last, but the whole number of cases in the town was not one to seven. In Reading, sixty cases,—nine fatal, mostly in thirty hours. In Plymouth thirty, and four fatal. In Arlington, on the Battenkilm River, and in Pawnal, typhus prevailed,—about one case fatal in ten. This prevailed more or less during the period of spotted fever ; and it was common for a severe attack of the latter to terminate in typhus."

1813. "The autumn of 1812 and winter of 1813 ushered in the most severe epidemic disease that ever afflicted the inhabitants of Vermont, the epidemic peripneumonia. It seemed to have the features of spotted fever, which had been in the State for about two years : the chief difference seemed to be, that now the greatest force of local affection fell upon the lungs. The unity of the hurtful principle is inferred from many places being affected with this disease in some measure a year or two before, whilst spotted fever more commonly prevailed : from the latter occurring at the same time with this in many places, and from the common features and sudden fatality of both diseases. In Pomfret it began in December, and continued till May : forty-four died. At Arlington, about the middle of January, and disappeared in June : ten died. At Reading, forty-four died from January to June ; and in this last

place, four hundred of the cases and forty of the deaths were after the 1st of March." Dr. Gallup computes that a very low estimate would make the deaths in five months throughout the State, the population of which in 1810 was 217,913, about 6000. In the latter part of the summer and first winter months typhus occurred, and also several cases of *cholera infantum*, which he says has prevailed more or less almost every summer.

Dr. Gallup, in speaking of typhus, says, "I can discover no difference between the disease which has afflicted the people of this country for twenty years past, and that described by English writers. *It prevails most frequently in August and September*, but no month is free from it, especially the fore part of the cold season." "For the purpose of accommodating the geometrical rules of nosology, typhus has been divided into *gravior* and *mitior*. This only denotes the extremes; and cases arise with all the intermediate degrees of morbid excitement. This shows not only the folly but the criminality of nosological divisions; they no more enlighten the honest inquirer after truth than the *ignis fatuus* does the benighted traveller. The hurtful principle or cause of fever, whatever it may be, admits of much variety; some periods afford fevers showing a propensity to affect, in a special manner, certain parts of the body; and much variety prevails in different temperaments as respects susceptibilities and responding action. These go far in explaining the diversified phænomena of fevers. When that grade, which is called *typhus mitior*, most generally prevails, many cases may be met

with answering the description of *typhus gravior*, and *vice versâ*. When the yellow fever prevailed at Philadelphia and other places, from 1797 to 1803, this part of the country was visited with fevers of different degrees of severity, usually called *typhus mitior*; some had the yellow tinge and black vomit. In the same subject the nosological character varies in a very short time, the *gravior* becomes *mitior*, and the *mitior* sometimes *gravior*, and either of them assumes the mixed form, or becomes more strictly inflammatory. With this mutability of condition, the nosological character is lost, and can be of no more utility to designate the quantity of disease or the degree of remedies, than a mute clock to tell the hour of time."

I shall now, as briefly as possible, notice the character of fever in the State of Massachusetts, especially at Boston, lat. $42^{\circ} 20'$, where it will be found that yellow fever has occasionally prevailed, but in a very trifling degree as compared with Philadelphia and New York; affording an additional evidence that this precipitate form of fever declines in frequency towards the higher latitudes, and that it often approaches in character and duration the worst forms of typhus.

I have no means of ascertaining the date of the earliest epidemics at Boston, nor can I find any year in which the mortality from fever exceeded three hundred. In 1798, Dr. Brown gives this as the maximum of mortality, surpassing that of 1796 ten times, and that of 1802 five times*. It will be re-

* Dr. Rand says the deaths were one hundred and forty-five in 1798.

collected that the year 1798 was a most disastrous one at Philadelphia; the deaths from fever exceeding 4000. The population of that city, lat. $39^{\circ} 57'$, in 1798, did not exceed 64,700, making the mortality one in sixteen of its inhabitants; while in Boston, lat. $42^{\circ} 20'$, with a population of 23,500, the mortality was only one in seventy-nine.

Dr. Warren* notices the fever of 1796, and he says, the physicians of the town were unequivocally of opinion that it originated from local causes. Its first appearance was on the 25th of August, in a family at the south-easterly part of the town, near extensive flats, which are daily exposed to the action of the sun. The two first cases were fatal on the fourth day, but without yellowness of the skin or black vomit. The succeeding cases were of a milder character; and two of them "had no inflammation of the eyes, but a thicker fur on the tongue, which was of a dark colour towards the height of the disorder, with more distinct pains in the head, back, and limbs, exacerbations at night, and without any remarkable change in the symptoms till the eleventh day, after which the recovery was slow, as in common typhus, and not completed till the fourth week."

Yellowness of the skin occurred in some cases, and in two the black vomit. The disease, unless conquered by a very early exhibition of medicine, often ran on to the eleventh day, and sometimes to the third week. From the beginning of September it was slowly increasing, and the greatest number of cases at any one time, under Dr. Warren's care,

* Med. Repos. vol. i. p. 131.

was in the first week in October, from which time it gradually declined till about the middle of December. "A very great proportion of those taken sick lived near extensive flats. Oliver's Dock, where the disease was most prevalent, was exposed to exhalations from foul substances, lodged about the wharves and docks of that quarter, with buildings so constructed as to admit of very imperfect ventilation, and with a large number of inhabitants crowded together in a small space. When the disease first made its appearance, the weather was warm; it became cool about the middle of September; and as the cool weather advanced, its violence and mortality were gradually diminished. Not above thirty persons died of it in the whole season. Having almost every fall seen a number of cases very similiar to the above, not excepting the black vomit nor the yellow skin, together with the quality of contagion and other circumstances usually attendant on fevers of this denomination, I have been induced to believe that the disorder was no other than what has more or less prevailed here almost every year, and is what is probably termed a bilious remittent fever."

I shall not stop to question the propriety of the name or the contagious quality ascribed to this fever. That it often partook more of the character of typhus than yellow fever, and was either one or the other, as circumstances swayed it, appears to me very evident; and the predominance of the latter in Philadelphia, and of the former in Boston, both existing at the same time and in the same place, is at least a strong presumptive proof of their

being modifications of the same disease, arising from the same remote cause, and influenced by temperature. Dr. Warren admits that it arose, independent of contagion, from putrefactive exhalations; and he very sagaciously remarks, "It has been generally thought that continued fevers are the offspring only of human effluvia, and intermittents of marsh miasmata; yet there is sufficient reason for believing that this limitation does by no means generally prevail."

That the attendants upon the sick are often seized with the prevailing epidemic fever is no proof that they take the disease by a contagion *sui generis*. They are peculiarly exposed to its exciting causes, and immersed in the atmosphere of its remote cause; and it would be wonderful indeed if they always escaped. Rush says that the female attendants in families afflicted with yellow fever often took it; and this might be argued to imply contagion: but surely there are few who can admit anything like contagion in that disease. Its local prevalence; its obedience to seasons; the invariable exemption of the natives of Vera Cruz, of Charleston, S. C. &c.; the extinction of the disease, taken from a sickly to a healthy district, with those who transport it, be it one person or hundreds; its non-communicability in the hospitals of Philadelphia and New York, &c., are facts which cannot be disputed; and they amount to a proof of non-contagiousness, as clear and decisive as the question requires. If typhus be yellow fever modified by temperature, &c., if it arises from the same remote causes, prevails in the same places, it is at least

reasonable to say that the cause which gives it to one may give it to thousands wholly independent of the aid of a cause so generally invariable in its operations as true and indisputable contagions. But I shall reserve this subject till I inquire into the fevers of Great Britain; though I may remark that Haygarth, the modern oracle of contagionists, strangely advocates his cause, when he urges that the febrile poison gets an increase of malignity by putrefying in foul clothes. It would have saved Jenner much labour had he found that the putrefaction of the vaccine virus would have answered as well as the recent matter.

The epidemic of 1798 began in Boston late in June, and ceased in October. Dr. Brown says*, "The weather in July, August, and part of September, was never known so uniformly and excessively hot and debilitating; the winds generally from the south, surcharged with heat and a clammy moisture. The fever prevailed with much malignity till about the middle of October, when it was completely checked by an inundating storm from the north-east of three days' continuance. After this, scarcely a case of the fever occurred; but the common bilious autumnal fever succeeded, and was considerably mortal. In November and December there were a number of cases of slow putrid or typhus fever."

Dr. Rand† has given a particular and highly

* Med. Repos. vol. ii. p. 360. In 1800 Dr. B. published "A Treatise on the Nature &c. of Yellow Fever; Boston, 1800," in which this epidemic is described; but I have not seen it.

† Med. Repos. vol. ii. p. 442.

instructive account of the weather, and of the circumstances connected with this epidemic.

“In May, the thermometer ranged during twelve days from 60° to 82° ; nineteen days from 48° to 90° . A few had *typhus mitior*.

“In June the thermometer ranged twenty days from 70° to 83° ; nine days from 65° to 70° ; for seventeen days the winds were south and south-west. Bilious and inflammatory fevers.

“July was hot and sultry. South and south-west winds prevailed eighteen days. The range of the thermometer was from 72° to 96° , except three days, when it fell to 67° . *Typhus gravior*, and in some instances the yellow fever.

“August. South-south-east and south-west winds prevailed twenty-three days. Thermometer 72° to 94° ; on the 20th and 23rd 67° and 69° ; healthy except the fever.

“September. Very little rain, and part of the month hot and sultry. For twenty-two days light breezes from the south-west, south, and south-east. Thermometer 56° to 77° . On the night of the 29th a frost. The fever abated the latter end of this month.

“October. West and north-west winds blew thirteen days; variable from north-east to south-east the remainder of the month. A great storm on the 7th, with much rain. A severe frost on the 29th, which arrested the further progress of the contagious fever.

“The pestilential or yellow fever appeared June 17th, in a family on Stoddard's wharf, consisting of eight persons. Five had the fever: one died on the

23rd, and another on the 30th. This wharf is between the mill creek and town dock, which is the receptacle of a large sewer, and surrounded by fish-mongers' stalls, from which the offal of fish, putrid fish, oysters and clams are thrown, and surrounded by stores which contained spoiled hides, beef, &c. Some days previous to their seizure with the fever a quantity of damaged salt and pickled fish was thrown into the creek at the back of Stoddard's house, which produced a very putrid exhalation. The disease at the last of July appeared at the foot and south and south-east declivities of Fort Hill; and scarce a family that resided below the summit on these sides escaped the fever. The hill is a solid mass of clay, covered with a few inches of mould; and its declivity towards the south renders the rays of the meridian sun perpendicular, and proportionately increases the heat. This side of the hill has been built upon but a few years; and the families from their first residence had thrown their waste water impregnated with animal and vegetable substances at their doors; and as the declivity of the surface soon made it disappear, they had not constructed drains to convey it to the river. The clay prevented its penetrating further than the termination of the mould; so that the extreme heat of the meridian sun, and the increased heat of the last summer, exhaled a gas that otherwise might have lain dormant, and conspired with other causes to render the air of that part of the town peculiarly disposed to excite this fever. The south, south-east, and south-west winds prevailed most of July, August, and September, which wafted the exhalation

tions from the wharves, stores, and docks, at the foot of the hill. At the margin of the river, on the south-east and south sides of the hill, there was stored a large quantity of salt fish, many half-putrid raw hides, and barrels of beef. The first person who was attacked with the fever on Fort Hill was a man who had been employed in conveying some of the putrid salt fish from the stores into the channel of the river. Another who had purchased semi-putrid hides, soon after removing them was seized with the fever, and fell a victim. The latter part of August, September, and part of October, the fever raged at the north part of the town, in Front Street, a narrow, confined, dirty street, fronting the east and south-east of the harbour, and exposed to the exhalations brought by the winds from the extensive flats and foul docks, from Hancock's wharf to the town dock. It affected some persons in Cross Street, where a cellar which had not been cleaned for some years was so offensive that a number of hogsheads of lime were strewed over it before any person could be induced to remove the dirt from it into the street, where it lay more than a week, during which time the occupier of the house was seized with the fever, but being removed recovered. A poor family of four persons, whose circumstances would not admit of removal, was seized with the fever, and all died; and two women living in the opposite corner probably received the infection from the same source, and died.

“The last of September and beginning of October the wind shifted to west and west-north-west, which conveyed the noxious exhalations from a mill-pond

into Back Street, where the fever seized a whole family whose garden wall was washed by the waters of the pond ; and individuals of some other families were also attacked with it. The filth of the streets flows into it in every direction ; and it is the receiver of the vaults surrounding the pond, of dead cats, dogs, putrid meat, fish, and rotten vegetables. The water was often drained off, so as to leave the mud, &c. exposed to the action of the sun, the intense heat of which acting on these substances, generated a destructive exhalation, which, during the prevalence of the south, south-east, and south-west winds, was blown from the town ; but as soon as the wind changed to the west and north-west its effects were fatally experienced by some families in Back Street. When the fever appeared there, the Selectmen were requested to order the water to be constantly retained in the pond, which being enforced, the fever soon ceased in that quarter.

“The *cloacæ* of the town were extremely offensive during the summer ; the effluvia arising from emptying a vault that had been exposed to the sun produced the fever in Mr. Gordon, which proved fatal to him.

“ From information of some of the most intelligent merchants, there remained in the stores in this town, during the last summer and fall, an immense quantity of salt and pickled fish, part of them in a putrid state, and a great many barrels of beef semi-putrid, exhaling a destructive vapour. These provisions were designed for the European and West India markets, but from the depredations

committed on our commerce by the French*, were not exported, and remained sources of poverty, sickness and death. The beef is packed in the country in the fall and winter, with not one half the salt necessary to preserve it through the summer; and when sold by the commission merchant, it is repacked, and not till then is the full proportion of salt added. Three lads, apprentices to Mr. Marston, the cooper, by repacking some of the beef, were seized with the fever, and all died.

“The fever did not seem to be contagious from the diseased. I know of no instance of its being communicated to the nurses or attendants of the sick, but appeared to be propagated by an impure local atmosphere operating on habits previously disposed to receive the infection. Five persons who were attacked with the fever were carried into the country and died; no person received the infection from them. Many of those who were conveyed by water, after their seizure, to Hospital Island recovered. None of the attendants sickened. The atmosphere in the sickly districts was perceptible to the smell and taste, exciting in my mouth the same sensation as a weak solution of corrosive sublimate, and was very similar to the smell and taste of the effluvia from the confluent small-pox; and it constantly excited in me a salivation during my attendance upon the sick in those

* Dr. Brown says “that all intercourse with the French West Indies was expressly forbidden by a law of the General Government; and that this might be one cause why such quantities were suffered to spoil and waste.”

places. I ascribed in some measure my security from the disease, to this effect upon the salivary glands.

“ This fever attacked the patient most commonly with a violent pain in the head, back, loins, thighs and legs, a pungent heat, burning sensation, and pain at the præcordia (seldom with rigors), nausea, vomiting, moist whitish tongue. Some had most exquisite pains in the stomach and bowels, with frequent vomiting of fluid blood mixed with bile. The vomiting in some continued till death. The eyes were affected with a burning heat, often suffused with tears; the conjunctiva of a yellowish red, and its vessels much distended. Some, whose pains and heat were very severe, had an appearance on the surface resembling the suffusion preceding the eruption of the confluent small-pox, with petechiæ and ecchymosis, and seemed to arise from the same rapid circulation of the blood in the evanescent arteries, often effusing the blood into the cellular membrane, producing purple spots. Some were so insidiously seized, that they were scarcely sensible of their sickness before they sunk under the disease. The blood as it flowed from the veins was of a dark purplish colour, like that of drowned or suffocated persons before respiration is restored. It soon coagulated, was not sizzly, and had a shining greasy appearance on its surface. The serum was yellowish. Only one person, of more than one hundred who lost blood in the first twenty-four hours after the attack, had sizzly blood. He had arrived from sea but twenty-four hours before his seizure. He lost in three bleedings forty-eight

ounces of blood, which was florid and sizzly. After the last bleeding, the pains in his head, the burning at the præcordia, the nausea and vomiting, greatly abated; and after the operation of a cathartic, he retained mercury, which soon affected his mouth. His distress, anxiety, and jactitation vanished, and he was free from fever the fifth day. Some few at the first attack were torpid and drowsy, sensible of little or no pain, with fluid blackish blood oozing from their nostrils and mouth. The pains and hard pulse continued from two to four days, when they commonly ceased; the pulse lessened from one hundred and ten to seventy-five, or below sixty; the heat fell below the natural standard, and in fatal cases was succeeded by coldness of extremities, a clammy sweat, low delirium. The burning at the præcordia, anxiety, distress and jactitation often continued till death ensued. The crisis in recovery was on the third, fifth, and seventh days. It terminated fatally on the second, fourth, and sixth days. Eleven persons who were my patients died out of one hundred and three, one before any medicine operated upon him; only two of them survived the sixth day. The skin at these stages had often a yellowish tinge, and in some as deep as a Seville orange; in many it retained its natural colour. The subjects of the disease were the active, athletic, middle-aged men; some few women, and scarcely any young children."

In the same volume of the Repository, p. 238, are the particulars of three *post-mortem* examinations of victims from this epidemic, by Dr. Rand and Dr. Warren; and I shall notice generally a few

facts which will render the above account of the disease more complete. The first case was that of a man who died on the sixth day, and who had had no medical aid till the first stage had nearly expired. The lungs and heart were congested, and blood effused into the cavities of the pleura and pericardium. The liver was highly inflamed and indurated, and, on cutting it, looked as if boiled. Gall-bladder contracted, and contained a little thick glutinous inspissated matter like pitch. There was no tinge of bile in or about it; and the hepatic duct had evidently for some time ceased to transmit bile from the liver. "The stomach exhibited an enormous distention of its veins, and had every mark of great inflammation. The intestines were generally in the same state; the smaller distended, and the larger contracted. The spleen uncommonly turgid. The peritoneum on the under side and the pleura on the upper side of the diaphragm were inflamed, but no other part of these membranes. The omentum thickened, turgid, and dark. In every stage of the disease in this case, the discharges from the bowels were of the colour and consistence of water-gruel, excepting a few evacuations of a matter similar to the black vomit; and this usually fatal symptom had also preceded the patient's death on the fourth day of the disease."

The subject of the second case was a person who died on the twelfth day, with symptoms of the mixed kind; a remission had taken place at the period usually critical, upon which, on the sixth day, a delirium ensued and continued till death. The vessels of the brain were astonishingly distended with

blood and serum effused between the dura and pia mater. Upon the sagittal suture and by the sides of the longitudinal sinus, where the large veins terminate in that cavity, a lymphatic band, about an inch wide, extending nearly the whole length of the sinus, was formed by coagulable lymph. The lungs were inflamed and adhered to the pleura; heart natural. "The liver much enlarged, highly inflamed; the convex surface near the gall-bladder exhibiting marks of extravasation, as if violently contused. Gall-bladder full of bile, and ducts pervious. The stomach was nearly in a natural state; but on the inside the surface of the villous coat was besmeared with a matter which seemed to be of the same nature with the black vomit, though nothing of this kind had been ejected in the course of the disease. The duodenum much inflamed for several inches from the stomach, and the whole tract of the small intestines in the same state. Bladder contracted to the size of a pullet's egg, its inner coat inflamed, and blood effused into the cavity."

In the third case death occurred on the fourth day. The lungs were inflamed, liver inflamed and indurated. "The gall-bladder was completely obliterated, its coats having coalesced with the contiguous parts, so as to form with them one confused membranous substance. The stomach was externally, to appearance, in a natural state; but its inner coat was covered with that black-coloured fluid denominated the black vomit." Colon and omentum inflamed. "In both the cases, where the gall-bladder had been diseased and ceased to perform its functions, as if the liver had been rendered inca-

pable of secreting bile, the body became yellow before death; while in the other, where the bile was found in due quantity, this circumstance did not occur."

I have enlarged on the subject of this epidemic at Boston, because I can speak from personal knowledge of the high moral and intellectual character of the authorities quoted; and because it appears to me to afford conclusive proofs of the correctness of the opinions I have expressed as to the affinity between yellow fever and typhus, and the identity of their remote cause; and at the same time, to explain why these aggravated forms of fever prevail so frequently in cities. We find from Dr. Rand's admirable paper, that in May "*typhus mitior*" existed; that in June the fevers were "bilious and inflammatory"; that in July they were "sometimes *typhus gravior* and sometimes yellow fever"; and that the epidemic ceased in October. It is impossible to doubt the influence of the local contaminations of air in giving rise to it; especially from the fact of the fever immediately ceasing near the mill-pond as soon as the water was permanently kept in it: and that the sources of animal putrefaction were largely concerned in producing fever is proved by the fate of the man who removed the putrid fish into the river,—of the one who purchased the offensive hides,—of the three apprentices who repacked the beef,—of Mr. Gordon, who was employed in emptying the vault,—and of those who sickened in Cross Street, from the filth accumulated in the neglected cellar.

We have in this epidemic, then, a fever beginning under a mild form gradually deepening into the

most severe ; and under the influence of an unusual degree of heat, sometimes assuming the character of yellow fever,—a form generally unknown in so high a latitude, and never met with frequently or extensively in its most decided and unquestionable shape, except in crowded sea-ports, where the air is preternaturally heated by the powerful reverberation of the sun's rays from the buildings, pavements, &c., where it is close and confined in crowded situations, and contaminated by offensive exhalations from all those accumulated sources of impurity, which are inseparable from towns ill regulated as to cleanliness, drains, and sewers. Under whatever forms the fever appeared, it exhibited no proofs of a contagious character. The five persons who sickened in Boston, and died in the country, communicated no disease ; those taken to the hospital, on an island in the harbour, did not affect the nurses and attendants ; and the localities of the epidemic clearly point to local causes. It cannot be contended that two distinct diseases existed,—one yellow fever from malaria, and the other typhus from human contagion ; for it is impossible to draw a line of separation between them. They are neither limited to fixed and invariable symptoms, nor has duration anything definite about it. The black vomit is not noticed by Dr. Rand, except in two cases of the three he examined after death ; and in one of these he expressly says it did not occur during life, though appearances like it were found in the stomach after death. If, therefore, we compare this epidemic with those in Philadelphia in 1793 or 1798, we are at once struck with the disproportion of mortality ; and it can only depend, I

think, upon the greater susceptibility to fever in the inhabitants of that city as compared with those of Boston, and upon the more widely diffused and more permanent and active exciting causes of disease in the one place than in the other. Dr. Rand says, "It appears from the returns made to the Selectmen by the physicians and undertakers, that there died of the fever from June 23rd to October 22nd, 1798, 145 persons." So that while the mortality this year in Philadelphia was upwards of 4000, or one sixteenth of the whole number of inhabitants, in Boston it amounted to about one in 160. Probably Dr. Rand's estimate does not include those who died at the hospital island, and in the neighbourhood of the town.

I can find no mention of any epidemic in Boston again till 1802, when the disease prevailed in the south part of the town, where it first appeared in 1796. "It was very limited in its extent; and if a patient was carried out of the range of the morbid atmosphere into a healthy part, and attended by persons there resident, the disease was not communicated in a single instance." It appears to have been a highly congestive form of fever, and the deaths were supposed not to exceed sixty*.

From the great improvements made in Boston of late years, and the admirable character of its police regulations respecting cleanliness, it has become one of the healthiest cities in the United States.

I shall here close this inquiry into the character of the fevers of North America, having shown by

* Med. Repos. vol. vi. p. 335.

an appeal to facts, that intermittents, common remittents, yellow fever, and typhus, are indisputably modifications of the same disease, arising from malaria,—considered either as marsh effluvium or the product of animal and vegetable putrefaction; its effects on the body being modified by temperature,—by the variable degree of concentration in the remote cause,—and probably by the state of individual predisposition.

The mildest form of marsh fever, viz. the intermittent, we have found to prevail from lat. 32° to 45° ; and that it often passes into yellow fever, and through an intermediate grade into typhus. In the southern latitudes this change of the intermittent into yellow fever, especially in years of the epidemic prevalence of the latter, is common; and if the degenerated type of the fever is protracted, it ends even at Charleston, South Carolina, lat. $32^{\circ} 47'$, in a low nervous fever,—a fact recorded by Dr. Ramsay in 1804. In the higher latitudes, the intermediate type does not assume the intensity of symptoms, nor the precipitancy of yellow fever. The intermissions become shorter, and the fever passes through a common remittent into typhus.

This difference of character in the intermediate grade of marsh fever, depending apparently on temperature, affords an additional argument in favour of yellow fever being merely the highest form of the common remittent.

That it is so, is proved by the epidemics of the interior of America,—where the adventitious importation of a specific contagion is impossible. We observe in them a regular obedience to season,

—a gradual rise, progress, and decline,—and such an approximation to the epidemics of the sea-coast, as leaves no doubt of the endemic origin of both.

The comparative frequency of the occurrence of yellow fever south of lat. 40° , and of typhus north of this parallel on the sea-coast, is very striking. Philadelphia is the last place, proceeding from the south, in which yellow fever frequently occurs. In the interior we meet with typhus in lat. 36° on the Roanoke River, where it is said to prevail epidemically in dry seasons. At Edenton, on the same parallel, the common bilious remittent is said often to end in typhus; and at Norfolk, about a degree to the north, the epidemic yellow fever in 1800 was succeeded in September by cases of typhus. In Frederick County, Maryland, about lat. $39^{\circ} 25'$, it is mentioned, that as the cold weather sets in, nervous fevers are common; and Dr. Vaughan shows, that in Delaware, between lat. $38^{\circ} 27'$, and $39^{\circ} 50'$, quotidians degenerate into tertians and semitertians, and these into continued fever; that in 1798 yellow fever protracted beyond the eleventh day became ordinary typhus; and that typhus was epidemic in 1803 at Wilmington.

At New York, lat. $40^{\circ} 42'$, we have found yellow fever much less frequent, less extensive, and less fatal than in Philadelphia; that it exists often with typhus; and that the last is the representative of the aggravated form of marsh fever, in those years when yellow fever does not occur. At Catskill, lat. $42^{\circ} 15'$, both forms were also met with, proceeding from evident local causes. The earlier cases were of yellow fever. One of the attendants sickened of typhus, which is inconsistent with the

idea of a specific contagion derived from yellow fever, on the supposition that these two diseases are distinct, but satisfactorily accounted for by considering them merely as modifications of the same disease arising from one remote cause. At Boston, lat. $42^{\circ} 20'$, in 1798, nearly on the same parallel, we find *typhus mitior* existing in May; bilious and inflammatory fevers in June; *typhus gravior* and yellow fever in July. At Providence, lat. $41^{\circ} 50'$, the common autumnal fever is said to be a mild typhus; and yellow fever has only prevailed thrice under the influence of great heat, and then with a trifling mortality as compared with epidemics of the South. In Vermont, typhus, according to Dr. Gallup, is the common form of fever. It is highly interesting to remark, that in 1793 he notices the evident aggravation in the character of the fevers of that State,—the year corresponding with the first memorable epidemic of Philadelphia. He notices the occasional occurrence of the black vomit; and, like Dr. Williamson in North Carolina, Rush in Philadelphia, and Vaughan in Delaware, refers the winter and spring pleurisy or peripneumony to the class of autumnal diseases. Dr. Pillson's Report of this disease at Greenville, lat. $35^{\circ} 30'$, from February to April, shows its affinity there to yellow fever, one case having the black vomit, the matter being ejected with that passive gulping which is described in the interesting case of the lady who died at Georgetown of yellow fever, arising out of a neglected intermittent, by Dr. Worthington.

In taking, therefore, a general review of the diseases of North America, which owe their origin

to malaria, we observe yellow fever almost annually epidemic at Vera Cruz, lat. $19^{\circ} 11'$; and that it gradually disappears in frequency as we approach the latitude of Boston, $42^{\circ} 20'$; that in the parallel of Philadelphia it often ends in typhus; that north of this line typhus becomes the more frequent form of fever, till we lose all trace of yellow fever in Vermont, as a distinct disease, the symptoms of both, however, being sometimes blended in the same case; that both of them are attended, from the south to the north, with diarrhœa, dysentery, *cholera infantum* in the summer, and in the winter and spring with a pleurisy or peripneumony, which in the south is more decidedly marked, like the autumnal fever, with bilious symptoms; sometimes, as Rush observed in 1803, with a tendency to a tertian type; and in the north having, like its fevers, a more typhoid character, sometimes approaching to the most malignant forms of congestive fever. It is highly interesting to observe, that when typhus occurs in those parallels of latitude obnoxious to yellow fever, it is towards the decline of that disease, as the cold weather sets in. In the north it occurs in the same season as yellow fever does at the south, though later generally, at least as an epidemic. Dr. Gallup says its greatest prevalence in Vermont is from July to September; but that it extends into the early part of winter, and sometimes till spring. This analogy with the typhus of Great Britain is important. It has been too confidently asserted, that the typhus of this country is confined to winter.

Of the causes which aggravate the fevers of

cities I think no impartial person can doubt, from the general contrast afforded, in this inquiry, between the epidemics of the sea-coast and those of the interior.

The confined limits of the disease; its prevalence in low alluvial districts; the striking origin of the epidemic at New London; the coincidence of cause and effect in Boston and New York; the occurrence of fever on ship-board under circumstances like those described by Dr. Burnett,—all point to local causes of contaminated air; and this will explain the prevalence of fever in the close, crowded, and filthy part of the towns and cities of this country.

That yellow fever cannot be considered a contagious disease is proved beyond all question. It is not communicable by the sick, in domestic life or in hospitals. The matter of black vomit has been swallowed, and applied to the body in a variety of ways, without any effect. We have seen that the typhus of New York and Boston was as incommunicable there as yellow fever; and Dr. Gallup's experience in Vermont was uniformly against anything like a contagious character.

In the next volume I shall offer a comparison of the fevers of Europe with those of America.

END OF THE FIRST VOLUME.

