



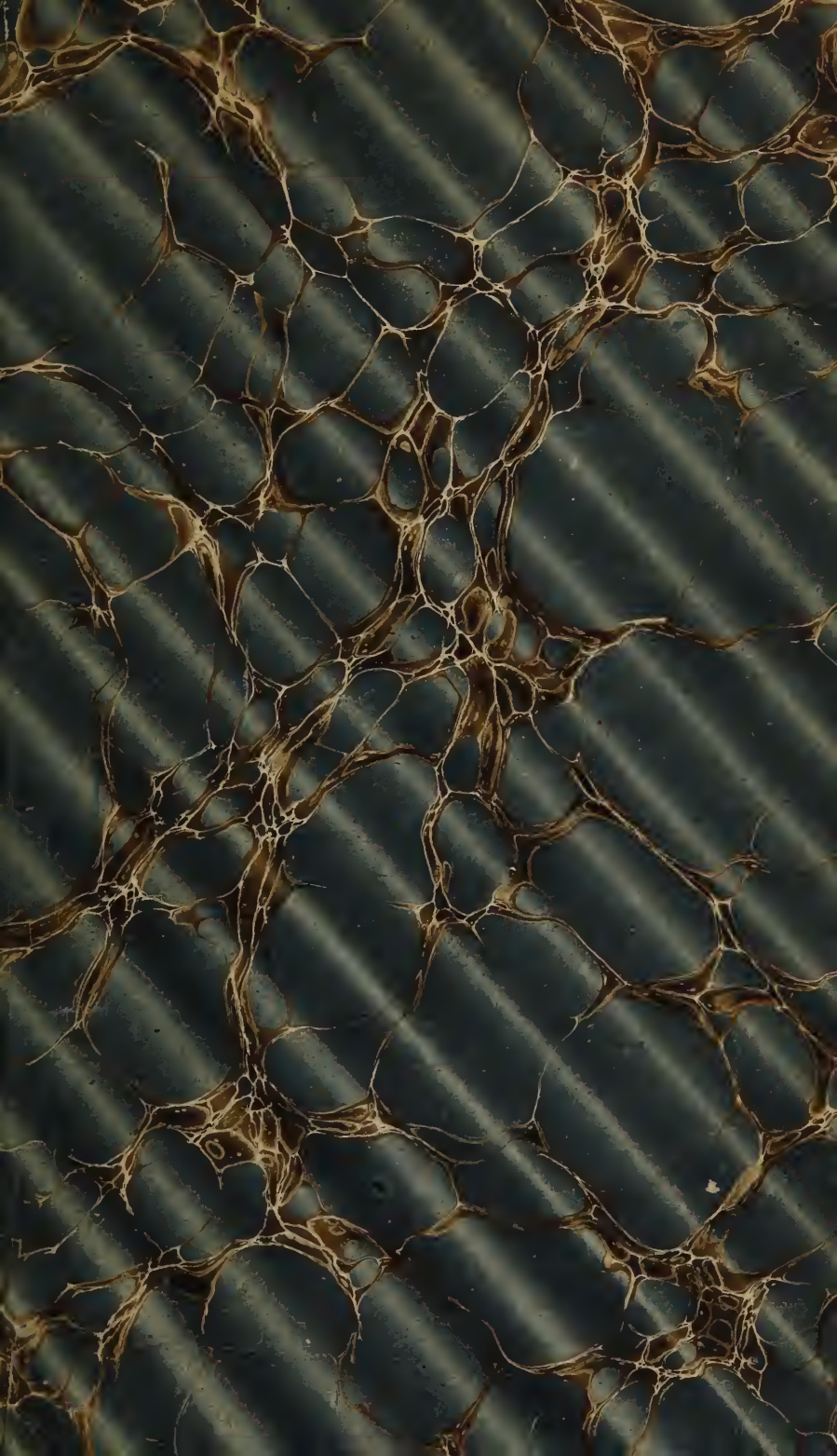
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ANNEX

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SHECUT'S
MEDICAL AND PHILOSOPHICAL
ESSAYS.

CONTAINING :

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| 1st. TOPOGRAPHICAL, HISTORICAL and other SKETCHES of the CITY OF CHARLESTON, from its first settlement to the present period. | | 3d. An ESSAY on CONTAGIONS AND INFECTIONS, (<i>Second improved Edition.</i>) |
| 2d. An ESSAY on the PREVAILING FEVER of 1817. <i>The Second Edition</i> , with improvements. | | AND,
4th. An ESSAY on the Principles and Properties of the ELECTRIC FLUID. |

THE WHOLE OF WHICH ARE DESIGNED AS ILLUSTRATIVE OF THE
Domestic Origin of the Yellow Fever of Charleston;

AND,

AS CONDUCTING TO THE FORMATION OF A MEDICAL HISTORY
OF THE STATE OF SOUTH-CAROLINA.

BY **J. L. E. W. SHECUT,**

PRACTITIONER OF PHYSIC,

And Member of the Literary and Philosophical Society of South-Carolina.

I write of the Seasons, the Medical and other Events of the City of
Charleston and its Precincts.

CHARLESTON :

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1819.



DEDICATION.

TO THE

Hon. John Drayton, L. L. D.

DISTRICT JUDGE OF SOUTH-CAROLINA DISTRICT.

SIR,

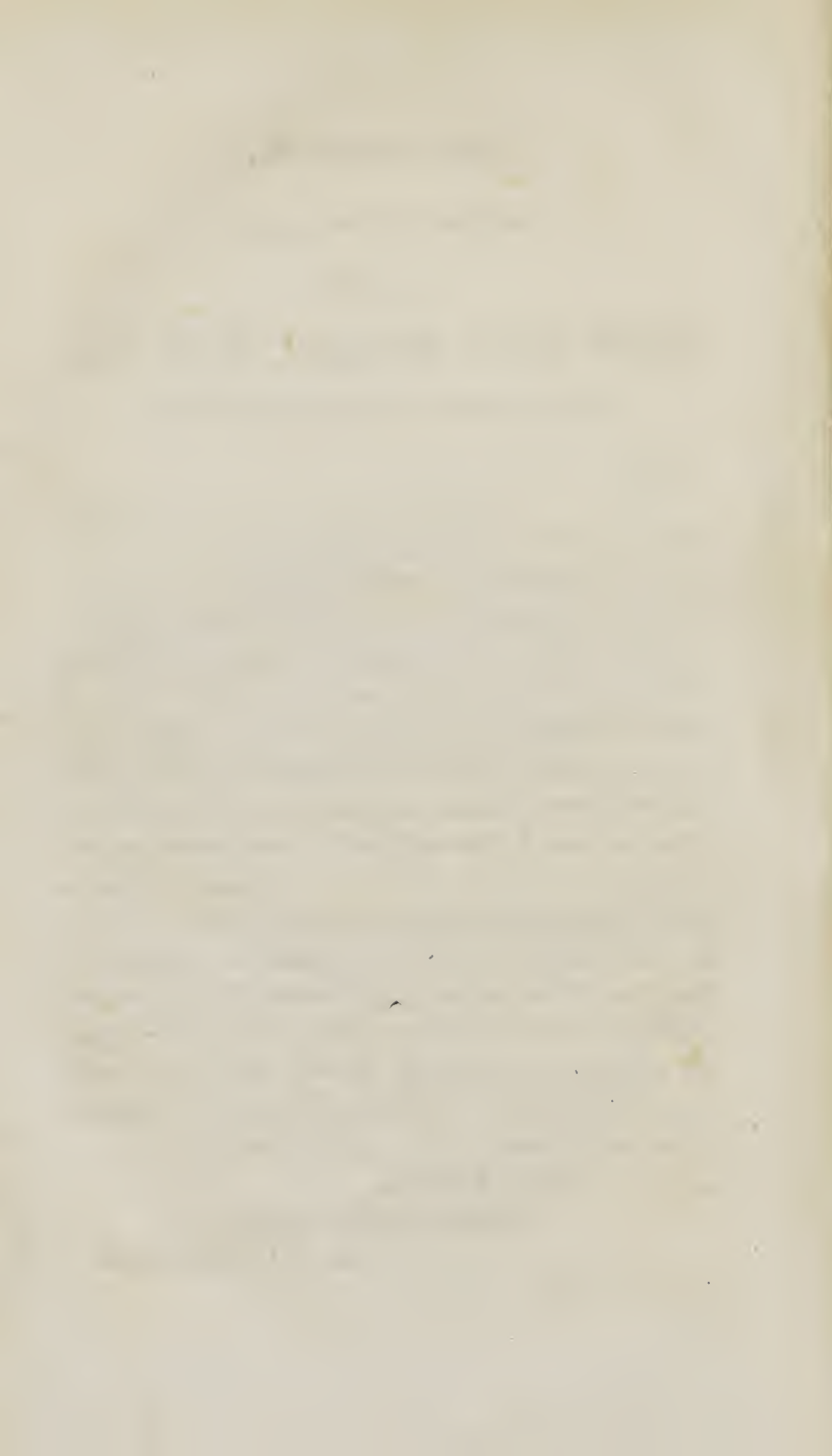
The following sheets are respectfully offered to your acceptance, as to the first native Carolinian, who has conceived and executed the noble design, of rescuing from oblivion the fast decaying materials, on which much of the important History of Carolina depended: and of which your invaluable "View of South-Carolina" is a perspicuous proof. Added to this, your zeal in the discharge of the important duties of the various offices of honor, repeatedly and deservedly conferred on you, by the suffrages of your approving fellow citizens; and above all, your unwearied attention to the promotion and encouragement of the Arts, Sciences and Literature of the State, as conducive to the growing fame of our nation; together with the high regard, which, in common with my fellow citizens, I entertain for you as a Gentleman of Science, induce me to offer you, together with the following Sketches, the assurance of my very sincere respect. I am, dear Sir,

Your most obliged


Friend and fellow citizen,

J. L. E. W. SHECUT.

February, 1819.



PREFACE.



DURING the prevalence of the Yellow Fever of 1817, I discovered, that operations on my electrical machine, varied with the rise, progress and declension of the Fever: that when the Fever first appeared in the city that summer, and indeed for some time previous to its occurrence, the electric powers of the machine had begun evidently to decline; that when the Fever raged with its utmost violence and fatality, sparks were not to be elicited, the fluid was almost totally inert; but as soon as the disease began to decline, a visible change also took place in the effects of the machine, from which, sparks were with some little difficulty produced; and on the entire cessation of the epidemic, which took place shortly after the restoration of an electrical equilibrium, produced by the *heavy concussion of thunder and lightning* on the 14th of October, 1817; operations on the machine were performed as usual, with an evident increase of electric power, as in other healthy states of the atmosphere of Charleston.

That this was a phenomenon, worthy of the most attentive investigation, will be readily admitted by all. It offered to my mind a boundless field of research, and promised a rich and abundant harvest if properly cultivated. It excited the most ardent inquiry, and stimulated to a more than common exertion of its faculties, a mind already actively employed for more than thirty years in the cultivation of science, and in the practice of medicine.

The first impression was permanent, it led to the examination of occurrences past and present, to retrospective and prospective views of the *actual effect* of the constitution of our atmosphere, upon the health of the inhabitants; and these to the important inquiry, *whether that peculiar state of the atmosphere, so constantly and invariably productive of the epidemic known among us as the YELLOW FEVER, did not in a great measure, if not wholly, depend on the absence of a due proportion of the ELECTRIC FLUID from the atmosphere of our city?* Sanguine in the belief, that such was the fact, I gave to the public a hasty sketch of the Fever, as it had appeared among us.

In that Essay, whose sheets extended coterminously with the progress of the disease, and were published immediately on its declension, I took the *unoccupied ground*, that "the peculiar (specific) predisposing causes of this modification of disease," depended on "a peculiar derangement of the atmospherical air, by being deprived of a due proportion of the electric fluid," &c.*

The very handsome reception of the Essay, the high terms of which *its doctrine* was spoken, by gentlemen of the first medical and philosophical talents and abilities in the United States; and the very flattering expressions of approbation contained in a review of its

* Essay on the Prevailing Fever of 1817, page 6 and 8.

pages,* together with the actual importance of the subject to the science of Medicine, were so many additional excitements, stimulating me to a more critical investigation of the principles of that doctrine, which I had already advanced, in various essays and literary correspondences. I was aware, that the attitude I had taken was as hazardous as it was important, because of its novelty; and I lost no time in fortifying myself for its future defence and support, by calling to my aid, such *historical facts*, as the records of my predecessors and cotemporaries could afford me, with regard to the influence and effects of the seasons upon the inhabitants of our city. In these researches, I have been more than repaid for my labour; they have afforded me ample proofs of the correctness of the *doctrine of electrical influence*, in arresting the progress of Yellow Fever, &c.

The propriety of publishing a second edition of the Essay, the first being entirely disposed of, and of prefixing to it the facts which had been collected for its support, together with those Essays I had already prepared for the press, and whose general tendency and design were the same, was suggested to me by several of my medical friends, to whose judgment I readily assented. Hence, it became necessary to say something of the Geographical situation, the Topographical, and Meteorological or Climacteric constitution of our city, in order to ascertain its *local peculiarity*, and the changes it has undergone since its first settlement. These have also led to the consideration of its improvements in the Arts, Sciences and Literature, particularly those connected with medicine.

To the works of the Reverend Mr. HEWITT, Dr. CHALMERS, Dr. MILLIGAN, and Mr. CHALMERS to the late Governor, now Judge DRAYTON, and to Dr. RAMSAY, as the faithful historians of South-Carolina, I

* New-York Medical Repository for April, 1818, page 255 to 264.

am indebted for the principal information contained in these Sketches; and to those venerable and respectable citizens, Mr. JOSIAH SMITH, Mr. JOHN CHAMPNEYS, Mr. MARK LAZARUS and others, for much valuable local information, and a view of papers of an official character, with regard to the original Topography of Charleston. From these respectable sources, and the liberal contributions of my literary friends, I have endeavoured to condense the information thus obtained, and to present them to my readers in the following order.

SKETCH I.

Of the original Topography of Charleston.

ON viewing the original maps or plats of Charleston, as delineated by those artists, CRISP and BARNWELL, at their respective surveys in 1704 and 1743, we perceive a *site*, which at the first view, impresses upon our minds the idea of its entire unfitness for the basis, on which to found the emporium of an extensive Colony, and were we to say to the growing youth of Carolina, while treading on the altered spot; here, once I angled for fish and caught them—here, formerly I saw rice, the great staple of Carolina, growing luxuriantly on this spot!—and there, we were formerly in the habit of shooting wild ducks, and of swimming in the pond! they might justly doubt the earnestness of the narrator; they might indeed wholly discredit such assertions, did there not remain, independent of history and the tradition of our fathers, the most undoubted natural proofs of their authenticity.

To point out to readers of the present era, the many natural proofs which still exist, as evidences of the former apparent unfitness of the site, on which to lay the foundation of a town, shortly becoming a city of importance, little inferior to the greatest in the union, will be the object of the following sketch.

The manner in which this surprising change has been effected, the time and labour which our fathers devoted to its accomplishment, the expence, the severe privations, and the hardships they endured, and the sacrifice of health and of lives, in converting a savage wilderness into a flourishing city, are amply and faithfully recorded in the histories referred to in the Preface, and to which the reader is respectfully directed.

The City of Charleston is located on a peninsula formed by the approximation and junction of *Cooper* and *Ashley rivers*, in the State of South-Carolina. It is laid down in the maps and charts, as situated in latitude $32^{\circ} 48''$ north, and longitude $79^{\circ} 54' 11''$ west from Greenwich, or 2° west longitude of the City of Washington.

The area of the peninsula from the point to the northern limits of the city, that is to Boundary-street, within the range of the old tapia horn works and draw gates, may be computed at about eight hundred acres, in an irregular plat of about one mile in length, and a half to three quarters of a mile in width, from river to river. Within this area there were ten large Creeks and several smaller ones, besides ponds, marshes and broken grounds. Hence, the slip of high land fronting to the east on Cooper river, and affording a prospect of the inlet from the Atlantic ocean, was selected as the original site of the town.

A large creek bounded this slip on the north, and another on the south. Its western boundary was the northern branches of the one creek and the southern branches of the other, which approximated to each other nearly in a line with Meeting-street. Thus, Charleston from the year 1680, the date of its first settlement,* to the year 1704, was comprehended within the limits of Amen and Cumberland-streets on the north, Meeting-street on the west, Water-street, on the south, and Bay-street on the east.

Within the first year of its settlement, the inhabitants erected thirty houses† for their immediate accom-

* Governor Drayton's View of South-Carolina.

† Chaimers's Political Annals, page 541, 548.

modation, they were of wood, and with the exception of a few, very inferior. The port was at the same time declared to be a port of entry, and the town to be the capital of South-Carolina; Mr. CHALMERS further observes, that a Collector for the port was first appointed in the year 1685. The enlargement of the town progressed but slowly for the first sixty years, in consequence of the difficulties from disease, threatened invasions of the Spaniards and Indians, and the privations and hardships common to so novel an undertaking, as the colonization of a new country so remote from the old; and, uncertain of the issue of their bold and hazardous enterprize, they continued to erect only buildings of wood, adapted to their present comfort and convenience

In Mr. EDWARD CRISP's plan of the town, from a survey in 1704, a copy of which may be seen in Dr. RAMSAY's History of South-Carolina, the most conspicuous buildings, both public and private, are thus numbered.

1. *Pasquero and Garret's* house, north east corner of Broad and Church-streets, the site now occupied by Messrs. M'KENZIE & M'NEIL.

2. *Landsack's* house, north west corner of the same, and the site now occupied by the *South-Carolina Bank*.

3. *John Croskey's* house, south west corner, now occupied by Messrs. JOHN and DUNBAR PAUL.

4. *Chevelier's* house, south east corner, now the property of Mr. JOHN HOFF.

These four buildings may be considered as the *nucleus* of Charleston, they being built in the centre, and constituting the angles of the square formed by the intersection of Broad and Church-streets, at that time the main streets of the town.

5. *George Logan's* house, north east corner of Church and Elliott-streets, now occupied by Dr. THOMAS FOLKER as a drug store.

6. *Poinsett's* house, south east corner of the same, now occupied by Messrs. HAYNE & M'CALL, as an office.

7. *Ellicott's* house, north east corner of Church and Tradd-streets, at present owned by Mr. MILLS.

8. *Starling's* house, south east corner of the same, and now occupied by Mr. COOK, as a store.

9. *M. Boone's* house, north east corner of Tradd-street and Bedon's-alley, lately occupied by Mrs. RUSSEL as a Boarding-house.

10. *Tradd's* house, north west corner of Tradd and Bay-streets, owned by Gen. THOMAS PINCKNEY and occupied by Mr. CAISON.

11. *Nat Law's* house, south west corner of the same, and occupied by Messrs. HUMPHREYS & MATTHEWS.

12. *Landgrave** THOMAS SMITH's house, south west corner of East Bay-street and Longitude-lane, the site lately occupied by Gen. ARNOLDUS VANDERHORST; on this lot was the first rice patch in South-Carolina.

13. Col. *Rhett's* house on East Bay-street, north of Broad-street and near Unity-alley, the site of which is occupied by the *Planters' and Mechanics' Bank*.

14. *Ben Skenking's* house, south west corner of East Bay and Dock-street, now Queen-street, owned by Mr. GEORGE FLAGG, and occupied by Mr. PEPOON as a grain store.

15. *Sindery's* house, north west corner of Broad and Bay-streets, owned and occupied by Dr. W. BURGOYNE as a drug store.

On the east side of Bay and directly in front of Broad-street, was the *Court of Guards* or Garrison; the site was afterwards built upon, and the building called the *City Exchange*; the lower part of which, on the fall of Charleston in 1781, was converted, by the British, into a kind of prison, which they named the *Provost*, and into which, many of our revolutionary heroes who refused to accept the king's protection were thrown and imprisoned. These vaults were afterwards occupied as Vendue Stores until the building of the present Vendue-range at the lower end of Queen-street.

* Landgrave was a title of American nobility, established by the Lords Proprietors of Carolina, in May 1691, and vests the holder with four Baronies of 12,000 acres of land each. See note to that effect in Dr. Ramsay's *History*, vol. 1. p. 45. It was probably borrowed from the Dutch.

The public market was situated at the western limit of the town, at the north east corner of Broad and Meeting-streets, the site was afterwards built upon as a National Bank, and Office of Discount and Deposit in the year 1801-2. With the sum obtained, by the City Council, from the United States, for the Exchange, they purchased the lot and buildings which are now occupied as the *City-Hall*. That part of Meeting-street, which lay to the south of Water-street, and without the lines, was known as the "*great street leading to the market.*"*

The following Churches take precedence according to the recorded dates of their erection :

1. The *Baptist* or *Anabaptist Church*, was built on a lot on the west side of Church-street, near to Water street, in the year 1685. The lot is at present used as a burying place for the members.

2. The *Independent Church*, formerly called the *White Meeting*, was a wooden building, erected in the year 1690, and occupied the same site, on which the *Circular Brick Church* was built in 1804.

3. *St. Michael's*, or the *First Episcopal Church* in South-Carolina, was erected at the south east corner of Broad and Meeting-streets. in the year 1690. The first Church was also built of wood. A second Episcopal Church was built between the years 1723 and 1733, in Church-street, this latter was built of brick and called *St. Philips*. Between the years 1750 and 1760, the wooden Church having been pulled down, the Congregation proceeded to build one of brick on its ancient site, hence, it is called the *New Church*, and in which Divine Service was first performed in the year 1761. This building may vie with any on the continent for architectural proportion and elegance. Of the Third Episcopal Church, *St. Pauls*, we shall speak hereafter.

4. The *Friends* or *Quaker Meeting House*, was situated without the limits of the town, on the west border of *Governor Archdale's Square*, which occupied the greater proportion of the land from Meeting to King-

* Landgrave Thomas Smith's original Title deeds, Anno 1693.

street and from Queen to Broad-street. The Meeting-House occupied the same site on which their present house of worship stands; the date of its erection is not mentioned by any of the writers I have consulted, but it is presumed to have been built shortly after the arrival of Gov. ARCHDALE, in 1694-5; the Governor himself being a Quaker.

5. The *French Church* was built on a lot at the corner of Church and Queen (then Dock) street, in the year 1701, on the site occupied by their present brick Church. In the year 1740, the original Church was burnt down, and all their records consumed; they again built a second Church on the site of the former, which was also destroyed by fire in the year 1796, and again rebuilt in the year 1799, which latter is the one now standing.

6. *St. Philip's Church*, already noticed, built between 1723 and 1733, though Divine Service was first performed in this Church 1723.

7. The *Presbyterian or Scots Church*, was founded in the year 1731, after having been forty years united to the *Independents*, they at this time separated and built them a Church of wood on the west side of Meeting-street, between Tradd-street and Price's-alley, and adjoining the lot on which their present elegant Church was erected in 1814.

A Theatre is said to have been opened in a building on Dock, near the corner of Church-street, at an early period of the settlement, near the site now occupied by Dr. ULMO, in Queen-street, and part of the back buildings of the Planter's Hotel; the precise time of the opening of this Theatre is not recollected. A second Theatre was opened in Church-street, between Tradd-street and St. Michael's-alley, about the year 1740, and occupied the site now improved upon by Mr. SOLLEE, the proprietor, and known as *Concert-Hall*.

Among the first brick houses built in the town, is that in Cumberland-street, now occupied by Mr. THORNE, immediately opposite to the *Episcopal Methodist Church*. It was the residence of Chief Justice TROTTER. Next to this is the old brick Magazine which

has been lately repaired; and from these buildings down to Church-street, was a spacious grove of Sweet and Seville oranges, which remained to the year 1756, and it is believed, that some of the trees were preserved as late as the year 1781, in the vicinity of said magazine.

The foregoing, appear to have been the only buildings worthy of particular notice within the limits of the town. Beyond these to the south and west were several farms or settlements; but, before I attempt to particularize these, it may be proper to take notice of the fortifications or lines, built under governor Sir NATHANIEL JOHNSON,* as a defence against the Spaniards and French, who threatened the infant town with an invasion in the year 1703.

We have already seen that a large creek, which has since obtained the name of *Vanderhorst's Creek*, formed the southern boundary of the town. On the northern margin of this creek, and in the fork of the first main branch, the governor caused a strong bastion to be built, which was called *Ashley's bastion*, the site of which is now covered by the buildings on the north side of Water-street, between East-Bay and Church-street. The stream and bed of this fork of the creek, between the bastion and East Bay-street, was strongly pallisaded across to the opposite shore, where, on the east or water side of Bay-street, a second bastion, called *Granville's*, was erected; the site of which is now occupied by Capt. MISSROON'S house and lot, at the north end of the present battery walk. To the south east of this bastion on the hardage, a detached battery or bastion, called *Blake's* was erected without the lines.

From *Granville's bastion* the line of fortifications continued northwardly along the margin of Cooper river on the Bay, to *Keating L. Smith's* wooden bridge, at that time a substitute for a wharf, and which has since been converted to *Vanderhorst's wharf*; thence to an angular ravelin, or salient angle of the lines op-

* This gentleman, highly in favor with the Lords Proprietors, had been previously created a *Cassique* of Carolina, another title of Carolinian nobility.

posite to *Tradd-street* at *Crafts' wharf*, thence to a half moon battery (covering the garrison or court of guards) the site of which is now occupied by the buildings, back of the present Custom-House, thence north, to *Col. Rhett's bridge*, now a part of *Blake's wharf*, to another ravelin near Dock, or *Queen-street*, now *Gibbs & Harper's*, late *Prioleau's wharf*, thence to another ravelin now *Lothrop's wharf*; and from thence to *Craven's bastion*, at the south margin of the creek, which formed the north boundary of the town at the *Governor's bridge*. This bastion, occupied the site on which the buildings near *Fitzsimmon's wharf* now stands.

From *Craven's bastion*, the line of fortifications extended in a south west direction between the margin of the creek and parallel with *Amen* and *Cumberland-streets*, to *Carteret's bastion* on *Meeting-street*. On this line there were two salient angles, one where *State-street* crosses *Amen-street*, the other where *Church-street* crosses *Cumberland-street*.

From *Carteret's bastion* the lines extended south, parallel with *Meeting-street* to a ravelin at *Queen-street*, the site of which is occupied by the buildings of *BERNARD ELLIOTT* and the *Hon. Judge GRIMKE*, at the corner of *Queen* and *Meeting-streets*, taking in a part of *Archdale's square*, to the commencement of the range of brick buildings near the *State-House*, called *Blake's buildings*. Here, *Johnson's half moon battery* was erected, extending from the latter ravelin across *Broad-street*, and occupied the site on which the *State* and *Guard Houses* were afterwards erected.

At this half moon were two draw-bridges, over the outer and inner ditches; these draw-bridges regulated the intercourse between those without and those within the lines, affording greater security to the inhabitants of the town. From this battery the lines continued still south, to another salient angle nearly opposite to *St. Michael's-alley*, the site of which, is now occupied by the buildings of *Messrs. GREENLAND, CRUGER* and *Dr. POYAS*; they then extended to *Colleton's bastion*, which was erected on the margin of

Vanderhorst's creek, where it intersects Meeting-street, the site of which is now occupied by a part of Price's-alley and the buildings of Mr. NATHANIEL RUSSELL.

The lines were then turned eastward from *Colleton's bastion*, and parallel with the north margin of the creek to *Ashley's bastion* at the beginning. On this line there was one salient angle which projected between Meeting and Church-streets, nearly in a range with the back of the lot on which the first Baptist Church was built, and within the limits of these lines of fortifications, the original town of Charlestown was comprehended from the year 1680 to 1743.

Broad-street from the Bay to Meeting-street, east and west, and Church-street from Water to Amens-street north and south, at this time constituted the two principal cross streets of the town, which contained but eight public streets, and an alley. These were, Tradd, Elliott, Broad, and Queen-streets, running east and west, from Bay-street to Church and Meeting-streets; and, Bay, Union, Church, and Meeting-streets and Bedon's-alley, running north and south.

Thus far I have traced the squares, fortifications, streets and buildings of the town. I will now say something of the creeks and marshes, which intersected it, and the peninsula comprehended as its suburbs. Within the lines the two northern branches of *Vanderhorst's creek* penetrated the lands as follows: the north east and lower branch, extended in a north west direction from the main branch through the squares, to within a short distance of the angle of Church-street and Longitude-lane; its site was mostly occupied by *Landgrave* THOMAS SMITH, as a garden; the margin of the creek, that is, its low grounds, constituted *the first rice patch* in the state,* the seed of which was obtained from the captain of a vessel from Madagascar, somewhere about the year 1696; and afterwards for many years constituted the great staple production of the state.† The upper or north west

* In Governor Drayton's View, page 115, rice is said to have been first planted in South-Carolina, as early as 1688.

† Hewitt's History of South-Carolina, vol. 2, p. 87.

branch of the creek, spread itself across Meeting-street, and partly up Price's-alley towards King-street. It was up the stream of this branch, at the west end of Water-street, that Mr. SAMUEL PRIOLEAU, and others, are said to have swum in the year 1728 to the site where the City-Hall now stands, at the corner of Broad and Meeting-streets.*

It is said, that originally, the site on which the Court or State-House, the City-Hall, St. Michael's Church and Guard-House are erected, together with several of the adjacent lots, was a large pond, or body of broken land; this tradition, is however, explained in the following manner, which goes to prove that this pond was artificial:—At the time of the threatened invasion, in 1703, by the French and Spaniards, Governor JOHNSON in causing ditches to be dug, and horn works raised for the defence and security of the town, selected that part of the town for a half moon battery, and double wet ditch, with draw bridges across; the depth of these ditches, the natural lowness of the land and its contiguity to the waters of *Vanderhorst's creek*, afforded ample sources for the collection and subsequent retention of a body of water, sufficient to create an artificial pond.

Be this as it may, as late as the year 1756, it was frequented by wild ducks, many of which have been shot in it, by persons still living. And at this time, in very wet seasons, the streets fronting these buildings, afford strong evidences of the former existence of low ground, and that the land has been made, as there is at such seasons a large body of water retained in the streets, until drained off by art—but to return:

The whole eastern front of the town was the broken margin of Cooper river, the land was much indented about Queen-street, forming a kind of natural dock or cove; from which circumstance the street derived its original name of Dock-street. It is probable this cove extended as far west as State-street, for Dr. RAMSAY observes in his history, that “the north end of Union-street” (now State-street) “was planted

* Doctor Ramsay's History of South-Carolina, vol. 2, p. 72. Note.

with rice about the middle of the eighteenth century" (1755.)

The creek north of the town ran parallel with the site of the present Central Market, extending beyond Meeting-street, its south margin, indenting the land (almost to the lines) in the direction of Amen and Cumberland-streets; several spots of which, even at this period, would make excellent rice patches.

I come next to notice the topography of the suburbs of the town. On the peninsula, south of the town and *Vanderhorst's creek*, were the farms of Messrs. FERGUSON & VANDERHORST; the communication between these farms and the town, was over *Yonge's Bridge*, which was thrown across the creek where Church-street is intersected by Water-street. At the extreme end of the peninsula, the point of which was originally called "*Oyster Point*," and afterwards "*White Point*," stood the old *Watch-House*. *White Point* may be now comprehended by the slip of land from the south margin of *Vanderhorst's creek*, (now Water-street) and along that street to Meeting-street, thence to South-Bay, and following the course of the Bay to the beginning creek as aforesaid, at the Battery.

To the west of the farms on *White point*, a second creek stretched northwardly, and in a line with Meeting-street, beginning nearly opposite Church-street continued; it meandered along the shore until it entered Meeting-street, which it crossed; and again meandered to Smith's-lane, near the centre of which, it terminated in a large body of low grounds, which in rainy seasons and high spring tides connected it with the following, or third creek, which issued from the mouth of Ashley river, near the site on which Mr. PETER SMITH'S elegant mansion on South-Bay now stands.

This creek extended itself eastwardly, nearly parallel with South-Bay, crossing Legare and King-streets, near Capt. INGRAHAM'S, and then as far as Mr. LOCKWOOD'S residence in Smith's-lane; where as we before observed, it formed at times a junction with the former creek. A bridge was built across this creek

in a range with King-street called *Lamboll's bridge*, known to all the oldest inhabitants now living, but its traces are at this time wholly obliterated.

A fourth creek issued from Ashley river north of *Harth's Lumber Yard*, meandering across Logan-st. into the body of the square between Lamboll and Tradd-streets, extending almost to King-street. At the head of this creek *Garnett's farm* was situated, and may be comprehended by the lots south of Tradd, and west of King-street, as low down as Mrs. JONES' lot.

Again, further north, a fifth creek issued from Ashley river, which sent forth a branch eastwardly, to Tradd-street; at the head of this branch there was also a farm cultivated, whose site at this time may be comprehended within the lots from Mr. DAVID DEAS on the north side of Tradd-street, westwards to Mr. LIMEHOUSE'S lot on the margin of the river. The main branch pursued a north east course, crossing Broad-street, and terminated near Vauxhall-Garden.

The neck or slip of land formed by the recess of the arms of this creek, is that formerly known as *Savage's green*; on which was erected a building for the manufacturing of loaf sugar, previous to the revolutionary war. It was called the *Sugar-House*, and was afterwards about the year 1775, converted into a *Work-House*, or *House of Correction*. This lot and building was afterwards owned by Dr. LE SEIGNEUR, who contemplated in the year 1807, the establishment of a manufactory of Cotton Yarns and Cloths. The machinery for this factory was lost on its passage from Europe, and the plan was relinquished by the Doctor.

The property was afterwards bought by Mr. JOSHUA BROWN, and constitutes a part of his large mill establishment on Ashley river. On this slip of land the *Charleston Theatre* was opened in 1793, and a new street laid off on its eastern front, which extends from Broad-street to the low lands of Tradd-street. New-street is handsomely improved with tasty and elegant houses.

The last creek that I shall notice in this sketch, is *Cummings' creek*, which issued from Ashley river, a few rods south of Beaufain-street, where it meandered to the eastward some distance; it then sent forth a branch south east, as far as Queen-street, through the marsh to that spot now occupied by SIFLEY & MINTZING, as a Saw-Pit and Lumber-Yard; whence it continued again eastwardly parallel with Queen-street, across Mazyck-street, almost to Archdale-street, indenting in its course great part of the square on which the *Marine Hospital* and *Poor-House* stand, as also the opposite square to the back of Mr. KNOX's lot, fronting the *Second Independent Church* in Archdale-street.

The main branch of *Cummings' creek*, pursued its course nearly parallel with Beaufain-street, passing by Lynch, Rutledge, Smith and Pitt-streets; here it turned north eastwardly, indenting the square on Harleston's green, till it entered Wentworth and Cumming-streets, where it terminated at the old distillery. Another small branch of this creek issued from the main branch and extended in an easterly direction, crossing the new street, leading from Beaufain-street to the gaol, and passing through Messrs. UMMANSETTER & DENER's Tan-Yards, terminated near Mazyck-street.

Mr. UMMANSETTER shewed me a large portion of the root of a live oak stump, which was dug up five feet below the surface of the earth, when they were laying the foundation of his Tannery in the year 1814. It is still sound and in a state of preservation.

The slip of land, south of *Cumming's creek* to the creek at Queen-street, and then in a line with Queen-street to Archdale-street, and along the west side of Archdale-street to the town line; and thence westwards to *Cumming's creek* at the beginning, (with the exception of two lots, No. 119 and 120, corner of Queen and Archdale-streets, the property of Mr. MAZYCK, and four lots on the town line and Archdale-street, the property of Mr HOPSON) was located as the Burying Ground, known in BARNWELL's Platt of Charleston, Anno 1743, as the "*Old Church Yard*,"

which has since been laid off into squares and streets, together with that part of the creek and marsh which has been filled up and enclosed as the garden of the *Poor-House*, extending from Mazyck-street, along Queen-street almost to Back-street.

Parallel with Ashley river, Back-street extends from Queen-street to Magazine-street, and from Back-street to Mazyck-street, and thence to Queen-street; the square is occupied by the Poor-House, the Work-House, Gaol, Marine Hospital, old Magazine, &c. &c. It is said there are yet two tomb-stones which mark the spots wherein the remains of two families of the first distinction, among the original settlers of Charleston, are deposited in the old burying ground.

The land on the north side of *Cumming's creek*, known as *Cumming's Point*, was not included in the survey of the town in 1743, is hence reserved for the following sketch.

SKETCH II.

*Continuation of the Topography of Charleston, from
the year 1743, to the present period.*

Towards the middle of the eighteenth century, and about sixty years from the first establishment of Charleston, the increasing population and trade of the State, rendered it necessary to extend its bounds. Pitch, Tar, Turpentine and Naval Stores had long been the principal articles of export from Carolina, and the Rice introduced by LANDGRAVE SMITH, in 1696, had succeeded so well in the lower parts of the State and low grounds of the town, that as early as the year 1740, upwards of 90,000 tierces or barrels of it were exported from South-Carolina.* And in the year 1744, not less than two hundred and thirty vessels were loaded at the port of Charlestown with the various productions of the State.†

Hence, in the year 1743, the boundaries of the town were enlarged, southwardly to the Bay or harbour of Ashley river, at White point to the mouth of the river, westwardly to the margin of Ashley river, and northwardly by a line running S. 34° W. from Cooper to Ashley river. This latter line may be now recognized as Pinckney-street, so far as it has been

* Hewitt's History of South-Carolina, vol. 2. page 87.

† Ibid. 120.

opened; and thence in a direct line through the town nearly parallel with West street, down to the river.

In its enlarged area, it contained 230 acres and 16 perches, laid out into 26 regular and irregular squares or trapeziums; containing 310 lots, exclusive of the public squares within that area.

The farm of Mr. HOLLYBUSH, which occupied the site at the corner of King and Broad-streets, the Rev. Mr. STOBO's house and garden, together with the farms noticed in the preceding sketch, as also the *Friends or Quaker Meeting-House*, were included in the new survey. The Parsonage house and glebe lands of the *Episcopal Church*, still remained without the limits of the town; and may be now recognized in the lots and buildings west of St. Philip's-street, and north and south of Wentworth-street, from the Parsonage house, now the property of Mr. JOHN M. EHRICK to Mrs. SARRAZIN's, and from Mrs. BAKER's lots on St. Philip's-street to the Bishop's house, now Mrs. DATTY's Female Seminary, back of Wentworth-street. The glebe lands of the Church, are laid off in lots, and let to tenants on extensive leases; it is however, indifferently built upon.

By this new survey, several squares and many new streets and alleys were added to the town. To the south, from *Yonge's bridge*, Church-street was continued to the point, and was intersected by Lynch's-lane and Lightwood's-alley, running east and west to Meeting-street; Smith's-lane was opened in the same direction to King-street, and Lamboll-street from King to Legare-street; Westwardly, and parallel with King-street, Legare-street was opened from South-Bay to Tradd-street; Orange-street, from Tradd to Broad-street; and Friend street, from Tradd to Queen-street.

Mazyck-street was also opened from Broad-street to the town line, near Beaufain-street; and Archdale-street, from Queen-street to the town line. From King-street north of Queen-street, Clifford's-alley, Clifford-street, and Beresford's-street, running east and west, were opened to Archdale-street, and Magazine and West-street, from Archdale to Mazyck-street.

Beaufain-street was without the limits of the town and near the line.

On the north, the old fortifications and bastions being somewhat demolished; a communication was opened from East-Bay, through Amen and Guignard-streets; also, through Cumberland (late Moore-street or Horlbeck's-alley,) to King-street, and through Hopton's-alley, (now Market-street) from Meeting-to Archdale-street. Pinckney street was the north boundary line of the town.

After the extension of the town, and the demolishing of the old fortifications, a plan was approved and an act passed in the year 1753, for "Fortifying Charleston in a very respectable manner;" and it was soon after begun to be put in execution on the south and east, but was shortly discontinued without finishing any part of it.

Dr. MILLIGAN, who wrote a small work, afterwards printed in London, in the year 1770, entitled, "*A Short Description of the Province of South-Carolina, &c.*" says, "at present" (1763) "the town is defended " towards the water by seven batteries or bastions, " of which there are considerable ones connected by " *curtain lines*, having platforms, with about one hundred heavy cannon mounted."* These curtain lines occupied the eastern side of Bay-street from Stoll's-alley almost to Queen-street, now occupied by the buildings which front Bay-Street, part of which are known as Coates' row, south of the Exchange, or Custom-House, &c.

The improvement of the lands added to the town by this new survey, kept pace with time; and the Germans, who had mostly located themselves in that section of the suburbs, comprehended within the limits, west of King-street, from Clifford's-alley to Parsonage-lane, formerly called *Dutch-Town*, made considerable improvements therein. They had not as yet organized a Religious Society, but attended Divine Service, generally at the Independent Church in Meeting-street, and occasionally at other established

* *Short Description of the Province of South-Carolina*, page 36.

places of worship, until the year 1759. About this period they formed themselves into a Religious Society, and built a House of Worship in Clifford-street, between King and Archdale-streets, which, in the year 1764, was consecrated by the name of *St. John's Church*. In the year 1783, they became a body corporate, as "*The Lutheran Church of German Protestants.*" In the years 1816-17, they completed their present elegant brick Church, at the corner of Clifford and Archdale-streets, and pulled down their former wooden Church, whose site now constitutes a part of their burial ground.

The industry and enterprize, the probity and honesty of the Germans, rendered them an important people among the first settlers of Charlestown; hence, they have ever been looked upon as constituting one, amongst the most invaluable acquisitions in Carolina; and they and their descendants have continued to deserve well of their country, for their steady attachment to its best interests; and have ever been among the foremost to risk their lives and properties in the defence of its civil and political rights and liberties.

Almost cotemporaneously with the building of the first German Church, a war with the Cherokee Indians, induced the government to erect a strong *Horn work* for the protection of the northern boundary. This work was commenced some distance beyond the town as it then extended, and "was to be flanked " with batteries and redoubts at proper distances, the " whole to extend from one river to the other."* This war happily terminated while the work was progressing; hence, it was never completed, and the parts that were built, extended across King-street road, east and west from Meeting-street to St. Philip's-street, and was long known as the *Indian Fort*, and *old draw gates*. It was built of the composition called *Tabby* (Tapia) by a mixture of lime-mortar and pounded oyster shells, which when dry, becomes impregnable to the heaviest shot. On the north front of this horn work were two very wide and deep ditches, on each

* Dr. Milligan's account of South-Carolina in 1763.

side of King-street, which were seldom ever dry. They remained until the year 1795, about which time they were filled up and built upon.

The site which these works occupied, may be comprehended by the squares east and west of King-street, above Boundary-street, now known as *Inspection square*, and the *Orphan-House square*.

About the year 1786-7, *Godwin's Company of Comedians*, who had previously occupied the Hall of the Exchange, opened their Theatrical campaign in a wooden Theatre, erected for that purpose, on the east or Inspection square. This Theatre was called *Harmony-Hall*. The building of this Theatre led to the rapid improvement of the land in its vicinity.

An act of the State Legislature was passed in 1790 for the establishment of an Orphan School in the City of Charleston, and Commissioners appointed for its management. Mr. ELLIS, was proprietor of a large portion of the land to the north of Boundary and west of King-street; this he liberally gave to the Commissioners as a site, whereon to establish a permanent Orphan-House, which was commenced in the year 1792, and completed in 1794. The lots which fronted King-street, were let out upon building leases; and thus, the west or Orphan-House square was soon improved to the greatest advantage; but its greatest and most lasting ornament, is that noble edifice, the Assylum for the destitute and helpless Children of the City, called the *Orphan-House*; and within whose walls hundreds have been matured to usefulness; many to importance, and a few to high honour in the state.

The attention of the public, as well as of the private citizens of the town, was directed to the draining and filling up the low grounds within its limits. Dykes or ditches, which afterwards led to the cleaner and more wholesome method of sinking arched brick drains, greatly facilitated these views.

The tenants on the glebe of the French Church, which glebe was comprehended in BARNWELL's plat by the two lots, Nos. 92 and 93, on the east side of King-street, between Broad and Tradd-streets, filled

up the low ground and erected houses on its site. This glebe is still occupied by tenants of the French Church, whose buildings extend from Messrs. JASPER & PORTER's Cabinet-Shop, No. 351, King-street, to the residence of Mr. P. FAYOLLE, No. 359, inclusive.

As late as the year 1754, the pond at the State-Housesquare, continued to be a harbour for wild ducks, many of which, as I have already observed, were killed in it, to that period. Shortly after this, it was filled up, and the "*State-House*, a large and commodious brick building," was erected on a part of its site. "The south front" of the building "was decorated with four $\frac{2}{3}$ columns of the composite order, whose capitals are highly finished; supporting a large angular pediment and cornice. It consisted of two stories, besides the roof. On the lower, were the Court room, the Secretaries office, and apartments for the House keeper; on the upper story, were two large handsome rooms, one for the Governor and Council, the other for the Representatives of the people, with lobbies, and rooms for their Clerks. In the upper part of the house or roof, was a large room for the provincial armory."* Such was the State-House previous to the revolution, and until it was partly destroyed by fire in the year 1788. Soon after this, the walls were again repaired and raised upon, to what it now is at the present time.

This building is now styled "*the Court-House*," and in which, the following Courts and Offices are located: The Federal Circuit, and Federal District Courts, for the Southern District of the United States; the Court of Equity; of General Sessions and Common Pleas, and Court of Appeals, which are State Courts. The Federal Marshal's, the Solicitor and Register in Equity, Clerk of the Court of General Sessions and Common Pleas; the Sheriff's and Conveyancer's Offices, together with the Judges Chambers, occupy the two floors of the original building.

The third story, which has been added since the fire alluded to, is occupied by the *Charleston Library*

* Dr. Milligan's Short Account of South-Carolina, page 35.

and *Medical Societies*; on this floor also, the Grand and Pleas Jurors hold their deliberations.

The filling up of *Vanderhorst's creek*, progressed but slowly; as also that at the *Governor's bridge*; this latter creek continued to be the repository for fish and oyster boats, to the beginning of the present century. The extensive marsh land and low ground to the north and west of this creek was filled up by Mr. JOHN EBERLY, Mr. ANTHONY TOOMER and others; and upon which made land, Ellery and Guignard-streets, and Maiden-lane, have been opened and built upon. On the west side of Meeting-street, upon the margin of this creek, Mrs. HOPTON and Mrs. LOGAN, cultivated extensive kitchen and flower gardens: these gardens occupied the site from the north west corner of Market and Meeting-streets, north to Mrs. SWINTON's lot on Meeting-street, and west to Mrs. SIFFLEY's lot on Market-street. The fire which occurred on the morning of the 6th. of July, 1819, laid waste the whole of the buildings and improvements which occupied the site of these two ancient gardens, and was attended with most distressing consequences to many individuals, some of whom are said to have lost their all.

Trott's creek, or *Trott's point*, north of the *Governor's bridge*, was filled up by Mr. WM. JOHNSON, sen. and others, and greatly improved. This point may be comprehended by the slip of land east of Bay-street, from Capt. GEORGE's lot, north, to the south side of *Williams' wharf*, near the market.

“ The pond at the lower end of Meeting-street, “ was filled up and built upon by Mr. JOSIAH SMITH, “ in the year 1767-8 & 9, at an expence of about “ £1200 sterling.” The site of this pond is now occupied by the buildings of JOHN B. HOLMES, Esq. Mr. FISHER, Mrs. GLOVER, and others, on Meeting-street, near South-Bay: the high land in the vicinity of the pond was cultivated, and several farms enclosed in 1704, by Messrs. UNDERWOOD, GILBERTSON, and others; and comprehends that part of South-Bay to the west of Meeting-street, from midway between Price's-alley and Smith's-lane.

In the year 1755, Mr. HENRY LAURENS, the father of Mrs. (Doctor) DAVID RAMSAY, purchased a lot of four acres in Ansonborough, which is now called *Lauren's square*, and enriched it with every thing useful and ornamental, that Carolina produced, or his extensive mercantile connections enabled him to procure from remote parts of the world. Among a variety of other curious productions, he introduced olives, capers, limes, ginger, Guinea grass, the Alpine strawberry, bearing nine months in the year; red raspberries, blue grapes; and also directly from the south of France, apples, pears and plumbs of fine kinds, and vines which bore abundantly of the choicest white eating grape, called Chasselat's blanc.

"The whole was superintended with maternal care, by Mrs. ELEANOR LAURENS, with the assistance of JOHN WATSON, a complete English gardener.*" This garden, long known as LAURENS', occupied the square on East Bay-street from Society to Lauren's-street north, then to ANSON-street west, and again to Society-street, south, thence eastwardly, down to Society-street to East-Bay-street, at the beginning.

Mr. WATSON, soon after, formed a spacious garden for himself, to the south of the above square, on the ground now occupied by NATHANIEL HEYWARD, Esq. and afterwards, about the year 1784, he laid out a large and elegant garden, stretching from King-street to, and beyond Meeting-street, in which he erected the first nursery garden in South-Carolina. The site of this latter garden, is just within the new line of fortifications, erected during the late war; it has been laid off into lots, and built upon by the present proprietors.

The great hurricane of 1752, the distressing fires of 1778, and 1787; the frequent recurrence of fatal epidemics, together with the revolutionary war, from 1775 to 1782, retarded in a great measure, the improvements in and around the town, which, had notwithstanding, increased very rapidly; 1200 dwelling houses were enumerated in the year 1765, in Charles-

* Doctor Ramsay's History of South-Carolina, vol. 2. p. 228.

ton. The number at the commencement of the revolution is not known.

After the termination of the war, and the establishment of American Independence, the enterprize of the citizens manifested itself in an eminent degree; buildings were now erected, not only to the draw gates, and from river to river, but they were to be seen rising in every direction beyond them, and particularly on the King-street road.

This happy state of things, and rapid improvement of landed property, directed to the further extension of the town, and hence a third northern boundary line was established, by a line from Cooper, at, and parallel with *Gadsden's creek*, to the waters of Ashley river, north of *Bennett's Mill*. This line is now comprehended by Boundary-street, from river to river.

An act of incorporation was passed by the State Legislature at their session of 1783, by which the town, heretofore known as CHARLESTOWN, was created a city; thenceforth to be known as the "CITY OF CHARLESTON." A City Police was also established, consisting of an Intendant and twelve Wardens, who were to be elected annually, from among the citizens. They were authorised and empowered to exercise, to a limited extent, the Civil Jurisdiction of the City; thus constituting an Inferior Court, with power to elect or appoint Commissioners of Departments; such as are necessary to the good order, regulation of the trade and internal improvement of the City, &c.

The City Police, known as the Intendant and Wardens of Charleston, with the officers and Commissioners of subordinate departments, held their Courts in the Charleston Chamber of Commerce, on the second and central floor of the old Exchange; the Council Chamber occupied the eastern wing; the City Treasurer's Office, the south west wing; the City Assessor, City Sheriff and City Clerk, the northern wings of the upper story. The lower floor was generally the place where Town Meetings were held.

The arched vaults underneath, were long occupied as Vendue Stores.

The attention of the City Police was early directed to the filling up, the public lands and streets of the City, whose low and miry situation more immediately required amendment. *Vanderhorst's creek* was wholly obliterated by the year 1792, and its main branch is now firmly trodden by passengers through Water-street, which occupies the site, along which it formerly ebbed and flowed. Lynch's-lane now occupies part of its southern branch, and the compact walls of the *Battery Walk*, has forever closed its communication with Cooper river, its parent source.

The creek at the *Governor's bridge*, now Market-street, is also with very little exception, filled up and extensively built upon; its once mud-based channel, is now occupied by our *Central-Market*, extending almost its whole length, from the Bay to Meeting-street; and its north and south margins are bordered with substantial buildings; the whole together, forming the great City Mart, for culinary commerce.

Gadsden's Creek, the northern boundary of the city, is almost entirely obliterated. For the improvements made upon this section of the city, posterity is indebted to the industry and enterprise of the late venerable general CHRISTOPHER GADSDEN. There is a tradition, that the original building, in which the general resided, was built by Captain, afterwards Commodore Lord ANSON, who had landed there, in or near the years 1741-2, while circumnavigating the world.

There is another tradition, that Captain ANSON obtained the property of all, or the greater part of that section of Charleston, still known as *Ansonborough*, while he commanded a small British vessel of war, on this southern station of the British Colonies. Anson-street, which extends from Ellery-street at the Market, to *Gadsden's creek* at Boundary-street, was named after him; and with the exception of Sir PETER COLLETON'S square, now partly owned and occupied by General CHARLES COTESWORTH PINCKNEY, Anson-

borough extended from near the market, northwardly, on the east side of Anson-street, to *Gadsden's creek*, and thence eastwardly to Cooper river.

The house of Captain ANSON, was originally built of the best black cypress, but was afterwards considerably enlarged by Gen. GADSDEN, and has lately been further altered and improved. A block of the main sill of the first house has been deposited in the museum of the *Literary and Philosophical Society of South-Carolina*, by Mr. JAMES DU PRE, the Architect, and is as sound, as the day on which it was laid on the foundation, although seventy-eight years have elapsed since that period.

The eastern part of the City, on account of its contiguity to the harbour, being principally commercial, improved with greater rapidity than the western. The importance of tide mills, as successfully established by Messrs. DANIEL CANNON & THOMAS BENNETT, senior, on the creek, issuing from Ashley river at the west end of Boundary-street, led to similar establishments, and also, to wind-mills; hence, the lands contiguous, began likewise to increase in improvement and value.

The basin of this creek, became the reservoir for these mills, and a causeway and bridge was thrown across, so as to afford a communication between the citizens of Charleston and those of Cannonsborough. The southern prong, or branch of the creek, extended eastwardly from the bridge, crossing Pitt street, and indenting the lot on the opposite square, now occupied by Mr. WILLIAM CLARKSON; it has been enclosed and its margins handsomely improved by valuable buildings and extensive gardens.

The creek and marsh between Montague and Wentworth-streets, have been greatly improved and built upon by Mr. P. WYATT, Mr. JOB PALMER, Doctor. JOSEPH GLOVER, and others. A starch and hair powder manufactory was erected on the south margin of this creek by Mr. LE FEVRE, some time in the year 1795, the site of which now forms the square at the corner of Wentworth and Rutledge-streets.—

There remains yet a great portion of this marsh to be filled up.

The marsh from *Cummings' creek*, to the creek at Broad-street, being City property, was leased to Mr. JOSHUA BROWN for a term of years; it contains from 40 to 50 acres of marsh, capable of being overflowed; this he has since dammed in at considerable expense, as a reservoir for his mills.

The lands on the margin of this marsh have been considerably improved. An attempt was made in the year 1808, to establish a Manufactory of Yarns and Cloths of Cotton, by a Company incorporated for that purpose by the Legislature, under the title of "*The South-Carolina Homespun Company.*" A site was purchased at the north west point, called *Cummings' Point*, and a spacious brick building erected; together with suitable offices—machinery of the most approved models was procured from Rhode-Island; and machinists, artificers and workmen of the first abilities, from Europe and the north. After three years persevering attention to this institution, the Company in 1811-12, suspended their operations, and voted the sale of the establishment; which finally took place, with the loss of about four fifths of the capital.

This experiment, although attempted under the most favorable auspices, proved to a demonstration, that South-Carolina was not yet prepared to become a manufacturing state; and the site originally occupied by the company, has been since converted into a steam saw-mill establishment, which was built by MARTIN STROBEL, Esq. who purchased their lot and buildings. Eastwardly from the *Homespun Factory*, and parallel with Beaufain-street, the lands have been built upon by Mr WILLIAM TAYLOR, sen. Mr. BASIL LANNEAU, Dr. SAMUEL WILSON, Mr. UMMANSETTER, Mr. STEELE, and others; the main body of the creek, from Beaufain to Wentworth-street remains unimproved; although the heavy rains wash much of the loose lands from its margin into its bosom, and being cut off from its source by the filling up of Beaufain street, the frequent passage of the citizens across it,

has at length rendered its bottom much firmer and less noxious.

Much remains to be done yet, ere all the creeks and marshes, which intersected the site of the city, will be obliterated; they have been justly considered as contributing in no small degree, to the causes which have been productive of fatal epidemics among us. In another century, it is to be hoped, this salutary event will be fully accomplished: the commencement of the present, authorizes the hope; for the uncommon zeal and enterprize of the City Council, (augmented by the fatal prevalence of the yellow fever of 1817, and stimulated by the advice of the Medical society) has already produced the most desirable effects—those of widening the streets and paving them with dry and wholesome materials.

To the administration of Intendants HARRY and GEDDES, with their respective Councils, the City owes some of its greatest improvements, since its establishment in 1680. To the public spirit of EDWARD MORTIMER, Esq. a member of Council, who moved, and his colleagues who supported the motion; together with the subsequent support of HENRY MIDDLETON, our distinguished fellow-citizen, and member of Congress, we owe the judicious arrangement of the present well established Post-Office, and Custom-House, which led to the purchase of the present *City-Hall*, at the corner of Broad and Meeting-streets; as also to the lots and buildings in its vicinity, for the purpose of establishing a Public Square or Park.

Almost cotemporaneous with these improvements, were the opening and enlargement of Union-street, from Broad-street to the Market. This enlarged street is now known as State-street. Chalmers'-alley running west from State-street, has been extensively widened to Church-street, and it is contemplated to continue it through to Meeting-street. This latter is now called Chalmers'-street.

Pinckney-street, the boundary line of the town in 1743, is now nearly in the centre of the city; it was in the present year opened to Meeting-street, and the sources of infection towards the east and south-east

ends of the city, are daily disappearing. East Bay-street has been elevated and paved with stone and gravelled, from Pinckney-street to the Battery. The same improvement has been made in Tradd, Elliott, Broad and Queen-streets, from Bay-street to Meeting-street, and in Amen-street, from the Bay to Church-street. In short, it is believed, that nothing will be left undone by our City Police, that can or ought to be done, for increasing the beauty, and bettering the health of the city.

Preparations are making for the enlargement of Clifford-street and Parsonage-lane, from King to Archdale-street; the present summer must, however, pass by, before this can be effected, although a commencement has already been made upon the former.

It would be foreign to the design of these sketches, were I to particularize the improvement of the city, with regard to the various edifices erected in, and near its limits. I must, however, be permitted to mention a few, that will long reflect immortal honor on their founders; with regard to these, I should be unjust were I to pass them over, especially since I have noticed similar ones, established previous to the peace of 1782.

Among those since that era, we may number, the *Orphan's-House and Church*, the building of the *South-Carolina Society*, in Meeting-street, that of the *German Friendly Society*, in Archdale-street, and that of the *St. Andrew's Society*, in Broad-street. These Societies, besides various other charitable institutions, that have not as yet built houses for the reception of their wards—such as the *Fellowship, Mechanic, Carpenters', Hibernian, Hebrew Benevolent, Ladies' Benevolent, and Methodist Charitable Societies*, severally educate, and in some instances, wholly support on their respective bounties, many widows and orphans, and school thousands of the present rising generation. And it would seem as if all classes of Christians, without regard to sectarian tenets, are vieing with each other, in the encouragement of Sabbath Schools, where children are not only prevented in a great measure from violating, but are taught the great import-

ance of venerating the principles of religion, and of keeping holy the Sabbath day.

The other edifices which claim our attention in this place are—

1st. *The Second Baptist Church*, a brick building, erected on the east side of Church street, was built in the year 1746, and is at present the only Church of that Society in the city. There are however, four associations of the Baptists in South-Carolina:—1st *The Charleston*, 2d. *the Bethel*, 3d. *the Saluda*, and 4th, *the Edgefield*; also two others, which are partly in South-Carolina, and partly in the adjoining States, viz. 5th. *the Broad river*, and 6th. *the Savannah river Associations*. The Baptists were among the first settlers of South-Carolina, and as early as 1683* began to establish themselves as a religious body; Mr. WM. SCREVEN, a native of England, was the founder and first Pastor of the ancient and respectable Church of the Baptists; which we have already seen was built as early as the year 1685. For many years, the increase of this denomination of Christians was but partial, and as a detailed account of their Church history, has been already given by the Rev. DAVID BENEDICT, of Rhode-Island; I shall only notice, that in the year 1787, the Church had the felicity of having for a Pastor, the Rev. Dr. FURMAN, who is, by Divine permission, still faithfully and zealously exercising his pastoral duties; not alone for “the benefit of his own Church, but also for the Baptist interest in South-Carolina, and for the cause of “Zion generally.”

To eulogise one, so extensively known as is this faithful servant of God, one so long and so justly appreciated by the citizens of Charleston as is Dr. FURMAN, might be rightly considered as superfluous; with the author of the “general history of the Baptist denomination” just quoted, we will concur in saying, that his pious and holy life, and his labours of love in the vineyard of his Lord “will furnish interesting articles for some future biographer.”

* Benedict's General History of the Baptist Denomination, vol. 2, p. 119.

At this period, the Society are endeavouring to build an enlarged house for worship, on the original site of their first Church. The communicants in the city, amount to seven hundred whites, blacks and coloured.

2d. *The Synagogue of the Jews*, in Hasell-street. This portion of citizens, associated themselves as a religious society in Charleston, sometime in the year 1750, under the auspices of Mr. COHEN. They read their prayers in a house in Union-street, near Queen-street, until the year 1757, when they removed it, or rather assembled for religious worship, in the house, now No. 318, King-street, then the property of ALEXANDER GILLON, Esq. and which then stood back in the yard. It is the same house that is now occupied by Mr. SENET, as a *kabob*, or confectionary and ice cream house.

In 1764, they held their Synagogue at a house in Beresford-street, near King-street. In 1780, they assembled in Hasell-street, at the old Synagogue, lately occupied by Mr. LITTLE, as a cotton gin manufactory; and in the year 1795, their present elegant Church was built on the adjoining lot, which they purchased for that purpose, from the heirs of NICHOLAS TROTT, former chief justice of the Province.

There can be no argument that goes more fully to illustrate the correct principles of our government, than that of a reference to the Jews who have settled among us. All other classes of citizens, however their peculiar tenets might have differed; yet all professing the Christian religion, were as one family.— Their interests, whether moral, civil or religious, were one and the same. The Jews were the only settlers, among those of the inhabitants of the old world, whose religious principles differed from those of the inhabitants of the new. To shew the salutary effects of tolerance in points of religious faith, I will insert the following appropriate observations, for which I am indebted to a learned member of their society: “ The Jews in this city, at the time of the revolutionary war, were but few in number. These had

“ emigrated chiefly from Germany and Great-Britain.
 “ The inviting temptation of an unrestricted freedom
 “ of conscience, in concerns of religion, which has
 “ attracted since that event, a great many to our
 “ shores, had not yet blessed this country. At the
 “ earliest date of their settlement here however, as
 “ soon as ten men could assemble, (and which the
 “ Hebrew law requires, for public worship,) they
 “ provided themselves with a place, as suitable as
 “ their then slender means could command. A Ves-
 “ try was afterwards organized, and a Minister called
 “ from Europe, to exercise the sacred functions of his
 “ office.

“ Such was the origin of the Hebrew Congregation
 “ in Charleston, at present the most numerous and
 “ flourishing of any in the United States. Accord-
 “ ing to information derived from the best authority,
 “ the number of Jews resident in the City, is between
 “ 640 to 660. The munificent spirit and pious zeal
 “ of some of their members, whom unsparing death
 “ hath removed to the silent tomb, assisted by the
 “ donations of their survivors, have contributed to
 “ the erection of that handsome and substantial Tem-
 “ ple, in which is worshipped the ALMIGHTY FATHER
 “ OF ALL!

“ When the war of the revolution commenced,
 “ all of this nation who were in South-Carolina, able
 “ to bear arms, zealously joined their country’s mar-
 “ tial ranks, for the great but dubious contest. The
 “ prize to be acquired in the event of a successful
 “ issue, religious and political freedom, was great
 “ enough to induce the free offering of every patri-
 “ otic exertion—and even of fortune and life in the
 “ undertaking. They, with the rest of their fellow-
 “ citizens, shared in the privations and hardships of
 “ war, also with them share the rich blessings of
 “ peace and freedom, the reward of their former
 “ sufferings.

“ Hence the grateful devotedness of the Children
 “ of Israel, has obtained its merited recompence. In
 “ this thrice favored land, they enjoy at last, in com-

“ mon with all men, that liberty of conscience, without which, man is but a privileged slave.

“ With an elevation of mind in harmony with the dignity, and sacredness of pure piety, the Jew adores the SUPREME BEING, according to a form of faith which his heart approves and sanctions. It is his belief, it was that of his progenitors for ages on ages past. What are the consequences of this freedom of worship? The peaceful acquisition and dissemination of knowledge, and the universal practice of those social duties that render us essentially useful to society.

“ The benevolent offices of humanity, not confined merely to this or that sect, enlarging its theatre of action, becomes at once sufficiently capacious to encompass the whole human race. As respects the Jews in particular, the verity of this axiom has been clearly exemplified. Their emancipation, with every other sect, by the constitutional charter, from religious thralldom under British rule in America, has been but recently effected; and behold the respectable footing on which this nation stands; they have already taken their stations, which they occupy with becoming dignity, as physicians, lawyers and merchants.

“ Our State Legislature has included them among its members. We have respectable specimens of their literary talents; they serve well in the army and navy, and what surer pledge can government possess for the fidelity of any portion of its citizens, than the claim it has on their gratitude, for the protection afforded to their dearest rights and interests on earth?

“ We are naturally prone to suspect the attachment and sincerity of those whose privileges we have retrenched—whom the laws have in any manner proscribed. The slave can never be trusted with safety; but the free man, free without restraint, in him may his country confide in her heaviest calamities. To sacrifice that country, would be to forge those chains, which are to bow him to the very earth!”

3d. The Episcopal, or *Wesleyan Methodist Church*, in Cumberland-street, commonly called the *Blue-Meeting*. The Methodists, as they were so deridingly termed in England, did not, so far as I can learn, exist as a distinct society in America, until the year 1785. Mr. WESLEY, their founder, had visited America previous to the revolution; and on his return to Europe, sent out missionaries, or travelling preachers, attached to their connexion; and in 1767, the Rev. RICHARD BOARDMAN and JOSEPH PILMOOR, arrived in the United States as missionaries. The Rev. Messrs. WHITFIELD and PERCY, attached to *Lady Huntingdon's Methodists*, had also visited America, previous to the revolution. Some time in 1784, lectures were delivered by the Rev. Mr. HILL, a *Huntingdon Methodist Preacher*, in Church-street, in a house, now the north east corner of Chalmers'-street. He also, occasionally, preached in the open air, in the vacant lot in Hasell-street, on which the Synagogue of the Jews was afterwards erected. He next preached in a house, back of the lot on the opposite side of the street, and on which the present Roman Chapel has been erected. Mr. HILL died on Sullivan's Island.

It was not however, until the year 1785, that any thing like a regular society of worshippers among the *Wesleyan Methodists*, were known in Charleston. On Sunday the 27th of February, 1785, the Rev. Messrs. LEE and WILLIS, two *Wesleyan Methodists*, preached for the first time in Charleston; Mr. WILLIS remained in the city, and organized the first regular society of Methodists in Charleston. Long indeed were they persecuted by the unreflecting part of the citizens, some of whom carried their blind rage so far, as to drag the unresisting preacher from the pulpit to the pump, where they have been shamefully drenched with water; but, for the honor of our city, and to the praise of our glorious Constitution, they are equally protected among other Christians; and these bold pioneers, in the armies of the Church militant of the Redeemer, have rendered themselves, by their zeal and Christian deportment, the delight of the sincere worshippers of God, of every sect and denomination.

The spirit of religious tolerance hath been sent forth by the Almighty ! the spirit of inquiry and discussion prevails in our land : The Constitution of the United States, under God, has been made the instrument for harmonizing Christians of every sect, who, though worshipping under different forms and ceremonies, agree in essentials ; all acknowledging “ the absolute sovereignty of God, in the control and “ final issue of every event, both in the natural and “ moral universe, the total moral depravity of the “ human heart,” and “ salvation, by the free and so- “ vereign grace of God, exhibited through the infinite “ righteousness and sacrifice of his Son,” who gave himself a ransom for all. In the city of Charleston there are attached to the four *Methodist Episcopal Churches*, 382 white, and 1814 coloured communicants. There has been nearly 5000 coloured, but they have seceded, and left the society to form one for themselves.

4th. *The Second Independent or Archdale Church*, was built in the year 1787, and, for thirty years, continued to constitute one society of worshippers with those of the parent society. A division was, however, made in the year 1817, which gave to the majority the ancient site, now the *Circular Church* in Meeting-street, and to the minority the brick *Church* in Archdale-street. The society, thus divided, are hence, under distinct and separate Church governments independent of each other.

5th. *Trinity Church*, at the corner of Hasell-street and Maiden-lane, was built in the year 1793, by the members of Mr. HAMMET’S society, who styled themselves *Primitive Methodists*—this Church is now added to the other Methodist Churches in this city—as also, *St. James’ Church*, on the King-street road within the lines ; originally built for Mr. HAMMET’S hearers, in 1802.

6th. *Bethel*, or the *Second Methodist Episcopal Church*, corner of Pitt and Boundary-streets, also a wooden building, was erected between the years 1799 & 1801.

7th. *The Roman Catholic Chapel*. The Catholics in the city of Charleston, associated as a religious society in the year 1786, and held their meetings for

divine worship, in the house at the corner of Tradd and Orange-streets, at present owned by Dr. PHILIP MOSER. They then convened for a short time, at the house of Mr. ANTHONY JANSKOFFSKY, in Beresford-street, Dutch Town; and in the year 1787, they purchased the lot and buildings in Hasell-street opposite to the Synagogue of the Jews, from the Rev. Mr. HILL, the Methodist clergyman, before-mentioned; on which, in the year 1801, they laid the foundation of their present elegant chapel. This society consists of 300 white, and 150 black and coloured members.

8th. *The Orphan's Church*, in Vanderhorst-street, was built between the years 1798 and 1800.

9th. *The Circular Brick Church*, in Meeting-street, was built in the year 1804, on the site originally occupied by their first Independent Church; formerly known as the *White Meeting*, and which, though built of wood, served as a place of worship nearly 114 years. This society of Christians, termed *Independents*, or *Congregationalists*, were among the first settlers of Carolina, and "in conjunction with the Presbyterians, were formed into a Church in Charlestown about the year 1690." These two sects "both agreed in doctrine, mode of worship, and in renouncing the power of bishops; but the latter were willing to submit to the authority of a presbytery; while the former, exercising in the congregational capacity every necessary power for governing their own Church, without any extrinsic interference, claimed to be an independent, self governed society."

These sects, after forty years union, differing only in the form of Church government, separated, and formed different Churches. The Independents kept possession of their ancient house of worship, while the Presbyterians erected one for their use, near the corner of Tradd and Meeting-streets, as we have already seen.

The Independent society was again sub-divided in the year 1817; so that at this time, there are in the city but 300 whites, and 300 coloured communicants belonging to the Circular Church.

10th. *The Second Presbyterian Church*, in Wraggsborough, was erected between the years 1809 & '11, and was dedicated by the Rev. ANDREW FLINN, A. M. pastor of said Church, on the 3d of April 1811, with an appropriate sermon on the occasion.

11th. *St. Andrew's*, or the *Third Presbyterian Church*, corner of Archdale and West-streets, built in the year 1814, by the members separating themselves from those of the First Presbyterian Church; these latter associated, and formed a distinct society, and appointed the Rev. Dr. BUCHAN, their first pastor. It would be foreign to the object of these sketches to enter into a detail of the causes which led to the separation of the different religious societies. We will therefore only state, that in the original Church there are 90 white, and 27 coloured communicants. In the Second Presbyterian Church, [number not ascertained] and in the Third, 85 white and 80 coloured. Ere long perhaps, a re-union will take place as has happened in other societies.

12th. *The First Presbyterinn Church*, corner of Meeting and Tradd-streets, was built in 1814, near the site of their first Church.

13th. *St. Paul's*, or the *Third Episcopal Church*, was erected in the years 1815-16, on a site in Radcliffeborough, presented by Mrs. RADCLIFFE for that purpose, and was dedicated by the Right Rev. and pious bishop DEHON; and an appropriate sermon was preached by the Rev. Dr. PERCY, on Thursday the 28th March, 1816. The original members of the Episcopal Church, were also among the first settlers of South-Carolina; which was a colony formed of several "different religious persuasions. None had "any particular connexion with government, nor had "any sect legal pre-eminence over another." As early as the year 1670, the members of the Episcopal Church associated as a religious society, and attempted the introduction of an established Church, similar to that of England; but, as might have been expected, this attempt was measurably impracticable from the vast body of inhabitants of other religious tenets, who had fled from religious intolerance in the

old, to the enjoyment of the liberty of conscience in the new world.

In 1698, an act of the Legislature was passed for "settling a maintenance on a Minister of the Church of England in Charlestown;" and it began to appear as if the members attached to that Church, "believing in the current creed of the times, that an established religion was essential to the support of civil government; they concerted measures for endowing the Church of the mother country, and advancing it in South-Carolina, to a legal pre-eminence." The consequence was, that great and lasting animosities took place between these and the other sects of Christians, which were never fully terminated until the present happy era; when it appears, that God by his wonderful providences, is about to make one Church of all the believers in Christ, throughout the world; a circumstance devoutly to be wished by every Christian.

In the three Protestant Episcopal Churches in the city there are at this time 735 white, and 311 coloured communicants, in all 1045, viz.

In St. Michael's, 350 whites, 130 black and coloured.

St. Philip's, 320 whites, 180 black and coloured.

St. Paul's, 65 whites.

14th. *St. John's*, or the *Lutheran Church of German Protestants*, corner of Archdale and Clifford-streets, was built in 1816-17; making in all 19 Churches or Houses of Worship in the city and suburbs of Charleston. Several of these Churches for elegance and architectural perfection, may justly vie with any on the American continent. The communicants in *St. John's Church*, at this time, amount to 265 whites, and 50 black and coloured.

I am indebted for the following statement of the lots and buildings in the city and suburbs, to the politeness of JOHN G. MAYER, Esq. late state assessor for the two parishes of St. Philip and St. Michael:

Number of dwelling houses in the city, exclusive of back stores, kitchens, and other out buildings, 3915; of these there are 1419 brick buildings, many of which

are valuable and in great style; and 2496 wooden buildings, with the same exceptions.

In the different villages and boroughs which constitute the suburbs of Charleston, there are to the north of Boundary-street, from river to river, and thence to the new line of fortifications, 558 dwelling houses, exclusive of back stores and other out buildings; of these there are 68 of brick, and 490 of wood. There are also 162 dwelling houses, from the lines to the quarter house; of these there are 8 of brick, and 154 of wood; making an aggregate of 4635 dwelling houses in the city, and on the neck.

At present there are 76 streets, 22 lanes and alleys, and about 35 wharves in the city; most of these latter being handsomely ornamented with valuable brick stores and warehouses. In the villages and boroughs, there are many handsome streets, spacious and airy, and numerous unimproved lots.

From a statement of the number of inhabitants in Charleston, by the last census taken by ANDREW BAY, Esq. agreeably to a resolve of the Legislature, there are 13,834 white inhabitants in the parishes of St. Philip and St. Michael; there are also computed to be about 1300 free black and coloured persons, and 12,000 slaves; making the total amount of inhabitants in the two parishes 27,134.

From every appearance, a fourth extension of the limits of the city, will ere long, be deemed necessary and just; so rapid, and so valuable are the improvements beyond its present limits. Much of the city, and a large portion of the country trade, is exclusively carried on by the merchants above Boundary-street, who are not subject to any of the city ordinances, nor do they pay city taxes. In the event of this extension, it is presumed that the north boundary will be the lines or breast works, thrown up during the late war.

SKETCH III.



Historical and Literary Sketch of Charleston.

It is a source of sincere regret to the lovers of science, that its progress has not been as rapid as the progress or topographical improvement of the city, with respect to its trade and commerce. For upwards of a century from its first settlement, science and literature may be said to have continued in a very languishing condition in Carolina. And although its history has recorded men of the first talents in the field and cabinet; and also several men of eminence in the science of medicine, there are but few monuments of their literary labours, that have been preserved for succeeding ages.

The same causes which retarded the progress of the town, may be offered as excuses for its long neglected improvement, and the selfish policy, which for many years actuated the prosperous adventurers to the colony, may be urged as a further excuse. But since the emancipation of our country from a state of political bondage, to a state of freedom; from being the petty slaves of royalty to that of freemen, and citizens of the only and greatest republic on earth; nothing can extenuate, no excuses can even palliate the gross and shameful neglect of the arts, sciences and literature among us; but the unanimous and zealous

efforts of the associated wisdom and talents of our state, to redeem it from the past, and to save it from all future opprobrium.

In the year 1700, while Charlestown was under the government of its proprietors, a law passed for instituting a public library in the province, to remain under the care and custody of the Episcopal Minister at Charleston. EDWARD MARSTON, at this time took the charge of it, and was disposed to contribute every thing in his power towards rendering it generally useful. But the Dissenters, from the choice of books, most of which were wrote by Episcopal Divines, and in the defence of the doctrine, discipline and worship of the Church of England, soon perceived the intention of the society; and a library, framed on such a narrow foundation, was treated with neglect, and proved utterly ineffectual for promoting the desired end.*

In 1710, the Assembly passed a law for establishing a Free School in Charleston, for the use of the inhabitants of South-Carolina. In 1737, the *South-Carolina Society* was formed; this is the oldest and most respectable institution of charity in the city.

Sometime in the year 1748, by which period a greater degree of liberality pervaded the breasts of the Carolinians, a more laudable and successful attempt to establish a *Library Society*, was made. The great object of this society, as may be perceived by their public advertisement, was the promotion of literature,† unrestrained by sectarian prejudices and contending tenets.

The names of the seventeen members who organized it, are—JOHN SINCLAIR, JOHN COOPER, PETER TIMOTHY, JAMES GRINDLAY, WM. BURROWS, MORTON BRAILSFORD, CHARLES STEVENSON, JOHN NEUFVILLE, THOMAS SACHEVERELL, ROBERT BRISBANE, SAMUEL BRAILSFORD, PAUL DEUXSAINT, THOMAS MIDDLETON, ALEX. BARON, ALEX. M'CAULAY, PATRICK M'KIE and WM. LOGAN. They obtained, in the year 1754, an act of incorporation by which they were known and

* Hewitt's History of South-Carolina, vol. 1, p. 147.

† Milligan's Description of Carolina, p. 38, 40.

distinguished as the *Charleston Library Society*; which has ever since been increasing in members, funds and books.

On the 17th of January, 1778, a very extensive fire took place in Charleston, when this Library, containing between six and seven thousand volumes, comprising a very valuable collection of ancient authors, with paintings, prints, a pair of elegant globes, mathematical and other instruments, and many specimens of natural history, was almost totally destroyed. Since the establishment of peace, the attention of the society has been principally directed to the most modern authors. A beginning had also been made towards the formation of a *Museum*.* This latter department, was, with the liberality peculiar to gentlemen of science, generously transferred from the *Library Society* to the *Museum of the Literary and Philosophical Society of South-Carolina*, by an unanimous vote of its members, in the year 1814.

At the present time, the *Charleston Library Society*, consists of 280 members; possesses 13,000 volumes; its capital in funded debt \$10,000, and if an average of \$3 per volume be allowed for the books of the Library, it would be \$49,000; its yearly income is \$3000.

By the calamity recorded above, "it is deficient in Ancient Literature, but contains a very ample collection of elegant and costly works in Botany, Natural History, Voyages, Travels, Civil History, Biography, Languages and Miscellaneous Literature. It also receives a regular annual supply from London, of new and valuable publications." It possesses also numerous Historical Prints, and several valuable Paintings. Its present members are zealous in fulfilling the laudable designs of its founders, their ancestors, in doing much towards the promotion and encouragement of science and literature in the state.

The first newspaper printed in the colony, was one at Charlestown, sometime in the year 1730, by Mr. LEWIS TIMOTHY, and a newspaper printing-office

* Dr. Ramsay's History of South-Carolina, vol. 2, p. 379.

has been, with very little interruption, constantly kept up by a descendant of that gentleman, one of whom was late a proprietor of the *Charleston Courier*. From this it will be seen, that half a century had elapsed from the first settlement of Charlestown, before a public journal was attempted to be established in it; hence, most of the accounts prior to this period, are either traditionary, or recorded in some loose journals, to whose pages it would be almost as difficult to obtain access, as to rescue from oblivion the events that are unrecorded.

The venerable Mr. JOSIAH SMITH, who has preserved files of the first and second volumes of newspapers printed in Charleston, has within the present year, presented them to the *Charleston Library Society*.

“ The only well furnished book-store in provincial South-Carolina, was one kept for about twenty-five years, by ROBERT WELLS, who contributed considerably to a taste for reading in Charlestown, by the regular and early importation of all new and admired publications in Great-Britain.” At the present period there are five well established book-stores in this city.

Sometime about the year 1750, Mrs. LAMBOLL excited great interest in the science of horticulture and gardening, by planting a large and handsome flower and kitchen garden, upon the European plan. It was the first of the kind in Charleston, and occupied the site, corner of King and Lamboll-streets. She was followed by Mrs. LOGAN, and Mrs. HOPTON; after which, gardening was generally attended to, by most families, occupying suitable lands, both for pleasure and profit; many of which, are continued to the present time.

The society called the *Fellowship Society*, was incorporated in the year 1769; “ originally intending to cover under its sheltering wing the deplorable maniac, and for that purpose, appropriated one half of its funds. The other moiety is appropriated to the education of the children of necessitous parents, &c.

In the year 1789, a *Medical Society* was founded in the city of Charleston, consisting of the following

member: PETER FAYSSOUX, ALEX. BARON, TUCKER HARRIS, DAVID RAMSAY, ANDREW TURNBULL, ISAAC CHANLER, GEORGE LOGAN, GEORGE CARTER, ROBERT WILSON, ELISHA POINSETT, JAMES LYNNAH, GEORGE HAHNBAUM, JOHN BUDD, and THOMAS T. TUCKER.

The talents and standing of these professional gentlemen, in the city, at once acquired for this society, the important character, which it has so ably sustained, and continues to sustain at this time. It was incorporated in 1794. In addition to the known liberality and philanthropy of the members generally, in the practice of their profession, their zeal for the promotion of science, was soon evidenced by the formation of three auxilliary institutions: *The Humane Society*; *the Charleston Dispensary for the poor*, and *the Botanic Garden*.

The Charleston Dispensary, under the professional eye of the Medical Society, together with the co-operation of commissioners appointed by the City Council, commenced its humane and benevolent career in the year 1798, under the immediate superintendance of Doctor JOSEPH KIRKLAND, a member of the Medical Society; which office he held for nearly fourteen years, with honour to himself, and infinite advantage to thousands of the afflicted poor.

Mr. ALEXLADER SHIRRAS, a native of Scotland, and for many years a respectable merchant in this city, at his death, bequeathed his spacious and airy mansion, with the lot and buildings, situate at the corner of Meeting and Federal-streets, as a Dispensary and Hospital for the poor. He also endowed it with his houses and lots in Champney-street; the income of which was to aid in furnishing the means necessary for the successful operation of the aforesaid institution. The Intendant of the city, and the Presidents of the Medical and the St. Andrew's Societies, for the time being, and their successors forever, he named and appointed trustees to his Dispensary.

The trustees, in honour of the benevolent donor, gave to the institution his name; and on the 7th of December, 1813, and after fifteen years existence,

the Charleston Dispensary, was transferred to that of the *Shirras' Dispensary*. The members of the Medical Society, continued as usual, to serve as attending physicians, two in each month, until the year 1817; when a physician and surgeon was elected by the society for one year; whose duty it is, to visit and apply to all the patients of the institution, the benefits of all the branches of physic and surgery, and for which services, he receives a stated quarterly salary.

The *Botanic Society*, which also emanated from the Medical Society, was founded in 1805, and was incorporated in the same year. "The Medical Society, gave to it three hundred dollars, fifty dollars per annum, and a large lot of land, which had been generously given to them by Mrs. SAVAGE, now Mrs. TURPIN, to be used as a *Botanic Garden*. The inhabitants were invited to join the association, and on their annual payment of any sum between four to ten dollars, at their option, they were entitled to privileges, in proportion to their respective subscriptions, and became members of the Botanic Society.*

Notwithstanding all the advantages and delights, that this most pleasing and instructive science offered to the citizens, in the adoption of the plan for its establishment; notwithstanding "an annual sum of \$1176, thus obtained from voluntary subscribers," added to what the Medical Society and Mrs. TURPIN had done for it; and although "the garden was opened the same year, under the most favorable auspices, and enriched with a considerable number of valuable indigenous and exotic plants, it flourished for a few years beyond the most sanguine expectations of its friends"; it has fallen!

A second attempt was made, by selling the original lot and improvements, to effect a more extensive, and at the same time more permanent establishment, the Medical Society renewed their former efforts towards its success; but it was in vain; the subscribers abandoned this valuable and interesting institution,

* Dr. Ramsay's History of South-Carolina, vol. 2. page 107.

and its site is now reduced to an equality with the surrounding farms.

That this institution has not hitherto succeeded, agreeable to the laudable wishes and designs of its founders, is much to be regretted; that it may yet, at no distant period, succeed beyond their most sanguine hope is most ardently wished: but whatever be the issue, theirs is the merit of having conceived its importance, and of having introduced it to the notice of their fellow-citizens; who may yet appreciate the value, the extensive utility, and absolute necessity of adopting and amply supporting such an institution, in or near the city.

Such an establishment would become at once, an invaluable seminary, in which their sons might be instructed in the practical parts of that science, which has ever been the delight of the learned among civilized nations: it would also subserve as an introduction to their future studies and subsequent usefulness and advancement in society. And let us, even yet, cherish the hope, that the legislators of the state, convinced of the utility and national policy of patronizing the arts and sciences throughout the state, will shortly add to the list of their acts, one, for the appropriation of means adequate to the successful promotion of this laudable and essentially useful object.

In the year 1802, JOHN DRAYTON, governor of South-Carolina, published his valuable work, "*A View of South Carolina.*" He was the first native Carolinian, it is believed, that has made the laudable attempt, to rescue from oblivion, the perishing materials, on which, the foundation of much of the original history of the state in a great measure depended; and for which, his learned cotemporary, Dr. DAVID RAMSAY, paid him such high and deserved compliments, in his preface to the *History of South-Carolina*, published in 1809.

In governor *Drayton's View*, are to be found, the most important facts relative to the natural and civil concerns of the state; its interior districts, soil, climate, productions, minerals and plants, with the internal improvements, and agricultural pursuits of its citizens. Such a work is of infinite importance to

Carolynians; and reflects the highest honor on its learned author.

In the year 1806, conceiving the era favorable to botany, the author compiled and published by subscription, a series of numbers on botany entitled, "*Flora Caroliniensis*," in honor of his native state. In this work, he claimed no other merit, than the design of promoting a taste for the study of that science, by simplyfyng as much as possible the *Linnæan system*. This work was honored with a numerous patronage, and was continued to the completion of a volume of seven numbers; at which he was compelled to relinquish the undertaking, with the loss of twenty months close devotion to its progress, and also, of 1800 dollars and upwards.

It is belived that no Carolinian had studied the science of botany, otherwise than for horticultural purposes, prior to the revolution; but "since that event, this delightful science has excited attention, which, though daily increasing, is far short of what it deserves."

Among the most eminent scientific botanists of South-Carolina, the following gentlemen will long hold the most distinguished rank, STEPHEN ELLIOTT, HENRY MIDDLETON and Gen. CHARLES C. PINCKNEY. Doctor MACBRIDE, late of St. Stephens, while living, pursued with unceasing ardour, the study of botany, particularly that branch of it, more immediately connected with medicine.

Society will long deplore the loss of this amiable physician, and scientific botanist, who, in the midst of his useful career, and in which he was deservedly acquiring for himself an accession of self earned honors and applause, fell a victim to his professional zeal, during the prevalence of the fever of 1817.

At this period, botany is more extensively cultivated as a science; it has been found all important to the student of medicine, and by no means beneath the dignity of students in all the branches of science. Indeed, the fair sex, conspicuous for their attention to the fine arts and accomplishments, have lately been aroused to uncommon exertions towards its ac-

quirement. In the winter and spring of 1817-18, during the lectures of Mr. WHITLOW, in this city, it is said that upwards of fifty young ladies attended in classes, for the purpose of acquiring a regular knowledge of this delightful science, many of whom were making the most flattering progress therein.

It is to be regretted, however, that at the eventful period, when a thirst for its cultivation had been thus successfully excited, in so respectable and so amiable a portion of the fair community, that it should at once be paralyzed, by the *itinerancy* of that learned and interesting lecturer.

On the first of November, 1806, a number of young gentlemen, conceived the laudable design of originating a second library society in the City of Charleston, and on the 2d of February, 1807, the following associated as members:—DAVID L. ADAMS, JOHN BLACKLER, THOMAS BALL, RICHARD FORDHAM, A. HERBEMONT, B. D. HENRY, JAMES KNIGHTS, CHARLES B. MEASE, THOMAS C. MOORHEAD, ROBERT MUNRO, JAMES MUIRHEAD, WILLIAM MURDOCH, JOSEPH B. PAINE, J. W. PAYNE, ARTHUR G. ROSE, A. H. ROSE, JOHN REID, W. E. SNOWDEN, PETER THOMAS, N. W. VINCENT, and JAMES WILKIE.

This association was incorporated in the year 1813, with the name of the "*Franklin Library Society of Charleston*," and is now in a flourishing condition. It consists of upwards of 151 members, possesses 1364 volumes, in Theology, Ancient and Modern History, Biography, Voyages and Travels, Arts and Sciences, Law, Politics, Poetry, Plays, Novels, Romances, and Miscellaneous Works. Its capital, as yet, consists mostly in books—the object of the society being principally directed to the extension of their library.

An attempt was made in the year 1809, to establish a Philosophical Society in Charleston, for which purpose, a number of gentlemen of respectable talents associated and formed the society, of which CHARLES DEWAR SIMONS, a young gentleman of superior talents and scientific attainment, was elected president. The society, soon became highly res-

pectable, with a large increase of members. A course of lectures, in natural history and experimental philosophy were commenced, and was ably supported by the respective lecturers, and attended by a large assembly of the most respectable citizens.

The merits of Mr. SIMONS, soon attracted the attention of the public, and he was shortly elevated to the Professorship of Chemistry, in the South-Carolina College, at Columbia. Scarce had he established himself in this honorable situation, ere he was accidentally drowned in a back swamp of the Congaree river, on his return to the college; having been on a visit to his family and friends in Charleston.

His death was universally deplored: for his was not alone a private, but a national loss. The society began to decline on his removal from Charleston, and appears to have died with him; as no successful attempt, that I have heard of, has been since made towards its further continuance.

So highly was Mr. SIMONS esteemed by the students of the college, of which he had been the professor; that, as a proof of their regard, they caused to be erected to his memory, an elegant monument in St. Philip's Church, Charleston; with appropriate inscriptions.

At the commencement of the year 1813, the author submitted to a select number of his friends, the outlines of a constitution, for organizing a society to be called the *Antiquarian Society of Charleston*. The object of this society were to be, *primarily*, the collection, arrangement and preservation of specimens in natural history; and of things rare, antique, curious and useful; and *secondarily*, the promotion and encouragement of the arts, sciences and literature generally.

On the 20th May, 1813, the following gentlemen agreed to associate for the above purposes, and signed their names to the original outlines for a constitution, by which the society were to be governed thereafter: DOCTORS RICHARD L. LATHAM, JOHN L. E. W. SHECUT, ISAAC A. JOHNSON, JOHN S. TRESKOT, and JOHN GRIMKE. Their first meeting, as a society, was held

on the 31st of the same month; at which, further measures were debated on, for the advancement of the society.

At their meeting of the 14th of June following, DOCTOR JAMES E. B. FINLEY, STEPHEN ELLIOTT, Dr. DAVID RAMSAY, the Honorable JOHN DRAYTON, the Honorable THOMAS BENNETT, BENJAMIN ELLIOTT, and Dr. ALEXIS DE CARANDEFEZ, attached themselves to the society as members.

Rules were submitted for the government of the society, by a committee appointed for that purpose, and adopted on the 30th of June; and by the votes of a majority of the members present, the name of the society was altered to that of *The Literary and Philosophical Society of South-Carolina*; by which name it was incorporated in the year 1814.

The surprising progress of this society is a guarantee, that the citizens of Charleston are awakening from their slumber, to the active promotion of science and literature: but this rapid progress was to be expected, from the happy choice of the society, in selecting STEPHEN ELLIOTT, as their president. The acknowledged talents, the extensive information, added to the mild and unassuming character and deportment of that gentleman, rendered him every way qualified to advance the best interests of the infant society.

The objects of the association were no sooner publicly known, than numerous donations of specimens, in every department of the arts and sciences, were liberally bestowed, with which to commence its Museum. These, with the cases and collection, presented by the *Charleston Library Society*, in 1814, began to assume a respectable and very flattering appearance.

The opportune arrival of that distinguished naturalist and practical chemist, Dr. FELIX L'HERMINIER, from Guadaloupe, with an extensive collection of specimens, the fruit of twenty years application, expense and industry, which he offered to the society, was an advantage, not to be lost sight of. Negotiations were immediately entered into with that gentle-

man, by a committee of the society. The citizens were also invited to co-operate with them in effecting the purchase of this collection, towards the establishment of a respectable and scientific Museum in Charleston.

Those persons who subscribed fifty dollars, on payment of that sum, became members for life. The State Legislature and the City Council, alive to the importance of this object, with a promptness and liberality, which will forever redound to their credit, contributed largely towards the purchase, and, with the sums subscribed by individuals, enabled the society to make a purchase of that valuable collection, which is now one of the chief, and perhaps, most interesting ornaments of the city.

The superior personal attention and talents of Dr. L'HERMINIER, were also enlisted in behalf of the society, by being appointed superintendant of the Museum. This was also an acquisition of importance; his practical knowledge in every department of science, and particularly that of chemistry, had already given a character to that department, which cannot fail to ensure its future progress.

But the society were not long to enjoy the advantages of his personal services. Unsuccessful in his endeavours, to secure a permanent residence among us, with the modest expectation of adequate remuneration, for his uncommon exertions to establish a regular chemical laboratory and drug store, and which he had completed at a vast expense, he, at once, discovered that his endeavours would prove unsuccessful.

With talents and attainments in every science, and accomplishments which entitled him to the patronage of the state; and although his value was duly appreciated by the members of the society, such was their situation, from the infancy of their establishment, that, unable to allow him a competent salary for his services, they were constrained to acquiesce to his determination of returning to his native country, to which he was invited to return, by that government which knew his merits, and were disposed to reward them.

As a proof of their regret at his departure, the members of the society, on motion of their late esteemed *Curator*, Dr. JAMES E. B. FINLEY, unanimously voted the following honorable testimonial of their regret and regard:—

“ In the Literary and Philosophical Society of South-Carolina, April 16th, Anno Domini, 1819—
 “ whereas, Dr. FELIX LOUIS L’HERMINIER, Chymist, member and correspondent of several learned societies, heretofore superintendant of the Museum of the Literary and Philosophical Society of South-Carolina, is about to depart from this country, the society regretting the loss they are about to sustain, in the distinguished abilities of this gentleman, cannot but offer him a parting testimonial of their regard;—
 “ therefore,

“ *Resolved*, that the Literary and Philosophical Society of South-Carolina, entertain the highest respect for their associate, Dr. FELIX L’HERMINIER, his talents, his accurate knowledge of natural history, his devotedness to the progress of science in this city, his industry and exquisite discrimination, in founding and arranging their Museum, entitle him to the sincere thanks, and the honorable notice of this society. Deeply regretting their loss in his departure, they request him to accept their fervent wishes for his happiness and prosperity wherever he may reside; and they will always be happy to recognize in him an honorary and corresponding member.

“ *Signed by order of the Society,*

STEPHEN ELLIOTT, *President.*
 TIMOTHY FORD, *Vice-President.*
 DR. FINLEY,
 DR. JOHNSON, } *Board of*
 R. GODARD, } *Superintendants.*
 B. ELLIOTT, }

“ H. W. PERRONNEAU, *Secretary.*”

Our distinguished fellow citizen the Hon. THOMAS SUMPTER, minister, resident at Brazils, has lately enriched the Museum of the society, by presenting it with an extensive, splendid and very valuable collec-

tion of minerals, birds, and insects of Chili, and the Brazils. The society are also in a very especial manner indebted to the Hon. JOEL R. POINSETT, the Hon. HENRY MIDDLETON, STEPHEN ELLIOTT, Esq. Messrs. MACLURE, CARADEAUX, and other respectable individuals, for their valuable donations of specimens in natural history, and for which, their names have been honorably mentioned in the journals of the society.

If allowances are made for the climactic, or constitutional apathy, that has always, to a certain degree, prevailed among the natives of warm climates, the society may be said to be in a flourishing condition. It consists of 138 members, many of whom are of the first standing in society, and of acknowledged literary and scientific talents. Its Museum is rich in an extensive collection of minerals, fossils and shells. The departments of Zoology, particularly those of Ornithology, Erpetology, Ichthyology and Entomology, are extensively filled. It is also rich in coins, medals and castings. The specimens of art are also very considerable; and the whole are arranged in the most appropriate order by their late superintendent.

The library of the society, being for the most part confined to books of science, is yet in its infancy. Several valuable volumes ancient and modern, have been presented to it by different persons, and by members. A fund is appropriated towards its particular establishment, which has been enriched by a donation of 750 dollars, from JOHN BLAKE WHITE, Esq. one of its members.

Upon the whole, this society may be said to be established upon such sure foundation, as cannot fail to ensure its ultimate success, and we look forward with pleasing anticipations to that period, when it will rank among the most useful and respectable institutions of the kind in America.

Since their establishment, the society has been deprived of several of its most useful and ornamental members, whose loss will be long deplored by their surviving associates:—among these were, the learned DEWAR, the distinguished RAMSAY, the ac-

complished MACBRIDE, and the amiable and modest KIRKLAND, LATHAM and FINLEY, for each of whom the society have publicly expressed their regret, by appropriate resolves, testifying the high value set upon them while living, and the great loss sustained to the society by their deaths.

Several young gentlemen attempted the establishment of a *Junior Literary Society* in this city, in the year 1814, which they termed the *Barlow Literary Society*. It is believed the association has been dissolved, as nothing appears to be doing towards its further extension.

The year following, and shortly after the melancholy event of the fall of the great and good Dr. RAMSAY, a juvenile society was in formation, to be called the *Ramsay Library Society*. This association also appears to have declined; yet, notwithstanding these failures in the establishment of literary societies among the junior members of the community, they are so many proofs, that a thirst for promoting and encouraging the arts, sciences and literature, has been at length awakened, and wants but the experience of maturer age, and the patronage of a liberal public, to render these efforts useful, respectable and permanent.

Among the fine arts, the city of Charleston boasts of the superior and exquisite talents of several of her native sons and daughters, as portrait and fancy painters. Perhaps no state in the union, has produced so great a proportion of *amateurs* in drawing and painting, particularly among the fair sex. A gentleman,* long in the habit of instructing in this elegant accomplishment, has been so kind as to favour me with the following remark :

“ I have observed, that the females of Charleston,
 “ have a peculiar talent for the science of painting,
 “ not only as it respects the beautiful proportions of
 “ figure and drawing generally, but in the harmoniz-
 “ ing and contrasting of colours. Their refined sense
 “ of beauty, their taste and industry, though mostly

* Mr. J. Canter, of this city.

“ exhibited in their domestic circles, would frequently
“ not be misapplied, if grouped with the more pub-
“ lic and celebrated specimens of European artists.”

Among her sons, we would make honorable mention of THOMAS CORAM, JAMES AKIN, WASHINGTON ALSTON, CHARLES FRASER, JOHN CANTER, JOHN B. WHITE, JOHN CART, JOHN S. COGDELL, JOHN C. YOU, HENRY BOUNETHEAU, and CHARLES SIMONS, as holding a distinguished rank among the amateurs of portrait painting and engraving; several of these being self-taught, render their attainments the more highly meritorious.

For elegant and chaste poetry, the sons and daughters of Carolina, have been long held in high estimation. Hitherto, their talents have been mostly confined within the limits of periodical papers; hence, those talents are only known and admired among their immediate acquaintances and friends.

In the year 1817, Mr. ELLIOTT, commenced the publication of his *Sketches of the Botany of South-Carolina and Georgia*, of which, five numbers of the first volume, accompanied with several highly finished plates of the grasses, is completed. Of the merits of this work, it is unnecessary to say any thing in this place. The well known talents of the author, his travels, and close attention to botany, particularly that of his native and her sister state, are its guarantees.

As a correct and truly scientific classification and arrangement of the plants, indigenous to South-Carolina and Georgia, containing several new and hitherto unknown or *nondescript* species, together with a mass of valuable information, with regard to the agricultural advantages, and medicinal properties of many species, this work may be justly considered, the best on the botany of these states, that has been yet offered to the public.


Yet, notwithstanding these energetic attempts of numerous individuals, to establish the literary character of South-Carolina, and to prove to the old world, that her soil is by no means unfavourable to the generation or cultivation of the arts and sciences, and that

her sons want but the appropriate stimulus to their labours, that of public patronage, to shield them from loss, while endeavouring to raise her literary fame to a level with that of the most favoured nations, examples are yet to be seen of the most unpardonable apathy and shameful neglect of her citizens.

DOCTOR RAMSAY'S *History of the Revolution*, his *History of South-Carolina*; and governor DRAYTON'S *View of South-Carolina*, with many other publications that might be named; although works of acknowledged superior merit, have scarce cleared the expenses of the paper, the printing and the binding.

Until the Carolinians are aroused to the formation of a permanent national character; and until the utility and vital importance of the arts, sciences and literature, form a predominant feature of that character, these things must and will remain, the reproach of South-Carolina.

SKETCH IV.



Climactic Constitution and Medical Sketch of Charlestown, with Meteorological and other observations, with appropriate tables.

IN order to establish a correct medical history of any district or country, it is essentially necessary to obtain a long series of observations on the climate, seasons, endemial and epidemical diseases, common or peculiar to such district or country.

The medical and meteorological observations for Charlestown, until the establishment of the Medical Society in 1789, with the exception of those made by the Rev. Mr. HEWITT, Doctors LINING, CHALMERS and MILLIGAN, may be said to be mostly traditionary; or that they were, the casual remarks of persons residing but a short time in the colony; and may serve, when taken in connexion with those of the foregoing authors, as data from which to establish, the medical and meteorological history of Charleston from its first settlement to the present date, a period of 139 years.

The most extensive series of observations, of this nature, that are of public record, are those made by Doctor LIONEL CHALMERS, and published in his valuable work, "on the weather, &c. of South-Carolina;" in which a regular table of the weather for ten suc-

cessive years, that is, from 1750 to 1759, is given. Those made by the other gentlemen, are to be considered rather as the historical, than as the medical character of the colony; and hence, for the first seventy years, from its first settlement, and again, for the thirty years which intervened, between the observations of Dr. CHALMERS, and the establishment of the Medical Society, we are left to tradition or conjecture, with regard to those events and occurrences that are connected with the medical history of the city.

If, with these historical facts, though few in proportion to the number of years that have transpired, and if from a retrospective view of the original topography of Charleston in 1680, compared with what it is at the present time, we shall be able to prove, that, in proportion as the city has improved by an amendment of its soil, so, in a relative proportion has the health of the city increased, we may be justified for indulging in the benevolent hope, that when all the low grounds are completely drained and filled up with wholesome materials, (one among the several existing causes of the fatal endemic being thus removed) its recurrence will be less frequent, and its fatality less extensive among our citizens.

The State of South-Carolina lies between the 32° and 35° 8' of north latitude, and between the 75° and 80° of west longitude from London, or 1° 24' and 6° 10' west from the City of Washington, the seat of the government of the United States. The distance and bearings of the city have been already noticed in the first sketch.

Its Climate,

Although extremely variable, is considered temperate, affording a medium between the heat of *tropical*, and the cold of *arctic* countries; and resembling in a great degree those of "Aix, Rochelle, Montpellier, Lyons, Bordeaux, and other parts of France; "Milan, Turin, Padua, Genoa, Parma, Mantua, and "other parts of Italy; Buda, Benda, Crimea, and "other parts of Turkey in Europe; Circassia, Astracan, and other parts of Russian Tartary; and those

“ of Chinese Tartary, which lie between the 44th and 47th degrees of north latitude.”

“ In comparing American climates,” says Doctor RAMSAY,* “ with those of Europe, to bring them on a par with each other, a difference of 12 degrees should be allowed for peculiarities in the American continent. The most remarkable of these is such a predominance of cold, as subjects an American, living in north latitude 35, to an equal degree of cold with an European residing in north latitude 47.” And it is upon this allowance that the resemblance of the climate of South-Carolina, has been compared to those places, in the preceding paragraph.

The Seasons,

Considered in a medical point of view, are distinguished as *hot and dry*, or *hot and wet*, and of these, there is an intermediate state, which may be termed *hot and moist*. It will be observed, that the seasons we are now treating of, are the summer, or as they are generally termed the *sickly seasons*; which may be comprehended by the four months commencing with the 21st of June, the whole of July, August and September, and terminating with the 21st of October. In some of those seasons, there are on record, several very remarkable occurrences. The Rev. Mr. HEWITT, records a very remarkable season of the first kind, where he says, “ during the summer of 1728, the weather in Carolina, was observed to be uncommonly hot, by which the face of the earth was entirely parched; the pools of standing water dried up, and the beasts of the field were reduced to the greatest distress.”†

The same year was remarkable for the hurricane which took place in August, overflowing the town and low grounds in its vicinity, doing incredible damage to the fortifications, houses, wharves, shipping, and cornfields, and for the appearance of the Yellow Fever, which “ swept off multitudes, both white and black.”

* History of South-Carolina, vol. 2, p. 49.

† Hewitt's History of South-Carolina, vol. 1, p. 316.

The year 1699, is recorded as a calamitous year, in which a desolating fire, laid in ruins, many of the houses; and a *Small Pox* and *Yellow Fever* greatly thinned the inhabitants of the town. The year 1700, was also remarkable for the first great hurricane experienced by the settlers of Charlestown. In the year 1703, the second epidemic attack of *Yellow Fever* is noticed; and in the years 1728, 1732, 1739, 1745 and 1748, there were also epidemic attacks of *Yellow Fever*; in some of which years, particularly in 1732, it commenced as early as May, and terminated as late as October!

Doctor CHALMERS, records the year 1752, as excessively *hot and dry*. He tells us, "that many cattle "perished for want of water; that the plants were "shrunk and withered, and the distress of men and "beasts was indescribable. When the mercury rose to "the 97 and 98 degrees of the thermometer in the "shade, the atmosphere seemed in a glow. At bed "time, it was not possible to lie long still; some of "the inhabitants were compelled to lay abroad on "the pavements. This circumstance is corroborated by the venerable JOSIAH SMITH, who informed me, that so intense was the heat, that along the Bay, he observed many families, who had their beds made in their balconies.

"Bodies that died, putrified in five hours, and a "candle that was blown out at this season, and set "in a chimney at 10 o'clock at night, the wick continued to burn clearly till next morning, and was "likely to do so for many hours longer."

This year was also very remarkable for the gale, whose violence occasioned it to be called the *great hurricane*, still remembered by a few of our oldest inhabitants, the effects of which, are minutely described in Dr. RAMSAY'S *History of South-Carolina*.

In this year, however, although it was excessively *hot and dry*, still, there was no such disease as an *Epidemic Yellow Fever*! On the contrary, Dr. CHALMERS, adds, "neither, *was ever a more healthy summer than this.*" To what cause shall we attribute this amazing difference between two years, that is, 1728

and 1752? Both remarked for being excessively *hot and dry*, both conspicuous for the violence of their hurricanes—while one only, is remarked for the existence of an Epidemic Yellow Fever, “which swept off multitudes both of white and black,” and the other, is asserted upon undoubted authority, to be *as healthy a summer as was ever known*.

Why, from the great similarity of seasons and elementary conflicts, did not *Yellow Fever* prevail in both years alike? The answer must be reduced to this certainty, that there must have been wanting in one of those years, a *specific cause* of the fever, and in the other, a *specific preventive* of it, otherwise, as there are proved to have existed in both years, similar degrees of *heat and dryness*, and similar *violence in their gales*, and *Yellow Fever* existing in one year, while the other was peculiarly remarkable for health; therefore, if we deny the agency of electricity, we must conclude, that there is neither a *specific cause*, nor a *specific preventive* of that disease.

But, that there does actually exist a *specific preventive* of this fatal endemic, it becomes my duty to explain, and to prove that preventive to be the *electric fluid*, or in other words, THUNDER AND LIGHTNING! and this assertion is warranted from the following facts:

1st. Dr. CHALMERS, after continuing the relation of occurrences for the year 1752, tells us, “that when “this violently hot weather began to break up, (about “the 21st of July) *every shower was accompanied with “most dreadful thunder and lightning*,” and that he has known it in that year, “to lighten and thunder “violently, and with but little intermission, for eight “or ten hours together.”*

It is, however, due to candour, to acknowledge in this place, that there are no positive proofs, that there was not; hence, it is acknowledged to be only presumed, that there was not any, or very little thunder and lightning during the summer of 1728.

* Dr. Chalmers on the weather and diseases of South-Caroliana, and notes in Dr. Ramsay's History of South-Carolina, vol. ii. p. 65.

But 2d, In the year 1741, when the Yellow Fever was prevailing with great violence and mortality in Philadelphia, Dr. FRANKLIN, whose brother was at Burlington, on his way from Boston, returning home, thus writes, "last night we had a severe thunder gust here, (Philadelphia) which lessened the violence of the fevèr to day, and I think you may now venture to return."*

3d. It is proved by the records of the journals of the Medical Society of this city, that seasons that were *hot and dry*, as also those that were *hot and wet*, and when Yellow Fever existed in any of these years either as an epidemic or sporadic disease, it invariably disappeared with, or soon after the restoration of an *electrical equilibrium*, from heavy concussions of thunder and lightning. Of this character were the years 1803, 1805, 1808, 1809, 1810, 1811, 1813, 1814, 1815, 1816, and 1818.

4th. The Yellow Fever raged with unusual violence in Charleston, from the 27th of July, 1817, to the 16th of November. On the 14th of October, there was a heavy fall of rain with several powerful concussions of thunder and lightning. By the 16th of the same month, the fever changed its type, and began sensibly to decline; the deaths from Yellow Fever were immediately lessened from 20 in the week to 9, and from that to 2, and in one week 3.†

5th. It has also been almost invariably the case, that in these years marked in the journals of the Society, as Yellow Fever years, that there has been but little or no *thunder and lightning*, and that in these years, the fever continues its course, until a stop is put to it by *cold and frost*. Of these facts I have been myself well ascertained from my own observations, since the year 1803, and more positively since 1812.

These facts, it is presumed, are of themselves sufficient to prove the doctrine of *electrical influence* in preventing the generation of Yellow Fever, and of checking its progress when it does exist. Were I to

* See Dr. Rush on the Yellow Fever of 1793, p. 134, &c. also, my Essay on Contagions and Infections, p. 27 to 30 and Note.

† Essay on the Yellow Fever of 1817, p. 15. 16.

enlarge here, on the subject, I might extend these sketches beyond their proper limits. It will be found, therefore, more at large, in the three following Essays, in each of which, *the doctrine of electrical influence* forms a predominant feature, supported by facts and occurrences beyond the reach of doubt. But to return.

There have been several periods, in which the *heat and dryness* of the season have been so great, that very large and deep swamps, which had never been known to be dry within the recollection of the oldest inhabitants, were in those years so dried up, that fires have not only travelled over their surfaces, but have consumed the largest trees growing in them, burning even their very roots to a depth of five or six feet beneath the surface, and baking the muddy soil to a considerable depth.

Of this character were the years 1793 and 1818. In the former year, an immense inland swamp in the District of Orangeburgh, called Skindoe Bay, was burnt through by fire, and its surface in many places, baked for several feet, and many of the largest trees continued burning for a week or more. In the latter year, the celebrated *Hell-Hole*, a swamp situate in Charleston District, adjacent to Santee River, was literally roasted! This latter swamp was a harbour for runaway negroes, wolves and other beasts of prey, and was never before known to be dry. In the neighbourhood of Pee Dee, I was informed, some of their largest swamps had shared a similar fate. The year 1818, will, therefore, rank among the driest years in the meteorological history of Carolina; it will also be recorded among its most healthy years, and in which there were many and heavy concussions of thunder and lightning.

On the other hand, the seasons that have been remarkable for the quantity of rain, and which caused them to be distinguished as *hot and wet*, are abundantly more numerous; in common, they may be rated in the proportion of four wet to three dry years.

In medical inquiries, however, this kind of computation, should not be entitled to more than general

consideration. The proportions should be graduated by observation actually made, and it is hoped, that the following remarks, which are the result of a particular attention to the quantities of rain that have fallen in Charleston, in the different seasons of ten successive years, and at distant periods of time, may be considered as sufficient experience, from which to establish a *hydrometrical scale* for the city of Charleston, by which to distinguish, with somewhat of mathematical precision, between *hot and dry*, *hot and moist*, and *hot and wet seasons* :

Quantity of Rain.

The medium quantity of rain which fell in ten years, that is from 1750 to 1759, was noticed by Dr. CHALMERS, as averaging 42 inches each year. The medium quantity which fell in eight years, from 1795 to 1802, as noticed by governor DRAYTON and Dr. RAMSAY, averaged 55 inches each year; but as there was a fall of $83\frac{1}{4}$ inches in the year 1799, and of only 39 inches in 1802, it is necessary from this difference, to fix a specific medium for each respective year, having a reference, however, only to the summer season.

From a superficial view of the great difference in the fall of rain in the two years above noticed, it would appear that a fall of from 75 to 83 inches of rain, would constitute a *wet year*, while a fall of from 35 to 39 inches, would be called a *dry year*. This, as it regards medical precision, and the health of the city, is however, not the case : a fall of 20 to 25 inches in the year, if it happens within the four months which mark the sickly season, will, as it regards the health of the city, constitute a *wet summer* ; while, on the other hand, if there be a fall of 30 to 45 inches in the year, provided there does not fall more than from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches in each month of the year, the distribution being thus equalized throughout the twelve months of the year, the season is properly a *dry one*.

Although “ less rain fell in the year 1802, than in “ any of the seven preceding years,” and “ though “ there were only sixty-four days, in which an actual “ fall of rain took place,” thirty-six of these days

were in the three sickly months of June, July and August, in which there fell at an average seven inches in each month, or 21 inches in thirty-six days of the three months, and which, happening at that season of the year, commonly known as the sickly season, must, as it regards the medical history of the city, be called a *wet year*.*

Upon the above principle, the following table having a reference only to the summer or sickly season, has been graduated. The quantity of rain necessary to constitute the respective seasons, are calculated to fall within the months of June, July, August and September; and it is confidently believed, that future experience will prove the calculation correct.

TABLE I.

Hydrometrical Table for Charleston.

Seasons.	Dry.	Moist.	Wet.
Quantity of rain.	10 inches.	15 inches.	21 inches.

TABLE II.

Average quantity of rain in each season of ten years, from the year 1750, to 1759, by Dr. Chalmers.

Seasons.	Rain in inches $\frac{x}{100}$
Spring.	6 09
Summer.	12 73
Autumn.	16 90
Winter.	6 01
Year.	41 73

TABLE III.

Average quantity of rain in each season of ten years, from the year 1809, to 1819.

Seasons.	Rain in inches $\frac{x}{10}$	Average of rainy days.
Spring.	9 7-10	14
Summer.	17 5-10	28
Autumn.	15 5-10	20
Winter.	8 3-10	12
Year.	51 inches.	74 d's rain.

* See Governor Drayton's View of South-Carolina, p. 23, and Dr. Ramsay's History of South-Carolina, vol. 2. page 57.

The Indians commonly anticipate a wet or dry season, from the appearance of the new moon, thus if the horns of the moon be up and down thus D , they say the moon lets out all the water, and they calculate on a wet month; but if the horns be both up thus V , they then say, she holds all the water, and that it will be a dry month. I have found this simple mode of prognosticating the weather, almost invariably correct from many years observation.

Difference of the Heat and Cold of Charleston.

The difference between the heat of summer and the cold of winter in Charleston, has been known to be as great as 83 degrees on different days of the same year. This amazing difference took place in that year, which, on many accounts, may be considered the most remarkable of any, in the History of South-Carolina, the memorable year 1752, in which "for twenty successive days, excepting three in June and July, the temperature of the shaded air, varied between the 90th and 101 division of the thermometer." Dr. LINING observes of the year 1738, that, "in summer, the heat of the shaded air, about two or three in the afternoon, is frequently between 90 and 95 degrees, and on the 14th, 15th and 16th of June, at 3 P. M. it was 98, a heat equal to the greatest heat of the human body when in health."

"The change from heat to cold, and *vice versa* in the spring and fall," says Dr. MILLIGAN, "are often sudden and considerable, and, *absolutely depend on the direction and force of the wind*. I have sometimes known a difference of more than twenty degrees, in Fahrenheit's thermometer in a few hours. In thermometers graduated by his scale, kept in the shade, where the air has free access the mercury, yearly rises in the hot months to the 96th, sometimes to the 100th degree, and (what is most insurportable) the nights are very little cooler than

“the days. In the winter, it always falls considerably below the freezing point*.”

That attentive and intelligent gentleman, Mr. JOHN CHAMPNEYS, repeated to me what he had before communicated to Dr. RAMSAY, that at three different periods, within his knowledge and recollection, the thermometer had fallen more than fifty degrees in less than fifteen hours; and that he also several times knew, fires kindled in chimneys, as not only comfortable, but absolutely necessary in some of our summer days; while, in some days of our winter season, they were altogether unnecessary, unless for culinary purposes.

In the year 1751, Dr. CHALMERS mentions a difference of 46 degrees in the course of sixteen hours.† The 20th of July, 1812, was remarked as the hottest and most sultry day known in this city for many years, the thermometer at 93°, although the mercury in the thermometer was three degrees lower, than it had been in the month preceding. On this day, the inhabitants of every class, whether in the shaded or open air, employed or unemployed, were sensible of its effect, by a profuse perspiration and other symptoms of oppressive heat. The thermometer in June had risen to 96°, but the heat was not oppressive, from which it is to be inferred, that the prevailing wind, must have been from that point of the compass, favourable to the proper modification of heat. There was a very sudden fall of the mercury in the thermometer from 80 to 46° on the 27th of April, 1813, and on the 16th of May, the same year, the air was so cold as to be compared with the air in winter. On the 17th of March, 1819, it fell 33° in the course of twelve hours, accompanied with a frost.

In the present year 1819, the thermometer had risen to 88 and 90° in June and July, but on the 18th and 19th of the latter month, it fell in the course of a few hours from 87 to 76°, a difference of eleven de-

* Dr. Milligan's short description of the Province of Carolina, written in the year 1763, and published in London in the year 1770.

† Chalmers on the weather and diseases of Carolina, vol. i. page 117.

grees. These variations, when not exceeding twenty degrees in the course of twenty-four hours, may be considered as common to the climate. When exceeding twenty degrees, as they are not common, so they are to be ranked among the extraordinary occurrences of South-Carolina.

In common, the difference between the summer's mean heat, and winter's mean cold, will be found to range between 75 and 56 degrees Fahrenheit, a difference of 19 degrees for the current year. Mr. HEWITT, says, "the mean diurnal heat of the different seasons, has been, upon the most careful observations, fixed at 64 in spring, 79 in summer, 72 in autumn, and 52 in winter; and the mean, nocturnal heat in those seasons, at 56 in spring, 75 in summer, 68 in autumn, and 46 in winter".*

If we compare the degrees of heat for the ten years recorded by Dr. CHALMERS, from 1750 to 1759, with those of the ten years from 1809 to 1818, upwards of half a century from the former observations, they will result in favour of the increasing mildness of the climate of Charleston. Thus, the average of the mean heat in the former is 68 degrees, while in the latter, it will be but 60 degrees, leaving 8 degrees less of mean heat in the year, in favour of the city; which proves, that the climate of Charleston is 8 degrees colder at this period, than it was sixty years ago.—May not this variation be owing to causes, connected along with those which occasion the variation of the magnetic needle? And may not the earth herself, in her vast and amazing revolutions, traverse east and west four degrees in each direction?

The summer heat of Charleston, is, notwithstanding, less intense, than that of the interior to the north westward of it. In the summer of 1808, the degree of heat in Columbia, which is distant about 100 miles in a direct line to the north west of Charleston, was frequently from 96 to 98°, while in the city it did not exceed 91° Fahrenheit.† In the city of

* Hewitt's History of South-Carolina, vol. 1, p. 136.

† Dr. Ramsay's History of South-Carolina, vol 2, p. 51.

New-York, the thermometer rose to $101\frac{1}{2}^{\circ}$ in the month of August, 1819; on the 21st of June it was at 98° ; in July, 99, and in the open air, at 124° .

This difference in the degrees of heat, between the two places, is to be accounted for upon natural principles, connected with their local situations. Columbia is remote from the sea, elevated above 1000 feet above the surface of the ocean; consequently is never fanned by the refreshing sea breeze, so reviving to the citizens of Charleston; which, as we have already seen, is located on a narrow slip of land, between the confluence of two large rivers, in an open situation, near the Atlantic ocean; whose winds are forever fanning its surface, and whose waves continually beat on its shore; in consequence of which, together with its low flat surface, nearly surrounded with water, the temperature of its summer heats are greatly moderated.

The following scale, graduated from the foregoing observations, will shew the mean heat of Charleston, at both the periods:

TABLE IV.

Thermometrical Scale of the Mean Heat of Charleston, from 1750 to 1818.

Years.	Seasons.	Diurnal Heat.	Nocturnal Heat.	Years.	Diurnal Heat.	Nocturnal Heat.
1750 to 1759	Spring.	66° Fah't	58° Fah't.	1809 to 1818.	58° Fah't	50° Fah't.
	Summer	80 "	75 "		72 "	67 "
	Autumn.	72 "	68 "		64 "	60 "
	Winter.	54 "	48 "		46 "	40 "
	Average heat for the year.	68 "	62 1'		60 "	54 1'

I come next to notice the degrees of *cold* experienced in Charleston. "The coldest days on record," says Dr. RAMSAY, "are, December 23d and 24th, 1796, on both of which, the thermometer in Dr. WILSON's house fell to 17° , a difference of cold greater than that in 1752, by one degree." It may be also remarked, that as the heat in 1812, was distress-

ingly oppressive to the citizens; so also was the cold in the winter equally severe; and may rank for its severity, with the cold of the winters of 1766, 1779, 1786 and 1796. The cold of Charleston will be better understood from the following section:

Frost.

Frosts of various degrees of severity, are the annual visitants of our climate; they are rarely very severe, and appear generally about the beginning, or middle of November, and seldom occur later than the last week of February, or first week in March.

There are, however, several extraordinary instances recollected by old inhabitants, and others, on record, of their happening as late as the last week in May; and at one time, on the first week in June. Mr. JOHN CHAMPNEYS, informed me, that on the 4th of June* (remarkable for its being the birth day of GEORGE, III.) a severe cold blast or particular species of frost, occurred in and near Charleston, which destroyed all the garden vegetables, particularly melons, cucumbers, squashes, beans, &c. together with most fruits not sufficiently forward.

The Rev. Mr. HEWITT, has recorded a frost which happened on the 7th of February, 1747, remarkable for its severity, destroying most of the orange trees, in and near the town.† “It is remarkable,” says Dr. RAMSAY,‡ “that when orange trees have been destroyed by frost, it has always been in the month of February. It is also remarkable, that oranges, though plentiful forty or fifty years ago, are now raised with difficulty.” This is certainly a further proof of the change of our climate, which we have just shewn to be eight degrees colder than it was sixty years ago. “Once in every eight or ten years, a severe winter destroys the trees on which they grow; of this kind were the winters of 1766, 1779, 1786 and 1796.”

* The year forgotten.

† Hewitt's History of South-Carolina, vol. 2, p. 202.

‡ History of South-Carolina, vol. 2, p. 527.

The frosts which occur in Carolina, are variously termed, according to their degrees of intenseness. 1st. the *Hoar Frost*, which is the mildest species. 2d. *White Frost*, somewhat more intense, and usually indicates warm, cloudy, and sometimes rainy weather to follow. 3d. *Black Frost*, the severest of all the species, and in which the waters are frozen to ice, the soil is closed up, and in moist places cracked into innumerable fissures of several inches depth beneath the surface. 4th. *the Cold Blast*, a species of frost, such as that mentioned to me by Mr. JOHN CHAMPNEYS, as having occurred on the 4th of June.

Whenever a severe frost happens late in March or April, fruit of almost every kind, is either put back or destroyed; fortunately, however, this is but seldom the case. And in *Yellow Fever seasons*, an early frost is among the most desirable visitations, as it puts a stop to the further progress of the disease, of which there have been several remarkable instances in the years 1796, 1802, 1804, &c. We had frost on the 19th of April, 1813, and again on the 17th of March, 1819, at which time the thermometer fell 33 degrees in twelve hours!

Snow.

Though not uncommon, is seldom observed to any extent in our maritime districts. There are instances, however, of its extraordinary fall in Charleston, particularly in the years 1790, 1792, 1800, 1809 and 1818. The snow which happened in January 1800, was the greatest ever known, and came from the N. W. and S. W. They seldom happen earlier than December, or later than February, and cover the soil not more than two or three inches, with the exception of that in 1800, which covered the earth six or eight inches in Charleston; but to much greater depth at Brunswick, in the State of Georgia.

Air and Prevailing Winds of Charleston.

It has been remarked, from the earliest and most attentive observations of the climate of Charleston, that the *hygrometer* almost always indicates a constant humidity of the air; and this is further proved from

the great difficulty, and sometimes the impossibility of performing any thing like a regular succession of electrical operations in the city, and particularly with those apparatus heretofore commonly used in practice.

The index of the hygrometer for the seven years recorded by Dr. RAMSAY, did not mark in any one of those seven years, more than twenty-four dry days, and the average of the whole seven years, is less than sixteen dry days for each; and this constant humidity of the air, and moisture of the soil, the quantity of low grounds still in the city, and its immediate vicinity, often inundated with water; and the vast body of marsh and swamps to the west and south-west, afford generally ample sources for the derangement of the electric equilibrium of the atmosphere, and the consequent generation of those *miasmas* that have been proved to be the sources of those fevers, that are the proper endemics of maritime Carolina.

“The winds in Carolina,” says Drs. HEWITT and MILLIGAN, “are changeable and erratic, and about the vernal and autumnal equinoxes, commonly boisterous. In summer they are sultry and suffocating, in winter, cold and dry.” It is now correctly ascertained, that the health of the city depends among other causes in some measure, on the course of the winds; thus, when the *prevailing winds* of summer, are from the east, the city is generally healthy during the whole of those months designated as the sickly season. But, if the prevailing winds are from the opposite points of the compass, that is, from the west or south west, then, in concurrence with the other exciting causes, an unhealthy season is almost certain; unless there happen repeated thunder showers, as is sometimes the case, or heavy concussions of thunder and lightning.

“In winter and spring,” says Dr. RAMSAY, “the east and north east winds have been found very injurious to invalids, especially those who have weak lungs, or who are troubled with rheumatic complaints. In these seasons, they bring with them that languor, for which they are remarkable in other

“ countries ; but in summer, by moderating heat, they are both pleasant and wholesome ; their worst effects are, to produce catarrhal complaints and colds.”

The winds are very variable in summer, sometimes changing from west, all the points of the compass southwardly, again eastwardly, and on to the north east, in the course of one day. In general, however, they shift only from west to south west, or south ; or from the east, south east, or north east ; and these are the prevailing winds of summer. It has been also observed, of the winds of Carolina, that those from the south are generally *hot and moist* ; those from the south west and west, less hot, but still *sultry and moist* ; north west and north winds are refreshing in summer, but chilling in winter. North east winds are generally accompanied with a dense, heavy atmosphere, while those from the south east, sweeping the bosom of the Atlantic, and are hence called the *sea breezes*, are cool, grateful and refreshing. This commonly sets in about ten o'clock each day in summer.

From a minute inquiry, as to the causes of the unhealthiness of westerly and south westerly winds in the summer, the following reasons offered to my mind, as not only the most probable, but also as the most natural and correct :

The surrounding country to the west and south west, for sixty or seventy miles, consists of low, flat marshy lands, broken with swamps and ponds, which accumulate annually vast bodies of putrescent articles, such as the falling leaves of the surrounding trees, and their berries ; the excrementitious matters of alligators, fish, reptiles and insects ; a source is hence annually formed for the generation of noxious effluvia, which becomes hourly more and more concentrated, and consequently more active as the heat of summer increases.

These effluvia, thus ripe for action, are continually mingling with the surrounding atmosphere, and are borne along by the west and south west winds to

and through the city of Charleston, and here, meeting with a counter current, issuing from the Atlantic ocean on the east, the two opposing currents form a kind of minor whirlwind, whose centre may be considered as the centre or *nucleus* of the *gaseous poison*, with which the west wind was loaded, and which being thus retarded, shortly afterwards, blends or unites this poison along with that, which is produced by the local noxious matters of the city.

An infected atmosphere, if not thus generated, is actually increased; and now the atmosphere of the city, overloaded with this accumulation of concentrated effluvias, becomes thus capable of producing the different grades of "fever that are the proper "endemics of Carolina:" and while our police laws are annually guarding the city from a transatlantic attack of this dread enemy, he marches triumphantly in, from the interior and surrounding swamps and marshes, and puzzles the wise, as well as confounds the ignorant, to account for his dexterity in eluding their vigilance.

From what has been said of the different effects of the different winds, the degrees of heat and moisture, and the occurrence or non-occurrence of thunder and lightning, during the summer or sickly season, it is deemed to be of the utmost importance to medical science, to ascertain from the history of such facts as have already occurred, the actual constitution of the atmosphere, during the prevalence of epidemic diseases in the city, particularly that which has been termed the Yellow Fever.

As the principal object of these Sketches, is the investigation of every cause, however minute, that is connected with the generation and extension of that fever in Carolina, the following tables have been founded on past actual occurrences, that on being compared with those present, we may be enabled more readily to discover, not only the general, but perhaps even also the specific causes of the infection.

It will be observed, that the tables in this work, are calculated to answer only for those diseases, that are

defined as *legitimate infections* in the classification of diseases, that are contained in the Essay on Contagions and Infections, and that consequently, contagious diseases are not implied, since these are governed by laws peculiar to themselves, as may be seen in that Essay.

TABLE V.

EUIDIOLOGICAL TABLE;

Or a table shewing the disposition of the winds, and their influence on the health of the inhabitants at particular seasons of the year.

Seasons.	Winds favourable to health.	Winds unfavourable to health.
Spring.	North, NW. West SW.	NE. East. SE. South.
Summer.	NE. East. SE. South.	SW. West & W. 1 p. N.
Autumn.		
Winter.	North, NW. West SW.	East, NE. East, SE.

The above disposition of the winds, and their respective effects upon the health of the inhabitants, are in themselves correct. But it sometimes happens, that those that are marked in the foregoing table as unhealthy, have actually prevailed, and yet the season has been healthy; and again, that those that are marked as healthy, have also prevailed in certain years, and the season has been very sickly, and this might lead to the conclusion, that the table was calculated upon erroneous principles.

To do away this impression, and to prove its correctness upon general principles, we have only to refer to the two following tables, in which we will find, that whenever unhealthy winds prevail, and the season proves healthy notwithstanding—there has been thunder and lightning sufficient to counteract the noxious effects of such prevailing winds. And when we find in any of those seasons marked unhealthy, that the prevailing winds are such as are marked

healthy, we will almost invariably discover, that those winds are accompanied, or followed by *hot and dry*, or *hot and moist* weather, and that there has been little or no *thunder and lightning*.

Hence, the doctrine of an *electrical equilibrium*, being essential to the health of the city, is more fully confirmed, by a collection of facts, though remote from each other, happening at different periods since the year 1699, in a broken series of one hundred and twenty years, have nevertheless occurred in nearly the same characters and with nearly the same effects at each time. And, that a derangement of the *equilibrium* in the atmospheric air, rendering it "a peculiar (specific) predisposing cause of yellow fever" is also more fully proved and confirmed.

The author is indebted to the works of the various writers quoted throughout, for the particulars contained in the following tables, from the year 1699 to 1764, and to the journals of the Medical Society of Charleston, as also the columns of the Charleston Courier, for those from 1803 to 1819.

TABLE VI.
METEOROLOGICAL OBSERVATIONS,
During the Healthy Summers in Charleston.

Years.	Greatest Ther. Height.	Seasons.	Thunder and lightning	Prevailing Winds.	REMARKS.
1700					{ First great hurricane at Charleston.
1713					
1740	91	wet			{ Second ditto the 5th Sept. { Great fire in Nov.—half the town destroyed.
1750	96				
1751	94				
1752	101	dry	much	SW. N. SE.	{ Third or great hurricane, 14th & 15th Sept. { Slight shock of an earthquake, 19th of May.
1754	93				
1756	96				
1757	90				
1758	94				
1764					Dreadful whirlwind, 4th May.
1791	90	wet		most E.	
1798	88	dry		S. N. W. E.	
1803	90	wet	little	W. SW. E.	Snow in February.
1805	91	dry	much	W. E.	A few cases sporadic fever.
1806	90	do.			Very healthy.
1808	91	do.	do.	W. E.	
1809	90	wet	do.	W. E.	{ Horizontal rainbow around the Moon, 23d Jan. { Great fire, 10th Oct.
1810	93	moist	do.	W. SW. E.	
1811	90	do.	do.	SW. W. E.	{ Destructive tornado, 10th Sep.—comet & earthquakes 16th May, very cold. { Gale, Aug. 27.
1813	90	wet	severe	Variable.	
1814	89	do.	much	W. E.	
1815	90	do.		E. S. SE.	{ Three very healthy years.
1816	94	do.		E. S. SW.	
1818	94	dry	much		{ Black frost, 19th April. { Snow 17th Dec.
1819	89	wet	much & heavy.	SW. W. NE.	
					{ Fire, cor. M. & Met. st. 6th July—comet appear'd 10th July { Few cases of sporadic fever to the 20th of August.

TABLE VII.

METEOROLOGICAL OBSERVATIONS,

During the Sickly Summers in Charleston.

Years.	Greatest Therm. Heat.	Seasons	Thunder and lightning	Prevailing Winds.	REMARKS.
1699					{ Desolating fire, small pox,
1703					{ and 1st epidemic yel. fever.
1728		dry			2d epidemic yellow fever.
1732					3d do. do.
1739					{ 4th do. beginning in May,
1745					{ and ending in October.
1747					5th epidemic yellow fever.
1748					6th do. do.
1753	91				{ Measles prevailed as a fatal
1755	90				{ epidemic.
1759	93				{ 7th and last epidemic yel-
1792	93				{ low fever, until 1792.
1793	89	wet	much	S. & W.	A few cases sporadic y. fever.
1794	91	do.		S. & SW.	Do. ditto.
1795	92	do.		NE. & SW.	{ Measles again prevail as a
1796	89	do.		SW. N. NE.	{ fatal epidemic.
1797	88	do.		S. NW. N.	{ 1st epidemic yellow fever,
1799	91	do.		S. NW. SE.	{ prevalent since the great
1800	89	dry		Same.	{ hurricane.
1801	90	wet		Variable.	{ Measles still prevail, but
1802	89	do.		do.	{ with less fatality.
1804	91	do.			{ 2d epidemic yellow fever of
1807	92½	do.		W. most E.	{ the new series.
1812	96	do.			3d do.
1817	87	exces- sive.	2 days	W.SW. NE.	{ 4th do. The great Yazoo
					{ fresh, in Jan.
					5th do. Gale in Sept.
					{ 6th do. Slight earthquake.
					{ 239 deaths from yellow-fev.
					7th do. 184 deaths fr. y. fev.
					8th do. Sporadic cases only.
					{ 9th do. 96 deaths fr. yel.
					{ fever. Measles prevail.
					{ 10th do. 148 deaths yel. fev.
					{ Rainbow around sun, 21st
					{ June, and gale the 7th Sept.
					{ 11th do. 162 deaths from
					{ do. Influenza universal.
					12th do. Few sporadic cases,
					13th do. 272 deaths yel. fev.

Drinking Water.

From the situation of Charleston, there were but few springs affording wholesome drinking water, hence, for many years, the citizens were obliged to drink that which was collected in wells sunk eight or ten feet below the surface of the earth, which is a little above the level of the surface of the low tide, and the quantity of water contained in them is usually from four to five feet, which is also nearly on a level with the high tide. These, together with the nature of the soil, occasions the water to be generally brackish; to strangers extremely nauseous, inducing nauseous gripings and even troublesome diarrhoeas.

From experiments made by Dr. CHALMERS, it was found, that fifty-five cubical inches (about one quart liquid measure) of the water usually drunk in the city, weighed six grains more, than the same bulk of rain water, and when the same weight of sea salt was added to the latter, it precipitated a solution of silver, became of a milky colour, with oil of tartar *per-deliquuum*, and tasted as the well water. From this experiment, it will appear, that a quart of the common well water of the city, contains from six to eight grains of *muriate of soda* or sea salt, and the waters of some wells considerably more. Generally speaking, the water contains, *lime, muriate of soda*, and a small proportion of iron. Dr. L'HERMINIER, in analyzing a specimen of water from the spring on Harleston's green, in front of Mr. WYATT's house, discovered it to contain *hydro sulphuretted gas*, united with lime and iron, with *muriate of soda*, in small quantities; its specific gravity equal to rain water. This mineral spring was no sooner publicly known, than it became in a great measure, the public resort for invalids.

The water of this spring appears to combine the properties of the *sulphureous and chalybeate* mineral waters, and is hence tonic, in some degree augmenting the strength of the system and increasing the circulation of the blood, and vigour of the muscles; and from the action of the *hydro sulphuretted gas*, in com-

ination with the iron and lime, it may be servicable in *dyspepsias*, or indigestion, torpor of the intestines, visceral obstructions, and in cutaneous and scrophulous affections; and these, with the proportion of *muriate of soda*, produce, in some constitutions, a very speedy effect as a purgative.

It is hoped that further experience may justify the expectation, that at least the poorer class of our citizens will find as happy effects resulting from their drinking this water, as are experienced by those, who at considerable expense visit the distant northern springs.

Hail Storms,

Are also sometimes destructive to the trees and fruit, as well as to the crops of grain and herbage, they are not, however, very frequent in the maritime districts of Carolina; in the interior they are more so, and have been known to distribute vollies of ice-balls or hail-stones, as they are commonly called, from an inch to an inch and a half diameter, doing great damage to trees and houses, and also to men and beasts that are not sheltered.

Thunder and Lightning,

Although, among the most awful, may be justly ranked among the most sublime and salutary conflicts of the elements, with which the city of Charleston is visited.

Heavy concussions of thunder and lightning, whenever they happen, are proofs, that an *electrical equilibrium was wanting in the atmosphere, of those places in which they occur*. For, one of the established laws of all the *ærial fluids* is gravitation, and hence, a tendency to preserve an equilibrium in every part; and as with the air or wind, so with the electric fluid, when any one part of the atmospheric air is charged with a greater proportion of the electric fluid, than some other parts are, that part which has it in excess is *plus*, or positively electrified, while that part which has less than its proper quantity, is *minus*, or negatively electrified. In such cases, that part which is *plus*

will readily part with its excess, on approaching that which is *minus*, and thus those concussions take place, which restores the *electric equilibrium*.*

The vivid flashes of lightning, which we so often observe in the summer months, are occasioned by the passage of clouds positively electrified, within striking distance of those that are negative; when the former instantaneously imparts to the latter a portion of their electricity or fire, and these again to others in succession, until an equilibrium is effected throughout the whole.

During this process, the air which was loaded with noxious exhalations, begins to evidence the neutralizing effects of the *ethereal fire*, it is soon purified, and the breathing of man and beast, which a while before was difficult and oppressive, becomes now free and pleasant; the dull, heavy, listless, and languid sensations of the mind and body, occasioned by the absence of the necessary quantity of this enlivening and invigorating fluid, are suddenly exchanged for a pleasing sprightliness, every where to be observed among the animal creation; and the type of fatal diseases, as we have already shewn, are changed to those less fatal. Hence, the citizens of Charleston, should view the frequent recurrence of thunder and lightning, among the *merciful visitations of Providence*; and while the

“————— aggravated roar,

“ Enlarging, deepening, mingling peal on peal,

“ Crush'd horrible, convulsing heaven and earth.”

“————— They should tremble and adore!”

Whirlwinds.

From the contiguity of South-Carolina to the Atlantic, and her affinity to the torrid zone, she is often visited with whirlwinds, *typhones*, or tornadoes, as they are commonly called. These conflicts of the elements, are in general more frequent in tropical countries, than in those of higher latitudes. Of those that have happened in this state, I will notice only that of September, 1811. The particulars of that

* See Essay on the Electric Fluid, page 9.

In May, 1764, which bared the channel of Ashley River, being already faithfully recorded, by the respective authors of the History of South-Carolina.* I shall only notice the latter, and for the particulars of which I acknowledge myself to be indebted to the editor and proprietor of that faithful journal, the Charleston Courier.

“ On Sunday,” the 8th of September, 1811,” the
 “ wind which had been for some days light and va-
 “ riable, shifted to the N. E. blowing very fresh
 “ throughout the night. It continued in the same
 “ quarter all day on Monday and Monday night.—
 “ On Tuesday morning it blew with increased vio-
 “ lence, and during the whole time, from Sunday
 “ evening, there was almost an incessant fall of rain,
 “ About ten o’clock in the forenoon of Tuesday, the
 “ wind shifted to the S. E. and at half past twelve
 “ o’clock the *tornado* commenced.

This phenomenon “ appears to have been about
 “ one hundred yards in width,” and approached the city with great rapidity in a tremendous black cloud, whose motion was like that of a body of clouds rolling over and over, and striking the earth at regular distances, prostrating all that opposed its passage, it rebounded again and again, marking horrible destruction in its train, with a noise that might be compared to the rattling of a thousand horses and chariots upon the pavements of the city.

“ After it had prostrated the flag staff on Fort Me-
 “ chanic, unroofed the house within the inclosure of
 “ that fort, thrown down the blacksmiths shop conti-
 “ guous to it, and unroofed all the houses immediately
 “ adjoining the fort, it crossed over to Lynch’s-lane,
 “ where it unroofed several houses ; from thence it
 “ proceeded across Church-street continued, to Meet-
 “ ing-street, where several houses were unroofed,
 “ particularly the large new brick house of NATHA-

* Chalmers on the weather, &c. vol. i. page 24 ; Drayton's View, page 18 ; Ramsay's South-Carolina, vol. ii. page 308, 309. The Doctor dates this whirlwind as having happened on the 4th of May, 1761. This error must be considered altogether typographical, since it is not likely that the Doctor, having the works of Dr. Chalmers and governor Drayton before him, would have made a mistake of four years in the date.

“ NIEL RUSSEL, Esq. whose loss in furniture, &c. cannot amount to less than \$20,000.

“ From Meeting-street it crossed to Tradd-street, where a large three story wooden house on the south side about half way between Meeting and King-streets was blown over, which crushed two adjoining houses in its fall, and most of the houses on both sides of the street to the corner of King-st. were unroofed or much shattered. It passed up King-street nearly to Broad-street, unroofing and shattering several houses in its progress until it reached Broad-street. Here the house of Dr. ALEXANDER BARON, situated at the corner of Orange-street, and the venerable mansion of the late Dr. ISAAC CHANLER, on the opposite corner, were roughly handled; the latter being old and weak, was completely wrecked to pieces.

“ On the opposite side of Broad-street the premises lately purchased by the *St. Andrew's Society* and occupied by Mr. HENRY INGLESBY, the mansion of the late Gen. M'PHERSON, and some other buildings were either unroofed, or much damaged. Passing through *Vaux-hall Garden*, it crossed over Queen street near to the corner of Friend-street, and shattering several houses in its progress, it went on to the corner of Magazine and Mazyck-streets; two or three small houses fronting on the former of these streets were blown down, and in the progress of the tornado up Mazyck-street, several houses were unroofed or otherwise much damaged.”

The chimney of Mr. GEORGE DENER's house in Mazyck-street, was broken off at the top, and the part which fell so maimed one of his negroes, that he died of the wounds in a few hours. “ From Mr. DENER's it proceeded to Beaufain-street, prostrating two or three houses therein, and hurling part of the frames thirty or forty yards into the arm of Cumming's creek, where they were planted in the mud to a considerable depth.

“ After leaving Beaufain-street, the houses being less compactly situated, the marks of its ravages are not so distinctly to be traced; though it appears to have lost nothing of its violence. The

“ mansion house of the Hon. Judge DESAUSSURE,” at the corner of Pitt and Montague-streets, “ was violently assailed, and suffered considerably. One of the chimnies was thrown down, and a part of the family who were in an upper room at the time, were precipitated with the falling bricks, through two floors into the kitchen, providentially, no lives were lost, except that of a negro girl.

Several other houses, “ in the range of the tornado, and on the outskirts of the city were either unroofed or much injured;” and the houses in the village of Islington, also sustained much damage. This devastating tornado, in its horizontal revolvings now rolling above the roofs, and now bounding against them, commenced its destructive effects as follows :

“ Miss MARGARET COZZENS, aged 21 years, was killed in a house adjoining Fort Mechanic ; a free mulatto man was killed in Church-street continued. Mrs. STEWART’s daughter, also in Church-street, died of her wounds a few hours after. A free mulatto girl in King-street ; Mr. PETERSON, a native of Germany, who kept the grocer’s shop, corner of Magazine and Mazyck-streets ; Mr. DENER’s negro fellow in Magazine-street ; Dr. CONTON, a very worthy respectable man, a native of France, whose house in Beaufain-street was thrown down, were all killed.

There were also “ two mulatto children, either killed or drowned, who were in a small wooden house which was also blown into the mill pond at Cannon’s bridge. Also several negroes whose owner’s names were not ascertained.”

Such was the force and power of this whirlwind, that many large pieces of scantling, tiles, slates and shingles, were hurled from their fastness and were borne as it were upon the wings of the wind. In many places, the fragments of window glass and other substances, were driven with fury and violence into the windows of those houses, by whose fury, they had been forced open, in its overwhelming passage.

Earthquakes,

Are not common to Carolina, they belong more particularly to those high mountainous countries, con-

tiguous to the equator, whose bowels are filled with sulphur and iron mines. Of this character are, Lisbon, Spain, Italy, Portugal, &c. The effect of their concussion, when happening in parts not too remote from America, has been several times sensibly felt throughout the United States, particularly that in May 1754, that on the 4th of April 1799, and lastly, on the 16th of December 1811, as also those in January and February 1812.

Although the effect of earthquakes are not frequently felt in Carolina, whenever they are, they produce a visible change in its climate and local situation, and although I am not in possession of any facts with regard to the effects of the two former, on the climate of South-Carolina, my own particular observations of the effects of the latter, dispose me to believe, that the great vicissitudes of heat and cold to which the climate has been subject since its occurrence, were owing to that cause. Witness the great heat of July 1812, and the excessive cold of the December following, add to which the uncommon prevalence of diseases in that season, which has been ever marked as the *healthy season of Charleston*, and the very remarkable number of *rabid animals* that have since that period, infested a large proportion of our continent, exceeding in number and duration of time, any thing of the kind on record. And if, as I strongly suspect, the variation of the climate depends on the same causes, with those of the variation of the magnetic needle, we need not be surprised, if at some period not far remote, excessive heat, such as has been recorded in the histories of Mr. HEWITT, Dr. LINING and CHALMERS, should be again experienced in Charleston.

It has been particularly observed, that the city of Charleston was more healthy after the great hurricane of 1752, than before. For four years previous to, and for forty years succeeding that event, there was no *epidemic* attack of Yellow Fever, though occasionally, there were a few *sporadic* cases of it;* and Dr. CHALMERS† informs us, that after the hurricane, children in particular, escaped the prevailing diseases,

who, before that time, under five years of age, constituted the greater half of the number in the bills of mortality of the town.

But now again, we find, that our children under six or eight years, are as liable to contract the disease as strangers are, as will be seen in the Essay on the Prevailing Fever of 1817. If these facts be compared, we cannot but refer their causes to those that accompany, or follow the phenomena of earthquakes, tornadoes and hurricanes.

Meteors.

“ The kind of *meteors* known by the name of *Aurora Borealis* or *Northern Lights*, are sometimes seen in the autumn, and generally denote warm and dry weather. They appear in the form of large pillars or streamers, a little to the north of where the sun sets in June; their motions are commonly languid, and they soon disappear. I have not observed them to rise more than twenty-five degrees above the horizon.”† Several of these meteors, as particularly noticed by the venerable Dr. TUCKER HARRIS, of this city, are recorded in Dr. RAMSAY’S South-Carolina,|| one of which I shall transcribe for this place.

“ On Tuesday morning the 12th of November, 1799, from a little after midnight until day light, the firmament of Charleston exhibited a singular but splendid phenomenon. Instead of a few solitary *meteors* sporting along the sky, which is not unfrequent, they appeared in countless numbers, darting incessantly in all directions, some of them emitted a light so vivid, that objects in a chamber not very dark, were rendered visible.

“ A similar phenomenon was observed at the same time at sea, about 60 or 70 leagues from the bar.— The like was seen at the same period, as far to the south as 29 degrees of north latitude, and 71 degrees longitude. Accounts from Nassau, in New-
Providence, mention the same appearance to have

* Dr. Ramsay’s History of South-Carolina, vol 2, p. 85.

† Chalmers on the weather, &c. vol. 1, page 87.

‡ Milligan’s Description of Carolina, p. 23.

|| Dr. Ramsay’s History of South-Carolina, vol. ii, p. 307, note.

“ been noticed there in the same morning. During
 “ the appearance of this uncommon phenomenon,
 “ the weather was very calm, yet the fears of some
 “ timid persons were so excited by the corruscations of
 “ effulgent light, darting in all directions, that they
 “ apprehended the Day of Judgment, and conflagra-
 “ tion of the world to be at hand.”

On the night of the 10th of August, 1812, fifteen minutes past 10 o'clock, my attention was suddenly arrested by the stream of an extraordinary meteor, having the appearance of a flying star, which darted suddenly across the heavens, from the south-east to the north-west. The stream of light which accompanied it, appeared to the eye, to be at least three or four hundred yards in length, and two or three in breadth, and of a dazzling brightness, illuminating the earth with its reflection, which caused my attention to the object, which was passing behind me.— The light remained visible for some seconds, and might be compared to a silver cord stretched across the heavens; the sky was unclouded, the stars very numerous, and the weather calm and serene.

From the foregoing remarks on the topography, soil, climate and local situation of Charleston, and from the vast body of low ground to the west and south-west of the city, it cannot but appear to every impartial reader, *that they afford sufficient proofs of the existence of local or domestic matters in and around the city*, that are capable when acted upon, by heat and moisture, with a deficient electricity in the surrounding atmosphere, of generating that infection, which is invariably the cause of that class of fevers, whose highest grade is that which has received the name of the Yellow Fever; and to which we will now direct our attention.

REVIEW.

The following extracts, from a review of the first edition of Dr. SHECUT'S Essay on the Prevailing Fever of 1817, are copied from the New-York Medical Repository for April 1818.

“ We are however, happy to remark, that the above narrative, uninfluenced by party spirit, by esprit de corps of colleges or academies in a true style of home-bred experience, will not afford the least argument to the importers of pestilence, nor even give that ungenerous, but so ridiculous example of blasting another country, or another set of men, for engendering a poison, which eventually had a nearer and a domestic origin.”

“ We sincerely congratulate Dr. S. for assuming the theory of electricity, as operative, and connected with the formation of pestilential diseases. It is perhaps the best as yet, that could be thought of to conciliate with the laws of nature, the mysterious and sometimes rapid diffusion of malignant fevers in various seasons and countries, and under dry or moist constitutions of the atmosphere. We ask, indeed, the candid and truly philosophical mind, whether he can see more evidence in his hypothesis of the virulent contagion of an undefined molecule, than in that which would operate a total or partial departure from living bodies of some principle, which must certainly sustain vitality, motion and the component parts of animal fluids? Does he not already know in nature, the evolution of hidden laws by which a plant is suddenly struck, fades, grows sapless, pines and withers away? We ask also, what other destructive mode of human life would not immediately take place, if the atmospheric pressure, the variations of which are so sensibly felt at the approach of a storm, were or could be for a few instants suspended ?

“ Our readers also, must not lose sight of a great principle in electrical theory, to wit : positive and negative electricity, are not understood to be different principles, but merely a relative proportion of the same, which like caloric are evolved by the laws of equilibrium, but with opposite action or re-action according to the presence of conducting or non-conducting bodies. Consequently, to all this we are to notice, at first, that when water is

“ converted into vapour, its capacity for electricity is increased,
 “ but it is since known that the conducting powers of vapour is su-
 “ perior to that of water, as proved by Priestly, by Volta, and by
 “ Lavoisier ; therefore, a warm and moist constitution of atmos-
 “ phere has a tendency or a power to attract electricity from the
 “ human body, because, ‘ any conducting substance in a *positive*
 “ *state of electricity* will act as a centre to the circumambient aerial
 “ principles, which recede in concentric circles.’

“ When the air is dry, the resistance to the electric fluid is
 “ in proportion to its density, as *action* and *re-action* are equal, so
 “ the electric fluid is justly to the air, and is accumulated to such a
 “ degree as to be equal to the resistance of the latter.* Again, a
 “ dry warm atmosphere may proportionably be very dense, and *re-*
 “ *act* the more against the electricity of the human system. We there-
 “ fore conclude, that under certain atmospheric constitutions, vitiated
 “ by excessive heat and moisture, vice versa, by drought, there is a
 “ galvanic evolution of electricity from animated bodies forming one
 “ of their constituent parts, and is disengaged through conducting
 “ substances by a chemical process of decomposition of the elements
 “ composing animated matter.

“ We perfectly agree with the author respecting the double char-
 “ acter of *sthenic* and *asthenic* disease, which he has observed in the
 “ Yellow Fever. We may add that we have seen it percurring in
 “ all its stages, exclusively in one of them; sometimes during
 “ a whole season, and sometimes differently at opposite situations
 “ of a large city, or in the same family. This singular difference
 “ of character, and which must lead to quite dissimilar modes of
 “ treatment, we have observed in other epidemics.”

“ We feel much indebted to the useful and ingenious Essay of
 “ Dr. SHECUT, who has shown himself an unprejudiced observer and
 “ a good practitioner. We hope that his work may be circulated
 “ abroad, and assist frightened governments and authorities in the
 “ better direction of their quarantine restriction, than against the
 “ Yellow fever of Charleston, which has not reached any port on
 “ our coast, beyond the southern latitude where it has broke out,
 “ and existed sometime, although no embargo has ever been laid in
 “ that considerable commercial port.

* * It is observed that the east *wind* or *sirocco*, which is very dry and frequently blows over the southern band of Italy and Spain, produces a temporary liveliness, an energy on the human system. Women are more visibly affected by it, so much as to make it proverbial; after a few days, if the wind continues, debility and prostration take place.

AN ESSAY
ON THE PREVAILING,
OR
YELLOW FEVER OF 1817 ;
TOGETHER WITH
PRELIMINARY OBSERVATIONS,
AND
AN INQUIRY INTO THE CAUSES WHICH PRODUCED IT.

SECOND EDITION WITH ALTERATIONS AND IMPROVEMENTS.

BY J. L. E. W. SHECUT,

PRACTITIONER OF PHYSIC,

And Member of the Literary and Philosophical Society of South-Carolina;

☞ Let it be remembered, that the Yellow Fever, which is the subject of this Essay, is that which is the proper Endemic of the City of Charleston.

DEDICATION.

TO THE

Sons and Daughters of the late Dr. Ramsay.

MY YOUNG FRIENDS,

You will accept this Second Edition of an Essay on the Yellow Fever of 1817, as a debt of gratitude, long due to your dear and estimable father, who from the year 1786 to the hour of his death, had ever honored me with his friendship ; and to whose professional knowledge and kind attention to my welfare, I owe the first and best lessons in the Science of Medicine. A desire of transferring to his esteemed Children, the sincere friendship I entertained for their Father, induces me to offer them these Sheets, and with them, a renewed assurance of the unalterable esteem and regard of

THE AUTHOR.

Charleston, March, 1819.

AN ESSAY
ON YELLOW FEVER;

Together with Observations and an Inquiry into the
Causes, &c.

PRELIMINARY REMARKS.

“FEVERS” says the immortal RAMSAY, “are the proper endemics of Carolina, and occur oftener than any, probably than all other diseases. These are the effects of its warm moist climate; of its low grounds and stagnant waters. In their mildest season, they assume the type of intermittents; in their next grade they are bilious remittents, and under particular circumstances, in their highest grade, constitute Yellow Fever.”*

This last or highest grade, constituting the *typhus icterodes* of Dr. CULLEN, and which as a proper *endemic* of Charleston, I have termed *typhus endemia*, is the subject of this Essay—and admits of the following propositions, as preliminary to the consideration of the disease itself:

1. What are the peculiar (specific) predisposing causes of this modification of disease?
2. What are the effects produced by those causes?
3. What are the characteristic marks which especially distinguish the Yellow Fever from the common bilious remittent?

* History of South-Carolina, vol. 2, p. 97.

4. What are the general and special indications of cure in Yellow Fever, as it has commonly appeared in Charleston?

I proceed to consider these propositions under their appropriate heads, as follows, observing previously, that I have purposely avoided the long contested points of the *contagious* or *non-contagious* nature of this Fever in this Essay, reserving it for the next; and briefly say on this subject, that from its first appearance in this city to the present day, it has never been found to be contagious; as has been sufficiently testified by almost all the Faculty of Physic, of the former and present period, with the exception of one writer.

CHAPTER I.

Of the Causes of Yellow Fever.

PROPOSITION 1.—What are the peculiar (specific) predisposing causes of this modification of disease?

ANSWER—1. A peculiar derangement of the atmospherical air, by being deprived of a due proportion of the *electric fluid*; either from excessive hot and dry, or hot and moist summers; in consequence of which, its vital influence, is either in greater or less degree diminished, and a *specific gaseous poison* is generated therein; which being inhaled by persons peculiarly predisposed, produces, according to the degree of predisposition, either a common bilious remittent fever as it is termed, or Yellow Fever.

2. A peculiar state or *diathesis* in the animal economy, particularly predisposing it to disease, and which is speedily called into action by the morbid effects of the noxious exciting power, or *gaseous poison*, of the atmospherical air thus deranged.

SECT. 1.

First cause of the Yellow Fever.

That hot and dry and hot and moist summers are alike equally productive of Yellow Fever, is a fact almost coeval with the first settlements of this city:

That as these have occurred with greater or less excess of heat or moisture, so also has the Yellow Fever prevailed with greater or less violence, in the same ratio, is another fact arising from the first, and is particularly remarked in the Medical History of South-Carolina, from its commencement as a colony to the present period.

And that heat and moisture, either alone or combined, are inimical to the healthy state of the atmosphere, has been abundantly proven by their influence on *electrical operations*. In excessive hot and dry, or excessive hot and moist weather, the *electric fluid* in the atmosphere, being blunted, absorbed or almost totally dispersed, it almost invariably happens, that in proportion to the greater or less degree of its dispersion from the atmosphere and face of the earth, so in like proportion is its influence felt in electrical operations; in which seasons, it is impossible to elicit a spark, and when elicited, the effect produced is so feeble as scarcely to be felt.

I have also found, that it is invariably the same states of the atmosphere, in which *electrical operations are impaired* or prevented,* that the Yellow Fever has prevailed, either in greater or less extent, in proportion to the greater or less deficiency of the electrical fluid in the atmosphere and its influence on the face of the earth; and from hence I infer, that it is *the absence of the necessary proportion of that fluid* which gives vitality to the air and to all animated nature, that causes the derangement of the atmospherical air, in such degree as to produce all the modifications of fever which "are the proper endemics of Carolina." And as the derangement of the *electrical equilibrium*, is either more or less impaired, in the same ratio will these endemics prevail with more or less violence, and be of longer or shorter duration, according to the longer or shorter absence of this fluid. And I further contend, that so long as there exists in the atmosphere an *electrical equilibrium*, that it is impossible from the known laws which govern

* See Preface to Sketches.

that fluid, that any thing like an *epidemic* Yellow Fever can originate in the atmosphere; but I admit that from particular causes of a peculiarly local nature, sporadic disease can and may exist, notwithstanding the equilibrium.*

That this is no vague conjecture, will be readily perceived, when we discover that the same identical powers which restore the electrical equilibrium in the atmosphere, are the same powers which put a stop to the further ravages of this fever: and these are THUNDER, LIGHTNING, COLD AND FROST !† And hence, with the learned BRYDONE, I consider the electric fluid to be the soul of nature, or that great vivifying principle, by which she carries on most of her operations. It is a *fifth element*, distinct from, and of a superior nature to the other four, which only compose the corporeal parts of matter. But this subtle, active fluid, is a kind of soul that pervades and quickens every particle of it.

If we consider the local situation of Carolina, the great body of low grounds to the southwest, as far as the state of Georgia; the vast extent of whose surface is exposed to the inundating floods of excessive wet, and the scorching rays of excessive hot and dry summers, the great mass of putrid vegetables destroyed by the heavy rains, together with their subsequent exposure to an excess of heat, after the waters have subsided, added to the generally prevailing winds of the season; something like a datum is afforded us, from which to establish, at least, the primary causes of the derangement of the atmospherical air; as also the predisposing causes that produce those modifications of disease among us.‡

It has been on all sides admitted, that the most dangerous grades of fever, are produced by a close constitution of the air, with long rainy or foggy weather; and that they most generally occur after great inundations of rain, especially in low marshy countries, and

* See Advertisement in the Essay on Contagions and Infections.

† See Sketch 4th, page 70, and also Essay on Contagions and Infections, (first edition) page 28 and Note.

‡ Sketch 4th, page 73, Essay on Contagions and Infections, 1st edition, page 44.

particularly when these have been preceded or are followed by a hot and sultry season. And this appears to be invariably the case, in all tropical climates, from the variable constitution of whose atmosphere, together with other secondary causes, the three modifications of fever abovementioned, arise.

It will further appear, from a close investigation of the causes, that each of these modifications of fever, may be traced to its specific origin; which, added to the remote and proximate cause in the animal economy, gives us the following correct distinctions:

1. *Marsh miasmata*, or vegetable putrefaction, unconnected with animal putrefaction, is *capable only* of producing fever of the intermittent kind. And hence, we find it to exist almost annually in the middle country of Carolina, which is marked by its surrounding swamps, bays, ponds, and other stagnant waters; but are yet free from human effluvia or animal putrefaction, in consequence of the thin and scattered settlements throughout. Dr. RUSH says, "I shall not attempt to distinguish the Yellow, from the common Bilious Fevers—they are only different grades of the same disease."* He considers Yellow Fever to be derived from *marsh miasmata*, as also the common bilious remitting fever, the intermitting fever, and that modification of fevers termed "inward" (*Febricula*.) I am disposed, notwithstanding this truly venerable and highly respectable authority, to adhere to what I have just laid down, as the result of *marsh miasmata*, unconnected with human effluvia, and that,

2. *Marsh miasmata*, combined with *animal putrefaction*, generates in the air a *specific gaseous poison*, capable of producing the highest grades of fever,† and in the following obvious manner:

In the animal economy there exists, generally, two causes of disease—the *remote* and the *proximate*.—The remote cause consists in an excess or deficiency of any of the enjoyments of life, or of the passions or

* Account of the Bilious Yellow Fever of 1793, page 178.

† Essay on Contagion and Infection, (first edition) chap. 11, page 19.

emotions of the mind predisposing to disease. The proximate cause consists of the predisposition just noticed, combined with the noxious exciting power that modifies the disease. And thus we find, from a long and painful experience, that although the first or remote cause may equally exist in natives as well as strangers, the modification of the disease, notwithstanding, essentially differs in the former, from that of the latter. In the first, it is a common bilious remittent, as it is called,* while in the latter it assumes its highest grade, and is in them Yellow Fever, (*Typhus endemia.*) The obvious reasons of this difference in the grade of fever, between the natives and strangers, will be pointed out hereafter, when I come to treat of the effects of this poison, &c. Concluding from the facts before us, that the opinion long since established, “that *marsh miasmata* and *human effluvia* combined, are the direct causes of the highest grade of this fever in all parts of the world,” is certainly among the most correct.

And this will also account in some measure, for the difference in their modification in cities, villages, and country places; for the latter have little else to contend with, than the *miasmata* of putrid vegetables—while the two former, from the immense number of their sinks and drains, as secondary causes, and from the great abundance of animal putrefaction in all populous cities and villages, an excess of animal effluvia is produced, which, combining itself with the *miasmata* floating in the air, is thence productive of those higher grades of fever which we have already specified.

Another incontestible proof that this *gaseous poison* is produced by a combination of *marsh miasmata*, and *animal effluvia*, is, that the fever which it generates in the system, is confined to its own limits, and has never extended to half a mile beyond the limits of the

* That modification of disease, heretofore termed the *bilious remittent fever*, will, I imagine, upon close inspection, prove to be nothing more than a symptom of the common autumnal remittent.

That a redundance of bile, evacuated in this fever, constitutes a prominent symptom of it, is not doubted by any: but that the bile is an original, or exciting cause of the disease, is an opinion, which now has but few advocates left.

city or village in which it originated. Of this fact, Sir NATHANIEL JOHNSON, appeared to have been apprised, even at the earliest period of the Yellow fever. Mr. HEWITT, tells us, that while the Fever raged in Charleston, in the year 1703, "the governot held his head-quarters *about half a mile distance from the town*, not wishing to expose his men to the "dangerous infection, unless from necessity;" nor do we find that any of his army received the infection, either from the air, or from contact, by their communicating with the garrison, in their necessary intercourse with each other.*

We have further to remark on this, that those persons who have taken the disease, and have travelled with it, or removed to a purer air of the country, although they have died with the fever, its influence has always ended with them; and in no one instance, that has come to my knowledge, has the fever ever been communicated to another. And this particular character of the Fever of Charleston, I have observed from the year 1794, to this time.

The doctrine advanced in the preceding paragraphs, are more fully confirmed by the remarks which may be found in the *Essay on Contagions and Infections*, where the subject has been more extensively considered.

The paragraphs contained in the first edition of this Essay, that are omitted in this, have been transferred to the 4th Sketch. I shall, therefore, only advert to the years, in which the fever has occurred with great violence in the city, and then proceed to a detail of that which took place during the summer of 1817.

The years most conspicuous for this fever are proved to be those in which there has been an excessive hot and dry, or hot and moist summer, with little thunder and lightning, which I presume was the case in 1732, 1739, 1745 and 1748; in which years, the fever was considered epidemic. The very heavy thunder and lightning of 1752, together with the hurricane which followed it, and which was the greatest ever

* Hewitt's History of South-Carolina, vol. 1, p. 182.

known in Carolina, seems to have produced a change favourable to the health of the city; since it appears, that for a period of forty-four years, that is from 1748 to 1792, there was no epidemic attack of the disease; but when it did occur it was merely sporadic.

In the year 1792, a new era of the fever commenced according to Dr. RAMSAY, which has continued to this time, varying only as to the state of the seasons, &c.

It is a fact, that for the last sixty years, there has been but one or two instances of heat equal to that mentioned by Dr. HEWITT, in 1728, and CHALMERS, in 1752. The greatest elevation of the mercury when shaded, has been 96 degrees of Farenheit's thermometer, which was in the month of June, 1812; and the hottest day was Tuesday the 20th July, of the same year; the thermometer was at 93. Citizens, as well those in retirement as those at labour, suffered greatly from the heat, and were in constant and profuse perspiration. After this an uncommon fall of rain took place, which continued to the 10th August; soon after which, the fever made its appearance, but with no great fatality. The month of December was the coldest, and may rank with the cold of the winters of 1766, 1779, 1786 and 1796. In this year also, we had frost as early as the 14th November; while in the year preceding, it did not occur until the first of December.

The greatest number of deaths that have been recorded to have happened in the city, from Yellow Fever, from the year 1748 to the present year 1817, a period of sixty-nine years, are those of the present year; which have amounted to 268, to the week ending on the 16th November. In the year 1799, there were 239 deaths—in 1800, 184; in 1804, 148; and in 1807, 162; and in this latter year also, the *Influenza* or *Catarrhus Epidemica*, prevailed with universal influence, and great fatality throughout the state.

In the years 1801, 2, 3, 5 and 6, and again in 1808, 10, 11, 13, 14, 15 16, the cases were very few; and in the four last, there was no case of Yellow Fever.

In October 1800, in September 1804, in September 1810, and also in September 1811, we had our usual

autumnal gales; the last, which was on the 10th September, 1811, was accompanied with a dreadful tornado, at about 12 o'clock, which blew down many houses and chimnies; large pieces of scantling, tiles, slates and shingles, were carried some hundreds of yards in the air, and several lives were lost by the sudden overthrow of the houses.* The last storm in Charleston, was on the 27th August, 1813.†

It will be also remarked, that in those years in which the fever has been uncommonly fatal and extensive, that there has been a great deal of rain, either preceding or accompanying a very hot season. Thus, in the year 1799, there was a fall of $83\frac{1}{4}$ inches of rain;‡ a greater quantity than had fallen in any one year for many years preceding; as, at an average, the quantity is generally from 48 to 49 inches per annum, in Charleston; hence, the year 1799, and the present year 1817, have been nearly alike, as to the heat and moisture, and extensive fatality of the fever. In this year, after a very dry spring, the rainy season set in, on the 27th of June, and continued for about six weeks, with little intermission, and without any or very little thunder and lightning. Innumerable insects infested our city and houses; even the Pride of India trees, (*Melia azedarach*) which shade our walks, and have been considered deleterious to animal life, have been literally covered with spiders and their webs; and it is believed, that in no former year, has there ever been a greater accumulation of spiders, musquetoës and bed-bugs, than has infested our houses in the present. In four months, viz. July, August, September and October, $31\frac{3}{4}$ inches of rain had fallen and on the 27th of July, exactly one month after the commencement of the rainy season, the fever made its appearance with great violence, increasing to the 28th of September, when it was at its highest, at which time there was a slight concussion of thunder and lightning, and the fever to decline, as will be hereafter shown. Another circumstance derived from the foregoing statements, and worthy

* See Sketch iv. p. 81. † See Sketch iv. Table vi. ‡ See Sketch iv. p. 63.

of particular attention, is the period at which the rainy season sets in. It appears generally, that those years, in which the wet season begins as early as June or July, the fever is more extensively fatal, than in those, in which it begins as late as September or October. And that the period which marks the commencement of our rainy season may be considered as that which predisposes the atmosphere to generate; while that which marks the period of frost, as that which most certainly puts a stop, not only to its further progress, but also to the causes which invariably produce the disease among us. It is believed also, that the fever generally commences its action in low, damp and crowded situations.

The following observations from Dr. CHALMERS, speaking of crowded houses, must be acknowledged of great weight: "and which is still worse, there are many narrow lanes and alleys, and more are daily laying out, with the view of increasing the value of lands; but the Legislature should prevent such nuisances, for those confined situations may hereafter prove a nursery for diseases, not of the most tractable kind, when the town becomes large and is more closely built."*

In this year it commenced in the south east section of the city, at or near Lynch's-lane, and progressed northwardly and partly north westwardly, to the market, and along the lower end of Church-street; of which places, it is to be remarked, and particularly of the two former, that they are on made lands, having been formerly creeks, which intersected the city.

By the middle of August, its extension and fatality were greatly increased, and in the latter end of the month, it infested most parts of the city, except the north west. The Bill of Mortality continued increasing to the 28th of September, at which period seventy-one deaths were reported for the week, ending on that day.

The prevailing winds during the summer, were the southwest, west and northeast; and on Wednesday,

* Dr. Chalmers on the Weather and Diseases of South-Carolina, vol. 1. p. 33.

the 24th of September, a heavy rain commenced, and was accompanied with a slight degree of thunder and lightning. The thunder was, however, very distant, and the lightning but slightly vivid. This feeble effort of nature, to restore the electrical equilibrium, was however, attended with happy effects. The air became more cool and pure, and an evident abatement of the disease was manifest from this partial concussion of the atmosphere.

The type of the disease, was in many instances changed to catarrhal; and in several, the symptoms were so blended as to produce a doubt, which of the types predominated. On the 30th September, there was rain, with slight thunder and lightning. In the beginning of October, very few cases occurred in the lower parts of the city; but the fever had extended itself to the northernmost part thereof, where it continued with great violence and fatality.

On the evening of the 14th of October, there was a great fall of rain, accompanied with several powerful concussions of thunder and lightning; which produced a very sensible and immediate change in the atmospherical air; and on the 16th of the same month, the electrical machine operated with great effect; yielding strong sparks and very vivid, which it had not done for some months, nor during the excessive prevalence of the disease.

By the 16th of October, the fever changed its type altogether, or rather formed or blended itself along with most other types of fever, of which *catarrhal*, *intermitting*, *remitting*, *nervous* and *worm fevers* were most conspicuous, as also that type of it, which has been termed country fever, to distinguish it from the city or town fever, for by the 19th of the month, the deaths from Yellow Fever, were 8, and from the other types, 13, which evidently proves its decline. To the 25th of the month, there was but one solitary case of death by this fever. On the 30th, a great change took place in the weather, which became extremely cool, and it is believed, that as the causes which produced this modification of disease, have been entirely removed by the concussions of thunder and lights.

ning before noticed, and by the fall of a smart frost which took place on the 18th of November, there can be no fear of a return, at least until next season.

By the Bill of Mortality, for the year ending on the 1st of October, 1817, the deaths have been in the proportion of every 22d person. In Beaufort it has been more fatal, and was in the proportion of every 6th person.

TABLE

Of the increase and declension of the fever, from the 27th of July, to the 16th of November.

AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
27 July to 3 Aug.	3	31 Aug. to 7 Sep.	26	28 Sept. to 5 Oct.	23	2d to 9th Nov.	3
3 Aug. to 10,	16	7 Sep. to 14,	36	5 Oct. to 12,	9	9th to 16th,	1
10 " to 17,	9	14 " to 21,	35	12 " to 19,	8		
17 " to 24,	22	21 " to 28,	43	19 " to 26,	1		4
24 " to 31,	82			26 " to 2 Nov.	1		
			140				
	82				42		

Total number of deaths from Yellow Fever, this season, to the 16th of November, 268. Four more persons died with the fever after the first edition was printed. Great as this number may appear, if we notice the number of deaths happening from Yellow Fever in the years 1699, 1703, &c. it will be found that according to the increase of population the proportion is considerably less now than at any period of the seventeenth and eighteenth centuries. For we are informed by Dr. CHALMERS, that when no contagious or malignant distemper prevailed in the town, the number of deaths were in the proportion of every 37th person, as by the bills of mortality; and Mr. NORRIS, in a letter, dated November 18, O. S. 1699, says, "150 persons had died in Charleston in a few days with the Yellow Fever.*"

Dr. Rush on the Billiety Yellow Fever of 1793, page 153.

METEOROLOGICAL OBSERVATIONS for 1817.

Months.	Thermom.			Quantity of Rain in inches & tenths.	Thunder and lightning.	WINDS.	Barometer.	Hygrometer
	highest.	lowest.	mean.					
June.	86	68	77	8 in. 2 qr. 4-10ths.	none.	West 9 East SW. 8 South.	30 to 30-36	10 to 60 damp.
July	87	71	79	5 0 2-10	none.	West 10. East 11.	30 to 30-40	15 to 40 damp.
August	86	67	76	9 1 1-10	none.	NE. 8 SE. 3 West 8 South 3 East 5	29. 90 to 30. 40.	30 to 60 damp.
Septem.	85	68	76	4 3 7-10	slight on the 30th.	East 9 SW. 4 NE. 8 SE. 4 SE. 5.	30 to 30. 40.	20 to 40 dry.
October.	83	50	66	4 3 "	heavy on the 14th.	West 3 NE. 10 NW. 8 SW. 9	30. 10. to 30. 40.	40 dry to 45 damp.
Season	87	50	68	32 in. 2 qr. 4-10ths.	2 days.	West and NW. most prevalent.	Dense.	Wet.

☞ To this second edition of the Essay, I subjoin the two following scales.

METEOROLOGICAL OBSERVATIONS for 1818.

Months.	Thermom.			Quantity of Rain in inches and tenths.	Thunder and lightning.	WINDS.	Barometer.	Hygrometer
	highest.	lowest.	mean.					
June	93	65	79	1 in. 2 qr. 5-10ths.	2 days.	South 3. NE. 8 SW. 12. East 2 West 2. SE. 3	30. 10. to 30. 30.	10 to 70 dry.
July	93	77	85	4 0 9-10	9 days.	West 12. SE. 1 SW. 10. East 1 South 5.	30. 10. to 30. 30.	90 dry to 10 damp.
August	92	78	85	2 0 4-13	6 days.	West 8. SE. 4 SW. 9. East 3 South 5. NE. 1	30. 10. to 30. 30.	40 to 60 dry.
Septem	89	61	75	3 0 8-16	5 days.	S. 5. W. 1. NW 6 SE. 2. NE. 4 SW. 4. East 8	30. 10. to 30. 40.	10 damp to 30 dry.
October	82	47	64	0 0 0	1 day.	North 7. SE. 3 East 2. S. 2 NE 14. NW. 3	30. 20. to 30. 60.	68 to 120 dry.
Season	93	61	77	11 inches 6-10ths.	23 days much.	SW. NE. S & W most prevalent.	Elastic.	Dry.

Continued for the three first months of the season of 1819.

June.	88	73	80	2 0 8-10	3 days.	SW. 5. East 1 West 2. South 2 SE. 3. NE. 4	30. 30. to 30. 50.	60 dry to 20 damp.
July	89	72	78	6 3 1-10	15 days	West 11. SE. 4 SW. 3. NE. 4 East 1. N. 1	30. 50. to 30. 20.	60 dry to 50 damp.
August	84	72	78	not ascertained.	12 days	East.		

☞ The work going to press before the end of August, the result of the month remains partly unknown.

The foregoing tables or observations, are of themselves sufficient to establish the *doctrine of deficient electricity*, as being the cause of that state of the atmosphere, peculiarly favourable to the generation and extension of the *gaseous poison*, or Yellow Fever infection; independently of the vast number of observations detailed in the Fourth Sketch, and 6th and 7th Tables.

From these, I shall clearly prove, that although *heat and moisture*, and *heat and dryness*, together with *animal and vegetable putrefaction*, have been, and are justly considered, as jointly engaged in effecting that derangement of the atmospherical air, and which act as the *stamina* of Yellow Fever infection, in such derangement of the air, that notwithstanding this, a *deficient electricity* in the atmosphere, is an indispensable occurrence, since without it, although all the other exciting causes continue to exist in all their force, they are yet incapable of producing an *asthenic disease*, or a fever of higher grade, than a common autumnal remittent.

In 1817, all the causes of Yellow Fever existed, *heat and moisture* in excess, animal and vegetable putrefaction in its usual quantity; sinks and drains as heretofore and to crown the whole—there was a *great deficiency of electricity in the atmosphere*—there being but one slight concussion towards the close of the sickly season, and only one heavy concussion on the 14th of October. The consequence was, as we have already seen, an unprecedented fatality from this infected atmosphere, in the death of 272 persons by Yellow Fever.

In 1818, many of the causes of *Yellow Fever* existed, the *heat and dryness* in excess, animal and vegetable putrefaction in the same proportion, and sinks and drains remained as before; *but there was no epidemic Yellow Fever*, and only very few *sporadic* and doubtful cases of it! How can this be accounted for? The doctrine of an *electrical equilibrium* as a preventive, and a *deficient electricity* as favouring the generation of Yellow Fever infection: can and does account for it upon the principles of genuine

philosophy; that there was no Yellow Fever in Charleston in the year 1818, is wholly owing to there having been kept up, during all the summer or sickly months, an *electrical equilibrium* in the atmosphere, as there were 23 days of thunder and lightning during the summer or sickly months of that year; and that there was an extensive prevalence of that disease in the year preceding, was wholly owing to the absence of electricity, or in other words, that there was a *deficient electricity* in the atmosphere of Charleston; there having been but two concussions of thunder and lightning during the whole of the summer or sickly months, is likewise proved. Again,

The present season 1819, to the 25th of August has been *hot and wet*, and remarkable for the excessive quantity of thunder and lightning; there having been upwards of 30 concussions since the first of June, some of which were very excessive. Towards the latter end of July, an inflammatory constitution of the atmosphere began to prevail in consequence of this excess. The prevailing diseases for the season, were intermittent, remittent and catarrhal fevers; and by the 10th of August, a few sporadic cases of Yellow Fever were detected in the city. The atmosphere of which, gave every evidence of a disposition to generate an epidemic Yellow Fever therein; and the immense number of strangers in Charleston, some of whom, both in point of situation and mode of living, were proper subjects of disease, became soon its victims.

All the causes of Yellow Fever, with the exception of a deficient electricity, existed this season as heretofore; the heat, though not excessive, was great, and the quantity of rain such as to constitute a *wet season*, and there can be no doubt, but for the occurrence of an excess of the electrical influence in the atmosphere, and on the face of the earth, an epidemic Yellow Fever must have prevailed by this time, and should the rain continue, and the fluid be "blunted, absorbed, or destroyed," it may yet make its appearance, though late in the season, with great fatality.

From all these circumstances, it is presumed, that with the exception of a few cases, the types of the prevailing diseases of the city to this date (the 25th of August) may be properly compared to those, which being occasioned by "the sensible changes of the atmosphere, producing local inflammatory affections" in the subjects, while from the "epidemic constitution of the air," a predisposition is manifested to generate an epidemic disease; and the types are so blended, that we are doubtful to which they properly belong, and hence, they are not to be considered as epidemic.

To prove this to be the fact, we will only advert to the bills of mortality, where we will find the proportion of fevers of various types, not to be such, as to justify the assertion of the existence as yet, of an epidemic Yellow Fever in Charleston.* But rather, that a disposition thereto is strongly manifested from the heat and moisture of the season, which being counteracted by the excess of electricity in the atmosphere, instead of an epidemic Yellow Fever, there exists intermitting, remitting and catarrhal fevers, which being aggravated by the causes just noticed, produce a *sporadic disease*, which in some patients, under peculiar circumstances, is *Yellow Fever*, in others, a *Febris Rheumatica*, or as it is vulgarly called a *Broken-bone Fever*; in others, a common autumnal remittent; and it is more than probable if this state of things continue to cold weather, it will change to the *Peripneumonia Typhodes*, or malignant pleurisy.

If, therefore, there be any absolute rule for the establishment of an *absolute fact*, it must appear to all, (but those who are obstinately determined, contrary to their better judgment, not to be convinced) that the different results of the years 1817 and 1818, go as far to the establishment of the doctrine of *deficient electricity*, as being the cause of that derangement of the atmosphere, which qualifies it for the generation of *Yellow Fever infection*, as any one *specific circum-*

* From the 11th of July to the 25th of August, the deaths from fevers are as follows: Billious Fever, 4; Catarrhal do. 4; Country do. 1; Hectic do. 1; Typhus do. 6; Worm do. 3.--Total, 19. Yellow Fever, (doubtful) 19.

stance, can possibly go towards the establishment of any one *specific fact* in the universe; and so also, on the other hand, that an *electrical equilibrium* in the atmosphere, is a certain preventive of that infection, as has been already noticed; and hence, from a retrospective view of the foregoing pages, and the visible changes made upon the character of this fever, by *thunder and lightning*, I am confirmed in the opinion, that the proximate and immediate cause, is to be traced to the effect first produced on the atmosphere, by combinations of *marsh miasmata*, with *human effluvia*, thus generating a *specific gaseous poison* in the atmosphere, whose noxious powers are bounded by certain limits which it cannot exceed.— And that the remote and predisposing causes are such as are to be found in the following section.

SECTION 2.

The second, or remote and predisposing Causes of Fever.

The second or remote and predisposing causes of Yellow Fever, consists in a peculiar state or *diathesis* in the animal economy, which renders it especially liable to the morbid action of the *specific gaseous poison* pervading the atmosphere and face of the earth. And this peculiar diathesis consists more immediately in that want of assimilation and naturalization to the various modifications of our climate in the degree common to the natives.

And other remote causes consist in excesses of any or all the labours, pleasures, or enjoyments of life;* or in the excessive passions of the mind, particularly fear and grief. These properly constitute, in their degree, a predisposition to contract the disease.

We have seen, that unusually dry and hot, and unusually hot and moist summers equally favoured the generation of this poison and the existence of the disease, in its present modification. It appears, how-

* Professor M'Nevin, of New-York, in his annual course of lectures, has noticed a fact worthy of remark in this place, "persons going with empty stomachs into hospitals, or other places where contagious diseases exist, will take them sooner than if their stomachs were full."

ever, that its prevalence is much more frequent after excessive hot and moist, than after hot and dry summers, in the proportions of four to three; as has occurred in the years 1794, 1799 and 1817, contrasted with the year 1728, and one year between 1794 and 1799, the particulars of which I have forgotten.

The natives of this and all other warm climates, particularly those near the tropics, are from their birth, gradually assimilated to the sudden and dangerous transitions of the weather, and also to the frequent recurrence of the effects of this noxious exciting power or *gaseous poison*, which produces this fever. And those native children, that arrive to the age of nine years, are thence considered as naturalized to the climate: but, until this, they stand equally exposed to the disease with strangers or foreigners.

Hence, in the natives, the effect of this *gaseous poison* is not as violent as it is in children and in strangers; producing in the former nothing more than a remittent fever; in many instances ephemeral, and in some only slight predisposition, such as head-ache, listlessness, gaping, yawning, stretching, hot flushes, &c. while in the two latter, the effect is more violent, and hence more fatal, since the noxious exciting power is acting upon an excitability altogether new, and unaccustomed to its influence. For as the Turk accustoms himself to his opium, the tobacco chewer to his quid, and the toper to his ardent spirits, so are the natives of any climate, however unfavourable to health, from a gradual assimilation and annual exposure to the local or endemial diseases, more accustomed to the influence of their powers; and invariably experience from them, effects less noxious and deleterious, and hence, less fatal than children and strangers; for the same reasons, that opium, tobacco and spirits, do not produce the same sudden and fatal effect, from use, that they do in persons not accustomed thereto.

Strangers and children are therefore, for the foregoing reasons, under all circumstances, especially liable

to its attack. And according to the previous state of the system, some in greater degrees of violence than others. Yet in many, even strangers newly arrived in the city, and children under three years, from a previous good habit, its attack has been so mild as to have produced in them no other modification of disease than that, to which the long established natives were themselves subject; I mean a mild remittent.

I attended many blacks from different sections of the state, and some Africans, not yet sufficiently naturalized, who were labouring under the disease, though not to the same degree of violence with the white children and strangers; and where they have had proper nursing and attendance, were more readily cured than the whites. Dr. CHALMERS observes, that the negroes of African descent in Charleston, are as susceptible of all sorts of diseases as those of the other colour, *if we except the Yellow or Malignant Fever and Gout.**

I am not from my own experience, qualified to say of this disease as of most others, that the intemperate and the irregular were most liable to its attack. A painful and melancholy experience has proved, that the most delicate, temperate and regular of both sexes have been equally, with those of the opposite character, the subjects of its destructive influence and fatality.

Persons most liable to its attack, appeared to be of the following descriptions: Strangers in full health, of the age of thirty years and under, constituted the first and most numerous class: secondly, from thirty to forty years and upwards; and children under six years were among the most numerous of the natives: next, those from six to nine or twelve years, constituted the smallest class.

With regard to the time necessary for strangers to become naturalized to the climate, we can fix no positive limits from actual experience, since it has in some instance varied very materially. It is pre-

* Account of the Weather and Diseases of South-Carolina, vol. 1. p. 37.

sumed, however, notwithstanding there has been some in the present year, that fell victims to it, after having resided among us twelve or thirteen years, that a period of nine years constant residence, will, in general, produce an assimilation sufficient to secure the subject from the disease in its highest grade.

Although the disease attacked indiscriminately, strangers of all ages and sexes, it more especially attacked such as were in low, moist situations and confined streets and houses, without the means of proper ventilation: also those, who from attachment to their companions and friends, spent much time, both night and day, in anxious solicitude about the beds of their sick and dying countrymen: to which may be added, the fatal practice of keeping up the spirits on such occasions, by frequent recourse to ardent spirits while night watching. And lastly, those who suffered themselves to be irregularly costive until it produced disease.

On the other hand it is a fact, that several strangers who continued to reside in the city, by attending particularly to the state of their stomachs and bowels, escaped the fever in its worst form, although they had several symptoms of its forming state.

From all, then, that has been collected of the history of the disease in the present and former years, we are directed to look for its causes in that impaired state of the atmospherical air, which tends to the generation of that *specific gaseous poison*, which has ever and invariably produced it in our city, as primary. To the state of our innumerable sinks and drains, as secondary and proximate, and to that want of assimilation in the animal economy, which so eminently predisposes to it, as the remote cause.—Strangers should, therefore, calculate to a certainty on the prevalence of this disease, in those years in which there has been, or is, an *excessive hot and dry, or an excessive hot and moist summer*, and more especially if there has been *little or no thunder and lightning*. Since the most incontestible proofs can be produced, that in the most powerful prevalence of the

fever, in particular years, an immediate stop has been put to its progress by heavy and repeated thunder and lightning; and its influence on the present year has been very sensibly diminished, and its progress plainly arrested by the slight concussions from the same sources: and those who propose emigrating to this city should defer their arrival until a frost, which usually happens in the beginning of November, or at most by the latter part thereof—after which they may rest secure from the fear of fever.

CHAPTER II.

A brief consideration of the effects of the Gaseous Poison on the Animal Economy.

PROPOSITION 2d.—What are the effects produced by those causes detailed in the foregoing sections?

ANSWER.—The effects produced by this *gaseous poison*, are obviously *the decomposition of the fluids*, in the first instance; perhaps, primarily the *gastric juice* in the stomach;* and thence descending along with its other contents to the *duodenum*, it there meets with the *bile* returning from the liver, which it also decomposes; and so, in regular succession, to the blood, which, from its active and deleterious stimulus, is excited to excess; and thus that fever is formed, which puts on, in the first instance, the appearance of a sthenic disease; but which is, in reality, a deceitful appearance—since the uniform tendency of this disease is to gangrene and sphacelus, unless speedily prevented.

In taking a view of the effects of this *gaseous poison*, on the animal economy,† I was imperceptibly led to speak of it as having been received directly into the stomach. I now take leave to rectify an error, which originated in a too rigid attention to its effects;—

* Some gentlemen with whom I have consulted on this subject, consider the *liver* as the primary seat of the disease: and others, that the *gaseous poison* is conveyed by the lungs directly to the blood, which is first diseased, and then the liver, &c.

† Essay on Yellow Fever of 1817, chap. 2, page 20.

while I measurably lost sight of the manner in which it was most probably introduced into the system.

Subsequent reflections, and a more minute attention to the subject, enables me, at this time, to offer a more probable medium of introduction, than either the stomach or the lungs. I am now decidedly of the opinion, that the *gaseous poison*, or Yellow Fever influence, insinuates itself *primarily* by the *olfactory nerves* to the brain; where, having produced a morbid excitement of the nerves; and becoming more and more diffused; it communicates in succession, its deleterious effects *secondarily* throughout the whole nervous system; and all the circulating fluids, producing the derangements which occasion the general and particular systems of the disease, as described in the first Section and third Chapter of this Essay. This mode of attack, and consequent effects, accounts for the disease putting on in most instances; first, the appearance of *sthenic inflammation*; which, shortly afterwards becoming *asthenic* is then no longer doubtful; but acknowledged as a legitimate *typhus*.

SECTION 1.

Of the similarity of effects between the poison of arsenic and the specific gaseous poison, producing the Yellow Fever.

“The effect of arsenic upon the human system
 “when received into the stomach; besides the effect
 “which it has in common with other corrosives is,
 “that it produces a piercing, gnawing and burning
 “sensation, accompanied with an acute pain in the
 “stomach and intestines, which last appear to be vio-
 “lently contorted or twisted—convulsive vomiting,
 “insatiable thirst, the tongue and throat parched and
 “dry—hiccup, palpitation of the heart, a deadly op-
 “pression of the whole breast; the matters ejected
 “by the mouth as well as the stools exhibit a black
 “foetid and putrid appearance, succeeded by a mor-
 “tification of the bowels.”

Those are the general effects of the poison of arsenic, when received into the stomach in such quantity as to produce death; and it is evident that in a smaller quantity its effects must be also less violent and consequently less fatal; and it follows, also, that the symptoms above described will be also less predominant, and hence less distressing. From which we may reasonably infer, that *arsenic*, received into the system in an equal proportion of strength to the same quantity of this *specific gaseous poison* capable of producing this disease, the symptoms and effects will be nearly or altogether similar; and, consequently, that the “piercing, gnawing and burning sensation” felt in and about the stomach, will be only equal to the great “load and anxiety” felt about the *præcordia* in Yellow Fever—the “contortions and twisting of the intestines,” to the obstinate torpor of them in this disease—the “convulsive vomiting,” to the irritability of the stomach; and so of the rest in succession.

It is further obvious, that whenever the gangrenous state of the fever is about to take place, the irritability of the stomach is increased to black-vomit, and that the matters ejected by the mouth, as also those by stool, exhibit the same appearance with those produced by arsenic and some other poisons; and lastly, that the closing scene in both are the same, or so nearly the same, as has been proved by dissections, as to admit the belief, that their effects on the animal economy differ only in proportion to the quantity of the mineral poison producing more speedy and more fatal effects in less time than that produced by the *specific gaseous poison* of Yellow Fever.

That the Yellow Fever is produced by poison is a doctrine long since admitted by Doctor LIND, in his *Essay on Diseases incidental to Europeans in Hot Climates*. (London, 1777.)—In which he states: “I am informed by a surgeon who lived some years in Senegal, that for several months during the dry season, the country was as healthy and pleasant as any in the world, but soon after the rainy season began

“ a low malignant fever constantly spread itself among the Europeans.” [STRANGERS.] “ *It seemed to proceed from a poison, as it were, got into the stomach.*”

And that its effects are primarily in that viscus is more than presumable, since the same judicious author tells us, that “ the chief objects of attention in all such fevers, are the contents of the stomach and intestines.” And under this strong impression and full conviction, that the stomach is the primary seat of the disease, I have founded both my theory and practice. I might, in this place, also produce many valuable remarks from our learned countrymen which go to establish this fact, but they would, were I to quote them all, swell this Essay to uncommon bulk ; for which reason I am constrained to dispense with them and proceed to the consideration of the varied effects of those *gaseous poisons* as they occur in Carolina.

SECTION 2.

Of the effect of the Gaseous Poison, in its simple and combined forms.

It appears to me, that the effects of this *gaseous poison* on the animal health, may be reduced to the following forms, as already mentioned in chap. 1st, sect. 1st :

1st.—That the modification of it, termed *marsh miasmata*, which is the produce of vegetable putrefaction, independently of animal putrefaction, peculiar to the “ warm, moist climate, the low grounds and stagnant waters” of Carolina, particularly the middle and lower country, is, most commonly, productive only of intermittents, of the first class *pyrexia*, and varies according to the character of the *gas*, of which it is formed ; and as this partakes more or less of a combination of the effluvia arising from animal putrefaction, so are the types or modifications of the disease also varied, as from an intermittent to a remittent, or else a continued fever, &c.

2d.—That which is produced by a combination of *marsh miasmata* and *animal putrefaction*, in seasons

that are either preceded or followed by excessive hot and dry, or hot and moist weather, and in which there is but little or no thunder and lightning, is a *specific gaseous poison*, peculiar to large and populous sea ports, especially near the tropic; and to towns and villages under similar circumstances, this gaseous poison almost invariably produces those modifications of disease that belong to the second class *apyrexia*, particularly that remittent fever which readily assumes the *typhus* type, and becomes Yellow Fever.

3d.—Whenever there is superadded to this peculiar combination, a cause productive of extreme malignity, it may then become contagious, according to those circumstances. This cause has, however, happily for Carolina, never yet existed among us, although it is said to have existed in other states of the union.

4th.—Those intermediate combinations, in which one or other of those gases are predominant, may be considered as the cause of those modifications of disease, which partake of both the *sthenic* and *asthenic* types; and hence, the *catarrhus epidemica* assumes the type of the *typhoide pneumonia*. The *synocha* puts on the livery of the *typhus maligna*; and the *Yellow Fever* is sometimes a "*causus*, at others a *typhus*, in "some instances a *synochus*, and in others a *synocha*;" and in others it is combined with highly malignant "states of fever."—(Dr. Rush.)

We discover from this, the reasons why the Yellow Fever has been considered as constituting the highest grade of our common autumnal remittent, and hence conclude with the learned Dr. DANCER, of Jamaica, that "it is not uniformly one and the same disease, "but is often a compound one, partaking at one time "the nature of the malignant fever, at another resembling the billious remittent," &c.

Although this appears to be the general, and perhaps particular nature of this disease, that of blending itself, or of being blended with the types of diseases that are prevalent at and previous to its existence.—There appears to be notwithstanding, a specific property attached to the *gaseous poison*, which produces

it; and which, almost invariably tends to hurry the disease from one state to another; and if a cure is not readily made out, to gangrene and mortification, in the same manner with arsenic or the bites of venomous serpents.

It appears also, that the effect of all poisons on the animal economy, is that of decomposing the fluids, or depriving them of their *oxygen*, and in an indirect manner producing obstructions in some of the secretory vessels, and more obviously in the liver; whence the suffusion of bile evidenced in the eyes and on the skin, in the advanced stage of the disease, has given rise to the name of Yellow Fever. The same yellow suffusion takes place in the eyes and on the skin from the bite of the Rattle Snake, and one species of Moccasin Snake.

QUERE.—Is it not a subject worthy of the most industrious inquiry. The similarity of effects produced on the animal health, by the different poisons of the animal, vegetable and mineral kingdoms? And that as the cure of the poison from arsenic is by emetics, cathartics and plentiful dilution of the contents of the stomach and intestines; so will the cure of any modification of disease, produced by any other poison operating on the stomach, be effected in the same manner, and by the same means?

CHAPTER III.

Of the Characteristic Symptoms and Curative Indications of the Fever.

PROPOSITION 3d.—What are the characteristic marks which especially distinguishes the Yellow Fever from the common autumnal remittent?

ANSWER.—The most obvious are, those sudden changes that are peculiar to this fever, in greater degree than any other modification of disease with which we are acquainted. Assuming, in the first instance, the type of a high *sthenic*, it rapidly changes to the *asthenic*, with great prostration of strength; an

obstinate irritability of the stomach and torpor of the bowels, a black-vomit, and a sudden tendency to gangrene and mortification.

It is true, that these symptoms, as such, are not alone peculiar to this state of fever, since there are others which degenerate from *sthenic* to *asthemic*, but whose changes are not so rapid, as is the case with the autumnal remittent. The irritability of the stomach in other diseases is not so obstinate; and the *melæna* or black-vomit of Yellow Fever is considered as specifically different from the *morbis niger* of the ancients, and the *atrabilis* of BOERHAAVE and VAN SWIETEN, and is the effect of a peculiar morbid action of the stomach, produced by the stimulus of the *masmata* or *gaseous poison* acting upon the liver, stomach, bowels, &c. But, as I have devoted an entire chapter to this subject, in my Elements of Medicine, shortly to be published, I forbear to say more in this place.

SECTION 1.

Of the Characteristic Marks and Symptoms of Yellow Fever.

In addition to the observations immediately preceding, it appears: 1st, That the specific character of the disease consists in its being produced by a *gaseous poison*, blended with atmospherical air, and producing in the system a morbid secretion of the fluids, which, ultimately, falling on the liver and returning on the stomach, produces that irritability which commonly ends in black-vomit,—and

2d—Its uniform character consists in its attacking, especially strangers and children under the age of nine years, not assimilated or naturalized to its influence.

From what has been said of the state of the atmosphere, previous to, and during the prevalence of this disease, I think it will clearly appear, that it is produced by the deleterious effects of a *gaseous poison*, received indirectly into the stomach through the medium of the nerves; and although it does not

immediately give evidence of its existence in that viscus, by any strongly marked symptom of derangement; but rather, that those symptoms are more readily discovered in the arteries, by their increased action. I am, notwithstanding, disposed to infer, from the intimate connexion of the stomach and brain, that this increased arterial action, which induces a belief of its being primarily a disease of the sthenic excitement, accompanied with symptoms of inflammation, and hence indicating the free use of the lancet and other powerful depleters, is nothing more than a primary disease of the nerves and their fluid: and secondarily, a disease of the fluids generally, of which the blood is the source.

That inflammation is of two kinds, *sthenic* and *asthenic*, is an improvement of medical theory, for which, I am indebted to the immortal JOHN BROWN, (*Elements Medicine, part 2. ch. vi.*) By which it is proved, that sthenic inflammation almost invariably terminates in resolution or suppuration, but never, unless improperly managed, in *gangrene* and *sphacelus* which the latter or *asthenic* inflammation is invariably disposed to do.

That the inflammation in Yellow Fever is of the *asthenic* kind, admits of but little doubt; for, notwithstanding it does in the beginning give evidence of an excessive excitement in the arterial system, connected along with those symptoms which occur in sthenic diseases, it is, nevertheless, true, that those very symptoms, and the increased arterial action, are nothing more than an effect of re-action in the system, since they are the immediate forerunners of that direct debility, producing sudden prostration of strength; and soon after, a secretion of fluids tending to *gangrene* and *sphacelus*, from the dissolved state of the blood, &c.

Although, in the forming state of this fever, the symptoms are generally, and for the most part, the same as those of the autumnal remittent of the natives, there is along with these symptoms, a peculiar and almost indescribable appearance of the whole physi-

ognomy of the patient, expressive of peculiar anxiety and alternate dejection; which is seldom experienced in the autumnal remittent.

When the disease is completely formed, the symptoms are commonly more violent; thus, the pain in the head and eyes are intensely acute, insomuch that the latter are complained of, as being ready to start from their orbits; in some they are watery, and in others dry, red and fiery, from the turgescence of their blood vessels. The tongue is generally white, somewhat furred, with red edges; the pulse is frequent, full and hard; the skin hot, dry and husky, leaving on the fingers, after taking the pulse, a sensation peculiar to this state of fever.

The pulse, however, very suddenly sinks and becomes weak and irregular, especially if the patient has been considerably depleted. The strength, which appeared at first to be considerably increased, is also suddenly prostrated; but of this, the patient does not seem to be fully sensible; the acute pain of the head and eyes appear to be removed and translated to the back, loins and knees; the dull heavy pain and oppression, accompanied with great heat and anxiety about the *præcordia*, and especially the pit of the stomach increase, and are accompanied with an obstinate torpor of the bowels and irritability of the stomach; which seems to constitute a new state of the disease. The two latter symptoms are, hardly, by any means, to be subdued, or even allayed.

And now the changes of the disease increase more rapidly, the pulse seems, at times, to be restored to its natural state, and the ardent heat of the body reduced to its healthy temperature; and except some slight remains of anguish about the breast and pit of the stomach, the patient, and frequently his attendants, are deceived with the appearance, and consider the disease as having been arrested; and more especially as the exacerbations or remissions of the fever are of the most flattering kind.

In general, however, they are suddenly undeceived, for the irritability of the stomach and torpor of the

bowels still remaining, at length, in the midst of the most sanguine hopes of a recovery, another and commonly fatal symptom occurs, which marks another state of the disease: a quantity of blackish matter, resembling coffee grounds, intermixed with flaky substances that float among the discharges, is ejected by vomit. The stools, if the torpor of the bowels is removed, are at first of a darkish green and brown, extremely foetid and offensive; it soon changes to a mud colour, and in some instances as black and thick as tar. It may not be amiss to take notice in this place, that the *black-vomit* in Yellow Fever, differs from the *morbis niger*; the *atrabilaris*, and all the morbid secretions of that *viscus*, enumerated by the ancients. It is, as I have already observed, a secretion of "blackish matter, resembling coffee grounds intermixed with whitish or greyish flaky substances (*flocculi*) that float among the discharges which are ejected in the act of vomiting," it is from this circumstance a specific symptom of Yellow Fever, by which it may be properly distinguished from other fevers, and in which there is sometimes a discharge of dark matter, occasioning the belief of its being the black-vomit, but wanting this characteristic mark, that is the *flocculi*, or flaky substances, cannot be considered as the black-vomit of Yellow Fever, but rather a discharge of vitiated bile, which may happen in any of the modifications of Typhus Fever.

About this period too, sometimes earlier or later, the eyes become yellow, as also the neck and face; and is here and there marked with blue and livid streaks, inclining to a brownish black; in some cases the whole body assumes a yellowish hue; and, from this circumstance, the disease has obtained the name of the Yellow Fever; though improperly, since in many instances, this symptom does not appear at all, or at least not until after death.

The next formidable symptoms in this disease, and which seem to indicate the sudden dissolution of the patient, are indeed, not alone peculiar to this fever,

since they happen in most low states of malignant fevers. These are a bleeding at the mouth and nose, a hurried and perturbed state of the mind, a desire to be removed from one room to another, or from one part of the same room to some other part, considerable restlessness and anxiety, great weakness of the sight and hearing, a delirium, hiccuping, convulsions, and at last, a total insensibility; all which appear to mark the malignant state of the disease, and the patient passing every thing involuntarily under him, is soon relieved from his sufferings by death.

Although the general and particular symptoms that accompany this modification of disease, have been thus particularly described, they are not to be considered as altogether constituting the characteristic marks thereof. These, as we have before observed, seem to consist principally in that *morbid secretion* which produces a torpor of the bowels and an irritability of the stomach, which usually terminates in a *black-vomit, peculiar to it*, and by strangers and children being especially subject to its attack; while the natives, if attacked by it, have it only in that form which constitutes the common autumnal remittent and does not degenerate into this type, unless there are certain exciting causes superadded to the general cause, such as a debauch, habitual intemperance, change of air, from the city to the country, and *vice versa*.

Sporadic Yellow Fever,* as it has been termed, and which I conceive to be a high grade of our autumnal remittent, occurs sometimes in those seasons in which *the legitimate Yellow Fever does not*, nor, (from the healthy state of the atmosphere) *cannot exist as an epidemic*. These *sporadic cases*, are in fact, of a very doubtful nature, and should not be confounded with the legitimate fever. We have already seen, that Dr. RUSH, with the most extensive practical experience, declined the attempt of distinguishing *the Yellow Fever*, from what has been termed the *common bilious fever*;† and

* Dr. Rush's account of the fever of 1793, page 10-11.

† *Ib.* id. page 178.

it is a fact, that will not admit of a doubt, that many cases of the latter kind, from habits of intemperance in the subjects attacked by them, are accompanied with symptoms so analogous to those of the legitimate Yellow Fever, that the oldest and most experienced among our practising physicians, have been deterred from a public declaration of their opinions, lest they should prove to have been premature, and thus occasion an unnecessary alarm among the inhabitants.

Among our native citizens, who have been attacked with the common *autumnal remittent*, which is the *proper annual endemic* of Charleston, and where these are addicted to habits of intemperance, or have been overtaken with a debauch, a yellowness of the skin, accompanied with livid spots, a vomiting of black vitiated bile, and dark foetid alvine discharges, have been very frequently observed to accompany such diseases; yet I doubt, whether any practitioner, who regarded his reputation, would pronounce such cases to be legitimate Yellow Fever.

I have every where assented to the opinion, that in our healthiest summers, there can and does exist, from *peculiar local circumstances*, sporadic cases of fever; and these peculiar local circumstances, are first a predisposition to disease, and secondly, low, damp, contracted situations, confined rooms, want of cleanliness, unwholesome food, intemperance, night air, &c. &c. and these circumstances, notwithstanding the existence of an electrical equilibrium, are of themselves capable of generating an atmosphere in their immediate vicinity, which contains all the necessary requisites for producing fevers of a high grade.

From all the preceding facts taken in connexion, it is assuredly a subject of gratulation to the citizens of Charleston, that they may with confidence look forward to the different seasons, and observing frequent concussions of thunder and lightning, rest satisfied from the experience of 139 years, as may be seen in the 4th Sketch, that such summers will be free from epidemic Yellow Fever; and, on the other hand, where there is little or no thunder and lightning dur-

ing the summer months, they may with some certainty look forward for a sickly season, and being thus apprised before hand, may take such precautionary measures, as may tend greatly to counteract the effects, that almost invariably result from a *deficient electricity* in our atmosphere. Strangers too, may take warning by anticipation, and by a timely removal, or a judicious and essentially necessary observance of such rules, for the prevention of an attack of fever, as are laid down by most medical writers, and in these Essays, escape the disease altogether, as hundreds have already done, both in this city and elsewhere.*

SECTION 2.

Of the Curative Indications in Yellow Fever.

The practice which I have adopted, with some variations, may be found in *Lind's Essay on the Diseases, &c. of Hot Climates*; *Sir John Pringle's History of the Diseases of the Army, &c.* and in *Dancer's Jamaica Practice*, and is adapted to the following intentions, viz:

1st. To withdraw as much as possible, the poison that has been received into the system, particularly when it has arrived at the *stomach*.

2d. To dilute and lessen its virulent action in the system, and especially in the alimentary canal.

3d. To provide against the debilitating effects of this noxious power, and the depleting remedies necessarily administered in the cure. And

4th. To counteract the irritability of the stomach, as also black-vomit and the tendency to gangrene, which almost always exists in this disease,

The first intention, of withdrawing as much as possible the poison that has been returned upon the stomach, is speedily and effectually answered by **EMETICS** combined with **CATHARTICS**. *But this bold and necessary practice should, if possible, be attended to in the beginning, or forming state of the fever.* It

* Hints towards the prevention of this disease, may be seen in the *Essay on Contagion and Infections*, chap. 4.

requires also, some judgment to ascertain that there is nothing which positively contra indicates their use; and if there is not, I give the following:

Rochelle or Epsom Salts, 2 ounces.

Tartar Emetic, 3 or 4 grains—mix—

Dissolve them in half a pint of warm water, and give a wine glass every 15 or 20 minutes, until it operates freely three or four times, by vomit. I then interpose copious draught of strained gruel, saturated with salt,* and if the first prescription does not operate downwards, so as to produce from five to ten motions, according to the strength and constitution of the patient, the following is ordered :

Jalap, half a drachm.

Calomel, ten grains—mix and divide into five papers :

One to be taken every hour in molasses, until the requisite number of stools are produced. “ Those vomits that are also productive of stools, (says Sir JOHN PRINGLE) are the most useful ; but especially if they are powerful enough to procure a plentiful discharge, upwards or downwards, of the corrupted bile. By this means, they sometimes effect a cure without further medicines.” And this I have frequently found to be the case in the present season ; the dangerous torpor of the bowels being more safely and speedily removed by this practice, than by any other that has come to my knowledge. After this, and especially if the skin be hot and dry, the patient is either placed in a tepid bath, or is sponged all over with cold water, or cold vinegar and water, for the space of five or ten minutes, or until the skin assumes the appearance of a goose skin ; then put between flannel or cotton coverlids, in which situation, a free and plentiful perspiration is elicited and encouraged by warm drinks of barley water, warm lemonade, balm, sage, rosemary or life-everlasting teas (*gnaphalium*).—And thus ends the first twenty-four hours.

The second intention begins with the second twen-

* See Chalmers on the Weather and Diseases of South-Carolina, vol. 1. p. 76, and also 177.—Also, Dr. Rush, on the Fever of 1793, page 64

ty-four hours ; and the remaining poison is still further diluted by the same drinks, along with the following :

Seneka Snake Root, half an ounce—

Boil it in three half pints of water, to the consumption of one third ; strain and divide the decoction into two equal parts. In one of the parts of the decoction, two ounces of Glauber, Epsom or Rochelle Salts are dissolved, and one grain of Tartar Emetic.

Of this, the patient takes a small wine glass every half hour, until it operates freely by perspiration and stool ; the number of which latter, are proportioned to the strength of the patient, and the violence of the symptoms.—When these are sufficient, this portion is laid by, and that, without the salts is given—a wine glass every hour.

If the stomach seems to be unsettled and rejects this formula, the jalap and calomel powders are given in its place, as before directed ; or jalap with the *sulphate of pot-ash*, and a *vesicatory (blister)* applied to the *scrobiculus cordis*, or pit of the stomach. The bathing or sponging is also continued as before ; and the following mixture is sometimes resorted to, where there is a lowness of spirits :

Spirits of Lavender, compound.

Spirits Nitre, dulc : Of each, half an ounce.

A teaspoonful to be occasionally taken along with the patient's ordinary drink.

The third intention is answered by critical and generous portions of wine, wine whey and other cordial drinks, alternated with the cathartic medicine. If the torpor of the bowels, with irritability of the stomach and rejection of the medicine continues, the following is directed :

Dissolve half a drachm of the salt of tartar, in four ounces of water. A table spoonful of the solution, to be taken every hour or two, in a small glass of lemonade, while in a state of effervescence. Stimulating clysters are also administered every hour or two, prepared by adding to the common clyster a quantity of soap-suds, or where there are spasmodic affections of the bowels, the smoke of tobacco.

If there appears to be an *atony* of the intestinal canal, clysters prepared of strained gruel or chamomile tea, with the yolk of an egg beat up with a small spoonful of the spirits of turpentine, are administered and repeated *pro re nata*.

The fourth and last intention, is answered by a close attention to the changes of the disease, as follows:—At that critical period, when the inflammatory stage of the disease is passing to the gangrenous, and the irritability of the stomach gives evidence of the approach of *black vomit*, the following graduated practice is pursued, and alternated as circumstances may require.

1st. Two table spoonsful of lime water in a glass of milk, are given every half hour, or hour,—or

2d. Two table spoonsful of fresh yeast, in a cup of lukewarm water, every hour or two,—and

3d. Infusions of hops (*humulus lupuli*) in easy draughts, or if the stomach will bear it, good old porter. Good wine is seldom rejected, sits easy on the stomach, and is grateful to the patient.

4th. If the pulse sinks or flags, a tea spoonful of the tincture of camphor, in brandy, is given in a small glass of water, every two hours; or is taken in a glass of the infusion or decoction of bark or of columbo. I have found beneficial effects from the tincture of small snake root (*Aristolochia Serpentaria*) in doses of a table spoonful every four hours, in a cup of the patients ordinary drink; and where the bark has been objected to, I have prescribed with advantage, equal quantities of charcoal powder, (*carbo ligni*) with magnesia, in doses of two scruples to a drachm, every two hours, in syrup or molasses.

5th. The inflammatory symptoms having disappeared, and the irritability of the stomach remaining still obstinate, the following has never failed with me but in one single instance.

16 grains of Cayenne Pepper, (*Capsicum Annuum*) may be rubbed up with an equal quantity of Calomel, to which may be added as much Crumb of Bread, moistened with Camphorated Spirits, as will form a mass, of which eight pills are to be made.

One of these to be given every hour, and clysters of bark to be given repeatedly, to which may be added also, one or two drachms of powdered charcoal.

In *typhus fevers*, the practice of administering warm stimulating remedies, is gaining an increase of advocates: it is said that DR. JOHN BINGHAM, of Leixlip, gives to his patients with great success, “ a teaspoon-
“ full or two drachms of common mustard, mixed
“ in a tumbler of tepid water, which, in less than half
“ an hour, will produce a gentle, free and salutary
“ vomiting, merely disburthening the stomach of its
“ contents: this is encouraged by regular draughts of
“ warm water, as in other vomits—eight hours after,
“ four grains of calomel is given to adult patients, and
“ two hours after, a gentle saline purgative is exhibit-
“ ed.” By this treatment, the Doctor says, he seldom fails to stop the progress of the disease. A decoction of the leaves of the common prickly pear, (*cactus opuntia*) has been also successfully used in *black vomit*.—Cupping, with scarification near the pit of the stomach, has been also resorted to by some practitioners, with advantage during the irritability of the stomach.

The patient is indulged with wine, wine whey, and even brandy and water; and while it remains on the stomach, infusions or decoctions of bark, acidulated with aromatic spirit or elixir of vitriol, or with the muriatic acid, are also freely given.

The yeast is ordered to be continued so long as the least propensity to vomit remains. I have found beneficial effects to result from sponging the patient with brandy, or with lime juice and salt, especially the head and trunk.

SECTION 3.

A brief recapitulation of the Reasons of the foregoing Practice, in this Disease.

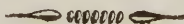
The primary objects in this disease, are to withdraw or reduce the action of the noxious power or *gaseous poison*, which has excited it; and at the same time, to guard against that rapid and sudden prostra-

tion of strength which almost inevitably follows copious depletion.

With this in view, I have, as it regards this disease, long since *sheathed my lancet*; indeed, I do not recollect to have used it, during the last fifteen years that I have practiced in Charleston, except in those cases that have been blended with *Pneumonia*: and my reasons have been founded on principles that are justifiable from the nature of the climate, and the rapid changes of the disease, as well as on the authority of those distinguished writers and practitioners, who have treated of the diseases incidental to warm climates; and in which they have asserted, that if bleeding is at all used in this fever, it must be with great caution, and the repetition of it with still greater, in those climates.—(*vide Lind on the Diseases of Hot Climates, p. 277.*)

And Dr. DANCER, in the Addenda to his *Jamaica Practice*, observes, “*Venesection*, or blood-letting, as “advised by HILLARY, MOSELY, RUSH, JACKSON and “others, though apparently indicated, and according “to report, very successful in America” (i. e. Philadelphia) “and in San Domingo, has not been found “so by be the generality of practitioners in this Island, “and has few advocates left, even among those who “are inimical to the use of mercury.” &c. &c.

Along with the lancet I have rejected mercury, except as an auxiliary ingredient, to a limited extent.—*Because, I have determined never to tremble for the consequences, resulting from its excessive use.* I know from fatal experience, that it is at best, a dangerous remedy; that it is not a certain one in this fever, many can testify.



AN ESSAY
ON
CONTAGIONS & INFECTIONS;
AND THEIR LAWS OF
GENERATION AND COMMUNICATION,
BY WHICH THEY ARE RESPECTIVELY GOVERNED, AND THENCE PRO-
PERLY TO BE DISTINGUISHED;
TOGETHER WITH
A Syllabus and Classification,
WITH PRACTICAL REMARKS
On the ORIGIN of CONTAGIONS and INFECTIONS;
TO WHICH ARE ADDED,
HINTS AND DIRECTIONS,
TO THE BEST MEANS OF PREVENTING THE EXTENSION OF CONTA-
GIOUS AND INFECTIOUS DISEASES.

Second Edition, with Additions and Amendments.

BY J. L. E. W. SHECUT,
PRACTITIONER OF PHYSIC,
Member of the Literary and Philosophical Society of South-Carolina, Author of *Flora Carolinaensis*, &c. &c.

DEDICATION.

TO J. B. WHITRIDGE, M. D.

DEAR SIR,

It is no common consideration that has led me to offer to your acceptance, this second edition of the following Essay :

It is the pure offering of a grateful heart, to a mind soaring above vulgar prejudices, and endowed with the noblest traits of the human character.

To the Physician, who, under GOD, has been made instrumental in snatching me from an accidental and premature death, in conjunction with my esteemed friends, Dr. BENJ. R. GREENLAND, and the lamented Dr. JAMES E. B. FINLEY ; this tribute, will not, therefore, be construed into flattery, but rather considered as the sincere effusion of gratitude.

With these Sheets, therefore, you will accept the assurance of my sincere regard, and believe me to be,

Respectfully,

Yours,

THE AUTHOR,

Charleston, March, 1819.

ADVERTISEMENT,

TO THE FIRST EDITION.

THIS Essay was prepared for the press, immediately after the publication of that on the Prevailing, or Yellow Fever of 1817; and designed, not only to point out the errors, which have obtained, among the advocates for the Contagiousness of Yellow Fever, in our own country; but also, to invite a candid and impartial investigation of the subject among the learned Practitioners of Europe and elsewhere, who have been carried away from the truth, merely, for the want of attending to those marks which distinguish CONTAGIONS from INFECTIONS, and the laws of GENERATION and of COMMUNICATION by which they are respectively governed.

The subject, being one of acknowledged importance to mankind generally, and to our country particularly, an apology for its publication is considered superfluous. It may be necessary to observe, that owing to unforeseen delays, its publication has been prevented, until upwards of ten months have elapsed since it was ready for the press.

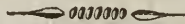
From this delay, however, two advantages have been gained to the author, and his readers;

1st. He has had further proofs of the correctness of his doctrine, of the Causes of the Yellow Fever of Charleston. From the circumstances of the present year, 1818, which, although it has been uncommonly dry and hot, yet there has existed, NO EPIDEMIC YELLOW FEVER! And only three or four cases of *anomalous or sporadic Yellow Fever*—but why? Surely *hot and dry*, and *hot and moist* summers, are nearly alike favourable to the generation and extension of Yellow Fever influence? True, but that is, when there does not exist, an ELECTRICAL EQUILIBRIUM in the air, and over the

ADVERTISEMENT.

face of the earth. Now, happily for our city, this *equilibrium did exist*, with little variation, from the 1st of March to the 9th of September; on which day, the equilibrium appeared to be deranged. It thundered 30 days from the 1st of March to the 27th of August, some of which concussions were very severe; particularly on the 2d of May, 31st do. 14th and 16th of June, and that of the 3d of July. On the 18th of September, the electrical equilibrium began again to exist, and operations on the electrical apparatus, have been undisturbed. It was during this want of electrical influence in the atmosphere of our city, that these *sporadic* cases of the fever occurred. Since the restoration of the equilibrium, we have had no more cases of it. And I am led to believe, that while it does exist, it is impossible for the *gaseous poison* or Yellow Fever influence to exist in that degree, that is capable of producing the *Epidemic Yellow Fever*.

2d. I trust, that the learned practitioners of Europe and America, from a candid investigation of these, and similar facts, that are respectfully submitted to their consideration, will easily detect the *fallacy of the doctrine of the Contagious nature of the Yellow Fever*; and that disease being proved, to be an *infectious one* (according to the doctrine contained in these Essays) and *not contagious*, will no longer subject our city to the fear, or the terrors of foreigners, and to the injurious effects that such a belief has, upon our commerce, our wealth, and our population.



☞ The following Essay, owes its origin to the very interesting and truly scientific correspondence between Drs. HOSACK and CHISHOLM, on the subject of *Contagions and Infections*, and have been enlarged from notes which I had taken, on perusing the letters of the former to the latter, on this important subject.

AN ESSAY, &c.

CHAPTER I.

ON CONTAGIONS,

And the Laws of Communication by which they are Governed.

CONTAGIONS are certain morbid poisons or humors, secreted from *organized living animal bodies*; that on being applied to other living bodies of the same, or even *distinct species*, are capable of exciting a disease of the same specific character with that which originally produced it; and is further capable of exciting or reproducing the same particular modification of disease, by the laws of communication peculiar to them; and that *ad infinitum*.

Contagions are said to be of two-kinds; that is, those that are produced by the *healthy action* of the vessels; as of the Rattle Snake, Viper and Spider; and secondly, those, which are formed in consequence of a *morbid condition* of the secreting arteries; as those of the *Lues, Variola and Vaccinia*.*

To discover the distinction which actually exists, between *contagion* and *infection*, it will be important immediately to impress upon the mind, the laws of their *generation* respectively, which are these: *contagions*, are not generated in other than "*organized*

* American Medical Lexicon, article Contagions.

living, animal bodies,” but when thus generated, may produce, what Dr. CULLEN terms *Fomites*; that is, the matters thus secreted, either in the form of sweat, saliva, blood, or pus, or even the breath of the diseased, and confined in the beds (or blankets) or other articles of apparel; are also capable of reproducing the same specific disease, as that from which it originated—while it is to be remarked, that *infections* are only generated by the decomposition of putrid animal, or vegetable substances, or of both combined; hence, they are the result of the process of putrefaction of *dead bodies*, animal or vegetable; and not of “*organized living animal bodies,*” of which, I shall say more in the next chapter.

Contagions when once generated, are thence communicable only by *contact or the touch, with the absorption of the virus.* And this law of communication constitutes a class of *Contagions*, which I consider as *original and primary*, and whose term is derived from the Latin *contagio* or *contagium*, from *contingo* and *contactus*, to come in contact or to touch.

But there is another class of *Contagions*, that, along with the foregoing, have an additional power and hence a *second law of communication*, which belongs not to the first class. By this second law of communication this class of *Contagions*, are capable of generating, within certain limits, an atmosphere possessing the property of exciting the same specific disease that the diseased body would generate, by coming in contact, or touching persons not diseased; and, this *contagious atmosphere*, possesses the peculiar power of exciting, or producing the same disease from which it originated, by both laws of communication, and that *ad infinitum*; and under all circumstances of the weather; either summer or winter, or pure or impure air.

A third law of communication peculiar to all the *Contagions*, is, that they are capable of being excited, or re-produced by means of their *Fomites*, or the matter of contagion, as already observed; and which have been imbibed, and held suspended as it were,

in different articles of clothing, or bedding, and afterwards being brought in contact, or even the close approach, that is, to within the sphere of their influence, excite disease of the same character, with that of the *original contagion, and that too, ad infinitum.*

Dr. CULLEN, treating of the remote causes of fever, observes, "As fevers are so generally epidemic, it is probable, that some matter floating in the atmosphere, and applied to the bodies of men, ought to be considered as the remote causes of fevers; and these matters present in the atmosphere; and thus acting upon men, may be considered, either as *contagions*, that is, effluvia arising directly, or originally, from the body of a man, under a particular disease; and exciting the same kind of disease in the body, to whom they are applied; or *miasmata*, that is, effluvia arising from other substances than the bodies of men, producing a disease in the person, to whom they are applied."*

Fevers, as will be shewn in the next chapter, almost invariably originate from *infections*, by which, I mean original and primary fevers. The above paragraph will, therefore, apply only, (as it regards the contagious effluvia, arising from the bodies of men,) to the *exanthemata*; while those which arise in consequence of other substances, than the bodies of men, will properly apply to the *Pyrexia* and *Febres*, of his classification. In his LXXXII. paragraph, we perceive the subject yet more clearly, and distinctly defined: "With respect to these *contagions*, though we have spoken of them as matters floating in the atmosphere, it is proper to observe, that they are never found to act, but when they are near to the sources from which they arise, that is, either near to the bodies of men, from which they immediately issue, or near to some substance which, as having been near to the bodies of men, are imbued with their effluvia, and in which substances these effluvia are sometimes retained in an active state for a very long time.

* Practice of Physic, vol. 1, page 78.

“ The substances thus imbued with an active and infectious matter may be called *Fomites*, and it appears to me probable, that *contagions*, as they arise from *Fomites*, are more powerful, than as they arise immediately from the human body.”

The diseases that may be properly considered as constituting the *first class of contagions* have been arranged by Professor HOSACK as follows :

“ The *Itch*, the *Syphilis*, the *Sibbins* of Scotland, the *Laanda* of Africa, the *Yaws*, the *Leprosy*, *Hydrophobia* and the *Vaccine Virus*.”* To this class also I would add *Phthisis Pulmonalis*. Dr. RUSH, otherwise disposed to reject it, admits, that it is *contagious*, by means of the breath from patients, whose lungs are ulcerated, and by the hectic sweat becoming putrid, by stagnating in the sheets or blankets. Persons sleeping any length of time in the same bed with a patient in confirmed *Phthisis*, is almost sure to contract the disease. The contagions of these diseases, may be also, very properly termed *fixed* or *indolent*, since they have not the power of communicating disease by any other means, than *actual bodily contact*, or by means of their *Fomites* conveyed, or transported in clothing, or other substances, capable of absorbing and retaining the fluid, or matters thus secreted, and holding them thus in an active state for a long time.

As a proof of this, it is well known that the *Itch* has been kept in circulation for years, along with the circulation of filthy ragged paper-money. It is frequently communicated by shaking hands, and by means of bed clothes, wearing apparel and especially gloves ; in all these cases, it has been communicated by *actual contact*, either personally or by means of some substances retaining the matter of the contagion (some say *animalculæ*.) But it has not, nor has any of the diseases of this class, ever been communicated through the medium of the atmosphere, and hence they are strictly and properly, fixed contagions.

* Letter to Dr. Chisholm, on Contagion,

The *Sibbens*, a term given in the west of Scotland to the venereal disease, and *Syphilis*, the term by which it is almost universally recognized in all other parts of the civilized world, are known to be communicated from diseased children to the nipples, and breasts of nurses, and again, from diseased nurses to sucking infants. It may be also contracted by using the same bed-vessel, recently occupied by a diseased person. And here, it is to be particularly remarked, that to be communicated this way, the *virus* is supposed to be deposited on, or near the edges of the bed vessel, which being shortly after occupied by another person, the thinly defended parts, which sometimes come in contact with the matter thus deposited, take it up, and being absorbed, the disease is readily excited. It is also more readily communicated in the form of *Chancres*, seated on the lips, by kissing, &c.

With regard to the *Laanda* of Africa, and the *Yaws*, I am not qualified, from any remarks in my possession, to say any thing specific: but from a close investigation of the characters of those diseases which belong to the first class of *contagions*, there can be but little doubt, that they are among such, as were considered *unclean* among the ancients, and are probably nothing more than so many modifications of the *Leprosy* of the Jews, mentioned in the Holy Scriptures.

Authors distinguish between the *Leprosy* of the *Greeks* and that of the *Arabians*. The former is said to be more superficially seated than the latter, and produce little white *eschars*, like bran or fish scales all over the body. They are accompanied with intense itching, redness of the eyes, offensive breath, a swelling of the hands, fingers and feet; but sometimes universal.* The latter, or *Arabian leprosy* consists of a general *cachexy* and emaciation, in which the veins of the legs are varicose in their whole course, and one, or both legs, swell by degrees to a most enormous size, the skin being thickened, rough, scaly and chapped, resembling strongly the leg of an Ele-

* Shaw's Practice, part 4, sec. 19.

phant, from which circumstance the disease has been termed *Elephantiasis*; of which SAUVAGES describes from PROSPER ALPINUS, GILBERT and others, nine different species.*

Dr. DANCER has given us the history of a disease, that is common to the blacks, and sometimes even to the white inhabitants of the West-Indies, which is termed *Coco-Bay* or the *Joint Evil*; others term it the *Red Disease of Guiana*.† It is obvious, from the symptoms of this disease as particularly described by Drs. HILARY and HEBERDEN, that it is one of the species of *Elephantiasis* described by PROSPER ALPINUS in the nosological arrangement of SAUVAGES.—This loathsome disease commences, “with copper coloured spots on the skin, and tuberculous swellings of the lobes of the ears, a falling off of the hairs of the eye brows, enlargement of the nostrils and lips, distortion of the fingers and toes, which ulcerate and drop off joint by joint.” It appears, that this disease also, is sometimes accompanied with tubercles, fissures, and ulcerations of the legs, which swell to a great size as in the true *Elephantiasis*. It is also common to *Africa*, the East as well as West-Indies, and to *Egypt*, where it is termed *Lævia*. It is considered highly contagious, and is also said to be hereditary. In some places, as at *Carthagene*,‡ the diseased are separated from the rest of the community, and are called *Lazars*. It is, however, principally hereditary in the male line; according to HUGHES, the children of leprous fathers being affected by it, while the mothers are perfectly free. The lasciviousness of these unhappy creatures, as related by SONINI and ULLOA, says Dr. DANCER, is shocking even to polluted ears.¶ From the foregoing view of *original and primary contagions*, it will appear, that the *Elephantiasis*, or Arabian leprosy, with all its species, as also the *Yaws* and *Syphilis* may be considered as forming the highest grade of *contagious or unclean diseases*; while

* Sauvages Nosolog. Meth. Tom. 2.

† Jamaica Pract. chap. 9, page 232.

‡ Ulloa's Voyages and Captain Riley's Narrative, page 191.

¶ Jamaica Pract. chap. 9. page 233.

scabies, *tinea capitis*, the *leprosy of the Greeks*, the *cracraw* of the Africans, *tetters* and the *itch*, as forming the lowest grade of indolent and fixed contagions, and come very properly within the denomination of the *unclean diseases* spoken of in the scriptures.

The second class of *contagious diseases*, according to Dr. HOSACK, in his division of contagions and infections, are as follows: *small pox*, *measles*, *chicken pox*, *influenza*, *whooping cough*, *scarlet fever*, and *cynanche maligna*. For reasons which I shall shortly assign, I propose to separate the *influenza* from *contagious*, and place it among the *infectious diseases*.

To this class of contagions, I have for some years had my doubts, whether to add the *plague*, or *pestis* of Europe, believing it to be an infectious rather than a contagious disease. From the perusal of Dr. DUCACHET's learned essay on the action of poisons,* the following facts appear so conclusive, that they have occasioned me some doubts with regard to the correctness of my former opinion, "that *plague* may be produced by inoculation with the matter of a pestilential bubo, is a fact, he says, established by evidence, which cannot be resisted. And that the bile and the blood, will also communicate the disease, rests on testimony equally sure, Dr. DESCENNETES distinctly and unequivocally declared in a personal interview with Dr. FRANCIS, his conviction of the contagious nature of the *plague*: and Sir GILBERT BLANE, and Sir JAMES M'GREGOR, have assured him, that the accuracy of the statement of Dr. WHYTE's inoculation and consequent death, might implicitly be depended upon."

Upon this authority, therefore, but at the same time with the most respectful deference to the opinion of Professor HOSACK, I have considered the *plague* or *pestis orientalis*, as proper to be referred to this second class of contagions.

There are certain animal poisons, that are considered by some physiologists as *contagions*; these are

* Inaugural Essay, &c. page 76.

“the poisonous humours that are produced from the “healthy action of the vessels, as those of the *rattle snake, viper and spider.*” If these are to be admitted as contagions, we see no reason why the poisons of all the venomous beasts, reptiles, fishes and insects, as also, the vegetable and mineral poisons, may not be added as so many *minor contagions* since it is certain, that every specific poison, has its peculiar or specific effect upon the animal economy.

Why I do not consider these poisons as proper to be classed among *contagions*, is, that neither of them, after having produced disease in the animal economy, are capable of reproducing a disease like to that which it produced by any of the known laws that govern the communication of contagions; for instance, if a rattle snake, a viper, or a spider inflict their wound in any animal, it is beyond controversy true, that the disease produced, in consequence of their poison in any such animal, is not, nor as far as I have been able to ascertain, cannot communicate the same specific disease to any other animal which may come in contact with the diseased, and hence they should be considered as they really are, nothing more than animal poisons.

I cannot, however, take leave of this subject, without saying something of the remarkable properties of certain snakes, and especially of the *crota-
lus horridus*, or rattle snake of America, in charming or fascinating squirrels, birds, &c. If this power is attempted to be denied, it would be calling in question the veracity of some of the most learned, and respectable persons who have asserted it. *Professor* ROBERT PATTERSON of the University of Pennsylvania, in his biographical notes on the Reverend and pious Dr. JOHN EWING, Provost of the University, observes, “Dr. EWING, has been heard to state a fact, which he witnessed at this period of his life, and which I cannot resist relating, since established by his character for veracity, it may shed some light on a question in natural history, hitherto involved in some obscurity. As he went to his school

“ one morning, at an early hour, he observed a bird
 “ in extreme agitation, flying repeatedly across the
 “ road, but never going beyond the fence, on either
 “ side, on which it constantly alighted; it would rest
 “ there for a moment, and then return to the opposite
 “ fence, always descending in its flight, until it near-
 “ ly touched the ground. Its agitation arrested his at-
 “ tention, and he stood to observe the cause. On
 “ the spot where it seemed disposed to alight, in its
 “ flight, he observed a snake, which had evidently
 “ fixed on its victim, and fascinated it beyond the
 “ power of escaping by its own efforts. He frighten-
 “ ed the snake away by throwing at it a stone; when
 “ the bird instantly flew off with evident symptoms
 “ of joy.”*

I have conversed with several gentlemen of known veracity, who have assured me that they have seen instances, in which this fascinating power influenced persons grown to maturity; and that they were found almost prostrate, and appeared to be in the act of attempting, (if the thing had been practicable) to crawl voluntarily into the mouths of the serpents.— Two of the cases related, were adults, and the third a boy of four years of age. And, indeed, I have heard so many well attested accounts of similar facts, during the twelve years that I practised in the interior of this state, that I am perfectly convinced of this property, and it only remains to be accounted for upon rational principles.

Sir HANS SLOANE is of opinion, that the snake first inflicts a wound in the animal, or bird, which he designs to ensnare.† But this opinion is erroneous, for it is well known that the rattle snake never bites any thing which he designs for food; but it is by the fascinating power, that they are enabled so to intoxicate small animals and birds, that they eventually crawl down the throats of these serpents, who all the while lay as quiet as possible, and with their hungry jaws wide extended for the reception of their prey.

* Ewing's Nat. Philos. by Dr. Patterson.

† See Wesley's Philosophy, vol. 1.

I believe, that it has been considered impossible, for these reptiles to bite any thing, without at the same time emitting their poison, which is contained in a bag at the root of the fangs, or hollow curved teeth, with which they inflict their wound, and which in the act of biting, being thus pressed upon, instantly ejects the poison.

Others are of the opinion, that there is a particular property in the eyes of these snakes, that on their fixing them on the eyes of any animal, or bird, they are immediately fascinated or charmed to their destruction. I have been lately informed by a learned friend, that it was the opinion of the late Professor BARTON, of Philadelphia, that the supposed charm was to be accounted for upon other principles; that the squirrels and birds, having their nests of young in the forks of trees, and instinctively knowing the enmity between the snakes and themselves, and fearful that their enemy might discover their nests, and thus destroy their young, become extremely agitated, and fly from side to side, but without leaving the immediate vicinity of their nests, in hopes of arresting the attention of the serpent, and drawing him off to another direction; but that at length being wearied out with fatigue, they flutter and fall into his power, and are thus destroyed.

While I acknowledge the ingenuity of this supposition, I cannot assent to the principle, and I shall endeavour to account for this wonderful property in snakes, by producing a power somewhat analogous; together with the certain causes of that power in the uses to which it has been obviously applied.

The amazing powers of the *Gymnotus*, or Guiana eel, otherwise called the *Torpedo*, as related by Drs. GARDEN and PRIESTLY, leaves us no room for doubt, but that they actually possess the power of shocking men at the distance of fifteen feet, with a strong electric shock. And the former gentleman states, "that he was told that some of these fish, or eels in the Surinam river, were upwards of twelve feet long, and that the stroke or shock of these produced *instant death.*"

From certain experiments, in which I was engaged in the year 1790, on the *Guiana eel*, it was clearly proved that the powers it possessed, were truly and positively electric. I received repeated shocks from it, some as high as the elbow, and with the same sensation as the shocks from an electric director. In forming the electric circle with five or six persons, the shock passed through every individual at the same instant: on touching the eel with a metallic instrument held in the hand, the shock was so severe as to stun for a moment;—from these experiments, I was convinced of the identity of this power, with that of the electric fluid.*

The peculiar property, or electric power of the *Guiana eel*, may be very properly considered as appropriated to its defence; and also as a mean in enabling it to provide sustenance, since, from all the effects that I have witnessed in its exercise of this power, they have invariably resulted in favour of the foregoing conclusion. Larger fishes, that might otherwise make a prey of these eels, are thus prevented from approaching near the limits of its influence; and are perhaps so stunned, as to incapacitate them from injuring these eels, while smaller fish are almost instantly killed by the slightest motion of the eel, and are thence drawn into their mouths for food, as I have witnessed many times, with the one before-mentioned: and this I give as the *only known cause* sufficient to explain the phenomenon of this power in the eels.

And by parity of reasoning, I would attempt to prove the peculiar property or powers of fascination, as it is called of snakes, to consist of a certain effluvia, which it emits at pleasure, and which possesses the power of stupefying the smaller, and sometimes even the larger animals; the former of which especially, becoming more and more intoxicated with the increasing effluvia, which the snake continues to emit, they are at length drawn into the vortex, or

* Since writing the above, I have seen that similar experiments have been made, and with the same results, by the celebrated Dr. Ewing, of Pennsylvania. Ewing's Natural Philosophy, page 69.

focus of the attracting effluvia, whose soporific property depriving them at last of the power of escaping, they fall into the mouths of their devouring adversary.

I acknowledge that this is mere hypothesis, and as liable to be erroneous as either of the foregoing; but when we consider what has been already advanced with regard to their not wounding any animal or thing designed for their food, I am encouraged to offer it as an opinion, that this power, termed fascinating, has been appropriated to snakes, as a mean for procuring them sustenance; and hence, I consider it as the *only known cause* sufficient to explain the phenomenon of that power.*

CHAPTER II.

OF INFECTIONS.

Before I enter into the definition of *Infections* and the laws that especially distinguish them from contagions, both as it regards their generation and communication, I shall attempt the explanation of an intermediate term, heretofore indiscriminately applied to both; and by thus previously establishing the sense in which these several terms are hereafter to be understood in this Essay; prevent the necessity of a needless repetition throughout.

Miasma is the Greek term for pollution, and hence, most Lexicographers; as also many distinguished practical writers, have applied it, to both contagions and infections. Thus, it is said, "to denote that contagious effluvia of pestilential diseases, by which they are communicated to persons at a distance."† Again, it has been used to "distinguish between

* Major Alexander Garden, a distinguished member of the Literary and Philosophical Society of South Carolina, a gentleman of deep research and of acknowledged talents; in a valuable paper on this subject, read before the Historical Society of New York, in September last; has advanced an opinion that tends to the confirmation of this hypothesis.

† Encyclopedia Britannica, Article Contagion.

“ that contagion, which is confined to the effluvia
 “ from the human body, when subject to disease, yet
 “ this contagion when it does not proceed immedi-
 “ ately from the body, but has been for sometime
 “ confined in clothes, is sometimes styled *miasma*.”*

Dr. CULLEN says,† “ we know with certainty only one
 “ species of *miasma*, which can be considered as the
 “ cause of fever; and from the universality of this,
 “ it may be doubted if there be any other,” and this
miasma as arising from “ marshes, or moist ground,
 acted upon by heat,” is considered by him as *marsh*
effluvia, to distinguish it from that, which arises from
 the human body in a diseased state; and which is,
 instead of *miasma*, properly termed *human effluvia*.

“ Another kind of *miasma*,” says the American Lex-
 icographer “ is putrid vegetable matter, and indeed
 “ every thing of this kind which appears in the form
 “ of air. *Miasma*, then, strictly speaking is an *aerial*
 “ *fluid*, combined with atmospherical air, and not
 “ dangerous except the air be loaded with it.”

With a view to render the distinction between con-
 tagions and infections less perplexing; and to affix to
 each of the terms used on these occasions, their se-
 veral definite meanings and applications; I have pre-
 fixed the following *Aphorisms* :

1. That particular exhalation from the bodies of
 diseased persons, by which the disease may be com-
 municated to persons coming within the sphere of its
 influence, in consequence of an atmosphere generat-
 ed by the particular morbid exhalation of the body
 thus diseased, is a *contagious miasma*.

2. The same exhalations, as also those fluids, or
 matters secreted by diseased bodies, and which have
 been imbibed in clothing, &c. and are thus capable
 of exciting and re-producing the same specific dis-
 ease, with that by which it was produced, should, ac-
 cording to Dr. CULLEN, be considered and called the
fomites of contagion,‡ as being produced by “ living

* Americ. Med. Lex. Article *Miasma*.

† Practice of Physic. Par LXXXIII.

‡ Cullen's Practice. Par LXXXII.

“vascular and secretory action upon the fluids they convey.”

3. That *miasma* or exhalation, produced by the decomposition of *vegetable substances*, during their *putrefactive process*, should be distinguished as *septic miasma* formerly termed *hydrogenic or marsh miasma*, and which is the primary cause of fevers, not malignant, and but merely infectious, from an infected atmosphere, such are the diseases of the first class of infections.

4. That which is produced by a combination of the third and fifth, as a *compound infection*. And as this partakes more or less of the *azotic miasma*, so will the modification of the diseases produced by it, be more or less *malignant*, and *vice versa*. These constitute the second class of infections.

5. That *miasma* or exhalation, which is produced by the decomposition of *animal substances*, during their *putrefactive process*, should be termed as it properly is, *azotic miasma*, and will be found to be the primary cause of malignant fevers, and hence constitute the third class of original and primary *infections*.

From these premises, I propose to draw the line of distinction between *contagions* and *infections* properly so called, and having, in the foregoing chapter, treated of the former, I shall now proceed to the consideration of the latter.

Infections are certain noxious effluvia, or *ærial fluids*, produced by the decomposition of either animal or vegetable substances, during their putrefactive process, or of both combined, as has been illustrated in the third, fourth and fifth aphorisms.

It will be readily perceived, that the distinction between *contagions* and *infections*, consists in the following particulars: The former are the product of “certain morbid humours or poisons, secreted from *organized living animal bodies* ;” and secondarily, by their *fomites*, or the matters of contagion; while the latter are universally the product of *dead animal or vegetable substances*, which let loose certain particles

or *ærial fluids*, while undergoing their putrid process, and being now attached to the atmospheric air, produces *infections* of various degrees of malignity, as noticed in the fourth aphorism.*

It may be proper to observe in this place, that the *contagions* of the first and second aphorism, invariably produce diseases of specific characters, whether communicated by contact or their fomites, for example, the effluvia arising from the secretions, or from the excrementitious matters of a *small pox* patient, will not produce *Yellow Fever*—but *small pox*. Neither will those of the *measles* produce *chicken pox*, but *measles*; so, neither will any of the original and primary infections, produce any or either of the contagious diseases; otherwise the doctrine of contagions, and its laws of generation and communication, by which it is governed would be at an end.

That a disease originally and primarily *infectious*, may, by concentrated effluvia, or by some peculiar causes super-added, become *contagious*, I am ready to admit, and it is upon this principle alone, that I have been at length induced to class the *plague* along with contagious diseases. For it is an old and well supported opinion, that it is produced by the same laws of generation as have been defined in the articles of infection; of which I shall proceed to say something, for the more perfect understanding of them; and having already defined their laws of generation, those of their communication will be now explained.

The infection which has been marked, as originating from *effluvia* or *miasma*, altogether vegetable, and constituting *the first class* of simple atmospherical infection, is productive only of that type of fever, termed an *intermittent*. The disease itself is not communicable by any of the laws that govern either

* Van Morn says the air found in sick chambers, is in part *Carbonic acid gas*, *azote*, *oxygen*, sometimes also *Ammoniacal gas*, and a peculiar emanation, which is the source of contagion. This seems to be a combination of *Hydrogen and carbonic acid gas*, holding in solution some part of the animal fluids. Dr. Trotter observes, that the smell of patients labouring under bad fevers, in the opinion of some, comes near to that of *sulphuretted hydrogen gas*.

contagions or infections; consequently we do not mean the disease to be an infectious one; but that the air is so far infected, or polluted, as to be capable of exciting, in persons predisposed, a disease of that specific character, either in the form of a *quotidian*, a *tertian*, or a *quartan*; but still retaining its type, as an intermittent.*

It has been considered necessary to say thus much on the subject of intermittents, in order to prepare the mind for the gradations in the class of fevers; and by which the doctrine of infections is more clearly understood. It will be necessary therefore, to advert to the actual origin and progress of this, as well as of those fevers of the foregoing class; such as they have almost invariably occurred for centuries past, and from the facts resulting from this investigation, the doctrine of infections, as distinct from contagions, will be clearly established.

In the interior of those countries where the population is thin, and the settlements scattered, there is but little animal putrefaction going on, and consequently the atmospherical air is seldom or never burdened with *azotic miasma*. But in consequence of the numerous river swamps, rice fields, mill ponds, and other stagnant waters, peculiar to low marshy countries, and the great mass of vegetable matters, that are annually deposited therein, the air is loaded with those exhalations which the summer heat extracts from them, by which an *infectious atmosphere* is generated, that is capable of exciting disease of a specific character, and that *ad infinitum*.

This infection as originating from *septic*, i. e. vegetable, or as it has been heretofore termed *marsh miasma*, independent of *azotic miasma*, or *animal effluvia*, is acknowledged on all hands,† to be productive of fevers of the intermittent type; and this infection, by the accession of other noxious powers, produces fevers of the *remittent* or *continued* form, in

* Essay on the Prevailing Fever of 1817, page 95.

† Cullen's Pract. Par LXXXIV. Amer. Med. Lex. Article *Miasma*. So also, Bertholine Sylvius, Celsus, Prosper Alpinius, and others.

some one or more of the modifications peculiar to them.

The progress of this fever is to be traced as follows: The persons particularly exposed to the influence of this infection, are most commonly seized with an intermittent, sometime in August, or from that to November, and if there be no further accession of any noxious exciting power, it runs its course either as a *quotidian*, *tertian* or *quartan*, but always retaining its type of an intermittent. But if to this primary infection, there is superadded some other noxious power, or also, as is very frequently the case, the patient be particularly predisposed to disease, the infection or vegetable miasma, now acting upon a living animal body, some of whose secretions are noxious, that is, *azotic*, the union or combination of the simple, original and primary *gas* or effluvia, with the noxious matters of the system, approximates more and more to the second order of infections, and thus an original and primary *intermittent* is changed to a *remittent*, or else to a *continued fever*. And if to this, there be also present an excessive hot or excessive moist season, with little or no lightning and thunder, the fever puts on the nervous livery, and is then the *typhus mitior* of Dr. CULLEN.

That the foregoing doctrine is something more than a bare hypothesis, the experience of most, if not all practical writers will substantiate. For it is an incontrovertible fact, with regard to these fevers, *that in proportion as the noxious matters which produce them, are lessened by the remedies, or means used for their expulsion, continued fevers are changed to remittents, and by the further expulsion of them remittents are changed or reduced to intermittents, or else the disease is altogether removed.*

There can be no doubt, that by an accumulation of *azotic miasma*, combined along with the *septic*, as is invariably the case in large maritime cities, within and near the tropics, an *infection* of higher grade is produced, and which is capable of exciting disease of greater duration and violence, and this infection

I term *compound*, as being formed of the union or combination of the two *gases* or *miasmas*, and from which union a *specific gaseous poison* (perhaps *ammoniacal gas*) is the result.

This infection, which I rank in the second class, is found to exist at all times within the limits of large and populous towns, particularly maritime cities, as before mentioned, but is active only, under a particular constitution of the atmosphere;* that is in excessive hot or moist weather. It is then capable of exciting actual disease, and more readily in strangers and children, than in adult natives. In common years, such as are not remarkable for an unusual degree of heat or moisture, and in which the air is kept elastic, by frequent concussions of thunder and lightning, the modification of the disease commonly excited by this infection, is the common autumnal remittent, and in proportion as this disease has been excited by an atmosphere, more or less charged with the *gaseous poison* or infection, and in proportion also, as the persons thus diseased are more or less assimilated or naturalized to the climate, the disease is also more or less violent, and in its worst state becomes what has been generally termed with us the *Yellow Fever*, the *typhus icterodes* of Dr. CULLEN, or *Pestes occidentalis vel tropicum* of Doctor HOSACK, and which I shall distinguish as the *typhus endemia*, or STRANGERS FEVER of South Carolina.

The law which governs the third class of infections, and which forms another distinguishing feature in the difference between them and contagions, is, that they are communicable, "*only through the medium of an impure atmosphere;*" and then, very rarely to any, except persons particularly predisposed to disease.— For, as Professor HOSACK has observed† "*in a pure*
 " air, in large and well ventilated apartments, when
 " the dress of the patients is frequently changed, all
 " excrementitious discharges are immediately remov-
 " ed, and attention paid to cleanliness in general;

* See the Syllabus at the end of this chapter.

† Letter to Dr. Chisholm.

“ these diseases are not communicated, or very rarely so, from one to another.”

To this class of infections, I am disposed to refer those modifications of disease, that form the *typhus gravior* of Dr. CULLEN. The fevers that have been variously termed *gaol*, *ship*, *hospital* and *camp fevers*, appear to me to be no other than the same fever, differently named, in consequence of originating either in crowded *gaols*, *ships*, *hospitals*, &c. In which situations the infection is more highly concentrated, and in which a proper regard to cleanliness, from particular circumstances may be rendered impracticable.— To this class, also, is referred one of the *profluvia* of Dr. CULLEN, the *dysentery*, which, according to Dr. LIND, almost always, either precedes, or else accompanies, or follows the fevers of this class; and generally the climates and circumstances that especially favour the generation of this type of fevers, are also favourable to the generation of dysentery, which is likewise more or less malignant, as the causes are more or less concentrated.

There is yet another disease, which does not come properly within the definition of either of the laws of generation or communication heretofore noticed;— it is, notwithstanding, evidently produced by an infection of a very specific character,* and as such establishes a *fourth class* in the genera of infections.— This disease has been termed by some writers, *catarrhus contagiosa*, and by others *catarrhus epidemica*; it is undoubtedly, the widest spreading epidemic ever known; for as Drs. CULLEN and RUSH,† have observed, “ it has seldom appeared in any part of a country, without appearing, successively, in every different part of it. Indeed, it has extended itself from Europe to America, North and South, including the

* Dr. Hosack classes it along with contagions, and Dr. Bardsley, Physician to the Manchester Infirmary, &c. in his account of the *epidemic catarrhal fever*, at Manchester, in 1802, also insists on its being an actual contagion; so also, does Mr. Tomlinson, who asserts that it is *highly contagious*; see *London Medical Phys. Journal*, vol. 9, p. 529-30.

† Cullen's *Prac. Pat.* MLXII. — Rush's *Med. Observ. and Enq.*

“ Western Isles; and it is believed, that in the years 1789 and 1807, its influence was felt over the whole world.”

It is said also to be a disease *sui-generis*, and is capable of blending itself along with almost every previously existing state of disease, which thence assumes various types and modifications, being at one time a *synocha*, at another a *synochus*, and at others a *typhus*: “ It very readily passes,” says Dr. CULLEN, “ into *pneumonia*, *peripneumonia* and *phthisis*,” and hence we may account for its being at one time a *typhoide pneumonia*, or cold plague, as it has been called; at another *malignant pleurisy*; sometimes a *febris rheumatica*, or true rheumatic fever,* sometimes a *typhus petechialis*, or spotted fever at others a head pleurisy,† and at other times in its original form, that of the *influenza*, or *catarrhus epidemica*.

Of the origin of this infection, I can say but little with any certainty; but that it is an universal one is past contradiction,‡ as it does not owe its origin to any of the laws generating contagions. That is, it does not depend on “ *the secretion of living animal bodies*,” neither on *azotic miasma*; it cannot be considered a contagion, and this is further proved from the circumstance of its extensive influence, which is exerted equally on the mountain as in the valley, and with as great fatality in the interior of any country, as on the sea coasts. Nor, on the other hand, am I disposed to admit that it is generated by marsh or *septic miasma*, but would rather trace it to a more probable source.

I am, therefore, disposed to hazard the opinion, that it originates in an excess of the *electric fluid* superoxygenizing the atmospheric air, and rendering it thus, too irritable for the healthy support of the system. It is thence too, very properly termed an *aerial or travelling infection*, the air alone being the medium of its communication, and that under all circum-

* Hooper on an Epidemical Disease of London.

† Dr. Milligan's Description of Carolina, page 63.

‡ London Medical and Phys. Journal. vol. 9, page 531.

stances, whether pure or impure, summer or winter, and wet or dry.*

This opinion will be found entitled to some weight, when it is considered that authors of the first eminence acknowledge, that there does exist at times, an inflammatory constitution of the atmosphere, and that, under very different circumstances of the weather. I have no doubt but that this state of the atmosphere is to be attributed to the excessive, or defective degrees of electrical influence on it, producing either *sthenic* or *asthenic* inflammation: For, says the learned BRYDONE,† “when an equal quantity is diffused through the air, and over the face of the earth, every thing continues calm and quiet; but, if by any accident, one part of matter has acquired a greater quantity than another, the most dreadful consequences ensue, before the equilibrium can be restored.”

That one portion of the atmospherical air sometimes possesses greater proportions of the electric fluid, than some other portions, is certain, and consequently one portion has it in excess, while the other portion is deficient, and the equilibrium in both is deranged; under these circumstances, it is possible that the particular infection of the *influenza* may originate in that portion in excess; and thus exciting the *sthenic* state of disease, which is proper to it in its original form; but which, in its progress, meeting with other previously existing diseases, unites itself to them, and becomes an *asthenia*, as in *typhoide pneumonia*, or *malignant pleurisy*, (*typhus petechialis*) &c.

Having thus gone through the catalogue of diseases that have been considered as *contagious* and *infectious*: I shall, here, offer a brief review of the most prominent features of the foregoing chapters, and conclude this, with a Syllabus, from which may be formed a genera or classification of them, in the order they have been presented.

* London Medical and Phys. Journal. vol. XI. page 82.

† Tour through Sicily and Malta, page 98.

SYLLABUS.

Distinguishing Characters

OF CONTAGIONS AND OF INFECTIONS.

Contagions are to be distinguished from Infections,

- 1st.—In being the product of LIVING ANIMAL BODIES.
- 2d.—By being a secreted fluid, or other matter, capable of re-producing the same specific disease.
- 3d.—In being communicable only by CONTACT, or by the close approach of persons; and by the absorption of the matter, or *fomites* of contagion.
- 4th.—And that under all circumstances of the weather, whether a pure or impure atmosphere, wet or dry, hot or cold, &c.

Infections are to be distinguished from Contagions,

- 1st.—In being the product of DEAD ORGANIZED BODIES, animal or vegetable, or of both combined.
- 2d.—By being *erial fluids* or *gases* evolved or disengaged from the foregoing, during their decomposition.
- 3d.—And are in general only communicable through the medium of an impure atmosphere; *i. e.* the atmosphere which supports them.
- 4th.—Or, they are the product of an inflammatory constitution of the atmosphere, and thence universal.

From all which, it will appear, that the following facts may serve as data, that may lead to the establishment of a *doctrine of infections*, founded on *electrical or atmospherical influences*, as derived from the actual occurrence of those facts, together with the modifications of the prevailing diseases, obviously depending upon the peculiar state of the weather, and collected from the medical history and annual meteorological observations for South-Carolina, as conclusive evidence in support of this doctrine, which I have arranged as follows:

1st. In *excessive hot and dry summers*, in which there is much *thunder and lightning*, the humidity of the atmosphere being dissipated, or rarified by the *electrical influence purifying the air*. The atmosphere does not support the *gaseous poison*, in a degree of strength or activity capable of producing *yellow fever infection*. Hence, the prevailing diseases of such seasons are almost invariably, common intermittents, mild intermittents, mild typhus (*typhus mitior*) with simple continued fevers.

2d. In *excessive hot and dry summers*, in which there is *little or no thunder and lightning*, the influence of the *gaseous poison* and type, or modification of prevailing diseases, depend wholly upon the greater or less degree of heat. If the heat exceed 96° in unusual dry seasons, the humidity of the atmosphere being dissipated by the excess of the heat, the *gaseous poison* being deprived of its necessary quantity of *hydrogen*, is not sufficiently active to excite *yellow fever*.* But if the heat is below 80° the *infection* or *gaseous poison*, retaining its full proportion of *hydrogen*, is then capable of exciting *sporadic yellow fever*, in proportion to the greater or less degree of heat, and the prevailing diseases of the season will be, obstinate remittents, *synocha*, or continued fevers, *causus*, *typhus endemia*, &c.

The year 1818, is a proof of the foregoing observation, as we had no epidemic yellow fever; the season was excessively hot and dry; the thermometer varied from 78° to 94° *Fahrenheit*; in the four months of June, July, August and September; there was a fall of only $11^{\text{in.}} 0^{\text{qr.}} 6\frac{1}{10}$ of rain; and in three of those months we had thunder and lightning, *twenty-one days*; in some of which, the concussions were very severe.—It is remarkable, that in the meteorological table of Philadelphia, for the year 1793, there was but one shock of thunder noticed during the whole summer season, viz. on the 6th of July, and only fifteen days of rain from that to the 31st of October; thermometer 67° to 91° .

3d. In *excessive hot and moist summers*, in which there is *little or no thunder and lightning*; the humidity of the atmosphere being increased, and there being little or no electrical influence present in the atmosphere, the *gaseous poison* is then capable of exciting its utmost influence, and the prevailing diseases,

* It is acknowledged, that an excessive degree of heat without the existence of an *electric equilibrium*, may, and does sometimes, put a stop to the violence of infections and infectious diseases. But this does not go to disprove the foregoing statement of facts; that the active influence of the *gaseous poison*, depends on a particular, perhaps specific degree of heat and moisture combined; or of moisture alone, and in either case, that its active influence is immediately arrested by *thunder and lightning, cold or frost*.

typhus endemia and *gravior*, are more extensive and more fatal than in other states of the weather, as occurred in the years 1732, 1739, 1745, 1748, 1793, 1799, 1809, and 1817.

4th. In *excessive hot and moist summers*, in which there is *much thunder and lightning*; although the extreme humidity of the atmosphere is favourable to the support of the *gaseous poison* or *yellow fever infection*, still, in consequence of the existence of the electrical influence in sufficient quantity to purify the air, the infection is prevented from the exercise of its influence on the animal health, as observed in the Essay on the Prevailing Fever of 1817, pages 92, 101, 104, &c. And the diseases of such seasons, are generally mild intermittents, remittents and catarrhal fevers. From which circumstance, I have attempted the formation of the following genera or classification of contagious and infectious diseases, in which, Professor HOSACK'S classification has been mostly adopted:—

GENERA ;

Or, Classification of Contagions and Infections.

CONTAGIONS.

CLASS I.

FIXED OR INDOLENT CONTAGIONS.

- ORD : I. TUBERCULA.
 Gen. Elephantiasis.
 Spec. 1. Framboesia.
 " 2. Coco-bay.
- ORD : II. SQUAMÆ.
 Gen. 1. Lepra.
 Gen. 2. Psora, etc.
- ORD : III. VITIA.
 Gen. Syphilis.
 Spec. 1. Chancres.
 " 2. Sibbens, }
 " 3. Laanda, }²
- ORD : IV. SPASMI.
 Gen. Hydrophobia.
 Spec. a rabies.
- ORD : V. PHLEGMASIÆ.
 Gen. 1 Urethritis.
 Gen. 2. Cynanche.
 Spec. " maligna
 Gen. 3. Pertussis.
 Gen. 4. Phthisis.
 Spec. " pulmonalis.
- ORD : VI. VESICULÆ.
 Gen. Vaccinia.

CLASS II.

VOLATILE ACTIVE CONTAGIONS.

- ORD : I. PUSTULÆ.
 Gen. Variola.
- ORD : II. VESICULÆ.
 Gen. Varicella.
- ORD : III. EXANTHEMATA.
 Gen. 1. Pestis.
 Spec. " orientalis.
 Gen. 2. Rubeola.

INFECTIONS.

CLASS I.

SIMPLE ATMOSPHERICAL INFECTIONS.

- Or, that which is the effect of an atmosphere charged with simple SEPTIC MIASMA (vegetable effluvia.)*
- ORD : I. INTERMITTENTES:
 Gen. 1. Quotidana.
 " 2. Tertiana.
 " 3. Quartana.
- ORD : II. REMITTENTES.
 Gen. Remittens.
 var. " biliosa;
- ORD : III. CONTINUÆ.
 Gen. 1. Synocha.
 var. a—Synochula.
 b—Synochoides.
 Gen. 2. Typhus vel Synochus.
 Spec. " mitior.

CLASS II.

COMPOUND INFECTION ;

Or, that which is the effect of the SEPTIC MIASMA, combined with AZOTIC.

- Continuation of ORD : III. Class I.
 Gen. Typhus.
 Spec. " Endemia vel Icterodes
 vel Pestis Occidentalis.

CLASS III.

ORIGINAL AND PRIMARY INFECTION ;

Or, that which is produced by AZOTIC MIASMA (animal effluvia.)

- Continuation of ORD : III. Class I.
 Gen. 1. Typhus.
 Spec. Gravior vel Maligna.
 var. a—Gaol, b—Ship,
 c—Camp or Lake Fever.
 Gen. 1. Dysenteria.

CLASS IV.

GENERAL OR UNIVERSAL INFECTION ;

Or, that which is produced by an inflammatory constitution of the atmosphere, without regard to either of the MIASMATA.

- ORD : PHLEGMASIA.
 Gen. 1. Catarrhus.
 Spec. " Epidemica.
 Gen. 2. Typhoide Pneumonia.

CHAPTER III.

Practical Remarks and Observations, on the Origin of Contagions and Infections.

THERE is not, perhaps, a portion of the habitable globe, that has been cultivated by man, which has not been at one time or other visited by contagions or infections. Some countries are remarkable for their particular contagions, that have almost invariably originated in them, insomuch as to cause them to be considered altogether national or *indigènous*.

When we consider the *leprosy* of the Arabians, the *frambæsia* of Africa; the *plague* of Æthiopia and Egypt, and the *yellow fever* of America, and that they have been distinguished for many ages, in those several parts of the world, to which they have been transmitted, by the same general character, and as Dr. CULLEN observes, are found "to differ only in circumstances that may be imputed to season, climate, and other external causes," we are compelled to acknowledge their *specific characters*, and to admit the laws of their origin; as also the laws of communication, by which they are respectively governed, and conclude, that they are the effect of a morbid action of the system, or of the peculiar constitution of the atmosphere, which I term the *local peculiarity* of the place.

From the specific characters, and the established laws of the generation and communication of contagions and infections, we are enabled to trace them in some measure, to certain limits peculiar to each, particularly contagions, whose secreted matters are at once obvious, and hence capable of being analyzed; and although *infections* are *ærial fluids*, or *gases*, which, from their subtilty or volatility, are scarcely ever to be detected by observation, even with the most correct *eudiometer*, still their existence, their properties, and their laws, have been proved by their

influence and effects on the animal economy, inso-much as to justify the foregoing hypothesis, which at length becomes an established law.*

The *plague*, which has been considered as the most malignant, and most extensively fatal pestilence that ever occurred in the world, in form of disease, is proved, notwithstanding, to be confined to certain limits; that is, it is only contagious from actual *contact*, or by means of its *fomites*,† and may “be avoided by a few simple rules. These consist in keeping beyond the sphere of infection, or contact of any clothes that has been within the sphere.”‡ It is proved by innumerable testimonies, to originate from the same sources that produce other malignant fevers; and but for the circumstance of its being communicated by inoculation, and also by means of its *fomites*, it, in other respects, would appear to have been more properly classed along with the *infections*.

The sources of all pestilential or malignant diseases, have been found to proceed from one or more of the following causes: moisture, stagnant waters, animal or vegetable putrefaction, unwholesome air, food and drink. Dr. THORNTON, in his medical extracts, observes, that GALEN,§ considers putrid fevers to arise from the corruption of dead bodies after a battle; and this opinion appears to have been confirmed by all practical writers since. ||FORESTUS, says, he was an eye witness to a distemper of this kind, which he calls a plague, being attended with buboes, and a high degree of contagion; and which he observes, was owing to the same cause, and Captain RILEY in his narrative, says, that the late plague which broke out in the Moorish dominions, originated from the putrefaction of the swarms of locusts, which had perished

* Modern Philosophy has amply proved, “every particle of matter to be enveloped in its own proper atmosphere; and that it is endued with the capacity of exerting or extending it, according to the particular circumstances in which it is situated. This capacity is called elasticity, and is prodigious in the *ariforme* state of matter.” And this is abundantly exemplified in the matters of contagion and the gaseous form of infections.

† American Medical Lexicon, Article, Miasma.

‡ Thornton's Med. Extr. vol. IV. p. 376.

§ Epit Galen de Feb. Differ. lib. i. chap. IV.

|| Observat. lib. vi. Queser. XXVI.

in the Atlantic Ocean, and were afterwards cast on shore, all along the western coast, from Cape Spartel, to Mogadore.*

Dr. MEAD, in his mechanical account of poisons,† says, “and here it may not be amiss to take notice, that all authors do agree, one great cause of pestilential distempers, especially in armies and camps, to be dead bodies, lying exposed and rotting in the open air.”

With regard to heat, or heat and moisture, with stagnant waters, being the cause of malignant and putrid fevers, we have, independently of the historians of our times, only to turn to the pages of DIODORUS SICULUS,‡ on the plague of Syracuse, or that of Rome, by LIVY;§ those of Copenhagen, by BARTHOLINE;|| that of Leyden, by SYLVIVS (*de la Boe*;)¶ of Italy, by CELSUS;** and, to come nearer to the history of our own times, the remarks of Sir JOHN PRINGLE;††—Dr. LIND, on the diseases incidental to strangers in hot climates; Dr. CHISHOLM, on the *Bouilam fever*; together with those of Drs. CHALMERS, HEWITT, LINING, HARRIS and RAMSAY, all of whom afford us a chain of testimony, so strongly connected, that leaves us not the smallest doubt that heat, moisture, and stagnant waters, were the cause of those fevers above mentioned.

The testimonies in support of the opinion, that unwholesome food and water, are oft-times the cause of malignant fevers, are also many and respectable. FORESTUS imputes, the plague at *Delft* in the year 1557, to the eating of mouldy grain, that had been long kept up by the merchants, in the time of dearth,††† we are told, that the city of Surat, in the East-Indies, is seldom or never free from the plague; the chief of the natives being Banians, who neither eat flesh nor drink wine, but live very poorly upon herbs, rice, water, &c. This poor fare, together with

* Riley's Narrative, page 482.

† Bibliothec History, 44, XII. chap. XIV.

‡ Barthol. Hist. Anat. Kar. cent II. Hist. LVI.

§ Prax. Med. approved tract. X.

|| Med. Extracts, Vol. IV. p. 287.

† Essay V. page 178.

§ Tit. Liv. Anno U. C. 291.

** De Medicin, 461, chap. X.

†† Diseases of the Army,

the heat of the climate are considered as the cause of this fever;* we also find, from the reports of the boards of health in England, that “they all concur in ascribing this malignant and fatal distemper, which exists among the forlorn and wretched poor, to nasty chambers, bedding and clothing, to *bad food*, septic air, &c.”† and these, being sufficient to establish the doctrine of the origin of malignant and pestilential fevers; we will turn next to the consideration of those that are peculiar to certain situations in different parts of the world, and which are termed their proper *endemics*.

That there are certain countries to which certain specific diseases are peculiar, we have already seen; and that there are *certain sections* in every country throughout the world, in which also, certain diseases occur annually, as the proper *endemics* of these sections, remain to be proved. I have already hinted towards a *local peculiarity*, by which I mean the establishment of a term, which embraces the situation, climate and general constitution of the atmosphere, favourable to the origin and support of such diseases, independently of the constitutions, habits or manners of the inhabitants.

To establish the *local peculiarity* of these sections in the different parts of the world, it is only necessary to advert to those of any one country: for instance, the State of South-Carolina, as described by Dr. RAMSAY.‡ Thus, the diseases on the sea coast of any country, and particularly near the tropics, are materially different from those of the interior of the same country, (with the exception of contagious diseases, and some of the infections.) In the interior, we find the diseases milder than those of the sea coast, and those on the margins of swamps, canals, bays, ponds, and other stagnant waters, are again different from those of the high sand ridges, or pine barrens of the same district. As each of those sections enjoys an

* Mead on Poisons, Essay V.

† American Medical Lexicon, Article Pestilence.

‡ History of South-Carolina, Volume II. page 100.

atmosphere peculiar to itself, it is obvious that in proportion to the greater or less accumulation of *septic miasma*, evolved or disengaged from the putrid matters of the place and mixing with the air, so will the disease excited, be of greater or less violence, and of longer or shorter duration. And this is what I conceive to be the *local peculiarity* of different sections of the same country.

Those fevers that are the proper *endemics* of all low, flat, marshy countries, are observed to exist only under certain circumstances, as it regards the season of the year, and the state of the weather. If the weather is mild, they arrive only to that height which is distinguished as the first class of infections; but if the season is uncommonly hot or wet, they almost invariably assume their highest grade, and are distinguished as the second class. Dr. LIND, whose interesting work I have occasion frequently to refer to, remarks on the *Yellow Fever* of the West-Indies, “that heat, exercise, and intemperance in drinking, disposes to this fever in hot climates, but they do not produce it without the concurrence of a *remote cause*. This remote cause exists at all times in *some parts* of the island; but in other parts of the same island, where there are no marsh exhalation, the disease is unknown.”* Again, “the most unhealthy spots in the world, have in their neighbourhood, and often at no great distance from them, places which afford a secure retreat and protection from disease and death, as has already appeared in part, but will be more fully proved in the sequel. In a word, the diseases most fatal to strangers in every country, seems not to be confined to particular seasons, but even during those seasons, to certain places only.”†

“There is nothing,” says Dr. RUSH, “in the air of the West-Indies above other hot countries, which disposes it to produce *Yellow Fevers*; similar degrees of heat acting upon dead and moist vegetable matters, are capable of producing it, together

* Diseases Incidental, &c. page 164. † Ibid.

“ with all its different modifications in every part of
“ the world.”*

These *local peculiarities* are especially to be observed, by a close attention to the different grades as well as modifications of the disease, as it exists in a city. If it be Yellow Fever, (*typhus endemia*) we find, that while it assumes its highest grade in one part of the city, it will be found in other parts of the same city less favourable to its existence, in no other form than that of a *common remittent*. If we trace the causes of this difference to their source, we find, that although the same degrees of heat exist throughout the whole city, there is abundant more moisture in some parts of it, as also dwellings indifferently ventilated, damp vaults, cellars, &c. and, that it is in these situations, the fever originates; and that although sinks and drains are common to all parts of the city, some are much more filthy, and emit an effluvia tenfold more offensive than others, and hence the air of these situations contain the noxious exciting power, or *gaseous poison*, in a more concentrated form, than the air of those parts of the city that are higher, more dry and cleanly, whose buildings are more spacious and better ventilated, and which are more remote from the streets of animal and vegetable commerce.

Great effects are very often produced from small causes, and when it is considered, that it requires the conjoint aid of several causes to produce *Yellow Fever*, as it is called, it is probable, that by a proper attention to those causes respectively, or to such of them as come within the control of man, we may, in time, be enabled to have a remedy equivalent to all. It will be observed, that each existing cause exercises a power peculiar to itself, and that several of these powers acting one upon another, at length produces the infection, as for instance:

If an acre of vegetable matters is cut down, and placed in such situation, that they may be speedily dried by the heat of the sun, the exhalations from those vegetables are extensively diffused in the

* Med. Obs. and Enq. Vol. 2, page 199. 200.

air, and are not thus productive of an infection ; but if this quantity of vegetable matter is heaped in a body in its moist state, or is thrown into a shallow pond of water, it very soon begins to putrify, and the effluvia which it emits being confined to a small space, is highly infectious, and capable of exciting a disease peculiar to its specific powers. Here, we perceive, that it requires the action of moisture, as well as of heat, to produce this particular *gas* ; and which, without the addition of moisture, would be dissipated by the air, as fast as it was discharged from the vegetables in their exsiccation.

I shall conclude this chapter, with quoting what has been said on the subject of pestilence, in the American Medical Lexicon, by way of illustrating the foregoing remarks : “ an army or a city may be afflicted with pestilence, engendered from the nastiness of the inhabitants, accumulated in the receptacles of their offals and excrements, whether hid away in the rear of their lots, or left exposed in the streets and by-places ; a *gas* arises from those foul and corrupted forms of matter, which contaminates the neighbouring atmosphere, to the distance of perhaps a few feet, and perhaps to an extent of many rods, and excites in those who breathe it, more or less sickness.

“ Also, in private houses, pestilence may be produced, and sicken or destroy a single family, from some internal or local cause about the house, cellar, yard, or their appurtenances ; but is not commonly called a pestilence, unless it cuts off a great number at a time. A pestilence may arise from internal, as well as external causes ; corrupting meat for example used as food, may be exceedingly noxious to the stomach and intestines of those who feed upon it, and cause dysenteries, fluxes, and various symptoms of febrile diseases.” Again, “ the atmosphere of ships between decks, is generally very impure ; pestilential air or infection is produced there from human excretions, from corrupting provisions, and from decaying cargoes, in great quantity ; and then

“the inbred poison, and the distempers which the
 “poison produces, are preposterously said to be im-
 “ported from foreign countries.”* It is most earnestly
 recommended to those, who have the regulation and
 enforcing of the quarantine laws, to read with atten-
 tion, the 11th and concluding paragraphs, contained
 in the American Medical Lexicon, under the article
Lazaretto.

CHAPTER IV.

Hints toward the best means for preventing the spread- ing of Contagious and Infectious Diseases.

PREVIOUSLY to the advancement of the hints, on
 the means for preventing the spread of these states of
 disease, it may be necessary to premise a few parti-
 culars, with regard to them :

First : Although we are constrained to acknowledge,
 that some of the *contagions*, and most, if not all the
infections, originate from sources beyond human con-
 trol ; yet, it is possible to prevent their worst effects,
 by means that come within the reach of almost every
 individual.

Secondly : That as they are known to exist invari-
 ably, under certain occurring circumstances, and these
 circumstances always preceding some of the dis-
 eases, we are thereby favoured with a fore-knowledge,
 that may, if properly used, tend to the counteraction
 of the most dangerous effects of the *infection*.

Thirdly: As *infections* arise from a variety of causes,
 and each *infection* being capable of exciting a dis-
 ease, peculiar to itself, it is reasonable to conclude,
 that the combination of two or more, by forming a
 noxious power more concentrated, must be also ca-
 pable of exciting a disease of greater violence, than
 any *single, simple and original infection*.

* American Medical Lexicon, Article, Atmosphere.

Lastly : By lessening the power of any one or more of the causes producing *infection*, the effect of the remainders will be lessened in a relative proportion, so that the disease when excited, will be less violent, and consequently less fatal. For each *infection*, as we have already shewn, being limited by specific laws, are incapable of exerting their influence beyond those limits ; examples of which will be given shortly by way of illustration.

The causes that are productive of the highest class of *infection*, are found to consist of the following :—

1st. A *deficient electricity*, in the atmospherical air, and on the face of the earth, by which the four following are qualified to generate an *infectious atmosphere* of the highest degree, and which is then capable of exciting in persons predisposed, a fever of the highest grade.*

2d. *Animal putrefaction*, or the decomposition of animal substances, whether in bodies of men, or of beasts, putrid flesh or fish, or the offals of either ; next to these, we may add the effluvia of sinks and drains.

3d. *Vegetable putrefaction*, these being specific, require no farther description.

4th. *Heat*. A degree of heat equal to that of the healthy temperature of man, and even some degrees below it, is capable of generating an infectious atmosphere in all low marshy countries, by its action upon the superabundant humidity of the soil.—And

5th. *Moisture*. All low and marshy countries, presenting a surface, such as marks the first division, or *low country* of South-Carolina, “ continually intersected by multitudes of swamps, bays and low grounds, and having large reservoirs of water, and “ rice fields at particular times overflowed.”† And these operated upon by the summer and autumnal heat, is another source from whence infection originates.

* Essay on the Prevailing Fever of 1817, 2d edition, page 92.

† Governor Drayton's View of South-Carolina, page 17.

Dr. RAMSAY, after having designated the *medical divisions* of South-Carolina, as resulting from the natural qualities of the soil, informs us, that “art has done something, and might do much more for the improvement of the country. Every drop of superabounding, and at present injurious moisture that is therein, may be turned to some useful account. *When suffered to stagnate, it is a curse, when properly dispersed it is a blessing.*”* To the same purpose have most authors devoted many pages of their valuable works, from a firm conviction of the possibility of rendering the causes of disease less formidable, and thence, less fatal to the human family.

From a review of the distinct causes of *infections*; it will be readily perceived, that large populous cities, especially those of low marshy countries,† possess certain peculiarities, which necessarily, and from the very nature of their constructions and purposes generate, daily, a superabundance of noxious air; and which, with the assistance of heat and moisture at certain seasons, produces an *infection* of the second degree of violence; and to which, if there be superadded, a more highly concentrated effluvia, such as is generated in fields of battle, gaols, hospitals, ships or camps, greatly crowded, arises to the third or highest grade of malignity. These various causes may be, therefore, considered as constituting a *local peculiarity* in each district, or section of the country, differing in its *medical division* from another section of the same country or district; and in which, there does not exist an atmosphere capable of supporting the *infection*, that is an atmosphere containing its share of the electric fluid in such proportion as to support an equilibrium.

These latter afford a secure retreat in the sickly seasons; and hence, the first obvious means of escaping the baneful effects of an infected atmosphere, is to

* Ramsay's History of South-Carolina, vol. 2, p. 101.

† Constantinople, so famous for the plague, is situated on a neck of land, very much intersected with low grounds and ravines, which add much to the fermentation of moisture engendered in that narrow streeed city.—See the *Engraving of the city of Constantinople, in Tweddle's Remains*, 4vo.

remove from the sphere of its influence, to those sections, in which it does not, nor indeed cannot exist.

In common sea, islands that are not crowded with houses, the high ridges of lands between the rivers, and remote from river-swamps and bays are generally healthy, while the inhabitants of cities and settlements on the margins of swamps and bays, are generally sickly; these also point to a *local peculiarity*, as distinct from the former; and hence, the physicians of Charleston, generally recommend to strangers and persons not assimilated to the climate, a removal to *Sullivan's Island*, during the sickly months and until frost.

The good effects resulting from a prompt attention to this judicious advice, has been repeatedly and recently experienced by citizens, and especially by strangers.

But there are many families, as well as individuals whose occupations in life, and whose pecuniary circumstances prevent them from a participation of the advantages arising from the above advice; consequently some other means must of necessity be resorted to in their behalf. Those most appropriate may be classed as follows:

They should, at all times, but especially during the sickly season, avoid excessive labour or fatigue of any kind; they should also avoid night air and watching, exposure to the heat of the sun, or the dews, rains or fogs of the season, intemperance in either food or drink, sudden changes of diet, and all convivial assemblies; for, as Dr. RUSH observes, “a plentiful meal and a few *extra* glasses of wine, seldom failed of exciting the fever, but when the body was strongly impregnated with the contagion, even the smallest deviation from customary stimulus of diet, in respect to the quality or quantity, raised the contagion into action.”*

Citizens, in whom the infection lies dormant until called into action by some other exciting cause, should ever, in those seasons, consider themselves predisposed to the disease; and although from their

* Med. Obs. and Enquiry.

assimilation to the *local peculiarity* of the place, they are only predisposed to the disease in its common, or mild form, that of a *remittent fever*. There are instances in which, from irregularity in living, or inattention to the known rules for preserving health, citizens of long standing, have had this dormant infection roused into action, and thus exciting a disease of the highest grade. I have seen many instances, in which persons who reside part of the year on their plantations, and part in the city, have fallen victims to the injudicious and rash practice of visiting their plantations during the prevalence of the disease in the city, and often, only by sleeping out of town, for *one or two nights*.

Dr. LIND, in his Essay on the diseases of hot climates, remarks, that he has observed “ persons who
“ had quitted their vessels, while lying in the ports of
“ unhealthy countries, and slept on shore, that they
“ are almost invariably seized with the fatal diseases
“ that prevailed in those countries; while those who
“ remained on board, kept wholly free from any at-
“ tack of disease.”† I am aware, that many persons, will consider this latter precaution superfluous; but from a minute attention to the animal system, and to the relative influence of *infections*, they will discover sufficient reasons for being thus attentive to changes of situation, however trivial in their appearance.

The absolute necessity of a *renewal of pure vital air, at every inspiration*, for the heathy support of the system, is too well known to need a more particular description. Persons having breathed the air of any country, however unhealthy, for a period of ten years, may be considered as perfectly assimilated to the air of the climate; the system adapts itself readily to the changes, while those changes are slow, gradual and regular; and thus a native of *Finland*, by gradual assimilation, may become a healthy resident of *Africa* or the *Indies*.

But, if during the prevalence of a disease from an infectious atmosphere, and to which the citizens resident, have been naturalizing themselves for a given

* Lind on the Diseases of Hot Climates, part II. page 170.

time, change from the local peculiarity of the place, to that of another less noxious, say for one night only, it must be obvious, that they will have exhaled or discharged the noxious air, and inhaled the purer air of the place in its stead ; and now, after having taken in a full portion of this air, they again return to that which is *infected*, the consequence will be, that as they again discharge the air of the former situation, they receive an entire supply of the *infected atmosphere*, and in point of predisposition to disease, are placed upon a parallel with strangers.

Citizens, as well as strangers, may be convinced of this predisposition to contract the prevailing disease by one or more of the following symptoms: an unusual flow of spirits, together with an increase of strength and vigour, without any obvious cause ; or a depression of the spirits, with evident weakness ; frequent yawning and gaping, sneezing and stretching the arms ; an anxiety, uneasiness and restlessness ; head-ache, with pain in one or both eyes, sometimes the latter are watery, and the whites discoloured, either pink or red ; warm flushes, and cold chills, alternately come over them ; and to use the patients' own words, the latter resembles a current of cold air or water, rushing through their bodies, particularly along the spine. In some, there is nausea, with reaching to vomit, the tongue coated with white or ash coloured matters, inclining to brown or yellow ; in some, there is a loss of appetite and loathing of food, while in others the appetite is greatly increased ; in all, there appears to be a preternatural thirst, and a great desire to indulge in more than ordinary, of cooling acid drinks, and in most, there is an evident increase of the arterial action.

Dr. RUSH, in his account of the Yellow Fever, of 1793, at Philadelphia, says " it has been observed in the southern states of America, that in those seasons in which the common bilious fever is epidemic " *'no body is quite well,'* and that what are called in those states 'inward fevers,' (*Febricula*) are universal."—Page 83.

With such predisposition, it requires but little additional excitement to produce disease. A single act of intemperance, or a slight departure from the common line of health, will frequently rouse the dormant power of the *infection*, into disease; while, on the other hand, a strict attention to the cardinal rules for preserving health, with one or two doses of simple medicine, has in hundreds of instances, not only prevented the forming state of the disease, but has also removed every symptom of the predisposition.

Independent of my regular practice, in the season of 1817, I prescribed for upwards of one hundred and fifty persons, who laboured under a marked predisposition to the disease, and who called on me at my several hours of meal, throughout the sickly season. To many of these I distributed not more than four doses of medicine, and to many others but a single dose; and, as far as I have been able to trace those persons, I have not ascertained a single instance, in which they had occasion to use more than that already mentioned, as having been prescribed for them by way of prevention.

I have heard it observed, that it is a dangerous practice, to disturb the bile at this season of the year, and that, by taking nauseating medicine, the bile is actually disturbed, and the person is then more liable to be attacked with the fever than before.

To this opinion I perfectly assent, upon certain conditions: If the patient is a citizen of long standing, is labouring under nausea, retching, &c. I always conceive it necessary to prescribe a cathartic, along with three or four grains of tartar emetic, that is, if nothing contra-indicates the use of the latter. If a stranger labours under the same predisposition, I prescribe the same medicine; but if the disease is actually formed; or if not actually formed, there is nausea, or indications that the bile will be a troublesome symptom, either of the predisposition or of the disease, I conclude, also, that it were best not to disturb it; or at least not until it becomes a symptom of the dis-

ease ; but I have ever found it an important point, to keep it in subjection, and the bowels perfectly soluble, whether the patient be actually diseased, or only predisposed. And the manner of effecting this, is within the knowledge of every rational man.

Having hinted thus much to individuals towards the means of prevention, I shall next take leave, respectfully, to suggest such, as come more immediately within the province of the *city police* and *board of health* ; previously to which, I shall offer a brief view of the influence of *infections* in cities and countries, and the means by which they are accumulated, supported and concentrated, as they have occurred to my mind, from a close investigation of their origin and powers for many years.

In the interior, where the sources of infection are merely *heat, moisture* and *vegetable putrefaction*, the sickly months set in as early as *JUNE*, for the wide and extensive surface of humidity, acted upon by the intense rays of the summer sun ; this surface covered with the decaying leaves of the forests, and the herbage of the low grounds, the atmosphere becomes saturated with the *simple infection*, and *intermittent fevers* are invariably excited ;* here, however, they have to contend with a simple and solitary infection, for the exciting cause is of a general character, it is wholly and entirely *vegetable miasma*, (*septon*) and independent of *human effluvia*, (*azote*) and the influence of this *infection* may be readily conceived, by throwing a stone into a smooth pond of water, and conceiving the stone to be centre of influence, and each circle that is formed by the shock of the stone on the surface of the water, becomes less and less, as they extend farther from the centre, till its influence is no longer seen—such indeed are the limits of all the infections, though some are more extensive than some others, as will be shewn.

* I have been informed, that a learned Practitioner of the north suggested the idea, that intermittents originated from wet or damp feet and ancles ; that on instituting an enquiry, it was found, that among those persons who wore worsted stockings and leather boots, summer and winter, there had not been known an instance of this fever for several years.

But in cities, we have sources of infection almost numberless; to the heat and moisture, we have, it is true, less vegetable but infinitely more animal effluvi — we have it in all its stages, green, ripe and rotten. If we compare the atmosphere of the city to a smooth pond of water, and every cause capable of exciting an infection to as many stones, we may conceive a resemblance of the mixed or compound infection, by a handful of these stones thrown at the same time, and at small distances from each other, into a pond, there would indeed be circles proper to each distinct stone, and these circles running into each other, will form an unequal and irregular circle to the whole, and this may serve to represent the difference between the first class of original and primary infection of the country, to the compound infection of the city, or the more concentrated form of the infection of camps, gaols, hospitals, ships, and other crowded and uncleanly situations, in all parts of the world.

Among the multiplied causes of infection in cities, it must be admitted, that the innumerable sinks and drains, if not the primary, are assuredly the secondary causes, and qualify the atmosphere to support, for a longer time, than it otherwise would, the stamina of the infection, by communicating almost hourly fresh supplies of their effluvia, and that this is the case, may be readily perceived, when we take notice, that the infection, which is productive of the peculiar disease of the city, does not extend its influence to more than half a mile without its limits. The drains, it must be acknowledged, were sunk through the city, to prevent the accumulation of moisture, and other exciting causes of disease, and as long as they are kept clean, answer a very valuable purpose—that they are otherwise than clean, especially during the sickly season, is not to be attributed to the neglect of our police, who are indefatigable in their exertions, and in the performance of their duties; but to those thoughtless and lazy individuals, who wink at the duplicity of their servants and others, that are in the filthy habit of secretly depositing the offals of fish,

fowl and the smaller animals, into the drains, and sometimes into their sinks or sewers.

I am perfectly satisfied, that on this subject, I am not alone; many citizens, particularly those that have been observant of the state of the city at different seasons of the year, have frequently, and especially in the latter parts of the evening, on passing certain drains, been almost overwhelmed with the stench, that has issued forth from some of the grates; this circumstance has frequently occurred, in particular sections of the city, particularly from Church-street to the bay, with the intersecting alleys; and I am warranted in saying, that in nine seasons of ten, the prevailing fever has originated within the limits of that section of the city.

From the beginning of June, in every year, and until frost, a daily inspection of the ware-houses, stores and cellars, in which are deposited grain, or vegetables of any kind, should be rigidly attended to, and all matters capable of generating, or sustaining the *infection*, should be removed. For we have respectable authority to support our opinion, that apparently trifling causes have led to the most serious and extensive fatality in cities. Dr. ROGERS relates an instance of a malignant fever occasioned by the *effluvia of putrid cabbages*.* Dr. RUSH, traced the origin of the most fatal disease, that ever afflicted the inhabitants of Philadelphia, (the Yellow Fever of 1793,) to a cargo of *damaged coffee* thrown upon the wharf.† And, in a communication to the public on this subject, says, “it is no new thing for the effluvia of *putrid vegetables* to produce malignant fevers, cabbages, onions, black pepper, and even the mild potatoe, when in a state of *putrefaction*, have all been the remote causes of malignant fevers.”

Owners of wharves and lots of low ground in the city, should be prohibited from raising mud to fill up their wharves, during any of the summer months; but more especially those persons who are in the ha-

* Rogers on Epidemic Diseases, page 41.

† Medical Obs. and Enq.

bit of filling up low lots with filth and rubbish collected in the yards and streets of the city. It is also a matter of notoriety, that the scavenger's carts convey, daily, to particular low spots in the city, but more generally the skirts thereof, promiscuous heaps of dead animal and vegetable matters, which, being deposited in heaps, become sources of infection; and greatly add to the general exciting cause of disease.

In directing the attention of the police, to the importance of filling up all low lands, within the limits of the city, it is obvious, that dry and wholesome materials are intended, and not the rakings and scraping of the streets and yards. I would suggest the immense advantage, of encouraging vessels to bring in dry sand and gravel as ballast, which might be purchased for the purpose of filling up all those situations, heretofore the sources of *infection*, near the bay; and, with regard to the trash of the streets, I would advise the selection of several high sandy eminences in or near the city, in which large pits should be dug at least twenty feet square, and five or six deep; the dry sand and earth from these pits, should be conveyed to those parts of the city which require filling up, and the filth and rubbish of the streets conveyed to these pits, and these, when filled, to within three feet of the surface, should be covered over with the remaining sand or earth, originally thrown out of them. It may, indeed, be argued, that this would be attended with immense trouble and expense; but if the life of one individual should be saved by it, it would be more than an equivalent.

I come next to speak of the means which have been found successful in preventing the spread of both contagions and infections—And these are:

1st. *Cleanliness*.—It is unnecessary for the public authority to recommend, unless the individuals composing a community comply with the recommendation; clean streets, indeed, may tend to lessen the influence of *general infection*, but, while individuals, neglectful of the common interests of the community, suffer their enclosures to abound with filth, or their

common receptacles to remain unneutralized, *infection* will continue to exist, and its effects to be felt by many. By cleanliness, I would be understood, that not only the streets and drains should be kept clean, but also, the enclosures of individuals, and their houses, sinks and cellars. By the neglect of one individual, on these points, thousands may become the victims of disease and death. A quantity of damaged coffee, thrown on a wharf in Philadelphia, in 1793, together with the effluvia of damaged hides, and other putrid animal substances, has been assigned as the source of an infection, which swept off, in the short space of one hundred days, four thousand of the inhabitants.*

2d. *Neutralization*.—Infections being considered as *acids*; the practice of strewing *alkaline substances* over suspicious matters, has been attended with happy effects. The white washing of houses with lime, and the sprinkling unslacked lime into sinks and sewers, previous to and during the prevalence of disease, is an important practice, and ought not to be neglected. All low spots ought to be drained, and their surfaces covered with lime or ashes, or at least with dry sand.

For my own part, I am disposed to believe, that a prompt attention to the foregoing particulars, are among the most important that comes within the reach of man; as the means of prevention, I will, however, add a third, that appears still to have weight with some writers, I mean

3d. *Fumigation*.—The various fumes of *muriatic*, *nitric* and *sulphuric acids*—of *brimstone*, *tar*, &c. have been extolled by different authors, but we are informed by Dr. TROTTER, physician to the fleet of England, and Dr. MITCHELL of the University of New-York, “that nothing was effected or accomplished by the experiments made with these acids, which, evacuation of the infected places, ventilation, careful scrubbing with soap and water, and lime washing the

* Mr. Carey's Account of the Fever of Philadelphia.

“ walls, would not have effected equally well if not “ better.*” There are, however, certain advantages to be derived in *infected apartments*, both to the sick and attendants, by a most rigid attention to cleanliness, removing the bed vessels immediately, by sprinkling the floor with vinegar, and the bed clothes with camphorated vinegar; also, sprinkling vinegar on hot bricks, and burning sugar, with aromatic herbs on a chafing dish.

Fumigations, with the *muriatic* and *sulphuric acids*, have been strongly recommended by that very able chemist, GUYTON DE MORVEAU. He put into a chafing dish, covered with fine charcoal, a tubulated retort of green glass, filled with nine ounces of *muriate of soda*, or common salt, slightly moistened, with half an ounce or a little more of water; the fire being lighted, four ounces of *sulphuric acid* was poured on the diluted marine acid; the *muriatic acid gas* was immediately disengaged, and this, uniting with the *ammoniacal gas* of putrefaction, neutralizes it, prevents its injurious quality, and removes, at the same time, all its loathsome fetor.†

In the above proportions, however, the gas arising therefrom, would be too powerful for the respiration of the sick; and, with this consideration, the *Medical Society of Charleston*, very judiciously recommended to the citizens, a more simple and safe, and at the same time equally efficacious process, for obtaining this *gas*, in sufficient quantity in their dwellings or sick chambers; which, as nigh as I can recollect, was to place a saucer with about a table spoonful of common salt (*muriate of soda*) on a few coals, and then slowly and gradually to drop on the salt, about half a drachm, or a tea spoonful of (*sulphuric acid*) oil of vitriol; at the same time avoiding the fumes while they were arising. The experiments which Dr. CAR-MICHAEL SMITH, F. R. S. made with the vapours of different mineral acids, for the preventing and destroying contagion are certainly entitled to credit. These

* Amer. Med. Lexicon, also, Domestic Encyclopy. Article, contagions.

† Thornton's Med. Ext. vol. IV. page 387.

experiments resulted in a preference to the vapours from *nitrous acid*, arising from the decomposition of nitre, or salt petre, by the *sulphuric acid*, or oil of vitriol, which may be prepared in the same proportions and manner of the foregoing. To obtain any thing like an effectual advantage, these experiments should be general; each house-holder, by a proper and simultaneous attempt, producing this vapour throughout the city; the infectious quality of the atmospheric air, may be so neutralized as to arrest the further progress of the disease for the season. It is of but small importance that a family here, and another there, in different sections of the city, prepare these vapours, while ninety-nine families of the hundred neglect it. The thing to do good should be general; the expense is indeed of so trifling a nature, that it is placed within the power of almost every house-keeper to comply with it.

Fumigations with brimstone, cannot be attempted, in situations occupied by sick or others persons; they are strongly recommended by Dr. LIND, for infected houses, hospitals, and other places, that have been evacuated by the inhabitants, with a view to destroy the contagion that may remain in them. The burning of tar and firing guns, have been strongly recommended by many, and I confess I was among the number. I have since seen, that kindling large fires, and firing guns, were resorted to in Philadelphia in the fever of 1793, but it does not appear to have had the desired effect. And Dr. CHISHOLM, tells us that "the smell of smoke of coal and tar, which
" is commonly pungent and penetrating, had no effect
" as a preventive; for the *Hope*, of London, careen-
" ing in an infected port, and having her bottom paid
" with this bitumen, received the infection as exten-
" sively as the others."* Dr. RAMSAY attributes the spread of the *Small Pox* in this city, in the year 1760, to the smoking of the house in which it originated; the smoke being carried by an easterly wind, propa-

* Med. Ext. vol. IV. page 269.

gated the disease extensively westward, in the line of the smoke.*

When these facts are taken into consideration, together with the apathy that generally exists among those who are not the immediate sufferers by these calamities; conceiving, each for themselves, that it is time enough to use means of prevention, when the *infection* enters their own dwelling, the experiments are neglected, or delayed until the *infection* becomes general, and then, the means advised for prevention are considered either as inefficient, or that it is too late to answer the end. We have a proof of this apathy, in vaccine inoculation—how many are there who still reject this certain preventive of *Small-Pox*? I refer for answer to the numbers afflicted with that dreadful disease, during the year 1816–17.

Having discharged, what I consider my duty, in first defining what *contagions* and *infections* are; the laws by which they are governed, and the limits of their influence: As also such hints for the use of the probable means for preventing their most fatal spread among us, I must conclude this Essay, with the sincere hope that it may awaken the attention of each class of our citizens, to the adoption of those, most likely to arrest the progress of them, by a general exertion, in the commencement of the sickly season; and, that it may also induce some person of greater leisure and better qualification, to devise some more effectual means of prevention, upon principles such as are suggested, in the Medical History of South-Carolina, by the late Dr. DAVID RAMSAY.

* History of South-Carolina, vol. II. page 73.

AN INQUIRY

INTO

The Properties and Powers

OF THE

ELECTRIC FLUID,

AND,

ITS ARTIFICIAL APPLICATION TO MEDICAL USES.

BY J. L. E. W. SHECUT,

PRACTITIONER OF PHYSIC,

Member of the Literary and Philosophical Society of South-Carolina.

“ He made a decree for the Rain ; and a way for the Lightning
“ of the Thunder.....JOB xxvii. 26.

DEDICATION.

To STEPHEN ELLIOTT, Esq. President,

AND THE OFFICERS AND MEMBERS OF THE LITERARY AND
PHILOSOPHICAL SOCIETY OF SOUTH-CAROLINA.

GENTLEMEN,

I should consider myself an unprofitable servant, and unworthy of being classed among the Members of your learned and very respectable Society, if I had suffered the leisure moments of my life to have passed away, without having devoted a portion of them to the cultivation of Science—the avowed object of your association.

You will, therefore, accept this Essay, or “ Inquiry into the Properties and Powers of the Electric Fluid,” as an attempt to fulfil a small part of my duty to the Society; and, as a testimony of the respect, and very sincere regard I entertain for you, jointly and severally, with which I beg leave to subscribe myself,

Very respectfully,

Your Obedient Servant,

THE AUTHOR.

Charleston, November, 1818.

DEDICATION.

TO BENJAMIN R. GREENLAND, M.D.

DEAR SIR,

You will accept the following Sheets, as a tribute due to your friendship and zeal, in patronizing and promoting Science. And,

Permit me to hope, that your laudable exertions, (began at a period of life, too commonly devoted to pastime and trivial amusements) may increase with your years, and that both may be extended, for the benefit of mankind and your own. With these sentiments, founded in sincerity, I pray you to consider me,

Very respectfully,

Yours,

THE AUTHOR,

Charleston, November, 1818.

PREFACE.

THE doctrine of an *Electrical Equilibrium* in the atmosphere, and on the face of the earth, as necessary to the healthy state of all nature, but more especially so to the animal kingdom, influencing the various modifications of disease, as advanced in the first edition of my *Essay on the Yellow Fever of 1817*, owed its origin to the truly philosophical remarks of Mr. BRYDENE.*

The other authorities, which the author has had an opportunity of consulting on this important subject, he has every where, throughout the work, candidly and proudly acknowledged; and it was not until near two hundred pages of this volume (containing a second edition of that *Essay*) was printed, that he was informed a doctrine similar to his, had been advanced some time since, by Mr. NOAH WEBSTER, of Connecticut.

He thinks it incumbent upon him to declare, that he had never seen such a book, and consequently, that he had never read a line of Mr. WEBSTER'S, on electricity, when he published this doctrine to the world. He is not, therefore, either directly or indirectly indebted to that author for a single idea on the doctrine of *Electrical influence*, nor indeed for any other.

How far the doctrines advanced by that gentleman, may agree or disagree with that which is contained in this work, he is not at present able to decide. The objects of Mr. WEBSTER were doubtless both humane and honorable; and he deserves well of his country, as does every author, whose desires are to trace to their

* Tour through Sicily and Malta.

PREFACE,

sources the evils which afflict the human family, and discover the remedies for those evils.

As the public will now have a fair opportunity of examining the doctrines of both authors, I shall leave the subject as it is, until an opportunity occurs of reading Mr. WEBSTER'S work, which I have no doubt will afford me much satisfaction. In the mean time, I proceed to explain to my readers, what they are to understand by an *electrical equilibrium*, as it has been, and will be, frequently mentioned in these Essays, as a fundamental principle of my new doctrine.

I have high authority for asserting that the "Electric Fluid exists in all bodies, in a certain quantity which is natural to them, and is commonly called their natural quantity."* Whenever the atmosphere of any place has the quantity natural to it, the atmosphere of such place may be considered as being possessed of an *electrical equilibrium*, and this constitutes its healthy state.

I have also high authority for asserting, that all bodies may have at one time an excess, and at another time, a deficiency of the Electric Fluid, in which cases, they have either more or less than "their natural quantity," and consequently their equilibrium is either impaired or destroyed, and these states constitute the *plus* and *minus* electricity of the immortal Dr. FRANKLIN.

"When an equal quantity" of the Electric Fluid "is diffused through the air, and over the face of the earth, every thing continues calm and quiet, but if by any accident one part of matter has acquired a greater quantity than another, the most dreadful consequences ensue before the *equilibrium* can be restored, nature seems to fall into convulsions, and many of her works are destroyed, all the great phenomena are produced, thunder, lightning, earthquakes and whirlwinds."†

Whenever, therefore, the atmosphere of any city or country contains a greater quantity of the Electric Fluid, than its proper quantity or *equilibrium*, the consequence is an inflammatory, or *sthenic* constitution of such atmosphere, which favours the generation and extension of epidemic diseases, of an inflammatory type, such as the *Catarrhus Epidemica*, or *Epidemic Influenza*, &c. and so, on the other hand, if the atmosphere of any place contains a less quantity of electricity than that which is natural to it, the

* Professor Ewing of Philadelphia.

† Brydone's tour through Sicily and Malta, page 98.

PREFACE.

consequence is, that an *asthenic* constitution of the atmosphere exists, and is favourable to the generation and extension of epidemic diseases, but directly the reverse of the foregoing.

If the equilibrium be but slightly impaired, the prevailing diseases will be more mild and less fatal; but if impaired or destroyed by excessive heat and moisture, though there may be many strong efforts of nature to restore, or to keep up the equilibrium, by frequent and heavy concussions of thunder and lightning; still, in consequence of *the excessive heat and moisture*, an equilibrium is *not restored*, and consequently, in proportion to their excess, will the prevailing diseases be, either sporadic or epidemic, or in other words, be more or less extended, and thence more or less fatal.

It is in the foregoing sense, that I would be understood, when speaking of an *electrical equilibrium*; and, great as I conceive the influence of the Electric Fluid to be in all nature, whether taken in the aggregate, or as confined to the most minute particle of an organized body, I yet consider it in no other light than as forming one, among the wonderful powers of nature, and constituting an evidence of "the wisdom of God in the works of Creation."

J. L. E. W. SHECUT.

AN INQUIRY, &c.

BOOK I.

Of the Universality of the Electric Fluid, as pervading all Nature, and being an inherent and essential principle in all bodies.

PREVIOUSLY to the establishment of facts by induction, or the drawing conclusions from the invariable results of repeated experiments, the philosophers of old ventured hypothesis for experience; and thus, the learned PYTHAGORAS and his followers, in defining the laws of nature, as it respects gravity, heat, light, &c. *imagined* a very subtle fluid to be the cause; and further considered this imaginary fluid to be free or emancipated from all gross matter; a celestial substance, that penetrated at will the pores of all bodies. To this fluid they gave the name of *ether*, and conclude that it is an element in which the celestial bodies are immersed, and where they roll.* ARISTOTLE asserts *ether* to be a *fifth element*, pure and unalterable—of an active and vital nature, and entirely different from *air* and *fire*, which constituted the *ether* of PYTHAGORAS and ANAXAGORUS.

PLUTARCH and ST. CLEMENS ALEXANDRINUS, confirm the doctrine of PYTHAGORAS, with regard to the all pervading influence of the *etherial fire*; and in the philosophy of PLATO, we learn that fire is generated of motion, being the effect of the act and friction of the small particles of bodies. Modern philosophy

* Wesley's Natural Philosophy, vol. ii. page 388.

aided by chemistry, has proved by experiments and observations, that the hypothesis of the ancients with regard to this fluid was correct; and what was called *ether*, *etherial fire*, &c. was indeed the same all pervading fluid which we call *electric*.

This fluid has been considered for many centuries to be the *soul of the world*. TIMOEUS LOCRENSIS, who, though he does not assign the cause of electricity, has declared it to be the *soul of the world*;* and the Rev. and pious Mr. WESLEY, while describing the wonderful properties of this fluid, observes, "such " is the extreme fineness, velocity and expansiveness " of this active principle, that all other matters seem " to be only the body, and this the *soul of the uni-* " *verse.*"†

Without however, ransacking the pages of an ancient history, to prove their knowledge of electricity, it will be sufficient to say, that the first discovery of the actual properties of this fluid, in attracting and repelling light bodies, suggested itself to them in the beautiful bitumen, which they termed *electrum*, or amber; and hence the term *electric*, has been applied by the moderns to that fluid which had been before known as *ether*, the *etherial fire*, the *soul of the world*, &c. which I would term *oxigine*. The *lyncurium* of THEOPHRASTUS, said to be the same substance, now known as *tourmalin*, was long known to the ancients as possessing the electric property.‡

The first progress towards the theory of electricity, by actual experiments appears to have been made by Dr. GILBERT of Colchester, then practising in London, who in the year 1600, published a treatise on the attraction and repulsion of other bodies than *amber*, such as *sulphur*, *wax*, *resinous substances*, *glass* and *precious stones*; which, when dried and rubbed a little, were endowed with the same property of attracting straws, and again repelling them, and other light substances, in the same manner as *amber*. In

* Wesley's Natural History, vol. ii. page 316. Bonnet's Contem. of Nature.

† Ib. id. page 76.

‡ Cavallo on Electricity. introduction. Note, page 19.

his treatise, which he terms *De Magnete*, we do not learn that he has applied the discovery to any medical or philosophical purpose, further than to have made the discovery, that other bodies beside *amber*, possessed a property of attraction and repulsion like it, which he termed *magnetic*.

Soon after him, Sir FRANCIS BACON published a catalogue of *electrics*, which however, differed but little from that of his predecessors; and, as late as the year 1670, at which time the celebrated BOYLE was pursuing with uncommon reputation the improvement of science, and rescuing it from the errors of former times, the true principles and properties of this fluid were yet unknown. Nothing more had been discovered than its property of attraction; even this father of genuine philosophy, had not yet seen the *electric light*, unless it was in the vivid flash of lightning.

Cotemporary with Mr. BOYLE, an ingenious burgo-master of Magdebourgh, is said to be the first who made any improvements in electricity; this gentleman, whose name was OTTO GUERICK, had mounted a globe of sulphur, on an axis, and whirled it in a wooden frame, rubbing it at the same time with his hand. Beside the properties of attraction and repulsion he also discovered that the excitation of his globe produced both *light* and *sound*, though in an inconsiderable degree.* Dr. WALL, whose paper, on this subject, was read before the *Royal Society of London*, and afterwards published in the philosophical transactions, appears to have procured a much finer electric light, which, together with the crackling noise, he compared to *thunder* and *lightning*. In 1675, Sir ISAAC NEWTON, and in 1700, Mr. HAWKESBEE, had each made a few advances in this science. Mr STEPHEN GRAY, a pensioner of the Charter House, is said to have presented to the *Royal Society*, an account of many experiments he had made, whereby this fluid became clearly perceptible both to the sight and

* He was also the inventor of the air pump.

feeling;* but it was not until near fifty years after, that is, in 1745, Mr. VON KLEIST, invented the Leyden phial. Mr. VON KLEIST was Dean of the Cathedral of Comin; he is said accidentally to have discovered the mode of accumulating the electric fluid, in what is called the *Leyden Phial*;† and about the year 1746, Drs. WATSON and FRANKLIN, discovered a *plus* and *minus* electricity.

From this period we may begin to date a more correct knowledge of the principles and properties of this important fluid; and the doctrine of its universal influence, has been gaining ground since that era, together with its application to medical uses, upon the slow, yet certain developement of facts, not the result of mere hypothesis, but by induction derived from experiments, which carry along with them their own incontrovertible evidences, and to which we shall shortly turn our attention. In the mean time, it may not be unimportant to collect and arrange in this chapter, the various terms that have been given to certain fluids, which have resulted from chemical and philosophical experiments and observations. I am aware, however, that I shall fall into the common error, that of “attempting to account for things, which from their very nature must, and ever will elude our researches.” This propensity, we are informed, even the great NEWTON, could not help indulging;‡ and which in subjects of such infinite importance to science, and in which, the entire energy of the mind is engaged, cannot fail to happen in many instances, however guarded.

Sensible, however, that such is the case, I must previously suggest, that the observations contained in this work, and which are not supported by facts sufficiently strong to establish them, are rather to be considered as inquiries; and, while I acknowledge that such is my own opinion, with regard to the properties of what is vulgarly called the *electric fluid*, as an in-

* Wesley's Philosophy, vol ii. page 78,

† Cavallo on Electricity, vol. i. Introduction. Note, page 23.

‡ Encyclopædia Britannica, Anno 1771, Article, Ether.

herent principle in all the works of creation, I would, by every possible means, avoid the introduction of an error, that might be construed in an improper manner, to the injury of genuine philosophy; or of introducing on the "map of science, a *terra incognita* of visionary theory."

I consider *ether*, the *etherial fluid*, *etherial fire*, the *nervous fluid*, the *animal spirits* and *caloric* to be only different names for the different modifications of the *electric fluid*, or the inflammable principle (*Phlogiston*) of Mr. HENLY.* I consider, also, what is now distinguished as *galvanic electricity*, to be no more than a different modification or excitation of artificial electricity, both of which differ only from *ærial electricity*, by being the productions of art. I consider it also, to be that peculiar principle, which is designed by *infinite wisdom* united with *infinite power* to support, vivify and enliven all the works of creation; and that it exists in every appropriate atom or particle of matter, pervading all nature, and thus giving health and vigour to all the bodies of the three kingdoms of nature, the animal, the vegetable, and the mineral.

Although a constituent principle in all the organized bodies of nature, its powers are variously and diversely applied, and its peculiar effects are more or less evident, according as the bodies on which its influence is exerted, are either conductors or non-conductors. Its influence and its powers may be traced from the dread convulsions of an earthquake, to the gentlest vibration of the nerves, or from the terrific eruption of *Ætna* or *Vesuvius*, to the simple spark from the flint. "A late ingenious writer," says Mr. WESLEY, "ascribes all earthquakes to the same cause, electricity. The impression, says he, they make on land and water to the greatest distance, is instantaneous—this can only be effected by electri-

* Mr. Henley, an ingenious electrician, from a variety of experiments, was led to conclude, that the electric fluid and fire are produced by similar operations, and are both extracted from bodies abounding with the inflammable principle; and therefore, he was led to suppose, that this principle (at the time called *phlogiston*) the electric fluid and fire, are only different modifications of the very same element; the first being its quiescent state of existence, the second its first active state, and the last, its most violent state of agitation. (*Cavallo*.)

“ city. The little damage done by most earthquakes
 “ is another argument for their being occasioned by a
 “ simple vibration of the earth, through an electric
 “ shock. This vibration on the water, meeting with
 “ the solid bottoms of ships, occasions that thump
 “ which is felt by them. That this shakes millions of
 “ ordinary houses, and yet none of them falls, is a fur-
 “ ther proof that it is not a convulsion in the bowels of
 “ the earth, but an uniform vibration, like that we oc-
 “ casion on a glass by rubbing our finger on the edge,
 “ which may be brought to such a pitch, as to break
 “ the glass in pieces, by an electric repulsion of its
 “ parts.”*

That earthquakes can and do happen from other causes I believe, sometimes they occur from water, at others from lakes of fire, and again from electricity; while at other times they may be owing to all these combined. I would not be understood, therefore, to confine them exclusively to electricity, though I believe it has a share in them all.

As the blood is the vital principle of animal nature, and the sap that of the vegetable, so is the electric fluid considered as the vital principle of all nature. In the animal kingdom, it is conceived to be that principle, which gives vitality to the blood, sensibility to the nerves, and mobility to all the parts; nay, more, that it is the cause of volition, or the act of willing, thinking, reflecting, reasoning and conceiving; and without it, the circulation of the blood, and the functions of life would cease. In the vegetable kingdom, “ although the subtle organization and laws of vege-
 “ tation, have been but imperfectly explored, and
 “ although we are not capable of discriminating that
 “ peculiar organization in each kind of plant,” which gives to each its peculiar properties, different from the other, we may with safety venture to assert, that in this kingdom its powers are equally essential; if it were not for the vivifying influence of this fluid, lands would in time, from cultivation, become too poor for

* Wesley's Philosophy, vol. ii. page 38.

vegetation, a *humus depauperatus*, would be the consequence, that is to say, the earth would be deprived by exhaustion of those organic particles necessary to vegetation.* And, although I may not be able to produce as many facts in support of the opinion of its essential existence in the mineral, as in the animal and vegetable kingdoms, I shall advance such reasons as cannot fail to be considered as satisfactory evidences of the fact. In the mean time, I would take upon me to say, that the efficacy or inefficacy of medicinal simples in the cure of disease, may depend in great measure, if not wholly, on the property of the article, as a conductor or non-conductor of electricity, whether animal, vegetable or mineral.

This sublime fluid gives vitality to the air, and is probably, the parent source of *oxygen*.† The magnetic powers of the load-stone, the polarity of the needle, and brilliancy of the diamond, owe their peculiar and variant properties and powers to the peculiar and variant applications of its influence; the formation of water, and perhaps all the revolutionary principles of nature, are to be attributed to the same cause. “Is not vision produced by an *ætherial fluid*, or something analogous to this medium, excited in the bottom of the eye, by the impulse of light, and propagated along the solid pellucid and uniform *fibrillæ* of the optic nerves to the place of sensation?” and, “may not animals have a power of extracting from the blood the electric fluid?” Are questions long since agitated by the great NEWTON, and the renowned PRIESTLY.‡

The fluid, which is the proper stimulus of the nerves, is acknowledged to be electric, but of a kind different from that which I have proposed. MAYO

* Ali Bèy's Travels, vol. i. page 232.

† Mr. Wesley, in his Natural Philosophy, vol. 2, page 89, says, “and may it not be doubted, whether this be not the only elastic body in the universe? Whether it be not the original spring which communicates elasticity to all other elastic bodies? To the air in particular, which is elastic no longer when detached from electric fire, but commences fixed and unelastic, and seems to recover its elasticity only by recovering the ætherial fire, which had been violently separated from it.”

‡ Thornton's Medical Extracts.

tells us, that the nerves are now ascertained, by the most decisive experiments to be conductors of the *galvanic electricity*; and is a species of electricity different from *ærial electricity*, as is fully demonstrated by its different effects. It is more located and confined than *ærial electricity*, it seems to originate peculiarly in a fermentative process of metallic substances; and is limited in its relations, but most strikingly adapted to the nervous sensibility—hence it has been denominated by different experimentalists, *animal electricity*, the *nervous fluid*, animal spirits, &c.*

I shall assuredly give to this idea its due weight, and shall attempt to show why it is considered to be a different species from that universal fluid, which, as pervading all nature, and being inherent in every atom or particle of matter, is properly considered to be the soul thereof, and is thence, by way of eminence, distinguished as *ærial electricity*. And, in the mean time, I can have no hesitation in admitting different terms, to the different adaptations and modifications of it, in and to different objects, as expressive of its properties or powers, in and towards them respectively. And thus, in its original and primary form, pure and unconnected with any gaseous or other matters, it is then, properly speaking, a pure, primitive, *ærial fluid*; thence very correctly termed *ærial electricity*; but when it enters into any *gaseous* or other matters, although in itself pure, and impossible to be contaminated or changed; yet, by reason of its thus occupying, or pervading other elements or bodies, it may then, by way of distinction, be termed *animal electricity*, *animal spirits* or the *nervous fluid*. In vegetable substances, it may be termed with equal propriety, *vegetative electricity*, *vegetable spirits*, or the *vegeto-nervous fluid*; and in metals and minerals, I can see no insuperable obstacle, to prevent its being also termed *metallic electricity*, which includes both the *magnetic* and *galvanic*; in short whether this fluid be elicited by friction from artificial means, or by the “fermentative

* Mayo's Notes to Wesley's Philosophy, vol. i. page 65.

process of metallic substances," thence termed *galvanic electricity*—it is still the same fluid, only differently modified or elicited.*

The report made to the class of mathematical and physical sciences, of the National Institute of France, in some measure justifies the opinion I have formed on this subject. They consider the history of electricity as properly referable "to two periods, which are distinguished as much by the nature of the results, as by that of the apparatus employed to obtain them. In the one the electric influence is produced by the rubbing glass or resinous matters; in the other electricity is put in motion by the simple contact of bodies between themselves. We should refer to the first of these epochs, the distinction of the two species of electricity, resinous, and vitreous, the analysis of the Leyden bottle, the explication of the thunder storms, the invention of *paratonneres*, (FRANKLIN'S iron rods, &c.) and the exact determination of the laws, according to which the repulsive force of the electric matter varies with the distance. The second comprehends the discovery of the muscular contractions, excited by the contact of metals, the explication of these phenomena, by the movement of metallic electricity, and lastly, the formation of the electric column, its analysis, and its different properties. VOLTA has performed, in this second period, what FRANKLIN did in the first. The sciences are now so connected among themselves, that whatever serves to perfect the one, at the same time advances the other. Under this point of view, *galvanism* will form a memorable epoch in their history; for there are few discoveries which have given to physics and chemistry so many new facts, and so different from what were known before. Already has the *ensemble* of these facts been referred to a general cause, which is the movement of electricity. It remains to determine with precision, the

* Both *hydrogen* and *nitrogen gas*, are injurious to galvanic operations, and the same gases are proved injurious to electrical operations in a very considerable degree.

“ circumstances which accompany them, to follow,
 “ the numerous applications which they offer, and to
 “ discover the general laws, which are perhaps inclu-
 “ ded in them.*

Chemists, on discovering certain properties in this all pervading fluid, have considered it as compounded of heat, light and magnetism, because, say they, “ we constantly observe in electricity, the correspondent characteristics of the triple compound, the effects of *caloric*, the velocity of *light*, and the power of *magnetism*.†” If the electric fluid be considered as the cause, and not the consequence of this phenomena, I conceive that it would be at once arriving at the fact, and I am disposed to contend, that it is utterly impossible to produce either of them independently of this fluid.

It appears to be the parent source of heat, light and attraction; and every atom or particle of matter, possesses it in one form or other. “ The electric fluid,” says the learned Dr. EWING, “ exists in all bodies in a certain quantity, which is natural to them, and commonly called their natural quantity.”‡ It is extremely *active*, and particularly evident in some bodies, that is, they shew signs of it, on being rubbed with the hand or any dry substance, while in some other bodies it is *passive*; and these give no signs of it by friction, as those other bodies do; hence, all bodies in the universe, are said to be either *conductors*, or *non-conductors* of this fluid.

As the entire animal system is composed of conductors and non-conductors, it is reasonable to suppose, that all the sensible parts, but more especially the nervous fibres are *conductors*; while those which have been distinguished by the baron DE HALLER, as the insensible parts, as the tendons, ligaments, bones, marrow, &c. are the *non-conductors*. These, together with all the *non-conducting* bodies, are also some-

* London Med. and Phys. Journal, vol. 11, page 524. Ree's Cyclopedia, Article, Electricity.

† Mayo's Notes on Wesley's Philosophy, vol. 2, page 4.

‡ Ewing's Nat. Philosophy, page 61

times termed *electrics per se*; which might lead to the conclusion, that they alone contained this fluid; but this mistake, together with that which considers all those other bodies, which easily receive this fluid, and again as readily convey it to be *non-electrics*, and originally destitute of it; or in other words, that they did not contain any electric fire, until it was conveyed into them. These distinctions, founded in error, are daily yielding to the more rational conclusions, founded on experiments, which go to prove, that all matter contains a proportion proper to it; which as we have already shown, is called the proper quantity, and it is said, that if you attempt to add more to any matter, "the additional quantity does not enter, but forms a kind of atmosphere around it."*

I am disposed to think with Dr. FRANKLIN, that most, if not all bodies are capable of receiving an additional quantity, and are then electrified *plus*, or positively, in regard to their proper quantity; but if they are of that principle which do not admit of an additional quantity of this fluid, they are then *minus*, or negatively electrified. Signor BECCARIA, says, that the apparatus of his observatory, was sometimes *positively*, and at other times *negatively* electrified, by the thunder clouds, that passed over it; and hence concludes, that the clouds themselves are also sometimes positively and at other times negatively electrified. Upon the same principles that the load stone is acknowledged to give polarity to metals, does modern chemistry allow the same polarity to minerals, as derived from electricity; and hence, each mineral is supposed to have on one side *positive*, and on the opposite side a *negative* degree of electricity; and this is termed their *electrical poles*.†

The general arrangement of these bodies have been according to their properties, divided into two classes, as follows:—

1st. *Electrics*, or *non-conductors*, are considered to be those bodies which receive and collect the electri-

* Wesley's Nat. Philosophy, vol. ii. page 79.

† Cleveland's Mineralogy, chap. 2, sec. 2.

cal matter most easily, after being a little rubbed or heated; and these are again subdivided thus :

(a) Diamonds of all kinds, the ruby, the sapphire, the emerald, the opal, the amethyst, the topaz, the beryl, the granite, rock-crystal, &c.

(b) Glass and all vitrified bodies, enamels of all colours, porcelain, glass of antimony, of lead, &c.

(c) Balsams, resins of all kinds, wax, &c.

(d) Bituminous bodies, sulphur, amber, asphaltum, shell, lac, &c.

(e) Certain animal productions, as silks, feathers, wool, hair and bristles, &c. and these are sometimes termed *electrics per se*.

2d. *Non-electrics*, or *conductors*, are those bodies which do not at all collect the electrical matter by friction, or in a very inconsiderable degree; and these are arranged as follows :

(a) Water, and all aqueous and spirituous liquors which are incapable of being thickened, and subjected to friction, ice, snow, smoke, vapour, &c.

(b) All metals, perfect and imperfect, and the greatest part of all minerals, as the load-stone, antimony, lime, bismuth, the agate, the jasper, marble, free-stone, slate, charcoal, &c.

(c) All living creatures, except their hair, feathers, bristles, wool, &c.

(d) Trees and plants of all kinds, threads, ropes, linen cloth, paper, &c.

Perhaps, it may be more correct to say, that the sensible parts of all living creatures, as distinguished by the baron DE HALLER, from their insensible, are the conductors of this fluid. And hence, the nerves, first of the brain, then the spinal marrow, the skin, the internal membranes of the stomach, intestines, bladder and ureters, will prove to be the most exquisite conductors of this fluid, by means of their sensibility, directly and immediately to all the sentient parts; and by the nerves themselves, more immediately and directly to the source of sensation; the muscular flesh as dependent on the nerves; and lastly, the breasts, which being covered with a great deal of skin, and many nerves, possess that propor-

tion of sensibility which depends upon the nerves and skin.

The muscles, therefore, are not so properly the conductors of this fluid, nor indeed is it reasonable to suppose it, since they possess a peculiar life, or *irritability* which the nerves do not; the nerves are not *irritable*, but *exquisitely sensible*; the muscles are not *sensible* but *extremely irritable*; and it is upon this principle, that I would explain the reason why some philosophers determine the *galvanic fluid*, as widely differing from the *electric*. As a proof of this, we find muscular contraction to be produced by means of galvanism, even after the extinction of animal life; and the Baron tells us “that the nerves are destined
“to feel, to suffer and to enjoy, to issue the com-
“mands of the will, bringing the muscles into action;
“but still the muscles have their own peculiar life, or
“*irritability*, superior to the nerves and independent
“of them; it is a power which survives them, and
“acting even when severed from the general system,
“and acting often on the living body without the im-
“pulse of the nerves, and sometimes in opposition
“to the will.”*

The electric fluid possesses also the property of attraction and repulsion, not only as it regards light bodies, such as the feathers of birds, the wool of animals, hair, bristles, &c. but even bodies that are compact and solid; and while it is found in most instances to differ from all other matters by the particles repelling, and not attracting each other, they, at the same time, are attracted by all other matters; “and from the
“extreme subtlety of the fluid, this mutual repulsion
“of its parts, and the strong attraction of them by other
“matters, arises this effect, that if any quantity of
“electrical fire be applied to a mass of common matter
“of any bigness or length, (which has not already got
“its quantity) it is immediately diffused through the
“whole.”†

* Thornton's Medical Extracts.

† Wesley's Natural History, page 79.

I have been long inclined to believe, that this fluid was itself the *great acidifying principle of nature*; and probably too the *alkalinizing*. Modern chemistry has proved, that *oxygen* is also an ingredient in the composition of *alkalies* and earths, and that it is therefore; the principle of *alkalinity*, as well as of *acidity*.*

If this idea be correct, the causes of many of her phenomena may be easily accounted for, and that it may be considered as the base of *oxygen*, or pure dephlogisticated vital air, we have the following inducements to believe—"atmospherical air, which contains somewhat less than three-fourths of *nitrogen* or *azotic gas*, and somewhat more than one-fourth part of *oxygen* is in this proportion rendered fit for respiration. Since the discovery of *carbonic acid gas* by Dr. BLACK, it has been ascertained that this elastic fluid always constitutes a part of the atmosphere. The constituent parts of which are, according to Mr. MURRAY :

	By measure.	By weight.
" Nitrogen, - - - -	77 50	75 55
" Oxygen gas, - - - -	21 00	23 32
" Aqueous vapour, - - -	1 42	1 03
" Carbonic acid gas, - - -	08	10
	<hr/>	<hr/>
	100 00	100 00†

" *Oxygen gas* in its pure state, would be more active, than is consistent with the economy of nature, and the *azotic gas* is unable to support respiration, vegetation, or combustion." In order to strengthen the supposition advanced above, it is necessary to show the analogy of this fluid with *oxygen*, together with the effects they produce on the three kingdoms of nature :

1. *Oxygen* by mixing with the blood, becomes one of the constituent principles of the body.

2. In excessive proportions, is too active for the purposes of life.

* Thatcher's American Dispensatory, page 29.

† American Medical Lexicon, Article, *Atmosphère*.

3. Is a principle constituent in water, in all acids and metallic oxydes, and in almost all animal and vegetable substances.

4. In many instances, *oxygenizement* (a term used for the combinations of oxygen with other substances) is so strongly opposed by cohesion, that it does not take place, unless assisted by a degree of heat, sufficient to melt or vaporize the *oxygenizable base*.

5. It is also often accompanied by the extrication of *caloric* and light, in a very conspicuous degree.

6. Such oxygenizable bases, as are capable of exhibiting the above phenomena, are properly termed combustible.

7. If the combustible body be vaporized, flame is produced, and the process is then termed inflammation.

8. The compounds of *oxygen*, are many of them fluid or solid, opaque, coloured, incapable of supporting inflammation, and are deleterious to animal life.

9. It is more active and pure in cold and dry, than in hot and moist weather. It is also more active and pure when the winds are west or north west, than when from the east or south east.

We shall now produce a few analogies of the properties of the electric fluid, in order to prove how far it influences what is termed *oxygen*, and perhaps, prove also by them, that it is not only the base of *oxygen*, but that it is, inherent in every particle of matter.

1. *The electric fluid is a constituent principle in the blood of animals, and gives it circulation.* "We know that a sixth part of the whole mass of blood is driven to the brain from the heart in an *oxygenated* form, and quickly returns thence *unoxygenated*, and is speedily supplied by fresh *oxygenated* blood. It was attempted to be proved, that this quantity of blood when passing into so small an organ as the brain, could not be intended by frugal nature solely for nourishment, and the generation of vital heat, but most probably gave out its *oxygen* to be formed by the action of the brain into the *electric fluid*;"* I would

rather say, gave out its *oxygen* to be qualified or renewed by the *electric fluid*, which I conceive to be the base of *oxygen*, or the *acidifying principle of nature*, and the great vivifying principle of the animal spirits or the nervous fluid.

2. Excessive proportions of the electric fluid, are not only too active for the purposes of life, but produce all the great phenomena of nature,† and, with regard to the healthy state of the system, when the electrical equilibrium is impaired by an excess of its influence, catarrhal affections become epidemic, and *influenzas* appear to spread far and wide, over the face of the whole earth, as in the years 1797 and 1807; on the other hand, when it is deficient in some parts of the world, nervous and malignant diseases prevail more abundantly, as has occurred in the years 1732, 1739, 1745, 1748, 1793, 1799, 1809 and 1817.‡

“ In the *sirocco-wind* at Naples, when the air seems totally deprived of this subtle vivifying fluid, the system is unstrung, and the nerves seem to lose their tension and elasticity, till the north or west wind awakens the activity of this animating power, which soon restores the tone and enlivens all nature, which seems to droop and languish during its absence.§

3. Those articles which are penetrated with the electrical matter, which either flows through them, or spreads equally on their surfaces, and are thence termed *conductors*, are water and all aqueous and spirituous liquors, acids, and almost all animal and vegetable matters, (with the exceptions mentioned in page 198; and these by means of water may be also made *conductors*.) and all metals.

4. There are also many instances, in which the electric fluid cannot be elicited, without the mediation of a sufficient degree of heat—for instance: in moist and wet weather, to obtain electrical sparks from the apparatus, a smart fire must be first kindled in the room, the heat being raised to the necessary

* Thornton's Medical Extracts, vol. 2, page 186.

† Brydone's Tour, page 98.

‡ Essay on Contagions and Infection, chap. 2, and page 154, and Sequel.

§ Brydone's Tour—see also Sketch 4, page 85.

temperature, sparks are obtained; beyond this, the experiment will fail in the same manner as if no heat had been resorted to. In crowded rooms that are not sufficiently ventilated, this fluid is dissipated or negative.

5. It is also frequently accompanied by the extrication of *caloric* and light, in a still greater degree, as is evinced in trees and other combustible bodies set on fire by lightning, these burn vehemently, and in the night with dazzling splendor, emitting the strong smell of phosphorous, (*electrate*) and these matters thus set on fire by lightning, are hardly extinguishable.

6. All oxygenizable bases are capable of yielding caloric and light, by means of the electric fluid, and are thence very properly combustible.

7. This principle (*inflammation*) is proved to be electric, by the combustible matters of a cart wheel, the hobb and axis, in their revolution being vaporized by attrition and friction, an electric flame is produced; so also on rubbing two dry sticks together, the striking a flint and steel together, and various other matters. In India it is said, "that a strong and sultry wind from the south, violently agitating the branches of the bamboo trees, a violent friction is produced among their dry stalks, which emit sparks of fire that kindle in a blaze among the leaves."* "The *ignis fatuus* is, we know, inflammable air ignited by electricity. It flies from a person who pursues it, because the electricity of each is positive."† The positive and negative principles of electricity are further proved by an observation of Dr. PRIESLEY, "that an *ignis fatuus* seemed to follow a person who had been long in a crowded room." This proves that the person was deprived of his necessary quantity of the fluid, from the heat of the room, and was therefore, *negatively* or deficiently electrified; while the *ignis fatuus* was *positive*, and therefore, seemed to follow the person. Perhaps *human combustion* is the

* Miss Owenson's Missionary, page 202, and note
 † Amer. Med. Dictionary; Article, *Electricitas*.

effect of an excess of *electrate*, or phosphoric matter generated in the system, and having a powerful attraction for the electric fluid, the body is vaporized, and this awful inflammation is thus produced.

8. The electric fluid as pervading all nature, is a part of all compounds, whether fluid or solid, opaque or coloured, &c.

9. The electric fluid is more active and pure, in cold and dry, than in hot and moist weather; and it is pretty well ascertained, that electrical machines operate with greater activity, when the wind is at the north or north west, than when from the east and south east; or perhaps from any other point of the compass.

From all which analogies, I am induced to believe, that the electric fluid gives to *oxygen*, all those properties which it possesses as oxygen, or in other words, that it is the base or parent source of it; and is itself, the great *acidifying principle of nature*. Perhaps it would be equally correct to say, that oxygen and the electric fluid was one and the same, only differently modified, as it regards the proportion of other *gases* with which it may be combined.

That the electric fluid is analogous to, or is the same principle as the animal spirits, termed elsewhere the *vital principle*: or rather, that this fluid, as the proper vehicle of all our feelings, is the source of that principle itself, may be ascertained by comparing the effects produced on each, by the different powers operating on them respectively, and thus producing the same, or similar effects; and also from a variety of other circumstances.

1. Heat and moisture produce similar effects on both, more particularly speaking, in hot and moist weather, when the electrical equilibrium in the atmosphere is impaired, the animal spirits are impaired in the exact proportion to the diminution of this fluid; electrical machines operate very imperfectly, or not at all, and the languid and listless state of animal nature at this time, indicates a deprivation of some power necessary to the active and healthy state

of the system; and this power is the electric fluid. "In damp or hazy weather the electric fluid seems blunted or absorbed by the humidity; when its activity is lost, and little or none of it can be collected, we ever find our spirits more languid, and our sensibility less acute.*

2. We notice very particularly, that whatever impairs the electrical equilibrium, either by its excess or deficiency,† produces similar effects on the animal spirits—we will give a few cases in proof. In cold and clear weather, the equilibrium in the atmosphere, is generally evidenced by the healthy state of animal nature; the system is invigorated, the tone is increased, and an accession of sound strength is almost every where experienced; if the equilibrium is impaired by an excess of this principle, the system is then excited in excess, evidenced most commonly by an exhilaration of the spirits, without any obvious cause; if the excess be greater, morbid strength takes place, and *sthenic diseases* prevail; on the other hand, when the *equilibrium* is impaired, in consequence of a deficiency of the fluid in the atmosphere, and over the face of the earth, the animal spirits become languid and flag, a dulness, and heaviness, with listlessness, gaping, yawning, and stretching is almost general. There is a loss of tone and elasticity in the muscular and nervous fibres; and if the deficiency be excessive, as in excessive hot and moist seasons, the almost invariable result is, that *asthenic diseases* prevail, and are generally predominant until the equilibrium is restored, either by thunder and lightning, or cold and frost.

That these are undeniable *facts*, the experience of ages has already proved, and the further experience of ages to come, will more fully prove to mankind at large. Dr. RUSH, in his account of the Yellow Fever of 1793, page 34, says, "every change in the weather,

* Brydone's Tour through Sicily and Malta.

† "It will simplify our language, if we consider *positive* electricity as the excess, and *negative* as a deficiency of this fluid: the former as the excess of uncombined electricity, the latter as a deprivation of the due or necessary quantity.—*American Medical Lexicon*.

“ that was short of producing frost, evidently increased
 “ the number of sick people.”

Lightning, (which is perhaps the effect of the vaporization of the electric fluid) oxygen, and artificial electricity, including the galvanic fluid—I have considered as the fluid, while the various *phosphates* (or more properly *electrates*) are the solid states of electricity, and for which I assign the following reasons :

1. Electrical operations emit the strong smell of phosphorous, from whence I conceive that *phosphates* are bodies in which the electric fluid, is as it were held in concentrated excess, and to which I conceive the term *electrate* as more applicable.

When any part of the body has been exposed to the electric stream, it acquires a sulphureous, or rather a phosphorous smell, which it retains for a considerable time; and CAVALLO* tells us, that “when the stream of
 “ electric fluid issuing from a point, is directed towards
 “ the palate, a kind of acid taste is perceived, now this
 “ smell and acid taste indicates that the electric fluid ei-
 “ ther alters the parts of the body upon which it excites
 “ those sensations, or that it carries along with itself
 “ some other principle, which may perhaps be sepa-
 “ rated from those substances through which this
 “ fluid passes, previous to its impinging upon the
 “ body.” This sulphureous or phosphorous smell and acid taste is a further proof, that the electric fluid is the *great acidifying principle of nature*, and that phosphorous is only a solid body of concentrated electricity. In order to prove that electricity has its peculiar affinities, and that it is capable of being modified by the different matters through which it may pass, we have only to notice, that “electric sparks of *iron* are
 “ of a silver white, those of *brass*, green, and those
 “ drawn from an egg, yellowish;” an iron rod immersed in water, the sparks issuing from it, or rather the flash, is of a flame colour, a miniature lightning, &c.

The analogy of phosphorous to the electric fluid, appears still further from the effects of different substances, acting upon it in such manner, as to resem-

* Medical Electricity, by Cavallo, page 22.

ble the electric fluid. "Phosphorous, when melted and put into pure *oxygen gas*, burns with dazzling splendour. In atmospherical air, it emits light in the dark, without the production of sensible heat;"* and although phosphorous, obtained from different substances vary in their apparent effects, they have, notwithstanding, this property in common with the electric fluid, that of emitting light in the dark, and hence, their analogy is proved, whether the fluid be natural or artificial.

Phosphorous is said, by the most eminent writers on natural history, to constitute a part of all organized bodies, whether of the animal,† vegetable or mineral kingdoms—so does the electric fluid. "Possibly" says the celebrated Dr. PRIESTLY, the light which is said to proceed from animals, as from wild beasts, when they are in pursuit of their prey in the night, may not only arise, as it has hitherto been supposed to do, from the mere friction of their hairs or bristles; but violent *muscular exertion* may also contribute to it. *This light*, may, with the electric flashes from the eyes, assist them occasionally to catch their prey, as glow-worms, and other insects are provided with a constant electric light for that purpose;"

Phosphorous is said to have a considerable share in the process of vegetation. BRYDONE,‡ speaking of *Mount Etna*, says, "perhaps of all the reasons assigned for the wonderful vegetation that is performed on this mountain, there is none that contributes so much towards it, as this constant electrical state of the air. For, from a number of experiments, it has been found that an increase of electrical matter, adds much to the progress of vegetation. It probably acts there, in the same manner as on the animal body."

* Thornton's Medical Extracts.

† The small fish called *ductylus*, is found to be luminous all over, when it is taken out of the shell in the dark, every part of its surface shines with a bright light; it is therefore, a true natural phosphorous, and makes every thing luminous that it touches.—[*Wesley's Pphilosophy*, vol. ii. page 73.] There are several other fish that possess the same property—and some kinds of decayed wood when wet, yield a shining light in the dark, and hence termed by the people in the country, *fox-fire*; perhaps an adulteration of the word Phosphorous.

‡ Tour through Sicily and Malta.

Characters drawn on paper with solid phosphorous, will appear like a flame in the dark, but in the light only a dense smoke will be perceivable, and if the paper be held near the fire the letters become black, and continue as legible as those made with ink; but in these experiments great caution is necessary, because, if a particle of the phosphorous be rubbed between two papers, they will immediately take fire, which cannot be easily extinguished.* This property as we have already shown, page 203, belongs also to the electric fluid.

M. DESSAIGNES, in a paper communicated to the National Institute of France, in 1810, asserts, that “when bodies *phosphoresce*, by an increase of temperature, the colour of the light is always blue, unless altered by the presence of iron;” and CLEVELAND tells us, that the colour of the light is variable, being green, blue, yellow, reddish, &c. and may even change during the experiment, according to the degree of heat, or some other circumstance.† The same changes, and from the same circumstances always happen in experiments and operations with the electrical apparatus, as mentioned in page 206. Hence, from their analogy, I see no insuperable obstacle to the term *electrate* being applied to the different kinds of phosphorous.

That the electric fluid also gives the magnetic virtue to the load stone, is an opinion which I have in common, with many of the foregoing, long since supported and advanced; that it also gives polarity to the needle, subsequent discoveries in chemistry, have confirmed me in that opinion; they are as follows:—

Let a common knitting-needle, or other piece of clean iron or steel wire, be laid horizontally on a pivot, then take a common flint glass tumbler, rub the tumbler well upon the sleeve of your coat if woollen, or on an electrical rubber, until the tumbler is made warm, then approach the needle or wire with the warm tumbler, and it will immediately traverse on the pivot, like the needle of a compass.

* Thornton's Medical Extracts.

† Cleveland's Mineralogy, chap. ii, page 59.

From this I conclude, that, as by friction, the electric influence is produced through the medium of other substances, so also, by friction, the magnetic influence through the medium of other substances, being also produced, must consequently be electric.

My ingenious friend, the late GASPAR TROTTI, formerly of *Minorca*, communicated to me a phenomenon, which may serve to throw some light on this subject. He says, "I suspended to the ceiling of my room a piece of polished steel, nearly of the size of a compass needle, where I suffered it to remain for seven years, at the end of this time I took it down and applied it to use, it proved to be an excellent needle, possessing a polarity equal to those needles touched with the load stone." It is said that any metal struck with lightning, has a powerful magnetic attraction for some time thereafter.

Professor MORRICHINI, of Rome, has ascertained, that needles may be *magnetized* by a condensing lens from the violent rays of the prism thrown upon them, and says, they are of equal polarity with those prepared by the magnet or artificial load-stone; and the same article informs us, that the Marquis RIDOLSI, has repeated the same experiment with success, having powerfully *magnetized* two needles, the one in thirty, and the other in forty-six minutes. One remarkable circumstance attends this mode of *magnetizing* needles, which is, that if one extremity of the needle be round or blunt, while the other extremity is sharp, when made to vibrate on a pivot, the point turns constantly toward the north, and the blunt end towards the south. This fact, also, in a manner explains a circumstance, which has been frequently observed by surveyors, that if a compass be long exposed to the solar rays in a hot day, the needle will not traverse well. A needle magnetized by the solar rays has been sent by the Marquis RIDOLSI to a friend in London, which is found to traverse remarkably well.

I consider the sun as a great globe of electrical fire, constantly and inexhaustably exciting all the powers

of nature;* and hence, the foregoing experiments may tend to show, that the magnetic power of the load-stone, and the polarity of the needle derive these peculiar properties from the sublime influence of the electric fluid. Magnets have lost their virtue, or have their poles reversed by an excess of this fluid (that is by lightning) and, our illustrious FRANKLIN, by electricity, gave polarity to needles, and reversed them at pleasure.† The same effect has also been produced on steel needles, watch springs, and bars of steel, that were nine inches in length, and from a quarter to half an inch broad, and about one-twelfth of an inch thick by experiments made with electrical machinery of great power by BECCARIA and VAN MARUM, as recorded in the new Cyclopædia of Dr. REES.

I proceed to the consideration of this *Universal Principle*, as it regards the animal kingdom. The electric fluid is known to be elicited from animals, or the human body to become electric, without the mediation of any electrical substance :

1. "Sparks have issued from the hair of the legs
"at particular times, on barely drawing off the stock-
"ings, which have been sometimes found reduced to
"ashes in the morning."‡

2. On combing a strong and clean head of hair in frosty weather.§

3. Strong flashes of electric sparks have been known to issue from a lady in New-England, whenever she changed her apparel.||

4. BRYDONE mentions a similar case of a lady in Switzerland; and that Professor SAUSSURE, and the younger M. JALABERT, when travelling over the high Alps, were caught among thunder clouds, and to their utter astonishment, found their bodies so full of electrical fire, that spontaneous flashes darted from their fingers with a crackling noise, and the same kind of

* The editor of the American Medical Lexicon, speaking of the connexion between *caloric* and *light*, says, "the just interpretation of these, leads to a belief, that the *sun-beam*, is composed of *anticroun* (caloric) and light; and "whenever by any means, light is attracted or fixed by another body, the repulsive principle is disengaged." Compare this with what has been said, p. 195.

† Encyclopædia Britannica, page 480. ‡ Medical Extracts.

§ Brydone's Tour. || Wesley's Philosophy.

sensation, as when strongly electrified by art. I have myself seldom ever drawn the fluid from my patients with my hands, that I have not experienced the effects of electrical excess in my system, a fulness of the vessels of the brain, and the flashing of sparks from my eye-lashes.

5. On wearing worsted under silk stockings, if we draw the silk stockings off in the dark, the bright electric fluid is seen flashing from every part of the worsted stockings.*

6. On rubbing the hands in a dark night, down the backs of horses, cats, dogs, and other smooth haired animals, electric sparks are elicited.

7. It abounds in the *gymnotus electricus*, torpedo or *electrical eel*, which has the power or property of generating and throwing out its electricity to the distance of fifteen feet.† It is said, that there are four aquatic animals which possess this power: viz. 1st. the torpedo which is considered as a distinct animal from the 2d, the *gymnotus electricus*, 3d, the *silurus electricus*, and 4th, another fish which has not as yet been sufficiently examined, nor yet received a name.‡

8. The amazing effect of human combustion, as recorded in WESLEY'S Philosophy, by MAYO, and in various fugitive papers, prove almost beyond doubt, the existence of this fluid, in all and every particle of matter.

9. *The electricity of the human body.*—Dr. HARTMANN, of Frankfort on the Oder, has published in a German Medical Journal, a statement, according to which he is able to produce at pleasure an efflux of electrical matter from his body towards other persons. You hear the crackling, see the sparks, and feel the electric shock. He has now acquired this faculty to so high a degree, that it depends solely on his own pleasure to make an electric spark issue from his fingers, or draw it from any other part of his body. Thus, in this electrical man, the will has an influ-

* Medical Extracts. † Essay on Contagions and Infections, page 143.

‡ Ree's Cyclopaedia, article, Electricity.

ence on the developement of the electricity, which had not hitherto been observed, except in the electrical eel.

BOOK II.

Of the Electric Fluid, as a Fifth Element, or the Soul of Nature, and its effect on Atmospheric and Animal Health, as the proper Stimulus or Life of the Nerves.

After what has been advanced in the foregoing Book, with regard to this *Soul of the Universe* pervading all nature, and as being an essential constituent in every particle and atom of matter, I will next enter into an examination of its operations and influence on the animal economy, and draw from thence such inferences, as may tend to establish it as the primary source of health and life, disease and death.

If, as I think it has been already sufficiently proved, we admit the electric fluid to be the *great acidifying and alkalizing principle of nature*, it is thence, the parent source of *oxygen*. We have already seen that *oxygen* in excessive proportions, is too active for the purposes of life, “hence the quantity necessary for the healthy constitution of the atmosphere, and also the animal system, is wisely graduated by INFINITE WISDOM.” Twenty seven parts oxygen, modified by seventy-two parts nitrogen, and one part carbonic acid gas constitute an atmosphere congenial to health and life; and this I would term, the atmospheric equilibrium.* It must be therefore evident, that whenever this equilibrium is deranged, either by excess, from an increased quantity of *oxygen*, or by deficiency from an increased quantity of *nitrogen* or of *carbonic acid gas*, the healthy state of the atmosphere is in like manner deranged, and all nature is subject to the effects resulting from either of these changes †

* Perhaps Mr Murray's Table, as quoted in the First Book, is the most correctly defined.

† Book i. page. 102.

Although atmospherical air is said to be the same every where, that is, that it contains all its constituent parts in regular proportions, yet it must be admitted, that its salutary effects may be prevented by heat and moisture, and from rarification or condensation; so that the space which at one time possesses a healthy atmosphere may at another time be filled with deleterious *gases* that dilute, blunt, absorb, or destroy the equilibrium of the air of that place, insomuch as to render the respiration of such air inimical to health, and dangerous to life—in like manner also is an electrical equilibrium impaired or destroyed.

I would not be understood to say, that either the atmospherical air, or the electric fluid were impaired or destroyed; but that the space which they occupy in healthy states of the weather, being occupied by an accumulation of noxious *gases*, that space must be evidently less pure, than the space which is free from those noxious *gases*; in the former an *equilibrium* is impaired, in the latter it is supported.

Passing by the awful concussions of earthquakes, whirlwinds, tornadoes, &c. the effects of an excessive effort of nature to restore an electrical equilibrium in the atmosphere, we will descend to those produced by a less excessive effort, and examine their effects: In that excess which produces thunder and lightning,* we perceive that the vital principle of animals and vegetables may be suddenly destroyed or suspended. It is hence, a power that produces *asphyxia* and death, by the deleterious influence of its excess, while, when in a just proportion, it is a power qualified to sustain life and support health.

If a record of facts, resulting from the excessive or defective influence of this fluid upon the atmospherical and animal health of nature were to be referred to, it would result in nearly the following scale of differences, founded upon one or other of the states of the atmosphere, depending upon the known laws of nature:

1. There is an electrical equilibrium, which is necessary to life, and essential to health.

* See Sketch iv. page 59.

2. This equilibrium may be deranged or impaired, either from excess or defect.

3. When in excess, in any one portion of the globe or district of a country, some other portion of the globe or district of a country, experiences the effects of its deficiency in them.

In those districts in which the electrical equilibrium is deranged, by an excess of the fluid, the atmosphere may be said to be *inflamed*, and is, in all probability, the same as the inflammatory constitution of the atmosphere, which it is said, can exist under different circumstances of the weather;* and under this particular constitution of the atmosphere, those diseases marked as the *phlegmasiæ* of Dr. CULLEN, are most prevalent; while in those districts that are deprived of a due proportion of this fluid, we find those marked as *pyrexia*, to be more or less prevalent.

This will appear yet more clearly, when we take notice of the effect, which the absence or presence of this vivifying fluid has upon the animal and vegetable kingdoms. "When an equal quantity of it is diffused through the air, and over the face of the earth, every thing continues calm and quiet;" animal and vegetable putrefactions, though present, are rendered less active, that is, their influences are weakened, or diluted to that degree, as to be rendered incapable, during the existence of the electric equilibrium, of exciting that modification of disease which terminates in *typhus*, or is accompanied with malignancy.

"Those remote causes of fever," says the learned Dr. CULLEN, "human and marsh effluvia, seem to be of a debilitating or sedative quality. They arise from a putrescent matter. Their production is favoured, and their power increased, by circumstances which favour putrefaction; and they often prove putrefactive ferments, with respect to the animal fluids."† The circumstances which favour putrefaction, are known to be *heat and moisture combined*; and the same powers are proved to be also unfavour-

* Rush's Med. Obs. and Enq. See also Preface to this Essay.

† Cullen's Practice, Par. 86.

able to the electrical equilibrium; it may be therefore received, as an established law of nature, *that so long as an electrical equilibrium is supported in the atmosphere, the remote causes of fever, though existing, are in consequence of this equilibrium, incapable of exciting diseases of higher grades than simple synocha, a mild intermittent, remittent, &c.** A reference to the actual states of the electrical influence, and the types of the prevailing diseases for the last forty years in Charleston, cannot fail to convince every unprejudiced mind of the correctness of this assertion.

It must, however, be remarked, that I mean only the diseases that depend on an *infected atmosphere* for their generation and support, and not *contagious diseases*, that can exist and communicate themselves under all circumstances of the weather, whether pure or impure, hot or cold, &c.†

Let any given space be deprived of its necessary proportion of pure atmospherical air, either from excessive heat rarifying, or heat and moisture combined, condensing it; or of noxious gases diluting it, that state of things invariably takes place, favourable to the process of putrefaction; and although it is not denied, that putrefaction takes place under any circumstance of weather, it cannot at the same time but be acknowledged, that the putrefactive process, or the decomposition of animal and vegetable substances, are more speedily effected during hot, or hot and moist weather, particularly, when, from the very nature of the weather, it is impossible that an electrical equilibrium can exist, than in those states of the weather in which it is proved to exist.

The absence of a just proportion of this vivifying and salutary fluid from the atmosphere, and over the face of the earth, may be therefore very justly considered as *the remote and primary cause* of those diseases, which constitute the class *pyrexia*, as marked in the *nosology* of Dr. CULLEN, including malignant diseases. And, however, strongly this fact may be opposed by

* Essay on Yellow Fever, &c. page 93.

† Essay on Contagions, &c. page 20.

prejudiced minds, I hazard the assertion, that it is a *truth*, established upon a well known law of nature, and that nature herself, must cease to act upon her own established laws, ere this assertion can be disproved.

Upon these principles, the reflecting mind may at one view, perceive both the *cause and effect* of those primary diseases originating in infection, and thence tracing them to their source, establish their locality beyond the power of contradiction; and thus remove the long established error of the importation of a disease, endemial to all the towns and villages in and near the tropics;* and in these, only under those circumstances in which the electrical equilibrium is impaired by deficiency; because, whenever it is impaired by an excess, we find the prevailing diseases generally, of an actual inflammatory nature, partaking of the inflammatory constitution of the atmosphere.

If we assent to the doctrine of putridity, as laid down by Dr. CULLEN, who says, "as putrid matter, therefore, is always, with respect to animal bodies, a powerful sedative, so it can hardly be doubted that human and marsh effluvia are of the same quality;"† and a little before he tells us, "they often prove putrefactive ferments to the animal fluids;" so must we also, by parity of reasoning, assent to the belief, that an inflammatory constitution of the atmosphere must be, with respect to animal bodies, a powerful stimulant; and thus, acts as a power exciting inflammatory action in the whole, or some part of the animal bodies.

In proportion to the derangement of the electrical equilibrium, either from excess or deficiency, so will the violence or mildness of diseases be, and it may be observed, that a variation of this equilibrium, similar to the variation of the magnetic needle, influences all the diseases that depend on atmospherical or infectious causes for their generation and support,

* Essay on Contagions and Infections, chap. 2, page 42.

† Par. 56.

to as many degrees in their grades or modification, as there are degrees of variation in the compass.

I am aware, that in advancing the foregoing *hypothesis*, I have subjected myself to the criticism of the world; some individuals of which, may, with *seeming propriety*, accuse me of enthusiasm; but I will prevent them in time, by acknowledging, that I am indeed an enthusiastic admirer of this science, and in my researches, have not only “skimm’d surfaces to catch straws,” but have hazarded the consequences by diving to the bottom in search of facts, which, having ascertained, I have thus offered to the acceptance of the world as data, whereon to reason on the cause and effects of a particular class of diseases, that have hitherto been acknowledged to be involved in obscurity and error.

But to return.—Let the candid and impartial mind compare the prevailing diseases of every season, with the existing states of the atmosphere, as it regards the electrical equilibrium; with myself, they must acknowledge, that it is, when in excess, a remote and primary cause of an inflammatory constitution of the atmosphere, and also of those diseases, which depend upon such a state of the atmosphere for their generation and support; * while its absence, favouring the decomposition and putrescence of animal and vegetable substances, is also the remote and primary cause of an infected atmosphere, capable of generating that *miasma* or *gaseous poison*, which proves itself to be a “putrefactive ferment to the animal fluids,” and is hence, particularly productive of those diseases whose tendency is towards putridity.

“From the dissolved state of the blood,” says Dr. CULLEN, “as it presents itself when drawn out of the veins, or as it appears, from the red blood, being disposed to be effused, and run off by various outlets, and from several other symptoms, to be hereafter mentioned, I have no doubt, how much soever,

* Although, contending thus much with regard to this fluid, when in excess or defect, as a remote and primary cause of atmospherical derangement and animal disease, I would not be considered as denying the agency of other concurring causes, producing the same or similar effects.

“ it has been disputed by some ingenious men, that a
 “ putrescency of the fluids to a certain degree, does
 “ really take place in many cases of fever.”*—
 Again: “ *Secondly*, The cause of death in fevers may
 “ be a *poison*, that is, a power capable of destroying
 “ the vital principle; and this poison may be either
 “ the *miasma* or contagion, which was the remote
 “ cause of the fever; or it may be a putrid matter
 “ generated in the course of the fever. In both cases,
 “ the operation of such a power appears, either as
 “ acting chiefly on the nervous system, inducing the
 “ symptoms of debility; or as acting upon the fluids
 “ of the body, inducing a putrescent state in them.†

By a reference to Book I. page 198, we find that all the sensible parts of the animal system, but more especially the nervous fibres are *conductors* of the electric fluid—that the nervous fluid, or animal spirits is analogous to, or is the same with the electric fluid. It must be evident, therefore, that the animal system is capable of being electrified *plus* and *minus*, or positively and negatively.

If this be admitted, we will prove, that whenever the atmospherical equilibrium is impaired by a *plus* or excess of *oxygen*, the *nervous fluid* is also *plus*, and an increased excitement of the nervous fibre is the consequence, as may be evidenced in rheumatism and the other *phlegmasiæ* of Dr. CULLEN; now, this increased excitement of the nervous fibres, is the effect of an excess of oxygen or the electric fluid in the atmosphere, and stimulating them in excess; and thus producing an inflammatory action of the rest of the fluids in succession, and so, on the other hand, whenever there is a deficiency of oxygen or the electric fluid in the atmosphere, the system parting with some of its proper quantity of the vital principle, may be said to be *minus* or deficient, and now, that particular energy of nature, *its excitability*, termed by some writers, the *vis medicatrix naturæ*, by a powerful at-

|| Cullen's Practice, paragraph LXXII.

† Ib. id. paragraph CI.

tempt to restore the equilibrium of the nervous fluid, or to bring back its proper quantity, becomes an exciting power of itself, which Dr. CULLEN terms* *re-action*, and describes, as being distinguished by the following symptoms: 1st. the increased force, hardness and frequency of the pulse. 2d. the increased heat of the body. 3d. the symptoms which are the marks of a general inflammatory diathesis, and more especially of a particular determination to the brain, lungs, or other important viscera. 4th. the symptoms which are the marks of the cause of violent *re-action*; that is, of a strong stimulus applied, or of a strong spasm formed, the latter appearing in a considerable suppression of the excretions, and this may, and does in some degree, account for the variable character of those modifications of disease, which at first put on the appearance of inflammatory action, but are suddenly changed to that state, which constitutes the highest grade of *typhus fever*; a most striking example of which, may be seen in the *typhus endemiu* or Strangers or Yellow Fever.

From all these circumstances taken in connexion, it appears to me, probable, that the electric fluid, which is at least, the great constituent principle of the nervous fluid, is the actual cause of both, *action and re-action* in the animal system. The hard callous bodies which are attached to those nerves, that supply the organs of involuntary motion, and are called *ganglions* are among the *non-electric* bodies; the baron DE HALLER has proved them to be incapable of contraction, and wholly devoid of irritability; he therefore considers them as so many *checks, which prevent our volitions from extending to those nerves, and also sensation from reaching the common sensorium*. In violent fits of passion, the accumulated electric fluid of the nerves, however, passes these barriers, and the vital organs are immediately in agitation, and sometimes death ensues †

* Cullen's Practice, Par. CII.

† Thornton's Medical Extracts.

That an electrical excess, and a deficiency of this vital fluid can and does take place in the atmosphere, and also, in the animal system may be proved from the following effects. An electrical excess is evidenced,

1st. In the death of animals, vegetables and minerals by thunder and lightning artificial electricity and galvanism. Animals and vegetables are struck dead by lightning, or a powerful electrical battery in an instant, and the oxidation of minerals or metals is as instantly effected by means of a galvanic battery. Mr. VAN MARUM by means of the *Tylarian battery*, which contains 130 square feet of coated surface, succeeded in *oxydating*, and again *de-oxydating* metallic substances.*

2d. In less excess it produces *asphyxia*, or a suspension of the vital and animal functions—inflammation, &c: and in that excess which constitutes what is termed an inflammatory constitution of the atmosphere, as in the years 1789 and 1807. *Catarhus epidemica*, or influenza, becomes almost universal, and generally speaking, whatever may be the type of the prevailing diseases, they, for the most part are accompanied with inflammation, either general or local.

3d. As it regards the atmosphere, the derangement is remarkable and in many instances awful. The violent concussions of thunder and lightning are familiar to most persons, as are those other effects of this powerful re-action of nature, already noticed.† Eggs are so *addled* as to be incapable of producing *chicks*, and sweet milk is suddenly soured. But as soon as the equilibrium is restored, how calm and tranquil are all things? The air is purified, breathing becomes free, strong and pleasant, the mind and body seems to acquire new life and vigour, and disease is merely casual, as has been fully experienced in this year 1818, and in all those years in which there is an equilibrium. Reverse the order, and let a deficiency of this vivifying fluid take place in the atmosphere, as in

* Ree's Cyclopaedia, Article, Electrical. † Preface.

the year 1817, its absence is soon perceived by the various phenomena which occur. As it regards the animal economy, "the whole system appears to be unstrung, the nerves seem to lose their tension and elasticity till the north or west winds awaken the activity of this animating power, which soon restores the tone, and enlivens all nature, which seemed to droop and languish during its absence.* If the deficiency be great, in consequence of excessive heat and moisture combined, the prevailing diseases are for the most part, such as have a tendency to gangrene, these are *typhus endemia*, *cynanche maligna*, *peripneumonia typhodes*, *typhus petechialis*, (or spotted fever) &c.† The two last diseases are said by Professor HOSACK, to be derived from an "*epidemic constitution of the air*,"‡ which I term an *asthenic constitution of the air*, to distinguish it from the *sthenic* or *inflammatory*; since it is certain, that diseases are *epidemic* in either case, viz. *catarrhs* in the one, and *typhus* diseases in the other.§ The decomposition of animal and vegetable substances are greatly facilitated in this *asthenic* constitution of the air, which being deprived of a portion of *oxygen* is loaded with an *ammoniacal gas*, or of *hydrogen* and *azote* combined, and in this state is peculiarly favourable to the generation and support of those modifications of disease, which I have distinguished as infectious.

I now proceed to advance further proofs of the existence of this fluid in, and its power over the animal system; and for which I am particularly indebted to the author of "*Medical Extracts*;" and generally to the immortal DE HALLER, BRYDONE, PRIESTLY, CAVALLO and others.

The circumstances which go to prove that the electric fluid, influences the animal system, in an especial manner, seem to be derived from the effect of its operations on the *irritable* and *sensible* parts, and also on the mind, the "will, consciousness, memory,

* Brydone's Tour. † Essay on Yellow Fever, &c. page 115.

‡ Observations on Peripneumonia Typhodes.

§ Essay on Contagions and Infections, page 202, and Sequel

imagination, judgment, &c.” It appears to me probable, that its effect on the mind, is to regulate its properties, by affording energy to the *will*, arousing *consciousness*, recalling or awakening the *memory*, enlivening the *imagination*, and strengthening the *judgment*, &c. and that this is the case, we have only to examine the situation of these properties of the mind, when there is a deficiency of this fluid in the atmosphere. Consult the learned Dr. RUSH on the state of the animal system,* during an asthenic constitution of the air, or that attentive Tourist, BRYDONE, and we shall find a universal sluggishness in all the functions of mind and body; very different from the vigour and activity that exists while there is an electrical equilibrium in the atmosphere. Can any thing then be more plain, than that this fluid is the great vivifying principle of nature, and in its proper quantity gives vitality and health to the universe; but in moderate excess or deficiency, is productive of disease, and when in high or extreme excess, it is also the cause of destruction and death?

“Is it not reasonable to suppose” says Dr. THORNTON, “that in the subtle vascular texture of the cortical substance, there is strained off or secreted from the *arterial blood*, a fluid, the finest, most attenuated and most moveable in all the animal body, a fluid analogous to fire, or the electric fluid? And, since the medullary substance of the brain, is of a fibrous composition. the threads of which are disposed in a parallel direction, does not this subtle penetrating fluid, therefore cling to the *medulla*, and pass along the nerves, at the command of the will, just as the electric fluid is retained by the *main conductor*, and passes along the wire connected with it?”

That portion of the animal system which acts as conductors of the electric fluid, has been generally heretofore, termed the *nervous system*, and these, when compared to the seats of excitability, particularly

* Account of bilious remitting Yellow Fever of 1793, page 86.

those of the medullary nervous matter, and muscular solid, it must appear evident, that from the peculiar effect of this fluid upon the peculiar excitability of this division of the system, they are thus made the proper vehicle of all our feelings, and of all our sensibilities. If so, the threads or fibres called nerves, are so many *electrical conductors*. The electricity of each fibre is excited apart, and each part impresses a stroke upon the brain, which is proportioned to the impression they receive, and to the excitement of the *electric matter*. In this case, every nerve excites distinct impressions; not only several impressions are made at the same time but they are effected with a rapidity that refutes the idea of sluggish matter, and which belongs *uniquely* to the electric fluid.* Again,

“ The causes which excite sensation, being without the body, to wit, the objects of the five senses, and external, with respect to the medullary part of the brain, is it not reasonable to infer, that sensation is produced by the reflux of the *electric* or nervous fluid moving along the nerves towards their origin, occasioned by the impulse of its objects or causes? Or, is this fluid expanded and drawn off, and sensation the result of the determination of the electric or nervous fluid to the part stimulated? In the exercise of voluntary muscular motion, it is no less natural to conclude, that the *electric fluid* is, by an effort of the mind operating in a manner instantaneously sent from its origin, in the beginning of the medullary part, along the nerves, which are continued into the mechanism of the muscles.

“ Should it be inquired, in what way the *optic nerve* conveys the image of objects around; and whether this arises from vibration, or the motion of *some fluid*? The answer is, it must be confessed, of very difficult solution; but it seems highly improbable, that a *soft inelastic cord* like a nerve, can vibrate, and no *inert heavy fluid* can equal the quickness of perception; we are then induced, says the celebrated BONNET, to admit, that there is a *subtle*

* Thornton's Medical Extracts.

“fluid in the nerves, whose tenuity prevents our seeing it, and which serves alike for the propagation of sensible impressions, as muscular motion. The *instantaneousness* of this propagation and some other phenomena, indicate that there is a certain analogy between this fluid and the electric fluid.”

To the same purpose, are the experiments and observations of the celebrated GALVANI, VOLTA, VALLI, URE, and other eminent *electricians*, all of whom, confirm the idea of their sameness, as the extreme tenuity of this *ærial fluid*, prevents us from seeing it; although we do know that it does exist, as an element that pervades all nature, penetrating the pores of all bodies at its will; so also, since the subtlety and tenuity of the *nervous fluid* prevents us from seeing it, although it is admitted to exist, and is acknowledged as the peculiar stimulus or life of the nerves, we see no reason why they may not be analogous to each other, or even the same fluid.

In the animal system, the nervous capacity is abundant, and it appears, that in this capacity, the rudimental projection of the organization, dimensions, form and powers of the body, consisted, and it would appear, says MAYO,* from numerous facts, to involve the mind itself in its provisions; even thought, reflection, reason, sympathy and conception, would appear like electrical phenomena. The sensibility of the nerves, is a fact so well established, that it is presumed, no one who has the least conception of anatomy would doubt it; and although, as I already said, “I should perhaps fall into the common error, of attempting to account for things, which from their very nature, must, and ever will elude our searches.”† I cannot avoid the advancement of such facts, as have been established by experiments, and which go to prove the correctness of this doctrine, because I cannot explain them.

If any fact, in itself inexplicable, is to be proved by analogy, I think this circumstance calculated to

* Mayo's Notes on Wesley's Philosophy, vol. 1, page 65.

† Book 1, page 196.

throw much light upon the properties and powers of the electric fluid, as the life of the nerves, “when the body is deprived of a limb, it will still feel the complete organization, even to the fingers and toes, and if the nerves be cut off, which communicate to a limb, that limb will become dead to all intents and purposes, even though it still continues attached to the body.” Does this not prove, that the nervous fluid or capacity, constitutes the rudimental projection of the organization, dimension, form and powers of the body? that, although a limb has been severed from the body or trunk, still, the rudimental parts, retaining their peculiar property of communicating the full and complete sensation of an entire body; the impulse of the nervous fluid, continuing to excite the same feeling in the limb, as though it actually extended to all the fingers or toes before their separation.

The effect of medical or artificial electricity upon the muscular and nervous fibres, tend much towards the further confirmation of this fact, but they are reserved to the third book. In this, I will advance such further observations as may be calculated to prove the identity of this fluid with the *nervous fluid*,* and its effects on atmospherical and animal health.

In MAYO'S notes on WESLEY'S Philosophy,† we find the following very interesting remarks on the nervous system. “It is well known, that there is a most powerful sympathy between the mental and organic powers of the body. The nerves are the instruments of all the grades of sensibility, of sickness, of health, of pleasure, and of pain. They are the instruments by which the passions, produce their varied effects on the muscles; fear, dread, and terror, impart a tremor to the nerves, and produce that ghastly spectacle which we behold in cases of affright and danger, this produces a weakness and debility which has a tendency to bring on the very disorder which we dread, by depriving the nerves of their tone, and reducing them to a state of debility similar to that, which would be a natural

† Book I. page 194. † Vol. I. page 66.

“consequence of the disorder.” Dr. CULLEN and others, also consider *fear* as a sedative power, capable of producing diseases either alone, or as a concurring cause.*

It would appear therefore, that *fear* produces a similar effect on the animal machine, to that which is evidenced in an electrical jar, deprived of its charge, it is then no longer capable of communicating its stimulus until re-charged with the fluid, collected at the prime conductor; so the nerves, deprived of their necessary quantity of this fluid by the impulse of fear, are for a while incapable of stimulating the muscles, until they are again supplied or charged with this fluid from its parent source. If the fear be excessive, the effect, in consequence of an exhaustion of the nervous stimulus, is death—when less excessive, it is attended only with temporary exhaustion, and *asphyxia* or swooning is the consequence, as is also the case in all excessive passions and emotions of the mind.

These effects, being generally instantaneous, is an argument in favour of the identity of the nervous and the electric fluid; or, at least, proves them to be analogous; for, as we have already said, the impressions that are made upon the mind, in the passions of fear, joy, &c. are effected “with a rapidity which “refutes the idea of sluggish matter, and which belongs uniquely to the electric fluid.”

It is also a fact, although the manner and cause are to us inexplicable, and only to be referred to INFINITE WISDOM and POWER, “that the nervous capacity is not uniformly the same in different subjects; “nor is it precisely the same in any two subjects, and “is even subject to variations and fluctuations in the “same individual.” If this were not the case, all men would be uniformly alike, actuated by the same principles, tending to the same objects, so that there would be no discriminating properties in them;†

* Cullen's Practice, Par. XCVII.

† Analogous to this is the fact, noticed in Dr. Hunter's Gurgical Essays, that it is from the different elaboration of a mass of innocent earth that gives life and vigour to the bitter alocs, and the sweet sugar-cane, to the cool house-leek, and the fiery mustard, to the nourishing grain of wheat and corn, to the deadly nightshade, and the still more deadly upas! Who shall be able to account for this?

whereas, now, although most, if not all men have nearly the same exterior form and appearance, and have the same passions and emotions inherent in the nervous capacity, some have one passion or emotion differently acted upon than some others, and often, the same individual experiences all the passions and emotions peculiar to all, at one or other time within himself.

The nervous capacity does not terminate here, for in addition to what we have already said of them, they appear to possess a kind of eccentric power of two distinct properties, termed their *active* and *passive* capacity. “The one is, that whereby the nervous effluvia is generated in the system, and which appears to be immediately employed to originate mental sensibility, and imagination; this diffuses itself from the centre to the circumference. The other, is that whereby impressions are made by outward objects on the organs, and which appears to be the source of organic sensibility and perception; this transfuses itself from the circumference to the centre. The former may be considered as an active, the latter as a passive capacity. In the active nervous capacity consists the degrees of animation and energy, which excite and propel to action, and which are employed to originate thought and design. In the passive capacity consists the appetites and passions; these are invested in the external organs, which are most conveniently situated for their respective enjoyment, and which are strongly excited thereto by their peculiar irritability. It would appear indeed, as if it was the original design of the CREATOR, that a perfect *equilibrium* should exist between the mental and organic powers; and perhaps, in that perfect equilibrium alone, could consist the most perfect degrees of health and enjoyment.”*

It appears therefore, that an electrical excess in the nervous system is, as has been already hinted, the stimulus which excites the excessive passions and

* Wesley's Philosophy, vol I. Note, page 66-7.

emotions of the mind ; and is also, in addition to other secondary and concurring causes, the stimulus which excites to a peculiar class of diseases produced by excess ; while a deficiency, whether direct or indirect, is the obvious cause of those diseases, mental and organic, which consist in a want of energy in the vital and animal functions. And thus, does that doctrine of *sthenic* and *asthenic* disease, first published to the world by the immortal BROWN, gain a permanent character for correctness and truth, which unreflecting minds have attempted to stamp, with the odium of error and enthusiasm.

It argues presumption and a vain arrogance, to condemn any doctrine in Philosophy or Science, merely, because it appears chimerical to us, or that we cannot see its principles through the same medium, and under the same circumstances, with the author or founder of such doctrine ; and how ridiculously ignorant must those individuals appear, both to themselves and to posterity, when such doctrines prove themselves to be correct, from a chain of concurring experiments and facts, resulting from its advancement ? It were, therefore, wiser to respect at least, the opinions of every author, who, from an earnest desire to investigate the principles of science, shall give to the world his labours and his experience, as the common stock or joint property of all men, than to censure or condemn them, before their doctrines and their *hypothesis* are refuted by such tests and upon such principles, as are warranted by opposing facts, equally strong and conclusive.

Who has been able as yet to determine, whether the nerves be tubular or solid rods ? Or whether they contain within them, or convey without them, the fluid which is acknowledged to be their proper stimulus or life ? Has the fluid itself ever been discovered ? There was a period in the History of Medical Science, in which, if the circulation of the blood had been asserted by any one, he would have been considered by the *profoundly wise* of that age, no better than an idiot or a visionary being. The circulation

of the blood, however, is now among the best established facts in the science, and I shall not be disappointed, if in a few more years, the doctrine of the identity of the electric fluid, with the nervous fluid, and of its being a fifth element, and the soul of nature, influencing the atmospherical and animal health as a primary principle, &c. shall be established upon principles as firm as any in the catalogue of medical facts.

That there are candidates for both sides of the question is beyond doubt, whether the nerves be tubular or hollow canals, containing a fluid proper to them, and analogous to the electric fluid? Or whether they are solid rods or "threads, which being highly elastic, vibrate variously to occasion various sensations?" It is not to be denied, that great ingenuity has been displayed on both sides of the question, still the subject remains a matter of doubt, who then shall determine? We have nothing but experiment, reason, analogy, and cause and effect to guide us, in determining on a question, whose answer is involved in inexplicable obscurity, and to those alone we must refer for a probable solution, keeping in view the elegant comment of the learned Dr. EWING, on Sir ISAAC NEWTON'S Rules for Philosophising,* which is as follows :

"As we have no safe method of investigating any cause, but by its known effects; when one cause is sufficient to explain the phenomena, we have no possible means of knowing that there are two or more; and, therefore, it is *unphilosophical* to assume the liberty of imagining that there really does exist more than one cause of the effect."

That the nerves are *inelastic cords*, appears probable from these effects, "a nerve cut asunder, does not retract its divided extremities, but becomes rather longer, extending its medulla into a round tubercle." Again, "were it elastic, it should be composed of hard fibres, having their extremities fixed to some firm bodies, since strings, otherwise con-

* Ewing's Philosophy, by Patterson.

“stituted and disposed, have no elasticity;”* and MAYO, in his notes on the above passage, says, “it would appear that the nerves are solid rods, which are endued with the especial capacity to be conductors of the *animal electricity*. This is what we comprehend under the idea of sensibility, which is of two kinds, mental and organic; and to preserve the system in complete harmony, their powers should be equibrously exerted; but their harmony may be interrupted and broken, by an undue preponderance. In cases of insanity, in hysterics, and hypochondria, there appears evidently, a derangement of the nervous system, and this appears to be of a mental kind. And convulsive, spasmodic, and paralytic affections, would appear to originate in a debility of the organic nervous powers. In short, it would seem as if the nerves were instituted the proper and sole directors of order in the system: that as long as they retain their native constitutional energy, they are competent to repel successfully, any attack on the vital powers: that a growing debility of the nervous powers, is a growing predisposition to some violent attack on the vital organs, and that all sense of pain and sickness, is a nervous struggle for the maintenance of their constitutional prerogatives; for their native authority and precedence in the body physical, if I may be allowed the expression. And that, finally, death takes place, when the nerves have lost the power of action and reaction, and can no longer propel or stimulate the muscles and vascular organs.”

Upon the principles then, of Sir ISAAC NEWTON, I request an investigation of the following propositions:

1st. The nerves are admitted, if not proved to be, the conductors of electricity.

2d. They are admitted to convey a fluid, which is of so subtle a nature, that its tenuity prevents our seeing it.

3d. This unknown fluid is admitted to be the *stimulus*, or life of the nervous system, acting upon them in

* Wesley's Philosophy, Vol. I. page 66.

a two-fold capacity, exciting both mental and organic sensibility.

4th. It is further admitted, that this fluid may exist in undue preponderance or excess, thence occasioning diseases, which extend to the mind, and again, in that deficiency, which produces a debility of the whole system evidenced by diseases peculiar to a debilitated state of the animal economy.

5th. The nerves are not only admitted, but proved by analogy to be solid threads or cords, soft, inelastic, and the absolute medium of sensibility, both mental and organic, and are supposed to serve alike for the propagation of sensible impressions and muscular and vascular contractions and expansions, and the *instantaneousness* of this propagation and its effect, together with some other phenomena, indicate at least, that there is a certain analogy, if not identity, between this fluid and the electric fluid.

6th. " In excessive fright, the eyes for a moment flash fire, the hair becomes electric and stands erect, the heart palpitates, &c." Are not these effects observed in patients insulated for electrical operations?

These, and numerous other phenomena, compel us to acknowledge at least their analogy, and in the language of the learned author of the "*Philosophy of Medicine*," to inquire, if " admitting the analogy, if not perfect identity betwixt the nervous fluid and that of electricity, we can account for one part of the appearances; upon what other principle can we explain the power that can make

" The knotty and combined locks stand an end,

" Like quills upon the fretful porcupine!"

" whence otherwise shall we account for those fiery scintillations of the eye, first excited upon a sudden alarm? And whence that succeeding dimness, when the hairs of the body subside, and the limbs sink down powerless."

In short, the more we examine the character and property of the electric fluid, the more will we be convinced, that it is the same identical fluid, that is the great agent of the *Immense Mind*, for carrying on

an essential operation in nature,* and from the dread convulsions of an earthquake, to the gentlest modulation of the nerves; it is the same power, only differently modified.

B O O K III.

SECTION I.

Miscellaneous Remarks on the Utility of the application of this Fluid, to Medical purposes.

It is not reasonable to suppose, that a fluid which appears to be an inherent principle in all the works of nature, and which in so eminent a degree influences the vital and animal functions of the human system, as it is clearly ascertained, the electric fluid does; we repeat, that it is not reasonable to suppose, that such a fluid should be without important uses in its medical application in a variety of diseases that originate in a disordered state of those functions. And, as “in every part and operation of nature, the fitness of things to one another, and their subserviency to the best ends, and to the use and felicity of intelligent beings, point out the consummate wisdom and goodness of one *Great Artificer*, one *Original Mind*;” so, with regard to the effects of this fluid, when properly and judiciously applied, it may be rendered subservient to the health of man.

Its superior influence over all the known powers of nature, entitles it to rank in the highest possible scale of *stimuli* or exciting powers; and here, an extensive range for the philosophic mind, offers itself to their consideration, both with regard to its powers and medical properties, and the manner and modes of its application, to the most laudable and humane purposes, the resuscitation of life, in cases of *asphyxia*, or suspended animation, and to the cure of disease.

* Mr. Wesley, in his Philosophy, says, “It is highly probable. this is the general instrument of all the motion in the universe.”—Vol. II. page 76.

In the first book* I have endeavoured to distinguish, between the natural and artificial fluid, the latter being excited by means of various apparatus, is either *metallic* or *galvanic*, or, more correctly speaking, the one is effected by friction, the other by a "fermentative process of metallic substances," produced by a combination of acid and alkaline solutions; but, by whatever means this fluid is elicited, it is believed to be the same fluid, differently modified, as has been there particularly expressed.

If then, this fluid is of such vast importance in its medical application, why is it not received into general use? The answer may be found in the considerations which follow :

The application of this important fluid to medical purposes is of no very distant date, for we have already shewn, that it was not discovered to possess the property of stimulating the system, until some time in the year 1746. The elder Mr. JALABERT, professor of philosophy at Geneva, is said to be the first who applied it to the cure of diseases, and that he succeeded in curing a locksmith, whose right arm had been paralytic fifteen years, by operating upon him at different times, from the 26th of December, 1747, to the 28th of February, 1748. The celebrated SAUVAGES, of the academy of Montpellier, next attempted the cure of paralytics, with considerable success, by means of electricity.

By consulting the works of FRANKLIN, PRIESTLY, CAVALLO, BRYDONE, and the *Medical Extracts*, we find a host of cases recorded, which go to prove the increasing importance of this fluid in medical practice from that period to the present time; and the most probable reasons of its not being received into general practice, may be inferred from the trouble and care which it is supposed are required with the apparatus, and the failure, which always happens when the fluid is improperly applied, as has unfortunately been too often the case, ever since the days of

* Book I. page 194.

Dr. FRANKLIN, who observes, that he has known
 “ some paralytic cases in which electricity seemed
 “ rather to make the patients *worse* than better. .

In order to obtain the greatest advantages which artificial electricity is capable of affording towards the restoration of health, it will be essential to distinguish between those modifications of disease in which it can be applied to advantage, and those in which it would, in the language of Dr. FRANKLIN, “ make the patients rather *worse* than better.” My own experience, for sixteen years, enables me to add my testimony to the truth of that part of Dr. BROWN’S doctrine, which distinguishes between *sthenic* and *asthenic diseases*; and the caution necessary, when administering *stimulants* in the former, or extensive *depletion* in the latter; and in no article of medical application, can the doctrine be more effectually tested, than in that of electricity, as will be shortly proved.

The list of diseases in which this fluid may be rendered of infinite advantage is extensive, comprehending many which come under the class of diseases of debility or *asthenia*: It is, therefore, not to be doubted, that if applied to *sthenic* diseases, it is then productive of injury to the patients, by increasing the excitability of the system, already excited in excess; that this was the case in those paralytic affections which grew worse on the application of this fluid, is not to be doubted, and many cases that have come under my own observation, tend to confirm it.

In the medical department of the Encyclopedia Britannica, we find, under the article *electricity*, the following appropriate remarks: “ Hitherto electricity
 “ has been generally applied to the human body,
 “ either in the method of drawing sparks, as it is called,
 “ or giving shocks. But these operations are both
 “ violent, and though the strong concussion may suit
 “ some cases, it may be of disservice in others, while
 “ a moderate simple electrification might have been
 “ of use.”

The effects of the application of this fluid to the human body, appear to be principally and primarily confined to the nervous system, then to the arterial system and the muscles; and secondarily, to all parts of the system in relation to their connexion and dependence on these respectively; and these effects are evidenced by the promotion of a free circulation of the fluids, particularly the blood, which is known by an increase of the pulse. Animal heat is also increased by it, and in many cases, where *diaphoretics* and *sudorifics* have failed to produce sweat, a generous and free perspiration has been known to result from electricity. So also, are all the secretions and excretions of the body greatly promoted by it; and so high an opinion had that eminent physiologist and anatomist HUNTER, of the powers of this fluid, when applied to medical purposes, that he says, "it is probably the only method we have of immediately stimulating the heart, all other methods being more by sympathy."*

The improper application of this important and instantaneous stimulus, to the cure of various modifications of disease, without regard to the constitution of the patient, or whether the disease be of excessive or defective excitement, is among the most conclusive reasons, why, in some persons it has done manifest injury by increasing the symptoms and aggravating the complaint; hence, bringing electrical operations into disrepute and preventing them from being resorted to in general, as a safe, speedy and effectual stimulus in all diseases in which the administration of stimulants are most obviously indicated.

The experience of years has proved to every attentive *electrician*, the impropriety of its indiscriminate application to disease; still little has been done, towards the establishment of a system of medical electricity. The importance of a system of this kind, is acknowledged by most practioners, yet it remains to future times, and more extensive experience, to call forth the talents and industry of some fortunate

* Hunter's Proposals for the recovery of drowned persons.

individual, who shall be qualified for its formation, and who shall, from a series of *legal experiments*, be enabled to distinguish between those diseases in which it would be applicable to advantage, and those in which it would be hurtful.

It is my design in this Essay, as it was in my "*Element of Medicine and Universal Doctrine of Disease*," to make the attempt, however feeble, towards the introduction of such a system ; or at least to form a kind of outline, which might serve as a skeleton, from which some more able mind, and experienced practitioner, might favour the world with a perfect system of practical electricity, adapted to all the diseases to which it may be applied with advantage and safety. In the mean time, I shall offer such remarks on the advantages of practical electricity and galvanism, as have come under my own observation and practice, within the last sixteen years, together with what I have been able to collect from the writings and experience of the most popular authors and practitioners of the age.

In most all the diseases termed *sthenic* by Dr. BROWN, and which are produced by excitement in excess, the application of this fluid is not only improper, but even hurtful ; and whether the disease be general, or any local irritation prevail in the body, such as inflammatory tumours, ulcers, eruptions of the skin, &c. operations from an electrical machine, or *Voltaic pile* increases the symptoms in each ; as the electric stimulus has a direct tendency in these cases, to produce congestions, or a local accumulation of humours, because these diseases having been produced by excessive excitement, either general or local, the application of this stimulus will be superadding to the same powers, already too much excited. It is then no wonder that Dr. FRANKLIN, and others, found electricity rather to make the patients worse than better. Perhaps they converted an *asthenic paralysis* to a *sthenic* by the violence of the shocks, and an excessive application of this stimulating fluid. This has been almost invariably the case in all those operations

which I have witnessed, both with the *Voltaic pile*, and the electrical apparatus.

It is in *asthenic diseases*, or diseases of debility, whether direct or indirect, in which the nervous system apparently labours under that deficiency of its proper stimulus or life, and in which all the senses are dull, the motions, both voluntary and involuntary are slow, the heart and arteries are languid, and the circulation of the blood, weak, small, and irregular, that we are to obtain the greatest advantages from a judicious application of this fluid.

Although, greatly averse to the fabrication and introduction of new terms in *nosology*, I have been obliged, in order to distinguish between those nervous affections which owe their origin, to an excess or superabundance of the electric fluid, and those from a deficiency; to term the former, *Electroses*, while I consider the latter, as very proper to be retained among the *Neuroses* of Dr. CULLEN. To every impartial mind, this division must appear highly proper, as it respects the practice of electricity; and as such I very respectfully submit it to their consideration.

Electroses, or the diseases in which the application of this fluid will be highly improper, consists of the following, as detached from the second class of Dr. CULLEN'S *Synopsis Nosologiæ Methodicæ*.

Class II. NEUROSES.

Ord. I. COMATA.—Of this order I consider *Aplexia*, as proper to be placed among the *Electroses*.

Ord. III. SPASMI.—Of this order *Convulsio*, appears to me to be an *Electroses*.

Ord. IV. VESANIÆ.—From this order I would detach *Mania*, and I would also consider all these persons who are easily intoxicated with ardent spirits, as peculiarly predisposed to that state, intermediate between *mania* and *hypochondriasis*; and hence, proper to be considered among the *electroses*. Whether there remain any other genera in this second class proper to be added, I am not able to say, but of those which I have separated, I am qualified to remark, that they are caused by an excess of electrical influence in the

system, and that electrical operations in either of these cases, will "rather do harm than good."

The diseases that very properly remain to *Neuroses*, and some of which are obviously caused by a deficiency of electrical excitement, and in which electrical operations have been and will be attended with the greatest advantages are:

CLASS II. NEUROSES.

Ord. I. COMATA.—1. *Paralysis*; 2. *Catalepsis*.

Ord. II. ADYNAMIÆ.—3. *Syncope*; 4. *Dyspepsia*; 5. *Hypochondriasis*; 6. *Chlorosis*.

Ord. III. SPASMI.—7. *Tetanus*; 8. *Epilepsia*; 9. *Palpitation*; 10. *Hysteria*; 11. *Hydrophobia*.

Ord. IV. VESANIÆ.—12. *Amentia*; 13. *Melancholia*; 14. *Somnium*. To this arrangement, I will also add, 15. *Typhus Endemia*, that is the typhus state of strangers or Yellow Fever, I have not as yet had an opportunity of trying its effects in this disease, but am led to believe, it would be effectual if properly and judiciously applied.

There are, also, some other genera of diseases, distinguished by Dr. BROWN, as *asthenic*, whose causes are to be traced to other sources, than an electric deficiency, in which this powerful stimulus is attended with the best effects; among these, are some states of *typhus fever*, of *tabes* and *atrophia*, *amenorrhoea*, *dysmenorrhoea*, and various modifications of disease accompanied with debility. It has, however, sometimes happened, that even among the disease just mentioned, some local affection, or auxiliary cause has existed along with the general disease, which rendered the application of this fluid improper, and even hurtful; hence, it depends altogether on the judgment of the practitioner, to distinguish between those diseases of debility from direct, and those from indirect causes, and generally, where there is a penury or poverty of blood, together with the symptoms upon which the penury of the blood depends, a relaxation and *atony* of the whole vascular system, the proper application of this fluid will be attended with the most salutary effects.

The genera of diseases which I have distinguished as *Electroses*, when improperly managed, are like all other states of *sthenic disease*, from other exciting powers, converted into *asthenic* by an indirect debility; when this is the case, electrical operations in their mildest form, cannot fail to restore the equilibrium, if not carried to too great length, or used with too much violence.

Experiments illustrative of the effects of electricity, when applied to the cure of diseases, have occupied the time and attention of many illustrious men in all countries since its discovery, and from which it has been clearly demonstrated, that by a proper application of its power, it may be made to suspend and restore animation, at the pleasure of the operator.— This astonishing effect is produced by first passing smart shocks through the head, which renders the animal motionless; then by transmitting the gentlest vibratory shocks, through the region of the heart, oscillations of the external muscles instantly ensue. If the operation be suspended for some minutes, or its duration be altered to parts remote from the heart, the animal relapses into its quiescent state, but will revive on its being repeated, as at first.

The following experiments made by Dr. URE, on the body of a criminal, tend to confirm the belief that this fluid is itself the vital principle of all organized bodies. The experiment was made with a *Voltaic battery* of 247 pairs of four inch plates; “ on moving
“ the rod from the hip to the heel, the knee being pre-
“ viously bent, the leg was thrown out with such vi-
“ olence, as nearly to overturn one of the assistants,
“ who in vain attempted to prevent its extension. In
“ the second experiment, the rod was applied to the
“ *phrenic nerve* in the neck, when *laborious breathing*
“ instantly commenced, the *chest heaved and fell*; the
“ belly was protruded and collapsed, with the relaxing
“ and retiring *diaphragm*; and it is thought, that but
“ from the complete evacuation of the blood, pulsa-
“ tion might have occurred. In the third experiment,
“ the *supra-orbital nerve* was touched, when every

“muscle in the murderers face ‘was thrown into
 “fearful action;’ the scene was hideous, several of
 “the spectators left the room, and one gentleman
 “actually fainted from terror or sickness. In the
 “fourth experiment, the transmitting of the electrical
 “power from the spinal marrow to the *ulnar nerve* at
 “the elbow, the fingers were instantly put in motion,
 “and the agitation of the arm was so great, that the
 “corpse seemed to point to the different spectators,
 “some of whom thought it had come to life. Dr.
 “URE appears to be of opinion, that had not incisi-
 “ons been made in the blood vessels of the neck, and
 “the *spinal marrow* been lacerated, *the criminal might*
 “*have been brought to life!*”

Other important facts, worthy of notice, as affording much information with regard to the salutary, and also hurtful effects of electricity, may be collected from the following histories :

1st. “On stimulating the region of the heart by
 “slight and gentle shocks, in animals apparently
 “dead, the vital organs were more certainly excited,
 “and the motions were more vivid, than when the
 “shocks were increased, and the latter appears to
 “retard, rather than to promote recovery.”* From
 the above phenomena, says Dr. THORNTON, it seems
 reasonable to conclude, that electricity ought to be
 principally directed to the heart, lungs and diaphragm,
 in the form of gentle shocks applied in a moderate
 degree, it excites vital action after other stimuli have
 ceased to act; carried to an extreme it destroys
 irritability and life itself; for, whether the stroke be
 sent from a thunder cloud, or a highly charged elec-
 trical battery, is immaterial, the effect from either
 may alike prove fatal. Hence, the impropriety of
 violent shocks of electricity formerly given in *palsy*,
chlorosis, &c. which like other exhausting stimuli,
 not only defeat the intention, but prove extremely
 injurious.

2d. We have a remarkable instance of the salutary
 effect of this fluid, in the case of the Rev. Mr. WIN-

* Thornton's Medical Extracts.

DER, Rector of Halstead, in Essex.* He is recorded as having enjoyed uninterrupted health to the age of fifty-four, at which period he was attacked with the symptoms of an approaching palsy, and shortly after fell from his chair—was almost wholly deprived of his speech and of his senses; by medical aid he was restored in a few weeks, so as to walk with the help of a cane—he repaired to Tunbridge, and after drinking the waters six weeks, was much relieved, but an universal weakness still remained—he had also violent palpitations of the heart, trembling of the limbs, a *subsultus tendinum*, with frequent *vertigos*.—Worse than all was, a constant pain fixed deep in his heart, with an extreme dejection of spirit. Thus he continued for nearly eleven weeks, when, about ten at night, while he was asleep in bed, it began to *thunder and lighten violently*; the noise suddenly awakened him. At this instant, he felt a quick strong shock, affecting him all over, just like an electric shock; at the same time the chamber was filled with lightning, which left behind it a *strong phosphorous* smell. Immediately he felt as if some obstruction in his chest was suddenly removed, and his breast recovered its full liberty and expansion, the oppression being entirely gone. When he arose in the morning, he was in perfect health; his head was quite serene, his breast easy, and he could move all his limbs with as much steadiness and agility as ever. Every paralytic symptom was gone; he could have walked ten or twelve miles with ease, and from that very hour, he has continued in a perfect state of health.

The foregoing case affords us the strongest proof of the efficacy of electricity in those paralytic affections accompanied with debility, and enables us to form some idea of the character of the disease; notwithstanding the violent palpitations of the heart and *vertigo* which might have led us to suppose the application of this fluid highly improper. It makes it also highly probable, that those symptoms occur in *asthenic* as well as *sthenic* diseases; or, that palpita-

* Wesley's Natural Philosophy, vol. II page 88.

tion of the heart and vertigo, is sometimes the effect of a penury or poverty of the blood, as well as of a *plethora* or fulness, and is then evidenced by a corresponding debility of the system, and other characteristic symptoms of *asthenic disease*, and in which the application of this stimulus appears to be necessary to counteract and remove them.

3d. In the European Magazine for June, 1803, it is stated, that “a man who had been bitten by a mad dog, and was in the last stage of canine madness, was taken to Professor Rossi, of Milan, who perceiving that he could not endure the sight of water or even any shining body, prepared in another room, a Galvanic pile of fifty plates of zinc and silver, separated by *discs* of pasteboard, moistened with a solution of the *muriate of ammonia*; he then used small strips of whited brown paper for a conductor, on which he caused the naked feet of the patient to be placed; and at the moment he opened his mouth to bite, he thrust in the end of his conducting rod, which communicated with the other extremity of the pile. The patient suffered much during this operation, which, after several shocks, rendered him so weak, that he was unable to stand. Being then extended on the floor, he was Galvanized with facility; the operation producing a copious perspiration. At two o’clock on the day succeeding the process was repeated, and at six o’clock on the following morning, the man went alone to M. Rossi, to tell him he was perfectly cured, for he felt no pain, the inflammation in his throat had subsided, and he had lost all aversion to water and other liquids; some time after he again submitted to the shock, and is now perfectly recovered.

4th. On the 31st of August, 1804, I was called to a patient in Radcliffeborough, said to be bit, on the 23d of the same month, by a mad dog. I found him laying with face on the bed, on arousing him, he began clawing the bed, wall of the room, &c. with his hands and nails, growling all the while like a dog, gnashing his teeth, &c. and snapping at the persons

present, requesting that we would chain him, as he felt an involuntary disposition to bite us. I had him secured, and dressed the wound, (which appeared disposed to heal) with a stimulating ointment, and giving him internally a large dose of *Tinct. Melo Vesicat.* Left him for the night; next morning, I had him brought to my house, in which there was a double Voltaic pile of two hundred and fifty zinc and copper plates, of five inches diameter, separated by discs of broad cloth, moistened with the common solution. He was placed in a chair, and the balls secured in his hands, the chains being extended to the extremity; a most profuse perspiration took place, although no other sensible effect could be perceived: next morning the *rabid* symptoms ceased; in the afternoon he submitted to the operation for an hour, becoming every day evidently better. On the sixth day, (being the 14th from the bite) the operation had the same visible effect upon him as upon other patients, and he was discharged cured.

5th. DE HAEN says, that he never failed to cure *St. Vitus Dance* by electricity; and I have myself relieved a case of three years duration, by the same means. Independent of numerous *paralytic* and *rheumatologic* cases, cured by electricity, we have accounts of various diseases, apparently *sthenic* or inflammatory, that have been also cured by it; among these,

6th. CAVALLO mentions the case of a gentleman, who was seized with so violent a sore throat, that he could not swallow any thing; but was perfectly cured by drawing sparks from the throat for half an hour, and in one hour the patient could eat and drink without pain.

7th. Mr. LOVET relates a case of *erysipelas*, or *St. Anthony's Fire*, that was cured by drawing sparks with the knuckle, or an iron style, the patient being insulated. And he considers electricity as a specific in all cases of violent pains, obstinate head aches, the sciatica and cramp, tooth-ache, &c. and mentions a case from Mr. FLOYER, Surgeon at Dorchester, Eng-

land, of a complete cure of *gutta serena*, and another of obstinate obstruction in two young women.

8th. The same gentleman cured a lady of a *fistula, lachrymalis* of long standing by means of electricity.

9th. Mr. Surgeon BIRCH, cured a young woman of a tumour on her thigh attended with many complicated symptoms, and among them a suppression of the menses, which had lasted seven months, by passing electric shocks through the region of the *pelvis*; on the fifth day her menses appeared, and flowed gently for three days, but when they ceased to flow, she was seized with a pain in her side, which was also removed by electricity, and she was ultimately recovered from all her complaints.

10th. He also gives another case of a lady who had been afflicted with painful ulcers in both her legs, for more than fifteen months, and which succeeded her lying-in; the legs were greatly swollen, but the ulcers had no malignant appearance; she had also a miscarriage ten months after, since which she had not been regular, but nature had endeavoured to relieve her at regular periods, by discharges of blood from the ulcers. Proper dressings and bandages were applied to the parts, and at the accustomed period, she was electrified; the next day she was taken out of order, and continued so the whole week. The ulcers mended from that time, and were healed in three week after.*

11th. Suspended animation, muscular contractions, universal tetanus, chronic rheumatisms, venereal affections, and a variety of other cases, cured by electricity in conjunction with other medical means, are related by the humane and learned Drs. FOTHERGIL, PRIESTLY, BEDDOES, THORNTON, CAVALLO,† ROSSI, CREVE, and many others; a recapitulation of which cases would swell this Essay to an unintended bulk; and, as much remains to be said on the most proper

* Cavallo on Medical Electricity, vol. ii. chap. 3.

† "Swellings in general which do not contain any matter," says Mr. Cavallo, "are mostly cured by drawing the electric fluid with a wooden point"—White swellings of the joints, (*emphysema*) *fistula lachrymalis*, cutaneous eruptions, scrophulous tumours, *cancers*, *lumbago*, *sciatica*, and even *pulmonary inflammations*, when in their beginning or incipient state, have been relieved by this fluid.—*Medical Electricity*, vol. ii. chap. 3.

modes of its application in disease, we refer our readers to those invaluable authors, and proceed to the practical part of our subject.

SECTION II.

General Remarks on Practical Electricity.

IN the application of this powerful stimulus to the cure of disease, three things are to be principally regarded :

1st. As it is known to stimulate the blood vessels as well as the nerves, and when very strong, is capable of destroying the mobility of the nervous power, which originates in the brain, its application should be always directed to parts remote from the head, nor should it in any case be forcibly employed, since it has been made to appear in the foregoing pages, that the injury done by artificial electricity, proceeds not from any want of efficacy in itself, but from the misapplication of its powers.

2d. That to derive beneficial effects from its influence, we should never use it in *sthenic diseases* of any kind, unless it be by insulating the patients, and drawing sparks from them with the knuckle, or drawing off the fluid by means of the zinc and silver mouth plates, to be shortly described. And, when applied in *asthenic diseases*, we are to look for beneficial effects, more from its moderate and regularly repeated operations than from violent or excessive applications of its power, in which way, it can seldom be attended with any good, but most commonly with very hurtful effects.

3d. The system ought to be prepared for the reception of the fluid, by previously emptying the stomach and bowels of their morbid contents. From a neglect of this, I have had several very strong and robust patients to become suddenly faint, with great nausea and a temporary dimness of sight ; these have been relieved by reclining on a settee for a few se-

conds, and the application of volatile salts or harts-horn to the nostrils; at least, one or two doses of some active cathartic should be taken either before or in conjunction with this potent stimulus, in order to prevent these unpleasant effects.

The artificial excitation of this fluid for medical purposes are various, those in common use, are, electrical machines, Galvanic troughs, Voltaic piles, Galvanic mouth plates, metallic tractors, &c. And also, by the *gymnotus*, the *torpedo*, the *silurus electricus*; and lastly, by friction with new flannel. It is deemed unnecessary, to enter into a description of the different apparatus necessary for constituting the respective machines, they are fully described by the editors of the *Encyclopedia*, REES' *Cyclopedia*, CAVALLO, &c. to which the reader is referred. I will, however, notice that the most useful, either for medical or philosophical purposes, are those whose prime conductors are very large. I was led to the experiment of enlarging my prime conductor, from the idea that the electric fluid might be most aptly compared to pure gold, a grain of which will hammer thin enough to cover a surface of two and a half square feet. In like manner, I conceived the diffusibility of the electric fluid to be so great, that a single spark of it would cover a surface of equal dimensions; and that hence, in bad weather, the little fluid collected on the glass was dissipated, or otherwise made its escape from a small conductor, before a sufficient quantity for an electrical operation could be collected.

With this view, I have enlarged my prime conductor to a cylinder of two feet two inches in length, and four inches in diameter, with a ball at each end, of nine and a half inches diameter; from one of which balls, two cylindric arms terminating each with a ball and curved brass rods, surrounding the two sides or edges of the glass plate, the rods having each a row of teeth for collecting the fluid from the electric. With this machine, the electric or glass plate of which is of the diameter of twenty-two and a half inches, I have been enabled, under all circumstances of the

weather, (with some little pains and extra. exertion, during the very worst kind of it) to procure sufficient fluid for medical purposes; while, with my former common conductor of twenty inches length, and three inches diameter, the fluid escaped as fast as it was collected from the electric. A large prime conductor is hence proved to be infinitely superior to the common ones in use;—extremes, however, are to be avoided. (*See Plate at the end of the book.*)

Mr. PARTINGTON, a celebrated electrician, of London, made a very judicious improvement in the mode of communicating the electric fluid, by means of *wooden points* fixed to the metal, by which a constant stream of this fluid can be directed with safety to any part of the body; and he succeeded in curing a violent inflammation of the eyes, in which the eyelids were closed, accompanied with excruciating pains, shifting from one part to the other, but principally existing on his temples, and sometimes darting to the back part of his head, or to the centre of his eyes; this cure was effected in five weeks. Deafness of seventeen years standing was cured by Mr. WILSON, with the electrical fluid thus communicated. The wooden points are very simple in their construction, and are of various sizes according to the parts for which they are intended to be used; a bit of lance or boxwood, beech, or any very compact wood, having a small hole bored in one end, to receive the point of the metal director, is cut or turned in a turning-lathe, in the form of a cone, having a sharp point, and being fixed by inserting the point of the director into the hole of the base of the cone, the director being attached to the prime conductor, by the chain in the usual way, it is then prepared for use.

With a view to modify the shocks from a Leyden jar, which in the usual way, is disagreeable to all patients, and especially so to those of delicate nerves, and upon the principles of the transmission of this fluid in the nervous system, to the common sensorium; previously modified by the *ganglions*, as described by the baron HALLER, in his physiology, I prepar-

ed a brass chain of about four feet in length, which was divided into four equal parts; three wooden balls of one and a half inch diameter, with brass eyes, were connected, one to each inner end of the chain, so that at every twelve inches the chain was interrupted by a wooden ball.

I commenced operating with this graduated chain, upon eleven patients on the 15th of July, 1819, the effect was, that the shock was totally prevented, and each patient declared this to be the most agreeable mode of receiving the electric fluid.

My manner of using this graduated *chain*, is as follows:—the patient may be insulated, or otherwise, one end of the chain is connected to the extreme end of the prime conductor, and an insulated director with a brass or wooden ball is attached to the other end of the chain.

The Leyden jar is charged in the usual way, and being discharged through the patient with this graduated chain, the fluid is so modified in its passage from the conductor to the patient, that its transmission through them, though seen is not felt, or scarcely so; that is to say, the spark is visible, as is the sensation, but the shock is completely broken.

This mode of transmitting the fluid has been objected to by several of my friends, who were present to witness the operation. They say, and with some appearance of reason, and assumed as a datum, that it requires ten times the quantity of fluid transmitted the new way, that is required by that of the old, to produce the same effect, and that nine-tenths of the quantity collected on the prime conductor, is dissipated by the balls before it reaches the patient.

By these objections, they lose sight of the *primary effects* designed to be produced by this *graduated chain*, that of transmitting the electric fluid through the system, without producing the shock, or violent convulsive or spasmodic sensation, produced by the old method.

The efficacy of this mode is now in a train of experiments, and I hope, before this Essay is published

to be enabled to say with certainty, whether it is effectual in those cases in which it is now applied, or otherwise. The order of communication may be also inverted, that is, the *graduated chain* may be made *negative*, by attaching its end to the coating of the Leyden jar, the other end being held by the patient, while the operator, with a common chain with a ball director attached, communicates the fluid as usual.

My learned friend Dr. TINSLEY, whose chemical talents are considered among those of the first order, confirms me in the doctrine which I allude to in this experiment; and, by an appropriate analogy, places the subject beyond all manner of doubt, "that a very great quantity of the electric fluid may be transmitted through the body, by means of imperfect conductors, without producing a shock, in proportion to the quantity." He illustrates this by adverting to an established fact in the practice of Galvanism. Twenty pairs of zinc and copper plates of two feet square and half an inch in thickness, although a powerful battery, will produce no violent shock to the person who may be operated upon, by reason of the imperfect nature of the conducting substance, water and watry solutions. While the same battery, and with the same conducting substances, will infuse a Platina wire in a few seconds.

I will mention another mode of exciting this influence in the system; its simplicity, added to its utility, renders it an important article in practice: The salival glands, may be excited in such a manner as to produce a copious discharge of saliva by rinsing the mouth with a saturated solution of sal ammoniac (*mu-riate of ammonia*) or holding a small lump of that salt in the mouth for a minute or two, then placing a small curved and semicircular plate of silver (say, a quarter of a dollar cut in two) between the upper lip and gums, a plate of zinc on the top of the tongue, and lastly another silver plate of the size of a dollar under the tongue, which is to remain between the central and lower plate. The three pieces are to be placed in such manner, that both the top and bottom plates

of silver shall be in contact with the central or zinc plate; the electric flash is immediately seen by the person making the experiment, and with the flow of saliva, a pungent feeling, and peculiar metallic taste is produced on the tongue. The invention and application of these plates is claimed by Dr. PHOEBUS of New-York, who has obtained a patent for them. This mode of exciting the electric fluid more immediately in the salival glands, has rendered the operation highly beneficial, in *anginas, asthmas, catarrhs*, incipient consumptions, dropsies, whooping cough, and various affections of the breast, and in some states of fever.

The operator having a choice in the three modes of exciting the electric fluid, 1st, by means of a metal globe or point; 2d, by wooden points; and 3d, by the plates above-mentioned, can be at no loss for the means which enable him to electrify patients under all circumstances; and as strong shocks produce too great concussion in the system, and unless in some very particular cases, have been proved to do more harm than good, it cannot but be obvious that *electrical batteries*, are not necessary in the cure of diseases, &c. hence in medical practice, a small *Leyden phial*, a globe director of metal, and one with a wooden point, are all the appendages necessary to be attached to their apparatus, together with an insulating stool.

The propriety of insulating sick persons confined to their beds, and filling them with the electric fluid, has been suggested by several eminent medical writers. It is a hint entitled to our serious consideration, and if generally adopted by practitioners, would no doubt be attended with highly beneficial effects, and prove a valuable auxiliary to other medicines. Bedsteads may be readily insulated by means of common dry porter bottles; and every practitioner should be provided with a portable electric machine, that might be easily conveyed to the apartments of the invalids. It is hoped, that this judicious hint will be

improved to advantage, and the result of the same be made public.

In all those diseases, in which electricity may be considered proper; it is the safest practice to begin with the mildest sparks, from the wooden point or ball; or by insulating the patient, and drawing sparks from him with the knuckles, or with the brass points or balls. In many cases, it is advisable to take the pulse of the patient previous to the operation, and to notice the increasing pulsation at the expiration of five or ten minutes, and also, whether the operation be attended with disagreeable or unpleasant sensations.

In chronic diseases of long standing, and where there are no ulcers or local inflammation, I have generally found the best mode of operating to be that of insulating the patient, and at every third, fourth, or fifth revolution of the wheel, to pass smart shocks through them, beginning with the arms and ending at the knees or ancles. In *amenorrhoea*, the shocks are more advantageously applied to the region of the pelvis transversely. Ten or fifteen minutes are sufficient for one operation in common cases; but where they are of long standing, half an hour may be employed to advantage in electrifying them each time. After one operation, it is easy to judge from the effect produced, whether we can repeat it with propriety.

In applying this fluid to the eyes or ears, and also to the inner fauces, the wooden points are most proper to be used, as by holding these a small distance from the part to be electrified, with the point directed to the part, a small and pleasant stream issues from the point, which may be conveyed from any distance most agreeable to the patient, and without any danger to him. If it should be necessary to pass shocks to the palate or through the tongue, in case of a *paralysis* of the same; a silver or iron wire, may be attached to the chain, and a glass tube being held by the patient, and placed in the mouth between the teeth, the wire may be so directed, as to pass the shock to any particular spot, without the

smallest inconvenience to any other part; the same may be done in the ear, in case of deafness, &c.— Eye glasses have also been invented with the same intention for operations on the eye.

The following cases may also prove, that it is not necessary, even in some serious accidents to make use of violent shocks towards a cure :

1st. A lady who had suffered a compound fracture of the arm; on the sixth day, by accident, and before the bones were re-united at their ends, again displaced them; they were set a second time, and she was discharged as cured. Shortly after, a contraction of the whole hand took place, and the fractured arm began to wither, and was wholly useless to her. She was now considered a cripple for life; for two or three months she resorted to every means recommended, as most likely to relieve her, but without any advantage; she was at length induced to try electricity, and was cured in nine operations, by having shocks passed from the shoulder of the affected arm to the knuckles. The shocks were of five revolutions of the wheel, and at first, fifteen minutes duration, increasing the time to half an hour. Internally she used the *pil e capsici*, and externally a volatile liniment. Her hand and arm were restored, and are as sound as before the accident.

2d. A valuable servant of ———, who had been bled by the overseer, soon after lost the use of her arm, which wasted away gradually, and in which, the circulation of the blood appeared totally stopt, as no pulsation was to be perceived at the wrist, she was brought to the machine, and gently shocked for fifteen minutes, with shocks of three revolutions, increasing the force and duration to five revolutions, and half an hour. In eighteen days the circulation was restored to the withered arm, which began to fill up anew, and she was discharged as perfectly cured.

3. Another valuable servant of Mr. R. near the Cypress, had a luxation of the *humerus*, by the falling of a tree upon her shoulder; the head of the *humerus* was thrown into the *axilla*, and the arm hung

dangling to the side, until surgical aid was procured, which was not sooner than eight or nine hours after the accident. A reduction was attempted, but in consequence of the tumefaction it was unsuccessful. In a few months the whole arm withered, and an entire stop was put to the circulation of the blood in the luxated limb; nine months after the accident, she was brought to town and placed under my care. After five operations in the arm with the ball director, the circulation of the blood was perceptible to the finger; and she expressed herself to feel a motion through the whole arm, like something crawling up and down it. She continued to mend daily, and an increase of substance was becoming more and more evident; after the fourteenth operation, a spell of bad weather set in, unfavourable to electrical operations: and to save expense, she was returned to the country with a promise to come again in good weather. I have never seen her since, but am sanguine in the belief, that had she been electrified for six months, she might have been so far restored, as to be capable of using her hand, even though the reduction of the arm could not be effected.

4th. An interesting youth, the son of one of our respectable citizens, was cured of a *Gutta Serena*, of twelve months standing. During the fifth operation of electricity, his sight was restored partially, and the eye continues to gain strength daily. He was a patient of Dr. MATTHEW IRVINE, who, together with several citizens of eminence, have been satisfied of the cure, which was effected by sparks drawn from the eye, with the wooden and metal points alternated, and by gentle shocks through the whole system.

There is another disease, whose cause remains yet to be accounted for, and whose cure seems to have been hardly if ever effected; I mean the *nervous head ache*, and here I take leave to digress for a while. If the cause which I shall assign to this distressing complaint be correct, it may lead us to the better understanding of many extraordinary symptoms, which

occur in other nervous diseases, and probably to their cure.

It appears to me more than probable, that those persons who are subject to *nervous head aches*, have the sensibility of the nerves, and irritability of the muscles, in greater degree than others, and that whenever the electrical equilibrium in the nerves is impaired from an excess of fluid in them, the head ache is acute and violent; and when this excess is overcome by *re-action* or by artificial means; the deficiency of nervous influence now produces head ache of the chronic kind; and the same kind of head ache is produced by a deficiency of electrical excitement in the nerves, from whatever may cause a deficiency in the atmosphere, such as excessive heat, heat and moisture, easterly and southerly winds, &c.

That there does exist an electrical excess in some persons more than in others, has been proved from the histories already noticed,* and may be further evidenced in those persons, who labour under *hallucination* from intemperance in ardent spirits, to that excess as to produce what may be termed "false vision" (*pseudoblepsis*.) It is certain that persons whose nervous sensibility and muscular irritability are acute, suffer more from intemperance, than those of a contrary feeling,† else, how comes it, that some men can drink a quart of spirits each day with impunity, while others are intoxicated with a very small quantity? BRYDONE insists upon it, that many invalids, "particularly the hypochondriac, and those we call *malades imaginaires*, owe their disagreeable feelings to the opposite cause, that of their bodies being possessed of too small a quantity of *this fire*," "for we find," says he, "that a diminution of it in the atmosphere, seldom fails to increase their uneasy sensations, and *vice versa*."

From all this, it will appear rational to infer, that the *irritability* and *sensibility* of such persons, are easily excited in excess, and are thence, as easily

* See Book III. Section I. page 237.

† Book I. page 199.

sunk below ; so that whether the stimulus be mental, as excessive joy or surprise; or bodily, from fatigue or intemperance, the effect is nearly the same. Such people after an excess of joy, usually sink into a kind of melancholy despondence ; or, after a debauch fall into that state of nervous and mental debility approaching to madness, and which I have termed *mania hypochondriasis*, (the *mania potatorum* of others.)

It is said, and no doubt upon the best chemical authority, that fire is so connected with air, as hardly to be separated. “ As subtle as fire is, we may even “ by art attach it to other bodies, and keep it prisoner “ for many years ; and that either in a solid or fluid “ form ; an instance of the first we have in steel, which “ is made such, only by impacting a large quantity of “ fire into bars of iron. In like manner, we impact “ a large quantity of fire into stone to make lime.— “ An instance of the second kind we have in spirits, “ wherein fire is imprisoned in a fluid form. Hence, “ common spirits will burn all away ; and if you “ throw into the air, spirits rectified to the highest “ degree (pure ether) not one drop will come down “ again, for the universal fire will take hold of and “ absorb it all.”*

Common fire is derived from the universal or electric fire, and hence, there is in ardent spirits a proportion of this *etherial fluid*, which is termed *alcohol*. May this not account for the effects produced by ardent spirits and other *stimuli* in nervous persons, or such as have their sensibility and irritability more acute, and consequently their excitability more easily acted upon than others ?

If therefore, those nervous affections are produced from electrical excess in the system,† the possibility is, that by abstracting the excess with the wooden points or even with the knuckles, we will surely relieve the patient ; while on the other hand, if strong sparks be drawn, or even mild shocks be passed through them, by adding to the system already excited in ex-

* Wesley's Natural Philosophy, vol II. page 77.

† Book II. page 218 and Sequel.

cess, we shall as surely increase the disease ; while, in those affections that are produced by a deficient electricity in the system, strong sparks and shocks of ordinary power, give tone and vigour to the nerves, by restoring their equilibrium.

If these things be so, and it is more than probable that they are, it will remain, that the electric fluid is indeed, in proper quantity, (an equilibrium) necessary to health, and essential to life ; but either in excess or deficiency, it is then productive of disease and death. But to return,

The mildest forms in which this fluid can be applied to the body, after these already noticed, appears to be by friction with the flesh brush, new flannel, or the palms of the hands. The good effects derived from these simple modes, is owing to the degree of electrical excitement produced in the parts to which they are applied. The brush and flannel are preferable to the palms of the hands, on account of the former being *non conductors*. The practice of exciting the electric fluid by friction with the palms of the hands, appears to have been known to the natives of *Otahiete*, who practised it with complete success in the case of Captain COOKE. It is not improbable, that the good effects derived from PERKIN'S *metullic tractors*, was in consequence of the Electric or Galvanic excitement they produced, in the parts to which they were applied, pretty much upon the same principles with the foregoing.

Another mode of producing effects somewhat similar, has been recommended by BRYDONE, whose attention to this subject is deserving the highest commendation. He advises nervous persons, to wear a waistcoat of the finest flannel next to the skin, which should be kept perfectly clean and dry, for the effluvia of the body, in case of violent perspiration, will soon destroy its electric quality ; this should be covered by another waistcoat of silk of the same size.—The animal heat and the friction that exercise must occasion, betwixt these two substances produce a powerful electricity, and would form a kind of elec-

tric atmosphere around the body, that might possibly be the best preventive against the effects of damps.

Having pointed out the different modes in use for exciting the fluid for medical purposes, I shall conclude the subject, by a brief recapitulation of the diseases in which it may be applied with safety, and the best manner of operating on patients in each state.

In *palsies, chronic rheumatisms, epilepsies, tetanus, hypochondriacal and hysterical complaints, hydrophobia and melancholy*, the most successful method is, to insulate the patients, and to pass smart shocks of from three to five revolutions of the wheel, through the arms, body and legs, for the space of fifteen minutes, increasing the number of shocks each day, gradually to an hour, and avoiding the head as much as possible; nor should the operation be persisted in, if the patient complains of any disagreeable effect or feeling in consequence thereof. If shocks given in the above manner, increase the disagreeable feelings of the patient, sparks may be drawn from them with the knuckles. By "disagreeable feelings," I do not mean those peculiar to electrical operations, for I have seldom operated on any person, who did not observe "that it was an odd kind of feeling which they did not altogether like, &c." but if the symptoms of the disease are increased by it, or if other unpleasant symptoms occur from it, we should at all events desist, at least for a few days, and then renew the experiment.

In diseases of the uterine system, such as *amenorrhœa, dysmenorrhœa, chlorosis, &c.* the operation should not be attempted until within two or three days of their expected appearance, for then, nature concurring, the effect will be more beneficial than when untimely applied. The patient should have some of her outer dress removed; indeed to obtain the greatest advantages from this fluid, the dress should be accommodated to the nature of the operation; pocket holes should be made on each side, so that the chain may come in contact with the skin on one side, while the ball of the director should be made to come almost in contact with the skin on the other; and thus

the shocks should be made to pass through the *pelvis* laterally. The operation may be continued according to circumstances, from one quarter to half an hour, for two or three days as above, and then desist, until within two or three days of the next regular period. "One of the most powerful means of exciting the action of the vessels in every part of the system, is the electrical shock, and it has often been employed with success, for exciting the vessels of the *utereus*."*

I think it necessary to add, that in the practice of electricity, either medical or philosophical, the air of the *electrical room*, should be as free from all obstructing bodies as possible, since it is obvious, that the air of such, is soon rendered negative, and hence unfit for successful operations, from the heat and exhalations common to crowded rooms.

In diseases of the eyes that have been of long standing, such as *gutta serena*, *fistula lachrymalis*, &c. in ear-ache, deafness, and an improper consistency of the *cerumen*, or ear-wax, and also in *anginas*, the safest mode of operating, is with the wooden points, or at most with a very fine wire insulated with a glass tube as already noticed. The operation ought not to be continued longer than from five to ten minutes at first, but may be increased according to circumstances, half an hour or more.

In desperate cases which require immediate assistance, such as *asphyxia* from drowning, frights, drinking cold water, &c. the shocks from the large apparatus are to be regulated according to the circumstances; in general, the shock should not exceed three revolutions of the wheel, and ought to be principally passed through the region of the heart, first very mildly; then gradually increasing their number and force as the case may require; bearing always in mind, that experience has proved, that "the vital organs are more certainly excited, and the motions are more vivid, than when the shocks are increased," and that violent shocks appear to retard rather than to promote recovery.

* Cullen's Practice, Paragraph MVI.

It is greatly to be regretted, that at times, in many urgent cases, such is the state of the weather, particularly in Charleston and all low flat countries, that it is next to impossible to obtain the electric fluid by means of the apparatus commonly used, even though the air of the room is made dry by fire; this commonly happens in excessive hot, or hot and moist weather, damp air, east and south easterly winds. It is however practicable in moderate weather, even when damp and rainy, to produce sparks by rubbing the glass plate or cylinder with tallow.

Fortunately for mankind, in almost all states of the weather, the fluid may be obtained by means of the large apparatus, or by a Voltaic battery, in quantities sufficient for medical purposes; wherefore it is especially recommended to electrical operators who have small conductors, to have at least a Galvanic trough or Voltaic pile, to serve in cases of extreme emergency.

To operate with a pile of zinc and copper, or zinc and silver, the patient should be seated in a chair near to the base or stand, on which the pile is elevated, the chains being attached, one to the upper, and the other to the lower extremity of it, when necessary to use it in all its force; the patient holds the brass balls at the end of the chains, one in each hand; the balls are covered with linen cloth and wet with warm water; he begins immediately to perceive a constant agitation, and a perpetual current of the animal electric fluid, or Galvanic influence, the effects of which are similar to those of electricity. Should the agitation produced be too great for the patient, the upper chain may be removed lower down the pile, and the bottom chain higher up, by this means the strength of the operation is considerably diminished, and it may be thus, either increased or diminished at the pleasure of the operator, to suit the patients.

Directors made of gold or silver are sometimes attached to one of the chains, in order to perform operations on the eyes, ears or throat, and should be insulated and applied with the same precautions, as have been recommended in electrical operations on those parts.

Galvanic shocks, appear to me not as powerful as those from an electric machine, they rather seem to be of a more benumbing nature, and hence, may be very properly compared to the shocks received from a moderate sized *torpedo* or *gymnotus electricus*. If shocks are preferred to the "peculiar agitation" produced by the common mode of Galvanizing patients, they may take one of the balls, wet with warm water, as directed, in one hand, and the operator the other, also wet: he may then pass shocks through any part of the body at pleasure, or through as many persons as choose to form an electrical circle, by holding hands, provided each persons hands be previously wet with warm water.

If the hands be wet, any person applying one hand to the upper and the other to the lower extremity of the pile, will immediately receive a smart shock, exactly similar to that from the electrical eel or *gymnotus*.

To conclude, although the greatest confidence is to be placed in the medical properties of this fluid, when judiciously applied, I would at the same time strongly recommend the administration of other remedies, to concur towards effecting the cures; for it is a fact well established, that such is the fluctuating state of the atmosphere, and of the animal system, with regard to this fluid, that one hour it is positive and the next negative, whence, to insure permanent effects from its use, the equilibrium must be gently and cautiously excited by it, and to secure as much as possible the equilibrium, when thus excited, such other remedies are to be referred to, as are known to fortify and invigorate the system generally; and these, to prevent a relapse, should be persevered in for some considerable time.



ERRATA.

☞ The reader is requested to correct the following errors with his pen, and such others as may have escaped the notice of the revisor.

- Page 25, Sixth line from the bottom, for "*Doctor*," read Doctor.
" 47, Fourteenth line from the bottom, for "1364," read 1634.
" 52, First line of second paragraph, for "*climactic*," read climacteric.
" 54, Third line from the bottom, for "*old world*," leave out *old*.
" 56, First line, for "*climactic*," read climacteric.
" 57, Twelfth line of second paragraph, for "*existing*," read exciting.
" 112, Fifteenth line from the top, for "*systems*," read symptoms.
" 133, Sixth line of first paragraph, for "*is*," read are.
" 160, Twentieth line from top, for "*Bouilam*," read Boullam.
" 188, First line of third paragraph, dele "*an*."
" 250, Reference at bottom, for "*page 20*," read 134.

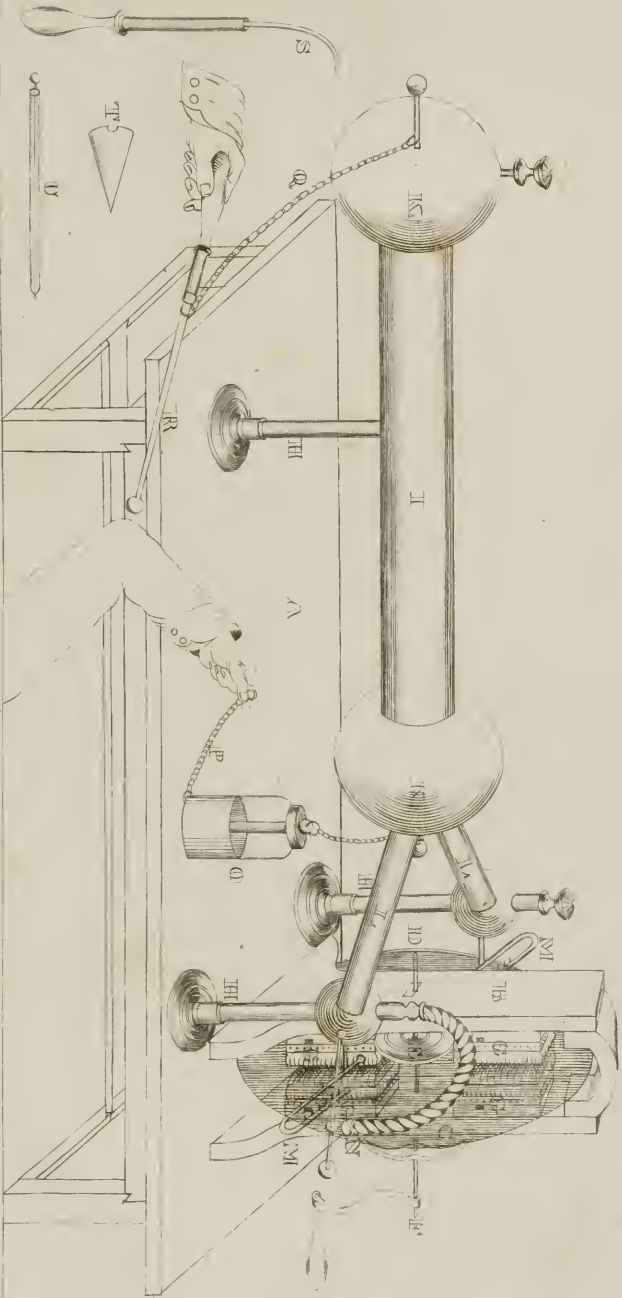
DESCRIPTION OF THE PLATE.



- A The table, two feet wide, three feet long.
- B The frame supporting the glass plate, or electric.
- C The electric or glass plate 22½ inches in diameter.
- D The axis.
- E The clamps.
- F The handle, or winch.
- GGGG The four rubbers, or cushions.
- HHH The three glass pillars, insulating the prime conductor.
- I The prime conductor.
- KK Two brass globes.
- LL The arms.
- MM The teeth, or combs, for collecting the fluid from the electric.
- N The electrometer.
- O The Leyden jar, connected to the prime conductor by a chain.
- P The chain held by the patient.
- Q The chain held by the operator.
- R The ball director, passing the shock through the patient.
- S The metal point director.
- T A wooden point, to be sometimes attached to the metal director.
- U A glass tube, with a wire for operating on the ear.

Figure 11

Temperature for Water. Thermometer fixed on a barometer stand.



Med. Hist.

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