DISSERTATION

ON THE

REMOTE AND PROXIMATE CAUSES

OF

PHTHISIS PULMONALIS.

Clayton & Van Norden, Printers, 64 Pine-street.

A

DISSERTATION

ON THE

REMOTE AND PROXIMATE CAUSES

OF

PHTHISIS PULMONALIS;

TO WHICH THE PRIZE WAS ADJUDGED

FOR THE YEAR 1825,

BY

THE NEW-YORK STATE MEDICAL SOCIETY.

BY ANDREW HAMERSLEY, M. D. &c.

WITH NOTES, CRITICAL AND EXPLANATORY.

SECOND EDITION,

REVISED AND CORRECTED.

"All physical science, whatever may be the variety of objects, mental or material, to which it is directed, is nothing more than the comparison of phenomena, and the discovery of their agreement or disagreement, or order of succession."

Brown's Philosophy of the Human Mind.

NEW-YORK:

PUBLISHED BY E. BLISS & E. WHITE,

No. 128 Broadway.

1827.

Southern District of New-York, ss.

BE IT REMEMBERED, that on the twelfth day of January, A. D. 1827, in the 51st year of the Independence of the United States of America, Andrew Hamersley, of the said district, hath deposited in this office the title of a book, the right whereof he claims as author, in the words following, to wit:

"A Dissertation on the remote and proximate causes of Phthisis Pulmonalis; to which the prize was adjudged for the year 1825, by the New-York State Medical Society. By Andrew Hamersley, M. D. &c. With notes, critical and explanatory. Second edition, revised and corrected. 'All physical science, whatever may be the variety of objects, mental or material, to which it is directed, is nothing more than the comparison of phenomena, and the discovery of their agreement or disagreement, or order of succession.'—*Brown's Philosophy of the Human Mind.*"

In conformity to the Act of Congress of the United States, entitled, "An Act for the encouragement of Learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the time therein mentioned." And also to an Act, entitled, "An Act, supplementary to an Act, entitled, an Act for the encouragement of Learning, by securing the copies of Maps, Charts, and Books, to the authors and proprietors of such copies, during the times therein mentioned, and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

JAMES DILL,
Clerk of the Southern District of New-York.

PREFACE.

THE ensuing pages, after but a short interval from the period of their first publication, and under the following circumstances, are again submitted to the medical public. Originally published in one of the medical journals of this country, while a wide circulation was in many respects given to them; others, not having access to such periodical, were thus unable to peruse them. To supply such deficiency, of which the writer has had sufficiently gratifying intimation, more especially from the members of the State Medical Society, a large number of whom remain unfurnished with a copy, the present edition has been undertaken. To enhance whatever merit the work may possess, it has been carefully revised, both as regards its composition, and the opinions it conveys.

There is no malady, which more imperiously requires, for its just elucidation, all the force of discriminating genius, and the capabilities of scientific research, than that, which forms the subject of the present attempt. Theoretical in its character, from the nature of the occasion which produced it, practical considerations have not been entered into. Nor is much room afforded for the display of novelty, except where unusual mental abilities are possessed, in arranging and discussing such facts in science, as have already claimed the most powerful efforts of minds of the highest character; and have, for the most part, been regarded as established truths. This is more particularly true, in reference to such animadversions, as have been made on the character of those causes, which may be justly deemed as possessing a *remote* influence, in the production of *Phthisis Pulmonalis*. As regards its exciting causes, we have strove, while aiming at accurate discrimination, to avoid all unnecessary refinements, and to place our principal reliance upon such pathological inferences, as result from the arduous and minute autopsic

examinations of those late French authors, whose labours in this department, have constituted a new era in medicine. Dissection is the dictionary of diseases. The precepts drawn from this source, combined with candid comparison, and proper attainments in anatomical and physiological knowledge, are liable to no error; and in proportion as medical science advances, will assuredly displace the proudest maxims of the schools, wherever the voice of authority has usurped the prerogatives of careful observation, and the inductions of an enlightened philosophy. Among those who have, so far as a general survey will enable us to decide, contributed, by a long course of judicious investigations, to the attainment of this end, we are much gratified in naming the author, to whose very interesting performance, in relation to this disease,* has been assigned the prize in medical science, for the year 1825, by the Royal Academy of Sciences in Paris. A partial analysis of

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* M. Louis. Recherches Anatomico-Pathologiques sur la Phthisie. Paris, 1825.

this work has also been given, from a committee* appointed for this purpose by the Royal Academy of Medicine at Paris, to which a copy was presented. To this analysis we are indebted for one or two remarks, which we shall transcribe, as containing an opinion, which the author states as the result of his pathological inquiries, and which coincides expressly with one of the positions maintained by us, in the text.

The following are the remarks of these gentlemen on this point: "Enfin, dans un dernier chapitre, M. Louis a examiné avec les faits la question de la nature des tubercules, question si souvent et si inutilement discutée à l'aide des raisonnemens et des inductions, et il a été conduit à conclure que la dégénérescence tuberculeuse des poumons est autre chose qu'une inflamma-

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* This committee consisted of M. M. Bourdois, Royer-Collard, and Chomel, and their report is appended to the Paris edition of the work itself. The circumstance of our not having seen this work, until the last page of the present dissertation had been printed, must account for the slight notice of it in the preface, in place of more previous formal examination.

tion, ou que la conséquence d'une inflammation."

It will also be observed, that we have suggested in a note those objections, which might be urged to such a belief, as are founded upon the occasional sufferings of patients in the earlier stages of consumption, and which appear strongly indicative of an inflammatory process in the thoracic cavity. We have endeavoured to represent these pains, as accidental in their character, and as not therefore to be regarded, as a distinctive badge of the tuberculous affection of the lungs. It is also well known to every experienced physician, that these pains do sometimes occur in the advanced stages of the disease, and instances are not very rare, where the use of the lancet is necessary to allay them. M. Louis commences, with the ensuing observations, a chapter entitled, " De la Peripneumonie et de la Pleurésie des derniers jours :"—" Dans les cas où la *péripneumonie* était très-bornée, aucun symptôme n'en faisait soupçonner l'existence ; mais quand elle occupait une certaine étendue, les malades éprouvaient, dans la plupart des cas (les cinq huitièmes,)

trois, quatre, cinq jours avant la mort, des douleurs dans un des côtés de la poitrine: en même temps le bruit respiratoire était faible, mêlé d'une crepitation fine, et la percussion rendait un son obscur dans le point correspondant. Les crachats acquéraient quelquefois un peu de viscosité, sans avoir néanmoins le caractère qu'ils présentent quand la péripneumonie a lieu chez des sujets non affaiblis par des maladies antérieures. Toutefois, ces symptômes suffisaient pour indiquer la nature de l'accident, marquer son début, faire voir que la péripneumonie peut se développer chez les phthisiques parvenus au dernier degré de marasme, et que les complications, jointes à la plus extrême débilité, n'empêchent pas de reconnaître les maladies intercurrentes, quand on y faite une certaine attention. La *pleurésie* développée dans les derniers jours de la vie a aussi donné lieu, dans la plupart des cas, à des symptômes capables de la faire reconnaître."

The developement of such symptoms, forms indeed an interesting epoch in the progress of this disease; and where a patient is confined to a chamber of warm and well

regulated temperature, and thus prevented from the action of the more ordinary remote causes of such symptoms, they may, yet, not improbably supervene, from the irritation of the parenchymatous substance of the lungs, communicated to the contiguous membranes, or from an inordinate use of those stimuli, employed to sustain the last moments of life, in a habit rendered peculiarly irritable, by the operation of the prevailing affection.

ESSAY

ON

THE REMOTE AND PROXIMATE CAUSES

OF

PHTHISIS PULMONALIS.

THE investigation of disease, although a subject eminently calculated to excite the feelings of the philanthropist, and give impulse to the best efforts of the votaries of science, has not, until comparatively a late period, been conducted by those strict rules of philosophic induction, which are deemed so generally necessary to the proper developement of truth. In the more early ages of the science, as remedies were few, and not combined according to the several chemical or botanical properties they possessed; so their application to the several diseases was marked by a want of that knowledge of the human structure, and attention to physiological principles, which more extensive opportunities of post mortem examination on the one hand, and more enlightened attainments on the other, have since so materially corrected. It is interesting to observe how our conceptions of physical phenomena have kept pace with the gradual demonstration and comprehension of those methods of argumentative

reasoning, by which our intellects are brought under the sway of such abstract conclusions, at which we arrive only after long and assiduous cultivation of our mental faculties. The symptoms of disease, which, when regarded in relation to their connexion with, and dependence upon, the morbid states, existing within, form a basis on which to erect a system of correct medical practice, when viewed only as *irregular appearances*, or *external signs*, betray the observer into erroneous deductions, and constitute false beacons of medical science. To judge rightly, has ever been deemed the most important step to be attained, in the gradation of intellectual exercises. The cloud of false reasoning and uncertain analogies which for a long while hung over the decisions of medical empirics, is esteemed, at this day, as one of the strongest evidences of that chaos, which results from insecure reasoning, and precarious investigations. But, in the wide inquiries into the constitution of man, especially, when overawed by a gross superstition, such as marked the researches of ancient times, no little pains were necessarily expended in clearing away the rubbish, which was afterwards found to beset the subject, ere the human frame, with its various morbid conditions, could be brought to bear even the faint beams of such philosophy as began to be shed over the remaining darkness. It was long, very long, after the occupations of the physician were severed from those of the priesthood, to which a blind veneration had attached them, that men could endure to seek for, or hope to obtain, the requisite permission to examine the bodies of

dead subjects, in order to acquaint themselves with the most simple arrangements of organic life. Whatever, before this period, was known of the internal structure of our bodies, was probably gathered from casual observations made by the priest on the altar, where his victim was sacrificed to appease an offended deity, or from such slight information as could be obtained by disclosures, made in consequence of wounds inflicted on the field of carnage. The former was, perhaps, one of the circumstances which created the alliance between the functions of the priest and physician.

The dissection of the first human body constituted an era in the progress of medical science; and irregular and ill-conducted as we may suppose it to have been, it must, notwithstanding, have afforded new excitements to the cultivators of our profession, and tended to render in some degree certain and fixed, what before was, bewildered by a maze of superstitious doubt and remote analogies.

The writer of the following pages has embraced the opportunity afforded by the Medical Society of the State of New-York, to deliver such opinions as he may find worthy of notice in the writings of others, and the suggestions of his own reason, in reference to the remote and exciting causes of *Phthisis Pulmonalis*. Previous to a more particular enumeration of what we conceive to be the remote causes of this disease, it will be necessary to premise some concise views of the subjects of respiration, and the constituent ingredients of atmospheric air.

"In the human body, air is received into the lungs

in consequence of a vacuum formed by the elevation of the ribs; with their action the diaphragm seems to correspond, and from a convex form towards the cavity of the thorax, it becomes nearly straight. It has been represented as becoming concave; but this is wholly inconsistent with the phenomena of muscular action. When the action of the intercostals is remitted, the chest falls in consequence of the elasticity of its ligaments, and relaxation is a constant alternating state, with contraction in every muscle, unless when diseased. This statement is now generally acknowledged to be correct; nor need we enlarge on the very different opinions which have been offered on the subject, or attempt to elucidate the difficulties which, on either view, have been felt. The only remaining difference of opinions relates to the respective share of the diaphragm and intercostals in this function. The latter are said by some late authors to fix the ribs only, and that the enlargement of the chest is chiefly effected by the contraction of the diaphragm. Each, however, produces some effect, though the chief agent is undoubtedly the diaphragm. In women, the intercostals seem to have a greater share in enlarging the thorax than in men, from the greater arches of the ribs, and the final cause is to assist respiration, when the motion of the diaphragm is impeded by the enlarged uterus. We have said that all the ribs are raised, and this is perhaps strictly true, though Sabatier contends that the lower ribs descend. (Memoir. de l'Academie Royale, année 1778.) Other physiologists have, however, drawn

different conclusions, both from the structure of the parts, and from observation. It has been contended also, that as the external and internal intercostals cross each other obliquely, their action must be different, and even opposite; but this has been fully contradicted by an experiment of Haller. In this experiment, it has been found, that in inspiration the ribs did not approach, but rather receded, and the space was in part gained by their protruding the sternum. If, as we find in pregnant woman near the time of delivery, the intercostals carrying on the function of respiration almost exclusively, so, at other times, it is chiefly, if not wholly, effected by the diaphragm. The union of the ribs with the sternum has been anchylosed sometimes with little injury to respiration, though more often with dyspnœa. When, from various causes, respiration is difficult, or, in other words, when water, inflammation, or other causes, prevent the access of the air and the elevation of the ribs, different neighbouring muscles are brought to the assistance of the several agents, particularly those of the thorax in inspiration, and those of the abdomen in expiration. To give a more fixed point to the former, the elevatores scapulæ are exerted, and the shoulders are raised. In the whole of this function, the lungs are passive; contiguous to the pleura, or at least separated only by an halitus, they are in contact with that part of the membrane which lines the ribs, both in inspiration and expiration, following in each the motions of the chest. The apparent object in this function is to expose every

particle of blood in succession to the air. The circulation seems to stagnate through the serpentine vessels during expiration, and to flow freely, when these are distended by the distention of the lungs. This, though apparently obvious, has been denied, chiefly on the principle that the regular return of blood irritates the heart to a regular contraction. Yet, when the lobules are distended, the canals of the vessels are necessarily shorter, and, when respiration is more frequent, the pulse is quickened. Whatever be the state of this function, there is always sufficient blood carried back to stimulate the heart to regular action. The blood vessels, we have seen, disposed freely on the cellules into which the extremities of the bronchiæ terminate, and the containing coats are there so thin, that the wax of the injection exudes. Whether air can pass or re-pass, has been the subject of some controversy; and, however discordant the calculation respecting the extent of surface to which the blood is exposed, physiologists have generally agreed that it exceeds considerably the whole surface of the body. The changes produced in the atmospheric air from respiration are found chiefly to affect its oxygenous portion : this is diminished, and water, in the state of vapour, with carbonic acid gas, is substituted.

" The necessity of a supply of fresh air in respiration must have been known from the earliest periods ; but the source of this necessity was little understood, till Boyle found the respired air loaded with aqueous vapour, and diminished in bulk. Mayow,

whose fair fame has lately been rescued from oblivion, showed that some principle, which he called a volatile ethereal spirit, was imbibed from the air; and Dr. Black found that air respired contained carbonic acid gas. In this idea of the subject, the unfitness of the air for the continuance of life was attributed to its diminished elasticity, for it was only suspected that carbonic acid gas was not fit for the continuance of this function. At last, after a period of more than twenty years, the constitution of the atmosphere was taught by Scheele and Lavoisier. They found that the apparently homogeneous atmosphere was composed of two gases of different properties, the oxygenous and the azotic, in the proportion, if bulk be considered, of 22 to 78, if the weight, 26 to 74. This proportion of a fluid unfit for respiration, in air essentially necessary to life, was astonishing, till it was found that oxygen, like ardent spirits, was poisonous, by its destroying, from excessive stimulus, the excitability, and that, like it, to be innocuous, it must be lowered, (diluted.) Late experiments, however, seem to show that the azote is not wholly useless. In explaining the process of animalization, we found the necessity of some principle, which could reduce the newly absorbed nutriment to an animal nature, and this appears to be azote. Yet the idea is encumbered with difficulties. Azote is an excrementitious fluid ; and the changes produced in the blood, from its circulation through the lungs, are apparently those from oxygen only. It is not, however, a very absurd idea that a principle at first necessary,

may in the end be injurious from excess. In fact, Mr. Davy, in some very accurate experiments, found a remarkable deficiency of azote, amounting, in twenty-four hours, to about four ounces and a half."*

Prepared by the foregoing statements, we feel more ready to enter into the necessary considerations appertaining to our subject.†

The prevalence of consumptive mortality, more particularly in this country and in Great Britain, has long been a theme of unfeigned regret to the philanthropist, and a cause of unmerited opprobrium on the medical profession.

Mr. Woolcombe has furnished a series of tables,‡ intended to exhibit the general increase of all diseases, from the experience of the Plymouth Public Dispensary, from Nov. 13, 1798, to Aug. 31, 1805.

In reference to phthisis in particular, he comes to the following conclusions: "The relative occurrence of phthisis appears from the first table to be as 1 to 22.27; and, on an average of three years in Dr. Willan's practice, it is found to have been as 1 to 29. Of its relative occurrence in other places, data are wanting on which to institute a comparison." The proportionate *fatality* of the malady is exemplified by a table consisting of two parts. The first con-

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* For the foregoing summary, the writer is indebted to the article *respiration*. *Parr's Med. Dic.*

† Vide note A.

‡ Essay on the comparative Mortality of different Diseases, by Mr. Woolcombe.

tains a selection from the London bills of mortality of the positive number of deaths from consumption, at different periods, in the course of the last century and a half. The second part consists of a few instances, casually obtained, of similar morality in different places in the kingdom, during the latter part of the last century. The following are the conclusions at which he arrives: "From the first part of the preceding table, it appears that the absolute and relative mortality from consumption has been gradually increasing during the last century, though it seems to have been considerably less in its relative proportion at the commencement of this period than it had been fifty years before." Shortly after we find the ensuing sentiments expressed: "As there is much reason to believe that the general mortality has for some time been on the decrease, relatively to the increasing population of the country, it admits of a question, whether the number of deaths from consumption, which, relatively to the number of deaths from all other causes, is without doubt very considerably augmented, is in reality increased relatively to the population of the country. In other words, does a larger proportion of the inhabitants of this island (Great Britain) fall victims to the disease at present, than did at the close of the seventeenth century." In several printed lists of the mortality of Portsmouth,* (New Hamp.) originally compiled by Dr. Lyman

* Portsmouth, 43° 5′ N. lat. and 6° 26′ E. long. from Washington, and contained 6,934 inhabitants in 1810.

Spalding, and referring to eight separate years, between the periods of 1802 and 1811, the sum total of mortality during the whole time, was 938; that from consumption, 199; making this disease to bear a proportion of between $\frac{1}{4}$ and $\frac{1}{5}$ of the collective number of deaths. Dr. Spalding has proved that as great an amount of deaths occurs from consumption in a given time, and in a given population, in the New-England states, as from malignant fevers in the southern states of the Carolinas and Georgia. It is proved, that from four or five thousand persons die annually in London of consumption. Woolcombe states it is the result of correct data, that 55,000 individuals fall yearly victims to this desolating disease in Great Britain. There is an observation of Dr. Willan's, accompanying his reports on the diseases of London, which we think it advisable to transcribe, as tending to qualify conclusions derived from the enumeration of bills of mortality, which, in England, as in this country, are subject to many inaccuracies from the mode of reporting, and the character of the persons by whom the statements are rendered. "In my own list," says this esteemed author, "the article of pulmonary consumption includes cases of ulceration of the lungs, and alteration of their texture, in consequence of pneumonic inflammation and repeated catarrhs. I apprehend that not more than a fourth part of the whole number of cases put down, could be referred to pure phthisis, arising from the slow and successive suppuration of tubercles in strumous constitutions." The etiology of diseases has

often been a subject of close contention among the physiologists and pathologists of every age. In many instances, refined attempts to discriminate between their various causes, terminated in the adoption of a verbose complicated phraseology; while, on the other hand, too general distinctions have overlooked some of the grand and essential agents, which concur in the production of morbid affections.

By the remote and exciting causes of a disease, we may be supposed to mean, both those operations from without, which, by divers methods, influence the healthy condition of our structure; and those, which by a more secret agency, *immediately* produce the morbid action. Here the attentive observer will recognize only new terms, for what, by the older physiologists, was understood by the *external* and *internal* causes. We doubt, moreover, if, for the majority of cases, a more simple and rational exemplification of causes can be produced.

By the remote causes, or existence of this disease, we then would desire to be understood, as intimating, both those which, by the direct influence they possess on the organ affected, produce the morbid result, as well as those, which, by inducing certain intermediate influences, concur in the developement of similar disease. We are aware, that this will comprehend, what by authors has been termed predisposing, or, as we have styled it above, *intermediate* causes; yet, we are of the opinion, that such an arrangement will be best suited to our present purpose.

"The existence in the lungs," says an eminent pa-

thologist,* whose observations in the course of our remarks will demand our particular attention, "of those peculiar productions, to which the name of tubercles has been restricted by modern anatomists, constitutes the true character of consumption."

This we conceive to be as true and concise a definition of the malady as we could have supplied, and keeping it in view, we shall proceed to disclose what appears to us, in the first place, to constitute its principal remote causes. The connexion of the atmosphere we breathe, with the organic apparatus by which the process is performed, is too strict, to have escaped the notice of the earliest observers of the constitution of our bodies. The sagacious Boerhaave, marking well the intimate relations existing between the functions of respiration, and the various other processes of animal nature, and yet ignorant of the true philosophy of the subject, with which late discoveries have furnished us, says, "summam in morbis difficultatem facere magnum numerum organorum quæ ad actionem concurrunt et quorum aliquod lœsum totam functionem turbat."

We propose to divide the remote causes into those which stand connected with general atmospheric conditions, and which appertain to large tracts of country—and into those which depend upon individual circumstances. These circumstances are either those of occupation or of constitutional predisposition. Of occupation, as in those trades, where, from

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* Laennec.

the artificial character of the air inhaled, or certain postures of body, a tendency is given to pulmonary affections—of constitutional predisposition, as from peculiar conformation of the thoracic cavity, from hereditary taint, as of scrofula, susceptibility to slight and almost imperceptible alterations of temperature, liability to frequent occurrence of cutaneous eruption, and consequent danger of repulsion; or, in fine, any circumstance of habit, temperament, or accidental disease, which predisposes the pulmonary organs to phthisical derangement. We shall proceed to discuss these causes, in the order above enumerated. It is a subject of trite remark, that those countries more especially noted for sudden and violent changes of weather, are most subject to the various grades of catarrhal affections and to confirmed consumptions. On the contrary, those countries which experience a more mild, equable, and better regulated temperature, where the cold is neither so intense, nor the heat so intolerable, as are apt to occur in the former case, are proportionately free from such accidents. It was formerly a subject of much surprise to the naturalist and the traveller, that different situations on the earth's surface, marked by the same parallel of latitude, should differ so widely in the character of their respective climates. A few familiar examples will illustrate this point. In the southern parts of New-England, (says Volney,)* between 42 and 43 degrees of north latitude, by observations made at Salem, near Boston,

* Volney's View of the Climate of the U. S. ed. 1804.

during seven years, by Mr. Edward Holyoke, (Trans. Am. Philosoph. Society,) and compared with twenty years observations made at Manheim, (Ephemer. Meteorolog. Palatina Manheim,) it appears that the temperature of Salem is higher in summer, and lower in winter, than that of several cities in Europe.* Again; "The historians and naturalists of America have long ago noticed with surprise, that the climate of the sea coast was by many degrees colder in winter than the parallel regions of Europe, and even in Asia and Africa, adjacent to the Mediterranean; still they seem to have overlooked a circumstance equally remarkable, which is, that the heat of summer is, in like manner, greater by many degrees than that of the eastern hemisphere." Another accurate investigator† has remarked as follows, in reference to the climate of this country: "Instead of remaining fixed and settled, the climate is perpetually changing and altering in all its circumstances and affections. And this change, instead of being so slow and gradual as to be a matter of doubt, is so rapid and constant, that it is the subject of common observation and experience. It has been observed in every part of the U. S. (continues he,) but is most of all sensible and apparent in a new country, which is suddenly changing from a state of vast uncultivated wilderness, to that of numerous settlements and constant improvements." Mr.

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* Meaning, we presume, cities under the same parallel of latitude. A. H.

† Williams' History of Vermont.

Volney has furnished a table, exhibiting the respective latitudes of Rome, Marseilles, Padua, and Salem, with their least and highest temperature, and respective variations. From this it appears, that the difference throughout the year at Salem is 119¾°, while it is at Rome only 54°, at Marseilles 65°, and at Padua 87°. Generally in Maine, Vermont, New-Hampshire, and Massachusetts, as stated by the same author, countries situated between 42 and 45 degrees of north latitude, parallels corresponding with the south of France and the north of Spain, the earth is covered every winter with snow for three or four months, so as to make the use of sleds and sleighs universal.*

"A little further north, namely, in Canada, at 46 and 47° north latitude, which corresponds with the middle of France, the snow begins to fall in November, and continues on the ground till the end of April, a period of six months, from four to six feet deep, with a clear and dry air. At Quebec, the mercury usually descends to 13 and 22 below zero; nay, the mercury was known in 1790 to freeze, which implies a still greater descent.† Now, such an instance seldom occurs in Europe, in latitudes below that of Stockholm and Petersburgh, which are situated at

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* These assertions, however correct in point of fact at the time they were made public, must now be received with some qualifications. Published 22 years ago, the face of our country, in these parts, has undergone considerable alteration, and our climate is proportionably ameliorated. *Note by the Author.*

† Liancourt's Travels, vol. 2. p. 207.

60°."* Philadelphia corresponds in latitude with Madeira, Valencia, and Naples. The general conditions of atmosphere, incident to large tracts of country, and upon which principally depend its sudden alterations, may be derived from the character of the soil, course and changes of wind, quantity of rain and evaporation, proximity to the seaboard, and, perhaps, from some other sources, which may have escaped our recollection.† There is no country on the face of the globe, where these positions may be so easily verified as in our own. We can hardly turn an eye to any portion of our extensive country, where the hand of cultivation has not produced those physical alterations, which display the great influence such circumstances possess in creating and modifying disease. "It seems," says Dr. Rush, "as if our climate were a compound of all other climates in the world. We have the damp and gloom of Britain in the spring, the scorching rays of Africa in summer, the mild temperature of Italy in June, the cold and snow of Norway, and the ice of Holland in the winter, somewhat of the storms of the West Indies at every season, and the capricious winds and fluctuating weather of Great Britain, throughout the year." The general change

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* The mean cold at Petersburgh for twenty years, from 1772 to 1792, according to the reports of the Russian Academy, was at 23 below zero, but the general cold is not mentioned. The ice is formed 25th of September, and melts 25th of April, as it does at Quebec.

† Vide note B.

of climate Volney* ascribes to two causes. "First, to the clearing of the land, and thus producing a mass of warm air, which is constantly increasing. Secondly, to the access of warm winds through these openings, by which the country is dried more rapidly, and the atmosphere more heated. The course of winds is influenced by the character of the soil over which they pass, as well as by their passage over high mountains and extensive sheets of water. The north-east, north-west and south-west are presumed to be the most prevalent winds in the United States. Dividing the year into thirty-six parts, we may affirm that these three engross thirty or thirty-two of those parts, the north-west and south-west having each twelve of them, while the east and north-east have six or eight. The rest of the year is distributed among the north-east, south, and west. The north can hardly be admitted to any share."

"General alterations in the climate from felling of the trees, and clearing of the lands, have been noticed by Dr. Rush in Pennsylvania, as well as by Mr. Jefferson in Virginia. The summers are longer, autumns later, winters shorter, lighter, and less lasting snows, with cold less violent." "When the settler moves into a new township, his first business is to cut down the trees, clear up the lands, and sow them with grain. The earth is no sooner laid open to the influence of the sun and winds, than the effect of cultivation begins to appear. The surface of the earth be-

* View of the Climate of the United States.

comes more warm and dry. As the settlements increase, their effects become more general and extensive; the cold decreases, the earth and air become more warm, and the whole temperature of the climate becomes more uniform and moderate, at the same time the lands and roads become more dry and hard, the stagnant waters disappear, small streams and rivulets dry up, and the redundant waters are carried off. The number and quantity of the snows decrease, the winds receive new directions, and the weather and seasons become much altered. These changes every where attend the cultivation of the country; and have formed a remarkable change of climate in those states which have been long settled."* The same writer observes, that in Vermont, "the north-west winds are dry, cooling, and elastic, while those from the south-west are more warm, moist, and relaxing." We may probably infer, that the character of the winds, in the northern and eastern sections of the United States, do not vary materially from what is here stated, in reference to the individual state of Vermont. The author of the "View of the Climate of the United States," whom we have before quoted, considering those remarkable alterations of temperature, to which our country is subject, arrives at the singular conclusion, that throughout the continent of North America, *there is no spring*. This assertion, although in part certainly correct as applied to the northern and eastern divisions of the country, is to be

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* Williams' History of Vermont.

esteemed as savouring too much of that spirit of unqualified remark, for which the writer was noted, when applied to the southern states, where the distinction of seasons is more marked and apparent. Speaking of the comparative quantities of rain in the United States and Europe, Volney avers, as the result of his examinations, that there falls more rain in the United States in fewer days, that there are fewer cloudy days, and more evaporation. Mr. J. (now general) Williams,* found, by a series of experiments and researches, that the mean quantity of evaporation at Cambridge, near Boston, for a term of seven years, was fifty-six inches, while in seven German and Italian cities, on a mean of twenty years, it was only forty-nine, making a difference of seven. But the cities of Italy are in a latitude much more favourable to evaporation than the vicinity of Boston, adjacent to the Atlantic ocean.

In one year there were at Salem,	-	173 fair days.
At twenty cities of Europe, -	-	64 do.
At these cities there were, in 1785,	-	113 cloudy days.
At Cambridge, near Boston, -	-	69 do.
At Salem, taking the medium of 7 years,		90 do.

The reason of this rapid evaporation, M. Volney believes, is, " because the winds are pure, in consequence of the general plainness of the surface, and because one of them, the north-west, which is certainly dry, prevails for two fifths of the year." It is

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* Trans. Amer. Phil. Society.

important to our subject to observe, that there is commonly more electric fluid in the atmosphere of the United States, than in Europe. This is unquestionably connected with the dryness of the air just noticed. Dr. Wm. Barton, in his notes to Dr. Gregory's Dissertation on Climate, as translated by him, makes the following observations in relation to the alterations of weather in the United States: "The range of the thermometer in these states is not unfrequently from 80° of Fahrenheit, in summer, to zero, or one or two degrees below it, in winter. In the present month, February, 1815, the mercury stood from 5° to 16° below zero, of Fahrenheit, in different parts of the United States."

There is a subject which stands in close relation to the other remote causes of phthisis pulmonalis, as applied to this country, which we deem of too much consequence to pass by; we mean the little connexion the mode of dressing in these states has with the ever-varying character of our climate. This point has been so often and so ably insisted upon, that we apprehend all that the most prudent lessons of foresight, and the earnestness of well-timed advice could suggest, has already been effected, and that nought will avail to correct the gross errors on this head, but the sad monitions of dear-bought experience. As well might the hardy inhabitant of Norwegian snows pretend to brave the rigours of his icy climate in the flowing robes of tropical indolence, as the native female of these states hope to indulge in the light

costume of Grecian attire, under the influence of a sky far different from that of attic serenity.

To explain further how the changes of climate above adverted to operate in becoming efficient remote causes of pulmonary consumption, would be to enter into details, with which the practical as well as theoretical physician is already sufficiently acquainted. We shall not, perhaps, however, be excused, if we do not, in some general terms, refer to the modus operandi of causes, which we have with some care endeavoured to exemplify. Nature has bestowed on man a certain and very remarkable aptitude for accommodating himself to such states of living, as the various necessities of his race render him from time to time liable to. Thus, the individual who shall remove from the arid plains of equatorial regions, to the colder latitudes of frost and snow, by a series of timely and long-continued precautions, acquires an alteration of physical habit, which will fit him for the altered character of climate he now inhabits. In these instances, without doubt, the whole constitution undergoes a modification of functions, which enable it, if I may be allowed the expression, to sympathize with the external circumstances to which it is exposed.

The northern man, in emigrating to warmer countries, ere long loses the vigour of frame, and disposition to bodily exercise, which marked him while breathing the air of his native clime. On the contrary, the lax fibre, and sun-burned hue of the southern planter, is, by a removal to colder countries,

exchanged for the robust form and sprightly animation, which is imparted by the invigorating qualities of his new abode. But to this doctrine there is a salutary limit.

While the various emergencies of our condition compel us occasionally to change our residence, if our constitutions were incapable of assimilating themselves to the divers atmospheric agencies to which we become subject, we would be compelled, in spite of many important considerations, to tie ourselves down to such localities as should have given us birth. But, while nature has endowed man with this peculiar property, she has left him liable to suffer from such acts of rash and imprudent exposure to the vicissitudes of weather, as a more cautious conduct could have readily obviated.

When, therefore, these vicissitudes are encountered, their results are felt in the experience of some morbid action, which is thereby generated. It will become at once evident, that the organs of respiration in all such cases will be immediately concerned. It would be rather foreign from our purpose to enter into philosophical details, tending to elucidate the particular manner in which the abstract qualities of heat and cold influence the living system. Some few observations on this head must be received in place of more extended investigation. Popular prejudice has all along conduced to the belief, that sudden exposure to cold, when the body is heated, would be attended with extreme hazard, and this alone has been accounted one of the fruitful sources of disease. The re-

searches, however, of more modern experimenters, have tended in no small degree to qualify such conclusions.

Those of Dr. George Fordyce and Sir Charles Blagden, familiar to every person, are among the most important in evincing that exposure to a high degree of cold, after violent heat, is unattended with danger to the constitution.* This fact is likewise confirmed by the mode in which the practice of bathing is conducted in Russia, and in several other countries, the inhabitants of which, " to heighten the luxury, and add to the refreshment of immersion in heated baths, or long exposure to vapour of high temperature, immediately plunge into contiguous cold baths, or run into the open air, and, without the smallest covering to their bodies, roll themselves in snow."† In considering a fact of this kind, there are two particular circumstances to be noticed, to wit, the acquired vigour of the subjects to whom the practice appertains, and the inherent powers of reaction possessed by the animal economy. The hardy Russian, whose every fibre is made tense by the severity of his climate, suffers no harm from such practices, as the principle possessed by the system just adverted to, is put in action in a frame capable of enduring the influence of the opposite media to which it is exposed.

But this would afford no ground for believing, that the more tender frame of an inhabitant of the tropics,

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* Vide note C.

† Essay on Phthisis Pulmonalis, by John Reid, M. D.

to whom, of course, belongs the same general law of nature, could bear so severe a change with equal impunity.

A due regard to these contrary circumstances is required, when commenting on facts, from which such important conclusions may be drawn. Whenever rapid transitions are undergone, which are followed by powerful reaction, a proportionately firm character of fibre is requisite, that the shock may be sustained without great injury to the bodily functions, or, perhaps, a total suspension of vital action. "The state of the body in relation to its susceptibility of being affected by cold media, has more reference to the *kind* than degree of previously existing heat; or, more correctly speaking, although an equal quantity of actual heat may be present in the system, such heat may be abstracted with greater or less facility and safety, according to the mode in which it has been generated.

The increase of temperature occasioned by what is termed an inflammatory action pervading the whole system, such as is sometimes observed in inflammation of the lungs; that attended with an extremely debilitated state of the vital power, as in instances of what has been improperly termed putrid fever; the heat consequent upon violent exercise; and that produced by communication from without, as in the example of hot baths, or exposures to other sources of great heat, while the body continues inactive, are all essentially different in their nature, and although in each case the quantity may be equal, and a

thermometer applied to any part of the body's surface shall indicate the same; yet from such temperature alone, it would be improper to form a judgment on the expediency and safety of the sudden application of cold.*

In the author's recollection, a case occurred of violent inflammation of the whole thoracic viscera, which speedily terminated in death, almost immediately following a large draught of cold water, when the body had been heated by unusual exercise. The deceased was, previously to the event, a strong and healthy man, in the prime and vigour of life.

In this case, the injury appeared to arise, not from the sudden abstraction of heat, but from the precipitate interruption of those *actions*, by which the increase of temperature had been generated.† Much has been said by those who dwell very earnestly upon the case of Alexander, and the great risk he encountered by bathing in the river Cydnus, when clothed with perspiration.

Dr. Currie, however, has, in our judgment, very accurately conjectured, "that, from the length and difficulty of the march, he must have been cooled as well as debilitated by excessive perspiration and fatigue, and under such circumstances, immersion in the cold and rapid Cydnus was followed by the consequences which we should expect from the principles already laid down." The vigour of his frame

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* Vide note D.

† J. Reid's Essay on Phthisis Pulmonalis.

must, we may presume, have been temporarily suspended, and the temperature of his body to such a degree lowered, as to leave not sufficient room for the necessary reaction to occur.

Bearing in mind these conclusions, we must also recollect, that the alternations of weather to which we are more especially subject in this country, act upon the system at a time when, unprepared for such attacks, no precautionary measures have been adopted, and we are consequently liable to all the effects arising from such exposure. The most common of these effects is, an increased and disordered secretion of the bronchial membrane, which lines the air passages, with general symptoms of fever. This will sometimes extend no further than the lining membrane of the nares, while, at other times, it will involve the membrane in its whole length. It is in these latter cases, that it is so very liable to be followed by genuine consumption. After this enumeration of remote causes of phthisis pulmonalis, *as connected with general atmospheric conditions*, we proceed to consider such other remote causes, as come within the more local circumstances we have above adverted to. And, firstly, those of occupation. Various mechanic arts have, beyond all doubt, a very considerable tendency to create a disposition to pulmonary consumption.

Some of them necessarily oblige those engaged to labour in apartments impregnated with artificial air, the inhalation of which thus becomes a constant source of irritation to the pulmonary organs. In

others, a continued adherence to such postures of body as prevent a proper expansion of the chest, and thereby impede the office of respiration, are attended in the end with a difficulty of breathing, and other more serious affections of the respiratory functions. It is proper here also to notice the injuries sustained by the same functions, in the inspiration of the contaminated atmosphere of jails, prisons, and other places where the air becomes loaded with offensive particles, and unfit for every salutary purpose of sustaining life.* Among the varions artizans, Dr. Cullen has enumerated stone-cutters, millers, and flax-dressers, as particularly subject to attacks of this disease. "But the most striking example," says another writer, "of this species of injury, is afforded by one of the processes of the needle manufactory; it is that of dry grinding, by which the needles are pointed; the persons employed in this labour are universally affected in a short time with the symptoms of approaching consumption." They go on coughing, till they either spit blood, or a thick

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* The author takes this opportunity to express his regrets, on the one hand, at the very deficient arrangement which has hitherto existed in our different penitentiaries, to secure to their unfortunate inmates that pure state of atmosphere so requisite to their health, and, on the other hand, his sincere congratulations, that by the more judicious plans pursued in the erection of some later buildings for that purpose, this subject seems to have met with the attention it so richly deserved.

substance, having the appearance of matter. They decline in flesh and strength, and scarcely ever survive to the fortieth year. Dr. Kirkland observes, that sithe grinders are subject a disease of the lungs, from particles of sand mixing with iron dust, which, among themselves, they call the grinder's rot."* It is moreover asserted, on good authority, that the gilders of London die almost universally at a very early period, of similar disease. Certain other occupations are very properly thought to bestow an immunity from this extensive malady. Such are those of boatmen, watermen, sailors, and gardeners. Certain animals of the lower order are moreover supposed to enjoy a marked exemption, as dogs; while, on the other hand, cows, it is reported, are particularly subject to it. "It has been remarked by other authors," says Dr. Beddoes, "that asses in our colder latitudes are affected with scrofula and consumption, diseases, to which we have no information that they are subject in their native climates."

As a very interesting illustration of the agency exerted by particular modes of living, in giving rise to, or preventing pulmonary affections, I shall take the liberty of subjoining an extract of a letter from Dr. Cogan, a medical practitioner, who had resided both in London and Rotterdam, to Dr. Beddoes,† containing some very apposite statements in relation to the modes of living, and liability of the Dutch to ca-

* J. Reid on Phthisis Pulmonalis.

† Essay on Pulmonary Consumption, by Thomas Beddoes.

tarrhal complaints. Speaking of the mode of warming their apartments, he thus remarks—"Five or six turfs, about the shape and size of our bricks, which is the usual fuel of the country, are arranged in the form of a chimney, and a glowing coal placed at the top, by which means the inward surfaces are enkindled, and the turfs are half consumed, before any share of a very moderate heat is received in the apartment. The females never approach the fire, but generally place themselves at the greatest distance, contented with a small coal of the turf completely charred in an earthen pot, filled with ashes, to moderate the heat. This is placed in a wooden box, with a perforated surface, and applied to the feet.

"Supported by this consolation, they prefer placing themselves at the greatest distance from the fire, generally by the windows, which, by the way, from their immense size, greatly contribute to the coolness of the rooms. In short, by the extreme airiness of their rooms, and warmth of their dress, they are secured against those extremes of heat and cold, to which the inhabitants of those countries are hourly exposed during the winter season. Their customs are a direct contrary to ours, it being customary among us to dress as lightly as possible, and render our apartments as warm as possible, by the united aid of large coal fires, double doors, warm carpets, and ceiled rooms, and by every caution that can prevent the external air from entering at chinks and crevices, to restore the balance of circulation. This contrariety in the mode of living, in these two essen-

tial articles of dress and habitation, will fully explain, my dear sir, the cause of the frequency of catarrhs in this country, and their being comparatively seldom in Holland, without imputing it, exclusively or principally, as some have done, to the general variableness of our climate. The transitions from heat to cold in Holland, are fully as frequent as in England, and the extremes of heat and cold are generally greater; but their effects upon the constitution are by no means so immoderate or violent. Thus, I fear, that the opprobrium that has been cast upon the climate of England, rather belongs to the injudicious conduct of its inhabitants. It has been remarked, that as luxury increases in Holland, respecting the greater comfort and accommodations of their apartments, they are becoming more subject to catarrhs."

The circumstances of constitutional predisposition, which afford a bias to pulmonary disease, are connected with very various conditions of the system. Books of medicine have almost universally recognised the doctrine of the hereditary character of consumption. A belief in such doctrine, so far as it is connected, either with peculiar conformations of the respiratory organs, general temperament or habit of body, rendering the lungs more readily excitable into morbid states, or, in other words, more susceptible to impressions from without, is doubtless in full accordance with known principles and every day's experience. By the same process of reasoning, we consider scrofula an hereditary disease. Any other view of this matter, whereby we are taught to

believe in the more *direct* transmission of the disease from parent to child, is unauthorized and gratuitous. The connexion between scrofula and consumption, will hereafter demand our special attention. Exanthematous eruptions, in constitutions liable to be affected by comparatively slight and imperceptible causes, as of variations in the atmosphere, by so acting on the surface, as to repel the eruptions there existing, and produce local determinations, more particularly to the lungs, frequently become sources of phthisis. Authors have enumerated other bodily appearances as characteristic marks of a tendency to this disease. The narrow chest and high shoulders, already noticed, weakness of the voice, whiteness of the teeth, fairness of complexion, and light hair, have all been observed to accompany a predisposition to this affection. Much reliance, however, we apprehend, cannot be placed upon these signs, except where a number of them concur in the same person. The undue action of the lungs, excited by much and loud public speaking, blowing on wind instruments, as well as such severe bodily exercises of any kind as are connected with hurried states of the respiration, become predisposing causes of pulmonary derangement. The habits of sedentary men, as of those confined within the precincts of a cloister, as also the class of the clergy generally, by a deficiency of bodily exercise, and too close attention to the studies of the closet, dispose the sanguiferous system to slow and sluggish action, and thus indirectly promote chronic affections of the pulmonic tissue,

or of some other organ essentially important to the well being of the animal economy.

We are now prepared to enter on the second principal division of our essay, which consists in the investigation of the exciting causes of phthisis pulmonalis. As preparatory to this undertaking, we shall annex a brief outline of the anatomy of the organs of respiration. "In anatomical descriptions of the human body, we find a division of its trunk into two portions, the thorax forming the superior, and the abdomen the inferior part of this division. The boundaries of the thorax exteriorly, are, however, not defined with sufficient precision to admit of a correct delineation. The two cavities of the chest and abdomen, are formed by the intervention of a large and powerful muscle, (the diaphragm,) which is the organ principally concerned in the mechanism of respiration, and by the alternate contraction and relaxation of which, the dimensions of each cavity are materially affected. The bones of the thorax, on the relative position and strength of which depends its variety in form and magnitude, consist of the ribs, situated laterally, the sternum, or breast bone, occupying the anterior, and a number of the vertebræ, or divisions of the back bone, the posterior part. Of these several bones, the ribs alone are destined for any considerable motion, in those alternate contractions and expansions of the thorax, which constitute the act of respiration. The breast bone and vertebræ, in their relation to the chest, are principally designed to give form, strength, and cover-

ing to the thoracic cavity, and to serve as fulcra to the ribs, with which they are connected, by distinct and moveable articulations. The external muscles, which are either remotely or directly connected with the functions of respiration, are in general found to correspond, both in magnitude and strength, with the bones to which they are attached, and do not admit of any description that would be intelligible to the general reader, or at all applicable to the subject of consumptive affections. The lungs, which occupy the principal portion of the cavity of the chest, are two soft, spongy bodies, corresponding in figure with the osseous coverings of the thoracic viscera, that have bee just described. They are chiefly composed of cells; these cells are minute ramifications of the bronchiæ, which last are sub-divisions of the trachea, or wind pipe, that long tube, composed principally of cartilaginous rings, which, commencing in the fauces, descends on the anterior part of the neck, divides primarily into two branches, that supply each division of the lungs, by separating first into the smaller bronchial tubes, and ultimately ramifying into membraneous vesicles or air cells, that in this manner constitute, as just stated, the principal portions of these organs. Interposed, however, between these vesicles, there is a quantity of cellular substance, which has no connexion with the cavity of the air cells, but connects these cells together, divides each lobe or lung into separate lobules, forms a surface for the innumerable divisions, and almost inconceivably minute ramification of blood vessels,

that are every where dispersed over them, and gives strength and substance to the general structure of the lungs. The blood vessels of these organs, which, as will be shortly seen, are of such important consideration, in reference to the several functions of the animal economy, are formed of branches of the pulmonary artery and veins. The trunk, from which proceed the minute ramifications of the pulmonary artery, arises from the right ventricle of the heart, whose alternate and successive dilatations and contractions, receive and propel every particle of circulating blood, previously to its distribution throughout the body. Thus conveyed by the contraction of the ventricle, and muscular force of the arteries, through their extreme branches, the blood is re-conducted by corresponding branches of veins to the left auricle of the heart, to be carried, by means of a separate and distinct system of vessels, through the extreme course of general circulation. Besides the parts already enumerated, as entering into the composition of the lungs, they are likewise supplied with lymphatic or absorbent vessels, and with nerves. By a membraneous expansion of considerable strength, (the pleura,) the whole internal surface of the thoracic cavity is covered, and, by a continuation or reflection of this membrane, is divided into two distinct partitions, which are entirely without communication, and in each of which one of the lobes of the lung is enclosed, as in a separate and appropriate capsule. A further reflexion of this membrane, by being expanded on its surface, furnishes an entire

envelope to either lung." It is curious to observe the fallacies connected with the opinions of the ancients on the subjects of the remote and proximate causes of disease. They held various sentiments in reference to the exciting cause of phthisis. It was either some acrid corroding humour, produced in the brain, and, by some inexplicable means, falling down upon the lungs, and destroying their texture; or it was the existence of some acid or alkaline substance, or some acrimony of the blood, depending upon certain conjectural chemical changes. Even animalculæ have been supposed, by their irritating presence in the pulmonary tissue, to cause this disease. Modern writers have formed far different notions on this important subject, some of which, as will be seen, however, have received much improvement from the late investigations of the French anatomists.

It will probably be a useful illustration to our subject, to state the arrangements adopted by the more celebrated nosologists, in relation to this disease. Sauvages ranks it as 2d genus of 1st order (macies) 10th class (cachexies,) and defines it thus: corporis emaciatio, cum amphi-merina lenta, tussi, dyspnœa, et ut plurimum puris sputo. Linnæus arranges it as 1st genus of 1st order (emacientes) of 10th class, (deformes.) Marcor cum hectica, tussi, dyspnœa, expectoratione purulenta copiosa. Vogel places it as a genus of the class cachexies—Extenuatio corporis cum febre lenta, vel hectica, dyspnœa et tussi. Sagar, genus of order 1st (macies) class 3d (ca-

chexies.) Corporis emaciatio cum amphi-merina lenta, tussi, dyspnœa, et ut plurimum puris sputo. Ab initio rarius in phthisi adest puris sputum, in statu contra, et fine semper. Cullen assigns to it a place as a sequel of hœmoptysis, which is found in the 4th order (hœmorrhagiæ) of class 1st (pyrexiæ.) He thus defines it—Corporis emaciatio et debilitas cum tussi, febre hectica, et plurumque expectoratione purulenta. He constitutes two species, the incipient and confirmed. Pinel, who, of all the modern nosologists, has probably the fairest claim to such a division of disease, as is best calculated to convey correct ideas of the connexions existing between the disease itself, and the general character of the functions implicated; makes phthisis a genus under 2d section (læsiones organicæ quibus hoc vel illud organum afficitur,) order 1st (læsiones organicæ generales,) 5th class, (læsiones organicæ.) He subdivides it into phthisis, tuberculo simplex—species complicata. A more extended enumeration of symptoms than is contained in any of the definitions above given, would properly lead to a consideration of three different stages of the disease, to each of which appertain its appropriate signs. Thus, the first, or forming stage, is marked by some degree of cough, more or less troublesome, especially at night, and while enjoying the recumbent posture. Pains experienced at the sides of the chest, sometimes only at one side, sometimes in front, under the sternum, expectoration not generally free, and of a mucous character, disposition to feverish action at night, some loss of appetite. The second, or formed

stage, is characterized by increased violence of cough, expectoration purulent, evident dyspnœa, pain more fixed, pulse quick, with tension, the tongue bearing a white coat, change of countenance, bowels inclined to constipation. No relief being obtained, the febrile paroxysms are observed to be more intense, and ensuing with greater regularity, preceded by a feeling of chilness, and terminated by perspiration, more or less profuse, rapid increase of debility, almost total absence of pain, expectoration still decidedly purulent, or perhaps of sanious character, total loss of appetite, regular night sweating, less tension of pulse, except during the exacerbation of the hectic, and colliquative diarrhœa. This forms the third stage, and, especially where the last symptom supervenes, is succeeded by dissolution. For the immediate elucidation of this part of our subject, we shall offer some few distinct propositions, the explanation of which will constitute our present purpose. 1st. Phthisis pulmonalis has claims to be considered as an idiopathic disease. 2d. The previous existence of inflammatory symptoms, is not necessary to the developement of phthisis pulmonalis, but that such as are characteristic of irritation, existing in a greater or less degree, do commonly occur.* 3d. Tuberculous formations are the real proximate cause of this disease.† I have thought it necessary to discuss the subjects contained in the first two positions as essentially requisite to en-

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* Vide note E. † Vide note F.

able us to collect such information, and deduce such inferences, as will more readily conduce to the establishment of our main intention, namely, to prove, as far as we have the ability, the existence of tubercles, as the proximate or exciting cause of phthisis pulmonalis. It will be observed, of all the nosologists above referred to, Cullen alone has preferred to assign a place to this disease, as a mere sequel, or as consecutive to a primary generic affection.*

What renders Dr. Cullen's assignment of this disease the more remarkable, is, that it involves a positive contradiction, between its situation in his nosology, and his opinions in relation to it, as delivered in his "First Lines." While in the one instance he has chosen to consider it as the sequel of an hemoptysis, he has in the other expressed an opinion that the disease arose from another source. Is it not probable, that this venerable teacher in medicine may have subjected himself to unmerited reproach, as being ignorant of that which the numerous dissections, performed in the very seminary in which he held so distinguished a place, as well as elsewhere, would have decidedly taught him, that the existence of tubercles was almost universally observed in the

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* Macbride, in his Nosology, has adopted the same course. He makes phthisis, with tabes, a species of a genus, to which he gives the name Hectica: a mode of proceeding, surely, very unphilosophical, when the hectic fever is, in each of these affections, a mere symptom of the constitutional derangement.

bodies of those, who had fallen victims to this malady? The following are his own expressions:—"I now come to consider the fifth head of the causes of phthisis, and which I apprehend to be the most frequent of any. This I have said in general to be tubercles, by which term are meant certain small tumours, which have the appearance of indurated glands." And in another place: "In one case, and that too a very frequent one of phthisis, it appears that the noxious acrimony is of the same kind with that which prevails in scrofula. This may be concluded from observing, that a phthisis, at its usual periods, frequently attacks persons born of scrofulous parents, that is, of parents who had been affected with scrofula in their younger years. That very often, when the phthisis appears, there occur at the same time some lymphatic tumours, in the external parts, and very often I have found the tabes mesenterica, which is a scrofulous affection, joined with the phthisis pulmonalis. To all this I would add, that even where no scrofulous affection has either manifestly preceded a phthisis, this last, however, most commonly affects persons of a habit resembling a scrofulous, that is, persons of a sanguineo-melancholic temperament, who have very fine skins, rosy complexions, large veins, soft flesh, and a thick upper lip; and further, that in such persons, the phthisis comes on in the same manner that it does in persons having tubercles." Is it not, then, an inconsistency in our author, to speak of a disease as being most frequently connected with a general condition of habit, and

also to refer it in a nosological arrangement, as a mere sequel of a topical affection? If we may be allowed to imagine what were the errors by which Dr. Cullen was betrayed into this inconsistency, we should adopt this train of reasoning in their explanation. He had observed, in the first place, that the external circumstances of habit, which mark a predisposition to a pulmonary hemorrhage, bear some degree of analogy to those which imply a predisposition to more serious pulmonary disorder. These are, the fair complexion, the narrow chest, the high shoulders, the long neck, and superior irritability of habit, remarked in both cases, but frequently depending upon different causes. Besides this, he could not have escaped remarking, that hemoptysis and phthisis were very apt to make their appearance about the same time of life, that is, the age of puberty, and from that to thirty, or thirty-five. A regard to the common and combined operations of the animal economy, would, however, easily serve to explain the simultaneous occurrence of the two diseases. There is a period in our lives, at which the different systems of vessels which constitute our frame, arrive at a condition of full and general developement. This period is that, at which we attain the growth of our bodies, and the maturity of our intellects.* At this time, the nervous, the sanguineous, the lymphatic constitutions, arrive at the full intensity of

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* Vide note G.

their several powers. The habit now seems to be under the mutual influence of those physical agencies, in their state of developement, the just balance between which is, in after life, to constitute so important a mean of preserving health. But if, at this time, through the exertion of various and contrary agents, one set of organs shall have obtained a predominance of action over any other, it will evince itself in the production of such morbid results, as flow from the irregular operation of the particular organ implicated. Has the sanguineous temperament obtained the ascendency? We may expect hemorrhages from some one part of the sanguiferous system, most liable to be affected on such occasions. Is it the lymphatic temperament which enjoys the mastery? We may expect some of those glandular enlargements which are the most common indications of a strumous habit. It is gratifying to adduce in behalf of these opinions, the testimony of a very eminent modern pathologist. "M. Broussais maintains, that as it is the superior developement of the nervous and sanguiferous systems, which disposes certain persons to the neuroses, to acute inflammations, and to hemorrhages, an analogous constitutional disposition, in which the lymphatic system enjoys a remarkable predominance of action, is the organic condition which renders other persons so liable to morbid enlargements of the lymphatic glands. The scrofulous diathesis, he considers to be, merely the lymphatic constitution carried to the highest degree, and which may be transmitted from parents to their

children, just as the sanguineous and nervous temperament may be transferred."* We have alluded to the irritability of constitution designated as a forerunner to each of these diseases; but let it be borne in mind, that it depends upon very different circumstances. The irritability connected with the habit prone to hemorrhages, is derived from, or connected with, general rapidity of the circulating system, with a tendency to particular determinations. That presaging phthisis arises from the weak condition of the lymphatic tissue, favouring such obstructions in the pulmonary organ, as prevent the proper decarbonization of blood, and become the cause of difficult respiration. Other arguments for not considering phthisis as a sequel to hemoptysis, consist in the purulent character of the expectoration, a characteristic termination of the former disease, but a very unusual termination of the latter. Hectic fever never attends the latter, but almost invariably accompanies the former. In the former, the pulse, at all times rapid, wants the tension and fulness attendant upon the latter in its active stage, and the debility which marks its passive. Other differences might be stated, but enough has been advanced, to prove the impropriety of the arrangement of Dr. Cullen, and to verify the claims which phthisis pulmonalis possesses, to rank as an idopathic distinct affection.

Secondly. The previous existence of inflamma-

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* Notes to Morgagni, De Sed. et Caus. Morb. by Dr. Cooke.

tory symptoms, is not necessary to the developement of phthisis pulmonalis, but symptoms characteristic of irritation existing in a greater or less degree, do commonly occur. The efforts of pathologists, as we have already observed, until a comparatively late period, have been directed by observations, made without due circumspection, and collation of facts not so arranged as to subserve the point at issue.

Having been long accustomed to regard every morbid appearance, which in any degree resembled purulent matter, as the product of inflammation, and such purulent matter being always furnished from what was styled an ulcer, or abscess, they were naturally at a loss to conceive how a fluid ejected from the lungs, and so closely allied to pus, could be otherwise generated, than as the product of previous inflammation in the same organs. In aid of this belief, they were accustomed to view this condition of the lungs, occasionally occurring after every symptom of acute inflammation. We do not pretend to deny, that the inflammatory process in the lungs, as in other parts of the system, may be followed by the production of pus, or even run on to the state of gangrene; although the more common termination is undoubtedly that of resolution. When, however, purulent matter is expectorated from the lungs, as a consequence of pneumonia, we are not a little inclined to the opinion, that a morbid state of the organ is thereby induced, essentially distinct from that which constitutes genuine phthisis. There are two circumstances connected with this inquiry, which will demand from us some

attention, namely, the existence of lymphatic glands in the lungs, and the relations existing between consumption and scrofula. On the former subject, ancient anatomists and physiologists were much at variance. There is no doubt, moreover, that the opinion of the deservedly eminent author of the "Morbid Anatomy,"* has had great tendency to create a disbelief in the existence of such glands. He thus expresses himself. "There is no glandular structure in the cellular connecting membrane of the lungs; and on the inside of the branches of the trachea, where there are follicles, tubercles have never been seen." Mr. Hewson held the same notions on this subject, with Baillie. Dr. John Reid was also inclined to this belief, seemingly influenced by the declaration of Dr. Baillie. While he disclaimed the prevalent idea of tubercles being necessarily connected with, or dependent upon, a scrofulous diathesis, he thus attempts to explain their formation. "Tubercles," says he, "may be regarded as the consequence of slight and repeated inflammation, originating in the mucous membrane of the lungs, and extending itself into the cellular texture of these organs, depositing the matter of which these bodies are constituted, which remains unabsorbed and inactive, until excited into the formation of abscess, by fresh and repeated irritation." It will be also proper here to mention another author of celebrity† on the subject of consumption, who,

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* Baillie.

† Essay on the Nature and Cure of Phthisis Pulmonalis. By Thomas Reid, M. D.

discrediting the existence of these bodies in the tissue of the lungs, has ingeniously contrived an explanation of the source of tubercles, predicated upon an alteration which he supposes to take place in the exhaling vessels of the lungs, whereby, instead of throwing out their accustomed lymph, their character becomes changed, rendering them capable of producing a more viscid fluid. " The same cause, continuing to act, may increase that viscid quality, till it shuts up their extremities, and constitutes, the small granules every where found in diseased lungs, termed tubercles." Portal, in opposition to these arguments and assertions, endeavours to form a distinction between the lymphatic glands of the lungs, and the bronchial glands. Naturally, he says, the lymphatic glands are very different, in their structure and situation, from the bronchial. They are much smaller, and also rounder, and harder to the touch, and resemble the other lymphatic glands. But the distinction between them in the morbid state, he found more remarkable than in the natural, having frequently found most of bronchial glands altered in the lungs, whilst the lymphatic glands were perfectly healthy, and vice versa. In reference to Morgagni, and others, who entertained the opinion that there are no lymphatic glands in these viscera, Portal observes, " Les medecins practiciens ne distinguent jamais les alterations de ces glandes. Soit qu'ils parlent des tubercules formés dans les poumons des asthmatiques, soit qu'ils traitent de la phthisie, de la naissance, ou d'autres especes de suppuration des glandes du poumon, c'est presque toujours d'une maniere vague, et

en confondant celles qui affectent ces deux especes, quoiqu'elles different entres elles aussi essentiellement, que les parties dans lesquelles elles ont leur siege." He conceives it indispensable, however, to make a distinction, before a correct idea can be formed, relative to phthisis, and consequently before any truly efficient remedies can be employed. Like the other lymphatic glands, he found those of the lungs presented a considerable diversity of morbid appearances, and particularizes obstruction, inflammation, and suppuration. In five persons who died of phthisis, but who had not expectorated pus till a short time before death, the lymphatic glands were affected in different ways. Some were enlarged, and filled with a chalky substance, such as is found in glands of this nature; in others, the substance had softened and become puriform; others were in a state of suppuration, and the adjacent substance had ulcerated.

He explains the varieties in the degree and seat of pain, by referring to the adhesions which take place between the lungs and pleura, the diaphragm, or other parts; and the aphonia, or paraphonia, which is sometimes very remarkable in phthisical persons, he ascribes to an injury of the recurrent nerves, from those parts of the lungs which receive branches from the nerves being diseased. In the phthisie de naissance, or hereditary phthisis, he maintains, that the lymphatic glands are the seat of the disease, and the bronchiæ either sound, or only secondarily affected. In three infants of Mr. B. which died phthisical, Portal found the lungs full of concretions; some were red,

and, as it were, fungoid; others appeared to possess the nature of wens; others were as hard as scirrhi, and some were suppurated. Most of the bronchial glands were healthy, but some which were contiguous to the lymphatic glands had undergone a change in their appearance. He was confirmed in the opinion of the lymphatic nature of this disease, from the circumstance, that the glands of the mesentery, those along the neck, the œsophagus, &c. were swoln, and full of a gypseous matter. (Portal, sur Plusieurs Maladies.) Morgagni avouched the hydatid origin of tubercles in the pleura and peritoneum, and in the texture of the viscera; and this subject has been ably dilated upon by Drs. Barron and Genner.* We have no means of deciding upon the accuracy of these distinctions; but, as Dr. Baillie has laid much stress upon the absence of tubercles in the follicles of the bronchiæ, we are induced to the supposition, that the tuberculous degeneration does not attack glands of that character. We think we may fairly indulge in the opinion, that such affections of the glands, as are marked by the common symptoms of obstruction, as tumefaction, partial redness, and disposition to suppuration, only affect those of more complicated structure, while the follicle has been deemed an example of the most simple gland.† We can easily

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* Cooke's edition of Morgagni—notes.

† Malpighi first assigned the name folliculus, to a simple character of gland; and Hewson entertained the idea that they consisted merely of convoluted arteries.

see why the former would be more readily influenced by all the causes tending to produce obstruction; and from actual observation, it appears that they alone, on such occasions, sustain the morbid action. Among others, who have maintained the opinion of the lymphatic constitution of the lungs, is Cruickshank. In his valuable work on the lymphatics, he remarks, "the glands at the root of the lungs are commonly of a blue colour." And again—"The glands at the root of the lungs are also frequently black." Cullen speaks of tubercles, as having the appearance of "indurated glands." Broussais accedes to the belief of the existence of glands in the lungs. Laennec seems to leave the question undecided. If the opinion of Malpighi, which has been supported by Morgagni, be correct, that the glands are composed of a cellular structure, might not their close connexion with the cellular connecting membrane of the lungs, have been one cause of their existence having been denied by such reputable authority? Haller also was inclined to assign to them a cellular structure.

The connexions which link together diseases similar to each other in some of their properties, are sometimes strongly marked, and at other times only to be recognised by strict and attentive study. When these connexions depend upon sympathies, it may be either owing to relations sustained between parts by nervous connexion, or from a similarity of original organization. Thus, when in hepatitis a pain is experienced at the top of the shoulder and clavicle, it

is evidently traceable to nervous connexion. But where the testes becomes tumefied, while the patient is suffering under parotitis, or where, in cases of bubo, the superficial glands on the inside of the thigh assume the same action, an analogy in structure is doubtless the cause by which they are so readily made to sympathize.* Scrofula is universally allowed to be a glandular disease, and whether its primary seat be in the mesentery or not, the lymphatic system, by the swellings of the neck, first announces its action upon the living frame.† Now, if glands of the same character, beyond all just dispute, have their seat in the lungs, by what other circumstances, it may be inquired, should we be guided in endeavouring to ascertain if any, and what relationship is, by the laws of the animal economy, established between these two affections? When diseases resemble each other, we naturally expect to find them induced by similar causes, both of a remote and proximate character. Universal experience has decided that the same external circumstances, which favour the production of phthisis, are also very liable to create scrofulous disorders: atmospheric humidity possesses, in both cases, a very powerful agency. The singular affection which has been observed upon the Alpine mountains, with the deformity of stature which occurs in its valleys, it being, in the one case, an enlargement of the thyroid gland, and, in the other, an affection of the spine, doubtless of the same character

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* Vide note H. † Vide note I.

with rickets, both depend upon the endemic constitutions of the air to which the inhabitants are subject, and are both marked with symptoms which serve to ally them to what occurs in the scrofulous diathesis. Perhaps the most convincing of these symptoms is the similarity of results obtained by dissection; for, in examining the bodies of those who have died of rickets, we commonly find a diseased state of the mesenteric glands, similar to what appears in cases of scrofula.

We do not stop to notice such opinions as have been entertained in reference to the production of the goitre, by which it is ascribed to the use of snow water, or other equally unsatisfactory causes. This opinion has indeed received from Dr. Saunders a reply, which we conceive totally overturns it. He mentions that the disease is frequent in Sumatra, where ice and snow are never seen, and that it is quite unknown at Chili and in Thibet, "though the rivers in these countries are chiefly supplied by the melting of the snow, with which the mountains are always covered."* Now, if we examine those conditions of atmosphere in which phthisis most frequently occurs, we shall be led to the conclusion, that they are much of the same character with those which we have adverted to, as operating in the production of the maladies above referred to. Morbid states of the lungs are very often met with in those who have died of scrofula. That some difference does really exist between those

* Saunders on Mineral Waters.

states of the air which are influential in creating scrofula, and those which produce consumption, we pretend not to deny ; and as the subject is one of lively interest, we shall proceed to deliver our sentiments on what we believe to constitute this difference. By referring to the comparative amount of ravages committed by scrofula in Great Britain and the United States, we shall discover the balance to be very largely in favour of our own climate. The universal dampness which prevails in Great Britain forms a striking contrast to the ever varying complexion of the climate of this country.

When, on the contrary, we make an estimate between the extent of consumption in this country and Great Britain, we are struck with the infinitely greater proportion of deaths on this side of the Atlantic from this one cause. It has indeed been always observed, that scrofula was most prevalent in those regions where there existed great humidity of the surrounding atmosphere. From this, and similar views of the subject, we are decidedly impressed with the correctness of the following positions : First, That such conditions of climate as are marked by long continued dampness of the atmosphere, and absence of the sun's rays, whereby the body is deprived of its natural elasticy, the free passage of the electric fluid is impeded, and the tone of the muscular fibre diminished, produce a languor of the system, a preponderance of nervous influence, and a liability to such glandular obstructions as are connected with the general symptoms of depraved digestion and vitiated

process of chylification, such as seem to constitute scrofula. Secondly, That such conditions of climate as are marked by frequent alternations of temperature, at one time evincing all the mildness and serenity of a southern sky, and at another time suddenly assuming the characteristics of a tempestuous region, whereby the body is exposed to the operations of agencies so contrary, as to destroy the balance of the circulation, and invite topical determinations to the respiratory organs, impeding their natural functions, and creating the common symptoms of dyspnœa, cough, &c. are prone to terminate in such affections of the pulmonary glands, as constitute phthisis pulmonalis.

We presume, that these distinctions will be considered as of some importance, when we reflect upon the almost constant language that has been held upon this subject, when referring in general terms to the points of similarity between these diseases, without inculcating such more philosophic views, as are taught us, when we attempt to investigate the precise characters of their remote causes. We could explain by the same method of reasoning, as we have above adopted, the superior number and violence of acute diseases, experienced in this country, to those which occur in Great Britain; and, on the other hand, the greater proneness there experienced to fevers of the typhoid kind. Other points of similarity between these affections might be traced, of a more undefined character, there being in each case, a more particular reference to the part primarily sustaining the morbid action. Thus, in the incipient stages, both of

scrofula and consumption, a cough commonly attends, but in the first case it is commonly dry, and without tendency to expectoration, and the principal uneasiness seems referable to the abdomen, which will be found in a tumid condition, and accompanied with deranged powers of digestion, constipation of the bowels, &c. In the latter case, where the catarrhal affection is primary, there will appear symptoms of febrile irritation, with increased mucous expectoration; while any attendant constipation of the abdominal viscera is to be regarded as secondary to the original affection of the bronchial membrane. Other points of analogy, as the hectic fever, general emaciation, loss of appetite, &c. might be insisted upon, but they are the results of dissection, which probably furnish us with the most direct and conclusive evidence of their similarity. Dr. Beddoes, in his Essay on Consumption, has afforded an extract of a letter written to him, by a gentleman of the name of Bowles, surgeon at Bristol, (England,) whom he had requested to compare the substance of tubercles and scrofulous lymphatic glands. The following is a part of his observations on this interesting subject, as contained in the work of Dr. Beddoes. "I have not noted down any observations on the resemblance betweed tubercles and diseased mesenteric glands; but in the examination of dead bodies, I thought I could discover real proofs of affinity between them. Their different stages are similar; tubercles are frequently found almost as hard as cartilages, apparently inorganized, and, on trial, imper-

vious to injections.* Diseased mesenteric glands are met with in the same state, except that I have not endeavoured to inject them. In other instances, they are both found to contain a curd-like matter, floating on a thinner fluid, and sometimes I have discovered ossific matter in them both. In case of tubercular phthisis, I have repeatedly seen the mesenteric glands so similar in appearance to the tubercles, *that if the latter had been removed from the surrounding lungs, I do not think it would have been possible to distinguish them.*" Having premised thus much, before we attempt to draw such conclusions, and adapt to our purpose such arguments as shall illustrate our position, I shall claim the liberty of advancing the opinions of some few eminent authors in relation to the necessity of previous inflammatory symptoms to the formation of phthisis pulmonalis.

Laennec, after speaking of such varieties of tubercles as had met his notice, observes, " we must not, however, conclude that these tuberculous degenerations were here the effect of the inflammation, since, setting aside their infrequency, com-

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* To a person whose opinions on the nature of these bodies is not formed, they would be readily recognized as inorganic, and the difficulty of injecting them is easily accounted for, when we remember that much nicety is required to inject lymphatics, in their healthy condition. As far as respects the resemblance between tubercles and diseased mesenteric glands, I feel myself authorized, so far as opportunities have presented themselves to me of making autopsic examinations, to confirm the assertions of Mr. Bowles. *Note by Author.*

pared with the frequency of this disease of the lungs, I have often had occasion to observe this variety of tubercles, and to the same extent, in subjects whose lungs were in every respect quite sound. Besides, M. Bayle has completely proved, that tubercles cannot be regarded either as a termination or consequence of inflammation." The variety of tubercles he here refers to, was not deemed, by the author himself, as possessing any thing peculiar in their character, but as a mere modification of their more ordinary appearance; and we may therefore conclude, that what he has expressed on this subject, will equally apply to the general characteristics of tubercular degeneration. Dr. Andrew Duncan maintained the same views, and he thus expresses himself in the introduction to his inestimable work on pulmonary consumption: "But there can, I think, be no doubt that it (phthisis) may justly be considered as an important genus by itself, and that it not unfrequently makes its approaches in such a gradual and imperceptible manner, as to be beyond the power of art, before it be certainly discovered to exist." The analogy existing between this disease and scrofula, which we have been at some pains to explain, may, we conceive, now be made properly to serve as an argument in behalf of our present position. It will be, moreover, now understood, that this was our intention, in instituting such investigations as we have already made; and in doing which, we have been obliged to state explicitly the circumstances wherein they coincide. The analogical argument we would draw from this, is, that as they assimilate to each

other in so many important particulars, and as scrofula does generally occur without any previous inflammatory symptoms, consumption may, in like manner, invade, without the previous existence of such symptoms. But this matter deserves consideration in another point of view; we mean the simultaneous occurrence of tubercles in various parts of the body, with phthisis, and where no antecedent symptoms of inflammation had evinced themselves. Mr. Bayle enumerates the following parts, in which he has discovered tuberculous formations, in the order of their relative frequency, in connexion with disease of the lungs. The bronchial,* the mediastinal, the cervical, and the mesenteric glands; the other glands throughout the body; the liver, in which they attain a large size, but come rarely to maturation; the prostate, in which they are often found completely softened, and leave, after their evacuation by the urethra, cavities of different sizes; the surface of the peritoneum and pleura, in which situations they are found small and very numerous, usually in their first stage, and occasion death by dropsy, before they can reach the period of maturation; the epididymis, the vasa deferentia, the testicle, spleen, heart, uterus, the brain, and cerebellum, the bodies of the cranial bones, the substance of the vertebræ, or points of union between these and the ligaments, the ribs, and lastly, tumours of the kind usually denominated schirrhus or cancer, in which the tuberculous matter is either intimately combined with, or separated in distinct

* Vide note K.

patches from the other kinds of morbid degeneration existing in these.

It was, doubtless, from a close consideration of these and similar circumstances, that Laennec was induced to make the following strong assertion. "I am led to believe," says he, "from many facts, that, in the majority of cases of consumption which terminate favourably, by the formation of fistulæ or cicatrices, the patients have undergone the different processes of the developement, solution, and evacuation of tubercles, without any suspicion of being affected by a more serious disease than a nervous cough, or, at most, a suspicious catarrh." We are very much inclined to the opinion, that if medical men would endeavour to recollect the primary symptoms with which the greater number of their patients have been attacked, previous to the formation of phthisis pulmonalis, they would discover very few, if any, which had been characterized by actual inflammation. In those cases where inflammation of the lungs has been produced by external injury, we do not find that they induce consumption, but more commonly the wounds of the organ cicatrize. Numerous are the instances in which the lungs have been wounded by a small sword, and even by balls, from which the patients have happily recovered. Bierling mentions one, in which a hundred and twenty ounces of blood were lost; and a German author describes a case, in which a ball passing through each lobe, did not prove fatal. In one instance, the right lobe was wholly exposed, and in several a part of the lung was cut off.

"Abscesses also in the lungs, when not from vomicæ, heal easily; though calculi, which are confined to the bronchial glands, are usually forerunners of hectic."* A learned author on the subject of climate,† advances the opinion, "that a simple injury of the lungs, and a rupture of their vessels, can never induce an incurable ulcer, and pulmonary consumption, unless the lungs themselves, or the general habit, have previously become contaminated with some taint." It may be asked, if there be not a rupture of the pulmonary organ, whence proceeds the bloody discharge which so frequently occurs in the first stage of consumption. It arises, we believe, in accordance with the views of Broussais, from a mode of action of the sanguineous capillaries of the part analogous to inflammatory irritation. When, in opposition to what we have observed, as regards such injuries as produce acute inflammation in the lungs. we contrast such mechanical irritants as do daily terminate in the production of consumption, we do not find the latter of a class calculated to excite active inflammation; but that they produce irritation, first of the brochial membrane, and then of the lymphatic glands of the pulmonary organ.‡ This process is commonly slow, and marked by its separate stages. Let us not be understood as denying that consump-

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* Parr's Medical Dictionary, article Pulmon.

† Gregory on Climate.

‡ Witness the inhalation of fine powders in various machanical employments, as before referred to.

tion may ensue upon inflammation of the lungs, and that, too, produced by external injury—our only intention has been to prove, that such inflammation was not necessary, and did not always occur.

If we analyze the principal symptoms which mark the approach of consumption, we shall be enabled to explain them, as easily produced, without supposing the existence of inflammation in any part of the thoracic cavity. The irritable cough, the difficult respiration, the febrile activity of the pulse, with such other appearances as present themselves, may all depend upon increased mucous secretion, and perhaps some effusion of lymph among the air cells of the lungs, impeding their regular action, and thus disturbing the harmony of the sanguiferous system. "No sooner does the secretion into the air passages exceed that which can be removed by expectoration, than accumulation begins, and a part of the cells of the lungs, which should receive air, becomes filled with secreted fluid.

This increasing, must necessarily prevent the due performance of the function of respiration, that function, without which life cannot be sustained. The blood no longer is changed from the dark or venous to the vermilion hue, and the colour of the body partakes of the leaden or livid shade. If the accumulation proceeds, respiration becomes more and more obstructed, the phlegm may be heard rattling in the air passages, and the patient sinks suffocated."*

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* Alcock on Inflammation of the Mucous Membrane of the Organ of Respiration.

We have asserted, finally, that tuberculous formations are the real proximate cause of phthisis pulmonalis. If it be true that consumption consists of an affection of the lymphatic glands of the lungs of the same character with scrofula, or, in other words, that consumption is scrofula, affecting the lungs, whence proceeds the purulent matter ejected to a large amount in most instances of consumption, so different in its appearances from the productions of diseased lymphatics. It has been always common for writers to speak in general terms of ulcers in the tissue of the lungs. Thus Dr. Cullen: "In every instance of an expectoration of pus, I presume there is an ulceration of the lungs." Such ulceration, however, we believe to be very rare, if by it be meant that solution of continuity of the part affected, to which, in a surgical sense, it has been restricted. "The formation of distinct abscess of the lungs as a consequence of inflammation, was at one time generally admitted among pathologists. Laennec, however, who describes suppuration of the lungs under his third degree of pulmonary induration, maintains, that it is exceedingly rare, and gives it as the result of his observations, that small abscesses are found in the pulmonic tissue, not above four or five times, and an extensive one, not above once, in many hundred cases."* If then this matter be not formed as a consequence of the common ulcerative process, there must be something peculiar in the for-

* Edinburgh Medical and Surgical Journal, Jan. 1824.

mation of these tuberculous masses, by which pus is generated. This peculiarity, we believe, consists in its secretion from a membrane, by which the tuberculous degeneration becomes encircled, and which will be more satisfactorily described in the words of M. Bayle, who, in speaking of the excavations formed by the destruction of tubercles, in the last stage of what he terms tubercular consumption, observes, that they are covered by a distinct membrane, which secretes the pus. "When this membrane is not found, (he continues,) there is always an albuminous membraniform bed, which supplies its place, except where a suppuration has occurred in that part of the tissue of the lungs which became inflamed, at the time that the softening of the tubercular encysted degeneracy took place." This very ingenious writer has divided consumption into six different species, but at the same time concedes, that, as might indeed be readily conjectured, many of them may be united in the same person. 1st, Tubercular phthisis. 2d, Granular. 3d, Phthisis with melanosis. 4th, Phthisis from ulceration. 5th, Phthisis from calculi. 6th, Phthisis from cancer. Under the fourth head, phthisis from ulceration, he makes the following observations, which we transcribe, both as tending to confirm our idea of the very rare formation of distinct ulcer of lungs, and also of the use subserved by the lining membrane, in the generality of cases; but which, in these instances, the pus being thrown out on the surface of the ulcer, as in other parts of the body, and depending upon previous pulmonic inflammation, is dis-

covered not to exist:—" The fourth species is very rare. The tissue ulcerates, and the ulcer is never covered by an albuminous membraniform layer, nor by any distinct membrane. It exhales a fœtid gangrenous odour. Its surface is unequal and irregular, covered with brown decayed parts, and generally exhibits traces of recent or remote hæmorrhage. The ulcer is sometimes large enough to contain three pullet's eggs."

He affords the following statement of the comparative frequency of these different species, from the results of nine hundred dissections. First species, six hundred and twenty-four. Second, one hundred and eighty-three. Third, seventy-two. Fourth, fourteen. Fifth, four. Sixth, three—equal 900. The very large proportion of cases arising from tubercular derangement, and the very small number from ulceration of the tissue of the lungs, will not, I hope, fail to be strictly noticed. We conceive the distinctions not to be well adapted for practical purposes, because we think the 2d and 3d species to be merely varieties of the first.

If we refer to such divisions of consumption as have been adopted by medical writers, we shall be enabled to ascertain how far the origin from tubercles has been properly appreciated; while we shall offer such remarks on the divisions themselves, as private deduction, and the more refined investigations of the present day, furnish to us. Dr. Duncan, sen. has divided pulmonary consumption into three species: the " catarrhal," the " apostematous," and the " tu-

bercular." He supposes, that in the first modification, "the expectorated matter is merely separated from an inflamed surface, in a manner similar to the separation of pus from a blister issue." In the second, from "an abscess of considerable size, which may be formed in the cellular substance of the lungs, as well as in any other part of the human body." In the third, "from a tubercle, or from the part surrounding a tubercle, terminating in suppuration, and commonly yielding, not proper purulent matter, but rather an ichorous sanies, somewhat resembling that which is often yielded by lymphatic glands in cases of scrofula, when scrofulous tumours terminate in suppuration." We are of opinion, that this division is defective, inasmuch as it connects together, two diseases of a character widely different, namely, a mere increased secretion from the tracheal or bronchial membrane, and an affection of the lymphatic substance of the lungs, in other words, catarrh and consumption. We are well aware that in many instances, it becomes very difficult to discriminate between protracted catarrh and incipient consumption; but this does not justify us in making them varieties of one generic disease. Such a distinction is moreover likely to mislead, in confounding that morbid condition, which, more frequently than any other, *precedes* phthisis with that which *constitutes* it. Our author very correctly observes, that the tuberculous form of consumption is most frequent and most hazardous. M'Bride considers phthisis in the first instance as primary or secondary, and adopts the following varieties of the

primary: "phthisis sicca," "phthisis mucosa seu catarrhalis," "phthisis hemoptoica." Of the secondary: "phthisis scrofulosa," "scorbutica," "syphilitica," "arthritica," "hypochondriaca," "chlorotica." Here it will be observed, that the characters of the primary, belong to such morbid derangements, as may and do constantly occur, without being followed by genuine consumption, and thus form totally distinct affections; while those of the secondary only apply to such different constitutional tendencies, as afford a bias to this disease, without in any degree specifying the more precise condition of the organ affected.

Nothing is said by this writer in particular reference to the origin or peculiarities of tubercles, and the methods of treatment he has enforced are vague and unsatisfactory. The divisions of Cullen (incipiens et confirmata) only relate to the separate stages of the disease, and with what propriety they are named species, I am at a loss to conjecture. M. Broussais divides phthisis into constitutional and accidental. The terms employed convey with sufficient accuracy the discriminations intended to be maintained, and seem well adapted to impress such views of the subject as are justified by strict physiological observations. We might extend our notice of these divisions; we have probably, however, sufficiently adverted to them, to exhibit the general basis on which they have been founded. There are so many opposite points of view in which morbid degenerations may be regarded, that it will often become a very

difficult task to select such as shall either best accord with the most correct theory, or be best calculated to apply to practical purposes. In forming, for instance, the varieties of phthisis pulmonalis, we may be guided either by the different appearances assumed by the lungs, under different circumstances, or we may refer to the causes which have been most essential in producing these circumstances, or to the general habit of body by which they may chance to be accompanied. Inasmuch, however, as in the phthisis arising from tubercles, the purulent matter is derived from one source, and where proper abscess occurs, from another; and as in the first instance, it is strongly marked by general lymphatic tendencies, and often accompanied by simultaneous lymphatic derangement; while in the other case, it most generally arises from a previous attack of acute inflamation induced by external circumstances, or the more common exciting causes, we might perhaps be enabled to institute such a division, as shall bear some relation to each of these conditions.

We have before adverted to the infrequency of pneumonia, as antecedent to tuberculous phthisis, while we are decidedly of the opinion, as we have before intimated, that the character of the symptoms which mark its inroad, are such as might, with great propriety, be referred to more violent chronic catarrh, but without the diagnostics of acute inflammation, at least in the substance of the lungs. Predicated upon such sentiments, we would divide consumption into, 1, *phthisis tuberculosa, vel ex catarrho;* 2, *phthisis apostemata, vel ex pneumonia.*

We conceive that such a division, if kept in view by the practitioner in medicine, would lead him to the particular consideration of the premonitory symptoms by which his consumptive patient was attacked, and thus more readily enable him to pronounce a judgment on the rational hope of cure. It would, moreover, induce him, while watching more narrowly the commencing symptoms, to urge upon parents and friends such timely advice, as may yet rescue the object of their affections from the insatiate maw of this fell destroyer.

We do not hesitate to declare it, as our unreserved and candid opinion, that, in many instances, the medical adviser will forewarn, very seriously, those concerned in the welfare of his patient, of the danger of approaching consumption, unless the severity of present symptoms should subside; when lo! the enemy has already entered the frail fabric of his victim, and is probably too firmly entrenched to be dislodged by the combined powers of skill and experience. But, perhaps, he has waited for the developement of inflammatory symptoms, and stands ready, with lancet in hand, to meet their indications; if so, we fear he has often sacrificed the lives of those committed to his trust, in compliance with the dogmas of an insecure faith, or the prejudice of long cherished opinions. Had he exchanged the maxims of the closet for the benefit of personal examination, and made his own deceased patients the subject of his instruction, he would often have found the tuberculous lung, without any of the appearances which denote pre-

vious inflammation, and been taught a lesson of lasting utility. The error of such writers as have made consumption a constant sequel of pneumonia, will, we imagine, be sufficiently apparent, from what we have advanced on this topic. Those who have gone so far as to deem pneumonia the proximate cause of the disease, thereby disregarding the important influence of the tuberculous formations, have most certainly mistaken the true theory of the subject.

After having thus noticed the regard paid to tubercles, as the proximate causes of phthisis, by some authors of eminence, and throughout the whole tenor of our remarks adverted to their existence, in this point of view, we proceed, in conclusion, to mark their more particular characters, and their separate stages, as assigned by those writers who have made them their especial study. It is thus, upon the observations made in dissection, that we are mainly obliged to rely in framing our argument on this head. There is no author on this point, to whom we can with so much propriety refer, as to M. Laennec, whose description of these glands will be found to comprise much interesting and minute observation. We dare presage the period in the history of medical investigations, when strictures on the morbid condition of parts, made with such philosophical accuracy as those of this distinguished pathologist, will, more than the reiterated assertions of schoolmen, and the fanciful theories of the speculatist, elevate our profession above the gross and vulgar errors which have too long attached to it, and bestow on it that

rank among the liberal pursuits, to which it is so eminently entitled.

"These bodies, when first observable in the substance of the lungs, have the appearance of small, semi-transparent grains, greyish or colourless, and varying from the size of a millet seed, to that of a hemp seed. In this their first state, they may be called *miliary* tubercles. These gradually increase in size, and become yellowish and opaque, at first in the centre, and, successively, throughout their whole substance. In their progressive and natural increase, several unite together, so as to form larger masses of the same kind, which, like the individual ones, are of a pale yellow, opaque, and of the consistence of very firm cheese. In this stage, they may be named *crude* or *immature* tubercles. It is in this stage of their progress that the substance of the lungs, which had been hitherto healthy, begins to grow hard, grayish, and semi-transparent round the tubercles, by means of a fresh production, and seeming infiltration of tuberculous matter in its first or transparent stage, into the pulmonary tissue. It also sometimes happens, that considerable portions of pulmonary tissue put on this character without any previous developement of individual tubercles. Parts so affected are dense, humid, quite impermeable to air, and exhibit, when cut into, a smooth and polished surface. Gradually there are developed in these comparatively solid and pellucid masses, an infinity of very minute, yellow, opaque points, which, increasing in size and number, at length convert the whole diseased

space into a tuberculous mass, of the kind named crude, or immature. In whatever mode the tubercles have first shown themselves, they at length, after a very uncertain period, become first softened, and finally liquefied. This change of consistence commences in the centre, and progressively approaches the circumference. In this stage, the tuberculous matter is of two different kinds in appearance, the one resembling thick pus, but without smell, and yellower than the immature tubercle; the other, a mixed fluid, one portion of it being very liquid, more or less transparent, and colourless, less tinged with blood, and the other portion opaque, of a caseous consistence, soft, and friable. In this last condition, which is chiefly observable in strumous subjects, the fluid perfectly resembles whey, having smaller portions of curd floating in it. When the softening of the tuberculous mass is completed, this finds its way into some of the neighbouring bronchial tubes, and as the opening is smaller than the diseased cavity, both it and the latter remain of necessity fistulous, even after the complete evacuation of the tuberculous matter. It is extremely rare to find only one such excavation in a tuberculous lung. Most commonly, the cavity is surrounded by tubercles in different stages of their progress, which, as they successively soften, discharge their contents into it, and thus gradually form those irregular and continuous excavations so frequently observable, and which sometimes extend from one extremity of the lungs to the other." The above remarks our author deems

applicable, as being the general characteristics of tubercular derangement; and although we have already allowed ourselves a quotation of some length, we shall, as the subject merits very faithful elucidation, take the liberty of stating two other appearances, which these bodies occasionally present, and which are thus described: "The above is the ordinary mode in which tubercles are developed; but there are two other modes, which, although mere varieties of the former, are yet deserving notice. The one is, where, in a lung containing tubercles in different stages, we find small portions of the pulmonary tissue, seemingly infiltrated by a gelatinous-looking matter, of a consistence intermediate between liquid and solid, transparent, and of a light greyish or sanguineous hue. In these diseased portions, the cellular structure of the lung is quite destroyed, but we can perceive in them a multitude of very small points, of a yellowish white colour, and opaque, and which are evidently portions of the tuberculous matter, which has reached the second stage of its progress, without there being any surrounding portions of the greyish substance, which denotes the first stage. The second mode of anomalous developement of tubercles, appears likewise to take place, without any previous formation of grey matter; at least, if there be such, the transition from it to the second stage is so rapid, that I have never been able to detect its presence. In this variety, we find here and there in the lung tuberculous masses of a yellowish white colour, much paler, less clear, and differing less from the substance

of the lung than the ordinary immature tubercle. These masses are irregular, angular, and have scarcely ever the rounded form of ordinary tubercles. They seem, like the variety described in the preceding paragraph, and like the diffused, grey matter, noticed before, to be an infiltration of tuberculous matter into the pulmonary tissue, while the proper, or rounded tubercles, are foreign bodies, which separate or press it aside, rather than penetrate it. These masses may, therefore, properly enough be named tubercular infiltration of the lungs. They occupy sometimes a considerable portion of one lobe. When they reach the surface, they occasion no prominence on the part, nor in any degree alter its form. As they increase, they assume the yellow colour of the tubercles, and terminate by softening in the same manner. These three varieties of tuberculous degeneration are often found in the same lung. Sometimes I have found this last variety alone, in lungs affected with peripneumony, and this even in the hepatised portions. In these cases, the small number and extent of the diseased masses, and their deep pale colour, showed their formation to be recent."

We have thus attempted, in the foregoing pages, to deliver our sentiments in relation to the remote and exciting causes of phthisis pulmonalis. In all medical research, there is an accuracy of thinking, there is a pertinency of observation, without which, in the wide field of medical inquiries, we are ever apt to be lost and bewildered, among the various relations of the objects which present themselves to our regard.

It has been said by an able philosopher,* "that the greatest part of true knowledge consists in the distinct perception of things, in themselves distinct." He, whose name in medicine bears with it authority highly deserving our consideration, has also said, "to observe is to think, and to think is to reason in medicine."† So long as medical reasoners shall yield themselves to the fascinations of an alluring theory, and plunge headlong into every system, which, though dark and intricate in its inferences, may chance to be engendered by some morbid operation of fancy, or gilded by the tinsel rays of some unsubdued genius: so long will facts be distorted by the colourings of imagination, and principles be rendered subservient to the establishment of some captivating creed. To be emancipated from such intellectual thraldom, by a strict and unbiassed adherence to the principles of approved reasoning, is the only sure method of rendering the efforts of intellect subservient to the purposes of truth, and in just correspondence with the maxims of an enlightened experience.

The author has ventured, as corollaries to the sentiments urged in the course of the preceding essay, to adopt the following conclusions:

First. To esteem the occurrence of inflammatory symptoms as necessary to the production of consumption, is to disregard the obvious inferences drawn from the dissections and animadversions of such modern pathologists, as have made the subject of phthisis the ob-

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* John Locke. † Dr. Rush.

ject of their minute investigation, as Bayle, Laennec, &c. Secondly. Those nosologists who, as Sauvages, Vogel, Sagar, Swediaur, have assigned to this disease a place as connected with general derangement of some one or more bodily functions, (class cachexiæ,) deserve a preference in that respect to those who, as Cullen, Crichton, Hosack, &c. have referred to it as a mere local affection, or as principally of an inflammatory character. Third. The remote causes of this disease are derived from such atmospheric agencies as have been detailed in the body of the essay. Fourth. The exciting or proximate cause of the disease generally consists in the production of tubercles.

NOTES.

NOTES.

Note A.

In the body of the Essay, as will be observed, we had incautiously neglected to refer to those more recent observations and experiments on the chemical changes effected by respiration, which are principally based upon the researches of Messrs. Allen and Pepys. For an acquaintance with the result of these researches, we are indebted to a highly ingenious Essay on the "Decarbonizing function of the lungs," from the pen of Dr. Pierson, and contained in the first volume of the "Transactions of the Physico-Medical Society of New-York." The following are the conclusions of Messrs. Allen and Pepys on this subject: "1st. The inspired air imparts none of its oxygen or nitrogen to the blood. 2d. The blood loses a principle, viz. carbon, which, by its union with the oxygen of the inhaled air, forms carbonic acid gas. 3d. The watery vapour found in confined air, is the serous discharge from the surface of the bronchial tubes. 4th. The blood derives heat from the decomposition of the inspired air, all the latent heat of the oxygen gas not being necessary to the formation of carbonic acid gas. 5th. The dark colour of the venous blood is owing to its being surcharged with carbon, and the bright scarlet colour of the arterial blood to its parting with carbon in the process of breathing." "The conclusions of these gentlemen," remarks Dr. Pierson, "as to the product of respiration, do not differ widely from those

of Crawford, Lavoisier, and Davy, who supposed also the most prominent circumstance of respiration to be the separation of carbon from the blood; but, as to the quantity of oxygen consumed, the place of its union with the carbon, and the source of the aqueous vapour, there is a great disagreement. It would then appear, that the principal design of respiration is to separate from the blood a matter which, retained in any considerable quantity, is extremely deleterious to life, but which, in a certain limited quantity, is harmless.*

"Carbon, as a part of the chyle, enters largely into the blood, and but a small portion of it seems to be expended in the processes of nutrition and secretion; the remaining part is conveyed out of the system chiefly through the medium of the lungs; it is, therefore, an excretion."

We have referred, below, to the opinion of Brande, as respects the source of the aqueous vapour of the lungs. We should be moreover justified in regarding such vapour as emanating, at least, in part, from the exhalents terminating in the cellular connecting membrane of the lungs. This

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* We are not authorized, by the anatomical structure of the part, in supposing the watery vapour to be derived from the source stated in the text. This watery vapour is not essentially distinct from the serum of the blood. The bronchial tubes are lined by a mucous membrane, which, except when in a state of inflammation, supplies none other than a mucous secretion. The view taken of this subject by Mr. Brande, is more consistent with our present state of knowledge. "The aqueous vapour contained in the confined air is secreted by the exhalents distributed over the surface of the air vessels of the lungs; attempts have been made to estimate its quantity, but without success; it is probably liable to variation, and can scarcely be considered as a product of respiration."* Lavoisier supposed it to consist of the oxygen of the atmosphere, combined with the hydrogen of the blood.—A. H.

* Brande's Chemistry.

would ally it yet more closely with the insensible perspiration, transpiring through the pores of the skin; such perspiration being in each instance produced, according to this explanation, from the cells of this membrane. Its appearance, in the form of vapour, is readily accounted for, by the condensation it suffers from contact with the atmospheric air. We are told that this cellular substance is interposed, as a connecting link, between the minutest fibres of the different solids of the body. It is thus thought to pervade every part of the animal structure. "By joining together the minute fibrils of muscle, tendon, or nerve, it forms obvious and visible fibres; it collects these fibres into large fasciculi; and by joining such fasciculi or bundles to each other, constitutes an entire muscle, tendon, or nerve. It joins together the individual muscles, and is collected in their intervals. It surrounds each vessel and nerve in the body; often connecting these parts together by a firm kind of capsule, and in a looser form joining them to the neighbouring muscles." "In the bones it forms the basis or ground work of their fabric, a receptacle, in the interstices of which the earth of bone is deposited."* In corroboration of its extent of surface, Haller asserts that the flatus of an emphysema has found its way to the vitreous humour of the eye. It is also supposed, that were the whole of the animal machine removed but this, its form would be still expressed in cellular substance. I am induced to make the preceding remarks, from having been led to observe that Bichat, in his "Treatise on the Membranes," has paid no regard to the cellular membrane, in these points of view. When condensed, it is well known that this substance presents a membranous appearance. It has been objected to the idea of the membranes being composed of condensed cellular substance, that such substance, although in its minutest parts, proved by the experiments of John Hunter

* Vide Nicholson's Encyclopedia, art. Anatomy.

to be vascular, is not endowed with feelings, even when the seat of inflammation; that nerves pass through, but are not lost upon it. Its pretensions, however, to be considered as primordial, in reference to the membranes, do not seem to us to be affected by such considerations. Every part of the animal system is modified in its texture and character, by the uses it is intended to subserve. One principal object of the cellular texture is, to serve as a cushion, or defence, against such pressure as we are constantly exposed to. Were it then in any degree provided with nervous influence, this important purpose would be frustrated. But this is by no means a sufficient argument against considering it as the basis or groundwork of membraneous, as well as of other tissues, to which are distributed such an amount of nervous fibre, and so complicated, or so obvious, as shall best answer the intentions of nature. In accordance with this view, the nerves themselves, for they, as well as the ligaments and tendons, may, by a process of maceration, be made to exhibit the same fibrous organization,* are to be referred to the same original texture. Whether, then, we speak of any particular part of the system, as of the membranes, or of the character of the solids in general, regard should be had to this interesting phenomenon in the arrangement of our bodies. Whatever, moreover, tends to simplify our notions of the animal economy, and render more evident the operations of Providence in the formation of our systems, deserves a strict and philosophical attention.

There are one or two reflections connected with the subject of this note, which, though somewhat foreign from its purpose, will, for a moment, detain us. Of all the organized substances of the body, the cellular texture is in the least degree entitled to that appellation. The periosteum is also

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* John Hunter commonly made his experiments with the tendo Achillis, which, from its size, was particularly calculated to afford the necessary appearance.

ranked among the almost inanimate parts of the body, but yet, when inflamed, becomes the cause of great pain. It in this respect differs from the cellular texture.* The principal use designed by the cellular texture is, as has been adverted to, to bind together the fibres of muscles and other parts of the body, and to enable them to move upon each other with sufficient softness and pliancy. Its cells are lined by a serous membrane, furnished, as elsewhere, with exhalents. These vessels are supposed to throw out a fluid, for the purpose of lubricating its substance. But they probably perform other services, and by means of the habitus they afford, give to the muscular fibre more capability of being acted upon by the impulses of the will. May we not, moreover, suppose, that when these capillaries, by the action of cold, or other causes, becoming interrupted in their functions, the disposition for action on the part of the muscular fibres becoming lost or impaired, by being deprived of their lubricating moisture, and an attempt to put them in motion accompanied with pain, that we have enough morbid action explained to constitute the proximate cause of *Rheumatism?* Did time allow, other arguments might be advanced in confirmation of the above suggestion.

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* Thus, the commonly received opinion, that bone is formed in the interstices of the cellular texture, is rendered much more probable than the old doctrine of Du Hamel, which referred its formation to successive layers of periosteum.

Note B.

A very philosophical and lucid arrangement of the various causes operating in producing particular changes of climate, will be found in the following quotation from the erudite and accomplished performance of Malte Brun, on the subject of "Universal Geography." 1st. The action of the sun upon the atmosphere; 2d. The interior temperature of the globe; 3d. The elevation of the earth above the level of the ocean; 4th. The general inclination of the surface, and its local exposure; 5th. The position of its mountains, relatively to the cardinal points; 6th. The neighbourhood of great seas, and their relative situation; 7th. The geological nature of the soil; 8th. The degree of cultivation and population at which a country has arrived; 9th. The prevalent winds.

Note C.

The article in the 65th volume of the "Transactions of the Philosophical Society of London," containing a notice of these experiments, concludes with the following observations: "A principal use of all these facts is, to explode the common theories of the generation of heat in animals. No attrition, no fermentation, or whatever else the mechanical and chemical physicians have devised, can explain a power capable of producing or destroying heat, just as the circumstances of the situation require. A power of such a nature, that it can only be referred to the principle of life itself, and probably exercised only in those parts of our bodies in which life seems peculiarly to reside. From these, with which no considerable portion of the animal body is left unprovided, the generated heat may be readily communicated to every particle of inanimate matter that enters into our composition.

This power of generating heat seems to attend life very universally. Not to mention other well known experiments, Mr. Hunter found a carp preserve a coat of fluid water around him, long after all the rest of the water in the vessel had been congealed by a very strong freezing mixture.*

And as for insects, Dr. Martine† observed, that his thermometer, buried in the midst of a swarm of bees, rose to 97°. It seems extremely probable that vegetables, together with many other vital powers which they possess in common with animals, have something of this property of generating heat. Dr. B. doubts if the sudden melting of snow which falls upon grass, while that in the adjoining gravel walks continues so many hours unthawed, can be adequately explained upon any other supposition. Most dead sticks are often frozen quite hard, when in the same garden the tender growing twigs are not at all affected. And many herbaceous vegetables, of no great size, resist, every winter, degrees of cold, which are found quite sufficient to freeze large bodies of water. It may be proper to add, that after each of the above mentioned experiments of bearing high degrees of heat, they went out immediately into the open air without any precaution, and experienced from it no bad effects. The languor and shaking of their hands soon went off, and they did not afterwards suffer the least inconvenience."

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* Is then the fluid immediately surrounding the body of a fish, in some very small space, warmer than the part without such space? A. H.

† Essays, Medical and Philosophical, p. 331. orig.

Note D.

The most interesting points of view in which the phenomena of heat can be regarded by the medical philosopher, relate to the various circumstances under which it is generated, and the diversity of effects which flow from its application to the human frame. Under this aspect, the suggestions of Dr. Reid, as contained in the text, are deserving of particular notice. Without such discriminations, the physician who attempts to discuss any principle in nature, as affecting our bodies, and as tending to particular results, argues as if the principles which obtain in the physical world, suffered no alteration, when they are made to exert their force, either in conjuction with, or in opposition to, that series of laws which govern the animal economy. On a general view of the subject, our bodies may be said to be exposed, so far as regards the effects which ensue, to three different characters of heat: The first is *solar heat*, as connected with the geographical situation of countries, and as resulting in the acquirement of certain modifications of the animal functions, as also of certain temperaments, or mental qualities, which it does not at present concern us to investigate. The continued exposure to such heat, begets a laxity of the muscular fibres, with a consequent indisposition to muscular action, and a redundancy of the bilious and cutaneous secretions. The habit of body then becomes changed; digestion, with its subordinate processes, becomes impaired; appetites are delicate and capricious; the colour of the skin inclines to a darker hue, and the nervous sensibility is increased. *Artificial heat*, which is the next character of heat we consider, produces results of a directly consecutive nature, without influencing the habit. The pores of the skin, which, allowing the person thus situated to reside in a northern latitude, are commonly constringed, become patent, sensible perspiration, more or less excessive, is induced, with more or less temporary debility. Even

those results may, by frequent exposure to such sources of heat, be in a considerable degree obviated. Thus, persons who have been long accustomed to labour in furnaces, and other places where great heat is employed, do not experience these inconvenient effects. Where strong bodily exercise is connected with such exposures to heat, the system, not being constantly subjected to an otherwise debilitating cause, becomes invigorated, rather than enfeebled. *Morbid heat*, or that which arises from some irregular operation of the system itself, constitutes the third character. This heat is a constant accompaniment of that form of disease, which is called fever, and is considered one of its most distinguishing characteristics. It is commonly, though not invariably, accompanied with other signs of its existence, as, thirst, quickness of pulse, anorexia, and so forth. It may exist in certain parts of the body, unaccompanied with general symptoms of fever, and is in these cases dependent on local diseased action. It is well to observe, that some one or more of the above detailed results of heat may accrue to the system, from indulgence in bodily exercise, and the tendency of this is, under proper restrictions, to produce health and strength. Having submitted this arrangement, we shall next consider some of the phenomena of this principle in nature, as applied to the living body. We have adverted, in the text, to those opinions which formerly obtained, of the safety with which violent transitions from heat to cold may be endured, and to the results of more modern experience on this subject. If we attentively examine this matter, we shall find that the error arose, at least in part, from confounding that "check of perspiration," as it is commonly named, and which properly refers to an interrupted action of the natural, insensible perspiration, with that which results from a preternaturally excited state of the cutaneous vessels. When the former is suppressed, or diminished, by the action of cold, or other causes, the system, being deprived of one of its appointed outlets, reacts indeed, but it is by the production of a conse-

cutive train of morbid operation, to counteract which, by the application of the appropriate remedies, is to restore health. In the latter case, the stimulus imparted to the cutaneous capillaries, excites in them an increased action; and when such stimulus is removed, by the application of an agent of a contrary nature, a healthy reaction ensues, by which the extended pores of the surface are contracted to their natural dimensions, and the system becomes exposed to its ordinary powers. This view of the subject, however, would not alone suffice to explain the differences of result, between an increased and a suppressed perspiration, and in what manner the system may undergo great changes from heat to cold, such sensible perspiration being induced to a considerable extent, with complete safety. It is also to be recollected, that perspiration is itself a cooling process, by which a very considerable portion of the heat communicated to the body, is evaporated. It is principally by those means, that when subject to such great increase of temperature, our bodies yet maintain, or vary but very slightly, from that particular standard of temperature, which is known under the name of *animal heat*. Whatever may be the grade of external heat to which we are exposed, this temperature of our bodies is not materially affected. It is generally agreed upon, that this temperature does not exceed 96° of Fahrenheit's thermometer; and we are informed by Muschenbroeck, that this amount of heat was communicated to a thermometer, which he immersed in the blood flowing from an animal. It was, however, formerly conjectured, that in high fevers, the heat of the human blood arose as high as 136½°, which was the belief of Dr. Hales. Dr. Boerhaave supposed that the serum of the blood would be coagulated by a heat not much above 100°; and both Drs. Hales and Arbuthnot have affirmed, that the natural heat of the human blood approached very near the degree of coagulation. More recent experience has well proved the fallacy of these observations. From what has been advanced, it may be argued, that the great

increase of sensible perspiration, in instances where the system is exposed to great increase of temperature, is a provision of nature, to frustrate an attempt to add to such system an amount of heat, which is incompatible with the exercise of its vital powers, or, in other words, cannot be endured. But let us suppose a case, where, in the language of Dr. Reid, "there exists an extremely debilitated state of the vital powers, as in instances of what has been improperly termed putrid fever." Here, though the heat of the body, at least, so far as we may judge by the sensation conveyed by contact with its surface, which is probably not always a very philosophical criterion, is much augmented in degree, and peculiar in its character, known in medicine under the appellation of biting heat, from the feeling communicated to the fingers, the severe application of cold would be attended with very injurious effects, and probably produce an extinction of life. Now, in many other instances of a weakened and diminished tone of the heart and arteries, the surface of the body is morbidly cold, instead of evincing an opposite condition, which circumstance may, perhaps, serve to show the propriety of reflecting upon the peculiar attributes which attach to the characters of heat, which belong to the distinction last named. To suffer, then, without hazard, these extremes from heat to cold, the following are to be looked upon as prerequisites:—A sufficiently firm condition of habit, to withstand the reaction produced, with an absence from such local congestions, or tendency thereto, as may expose to particular danger the part so circumstanced. The transition must occur, before much fatigue, together with the very abundant perspiration, may have ensued. The body must not be so situated, in its sudden exposure to a comparatively or absolutely cold medium, for a greater length of time, than to allow the necessary reaction to take place; the heat of the system to be reduced to its ordinary standard, or perhaps a little below it, lest it should experience those effects, which flow from a long and unguarded exposure to a temperature

very much above or below its own. These suggestions, perhaps, possess more of interest, than utility, as these sudden changes are never undergone, but for the sake of experiment. They still, however, deserve some attention, as indicating the processes which nature employs to obviate the danger, which, it is presumed, would otherwise be incurred, in the cases above stated.

Note E.

The term irritation is one of those, which seem to have afforded no little ground of cavil, to the physiologists and pathologists of every age. The vagueness of idea comprehended under the term appears, with some authors, to have almost induced them to discard it from their notice, as being of too undefined a character, to admit of special cognisance. Our own impressions are, that blame is rather to be attributed to the irregular manner in which the term has been employed, than to any defect arising from its more inherent ambiguity. Unfortunate results of the same kind have ensued, from the confusion and misapplication of the terms *contagion* and *infection;* the distinctions between which have been too little regarded by European writers, and most others who have devoted their thoughts to the subjects connected with these important agencies. We cannot, for a moment, refuse our assent to a certain principle of irritability, or something extremely analogous to it, which is somehow remotely connected with the vitality of our systems. This must correspond with the *vis insita* of Haller, and the *inherent power* of Dr. Cullen. But this principle, like every other connected with the functions of the animal economy, is liable to action irregular or depraved. A difficulty, however, presents itself in our attempts to explain these actions, to appropriate to them their particular symptoms, and to

distinguish them from the characteristics of common inflammation. We are not here contending for the doctrines of that nervous irritability, which depends probably upon causes yet more undefined and abstract than those, the phenomena of which we are now considering. We refer to that principle of vitality, which, under the names before quoted, has claimed the contemplations of Haller and Cullen, and which Sir Gilbert Blane designates by the term *state of tension*. As applied to the muscular power, he thus defines it: "No muscle, whether voluntary or involuntary, can act, unless the fibres are previously in such a state, that, if divided, they would shrink by their resiliency, leaving an interval between the cut extremities."* In like manner, Bichat, speaking of an inherent power with which he supposes the capillaries endowed, rendering them altogether independent of the primary impulse, afforded the larger vessels by the actions of the heart, thus expresses himself: "Dans le systeme capillaire générale, la contractilité organique insensible, ou la tonicité, reste seul pour cause de mouvement du sang."† Will an increased action of this principle, producing some determined result, different, according to the individual circumstances of the case, terminate in a morbid state, when applied to the pulmonic tissue, marked by that altered condition of the gland, which constitutes a tubercle? Is it any other than an increased action of this principle, which, in cases of scrofula, produces the enlargement of the gland? If so, this principle must surely be distinct from inflammation, the symptoms of which are more readily defined, and more easily recognised. How far it is in any manner allied to that species of inflammation which has been denominated subacute, and which has to so excellent a purpose engaged the thoughts of the illustrious Broussais, it may be a nice point to determine. It would probably conduce to a right apprehension on this subject, to consider the characters of these two principles, as

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* Blane's Med. Logic. † Bichat, Anatomie Générale.

applied to the various tissues, and as described by Bichat. A very interesting article, touching this matter, will be found in the fourteenth number of the New-York Medical and Physical Journal, extracted from the London Medico-Chirugical Review, and entitled, "*Diagnosis between Irritation and Inflammation of the Mucous Membranes of the Bronchiæ.*" Although of some extent, we cannot deny ourselves the gratification of inserting it *in toto*. "M. Nauche thinks he has discovered a chemical test of bronchial inflammation in the secretion from the mucous surfaces. In the natural state, or where there is merely *irritation*, the mucous secretion he has found to be acid, while, on the other hand, when actual inflammation obtains, the nature of the secretion is changed, and it becomes alkaline. The two states are readily recognised by turnsol paper, which turns red with the one and blue with the other. M. Nauche has examined the expectoration, with respect to its alkaline and acid character, in the diseases of the respiratory organs. He believes, from this inquiry, that they may be divided into matter produced by irritation, an increased secretion from the mucous follicles which line the membrane of the air passages, and into matter, or expectoration, which results from their inflammation. He has observed that the white, mucous, frothy expectoration, which is frequently brought up in large quantities by persons in a state of agony, has always an acid character, when the air passages have not been the seat of previous disease. This character is likewise found in the white frothy expectoration which occurs during the whole continuance of pleurisy, whether acute or chronic, and at the commencement of pneumonia, when the matter expectorated is white, or even yellow. It is often lost in the course of this disease, and re-appears towards its decline. The acid expectoration is likewise found in emphysema of the lungs and scrofulous phthisis, when the tubercles are but little developed, in the state called crude. It is evident, in all these cases, that the mucous membranes which furnish the expec-

toration are only in a state of increased excitement, and that they are in no degree inflamed. M. Nauche has likewise found expectoration in certain advanced cases of phthisis. He believes that this depended upon these matters being the product of an increased secretion of the mucous membrane lining the excavation formed by the tubercles. The expectorated matters, on the contrary, are always alkaline in inflammation of the mucous membrane of the bronchia, and in all the cases designated by the names of acute and chronic colds, or mucous phthisis (phthises musqueuses.) Although this expectoration is not regarded as purulent, it is, nevertheless, a kind of pus, peculiar to inflammation of these membranes, and analogous to the purulent serosity which is furnished by serous membranes when in a state of inflammation. The expectoration likewise becomes alkaline in peripneumony, when the inflammation of the pulmonary tissue communicates itself to that of the mucous membrane of the bronchia; and this secretion is the product of the inflammation of these two tissues. The expectoration is likewise alkaline in phthisis pulmonalis in the second or third stage, when the tubercles become broken down. It is usual, in such cases, to find the internal membrane of the lungs deeply altered. It frequently happens, particularly among phthisical patients, that both these kinds of expectoration are to be found in the same vessel. That which results from an augmented excitement comes up most easily, is white, frothy, and acid; the other is brought up with difficulty, is yellow, thick, and alkaline. In this disease, when the patient has only the former kind of expectoration, his life is often in the greatest danger." We have, doubtless, much yet to learn in reference to the phenomena, both of inflammation and irritation, more especially the latter. What has been advanced may perhaps serve, at least in some degree, to establish opinions on the particular attributes which attach to them.

Note F.

When we speak of the proximate cause of a disease, an association arises in our minds, tending to connect such proximate cause, with the disease itself. It is by no means at all times an easy task to point out the distinctions which should, in strictness of speech, be maintained. We have, in the text, adverted to the opinion of Laennec, that the existence of tubercles in the lungs constituted the true character of consumption. We have, moreover, asserted it as our opinion, that tuberculous formations were the proximate cause of this disease. Is, then, the proximate cause of the disease in no respect different from the disease itself? This question, if scrupulously weighed, will be found, many times, to embrace subtleties, which, without extreme caution, may lead to erroneous deductions. The following observations from the learned Van Swieten, are in point:—"The causes of diseases are two-fold, viz. either immediate or remote. The immediate cause is that which, being present, constitutes the disease, and, when absent, it is cured. But the remote cause of the disease, is that which so disposes the body, while it is present, as to render it fit to receive the disease, provided another cause should be joined to it; therefore, neither of these causes existing alone produces the disease, but, being united together, they constitute the disease. The remote cause inherent in the body is called the predisponent; the other, which comes after it, is called the *procatartic*, or simply the *occasion*, which is only hurtful to those in whom the predisponent cause existed."* Again. "The proximate cause of a disease is said to be the whole of that which constitutes it into the being of a distemper, and whose present existence directly implies and continues the disease, as the absence of it removes the disease."† We shall not be accu-

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* Van Swieten's Commen. vol. 10. † Ib. vol. 11.

sed of want of comprehension, if we again ask, in what circumstances or accidents does the proximate cause of diseases, differ from the morbid affection itself? It differs. we have been informed, from the remote cause, in being within the body, and only arising as an effect from causes exterior to the system. It differs from the predisponent cause, in being confined in its operation to the part sustaining the precise morbid action, while the predisponent cause is frequently of a general nature, and affecting the system at large, being determined by causes of a more accidental kind to the developement of the specific malady. It may arise, however, as the result of one or of both these agencies combined, and *it* produces in its turn the *disease itself.* It consequently stands to the disease itself in the closest relation of cause and effect. "Hujus præsentia ponit, continuat, morbum. Hujus absentia eum tollit. *Est fere eadem res ipsi integro morbo.*"* But, although almost, it will be allowed not to be altogether *eadem res* with the disease itself. It is, then, the primordium of the morbid action within the system, consisting in the irregular operation of some part or function of the system, but commonly, if not always, of too undefined a character to admit of accurate delineations; yet, by its operations, constituting "the being of a distemper." Now, however this may serve to assist us in affixing ideas of some definite character to the employment of these terms, it will often be extremely difficult to express, in language sufficiently precise, in what consists the nature of those changes preceding the developement of a particular disease. It will be, for aught we can prove to the contrary, absolutely impossible, under certain circumstances, to separate in idea, much less convey in language, our sense of the appropriate distinction. Thus, in phthisis pulmonalis, there must doubtless occur some morbid changes ere the tuberculated gland is formed; and, as these tuberculous formations, to employ the term

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* Institutiones Medicinæ. Boerhaave.

used in the text, on the high authority of Laennec, constitute consumption, we might be thought liable to the charge of inaccuracy, when we have asserted in one of our positions, that these formations were the proximate cause of the same disease. It might be retorted upon us, do physiologists allow a disease, when formed, with its various attributes, to be in no wise different from that complication of causes, however obscure and intricate, which were exerted in its formation. We urge it, as our belief, that they do not; but under our excuse in saying, that we are here, as in many other instances, obliged to yield the assent of our faith to principles deeply woven into the structure of our frames, but which physiology, and her sister pathology, just awoke from a long night of obscurity, and ushered into the daylight of sound truth, have not yet illuminated with their meridian beams.

Note G.

It is not strictly true, that we attain the maturity of our intellects, at so early a period, as that at which we arrive at the growth of our bodies; the expression in the text is therefore to be understood with the necessary qualifications. Some few years elapse, after we have attained the stature of manhood, before our intellects reach the highest degree of vigour, which they are destined to possess.

By a practice which obtains with us, we commence the exercise of our various professions, before we are qualified to give to them all that vigorous attention, which may be suited to the capacity of our minds. This subject might perhaps be so represented, as to convey the impression, that the most perfect exercise of judgment is not evinced, till many years have elapsed, from the period of the full stature of man. It would be a matter of much difficulty to select that period,

when the force of youthful imaginations have lost their influences, and we regard the world and its concerns, with the eye of experienced reason. It is not intimated by this, that we are not fitted, before such time, to perform many of those reasoning functions, which determine much of the felicity of our after life. Nature has wisely ordered it, that, in making such selection, we are commonly ere long accustomed to that train of mental and physical operations, to which we have devoted ourselves, or else have been led to such choice, by accidental circumstances, which, while they do not conflict with our reason, seem, in a manner, to compensate for the absence of its more perfect control. There is no one act, in our whole lives, in which the force of prudential considerations should possess greater weight, than that which connects us with another in the marriage state; and yet there is none, where the voice of reason is so loudly uttered in conjunction with the claims of affection, and all the tones of passionate regard. Here, then, the wisdom of nature is again apparent, prompting us to fulfil one of its most salutary laws, when a just equilibrium is maintained, between the selfish maxims of a worldly mind, the amorous breathings of sickly romance, and the carnal appetites of the voluptuary. This period being passed, and the usages of society unfolding themselves to our view, we are, some years afterwards, called upon, where sufficient competency exists in other respects, to exercise such wisdom as we are gifted with, in those matters which require us to throw off the charms of fancy, and disengaging ourselves from the play of youthful affections, demand the total and untrammelled display of the powers of judgment, where, it may be, the liberty, the life, or the reputation of a fellow creature, or, the salvation of a common country, in some degree rests upon the issue.

Note H.

The doctrine of sympathies presents another of those subjects of complex consideration, which exhibit themselves to the mind of the contemplative philosopher. To deny their agency, would be rash—to attempt their explanation, hardly less so—causa latet, vis est notissima. On all abstruse questions, one of the readiest and most correct modes of procedure, consists in the establishment of certain divisions or boundary lines, by which a great whole may sometimes be comprehended by a very ordinary intellect. Thus, when we declaim of sympathies generally, the mind is apt to lose itself in loose generalizations, and wander amid a series of crude and isolated inferences. It was, doubtless, a want of such system, which, in a great measure, clothed all the observations of the older medical writers on this subject, in language too vague to be strictly comprehended; and gave a sanction to conclusions too gross and illogical, to obtain the assent of our understandings. It is not our intent, on the present occasion, to cite those various opinions, which, from time to time, have been advanced, to clear away the mysteries which are attached to this doctrine. We are, however, as little inclined to favour those views, which make the nervous system the exclusive source of sympathetic feeling. That the nerves are the grand agents, at least in the majority of cases, we do not hesitate to admit; but, at the same time, we would that due regard should be paid to other phenomena, where their controlling influence cannot be allowed. Such were the sentiments with which the author was deeply impressed, as expressed in the essay, when he accidently met with a passage in Professor Chapman's "Elements of Therapeutics," which attracted his attention, as embracing sentiments similar to his own. After combating the idea of referring sympathy exclusively to the nerves, he thus more fully discloses his views: "But there are many other sympathies, not less conspicuous,

between parts, the nerves of which have not the slightest connexion. It appears, that, either by the co-operation of different organs in the performance of a function, as in the complex apparatus subservient to respiration, or from similarity of structure, parts, though detached, being prone to be affected by the same cause, as the parotid gland and testes in the male, and the same gland with the mammæ in the female, the habit of acting in unison is acquired, and sometimes confirmed." Much space, indeed, is yet left to be occupied by more extended research, on this very important theme.

Note I.

We are authorized in believing, that a more strict attention to such symptoms, as manifest themselves in scrofulous habits, though they may not always be of a very prominent character, are commonly sufficient to warn us of the existence of this diathesis, previous to the appearance of the enlarged cervical glands. It is, however, as intimated in the text, but the too common practice to date the commencement of this disease, from the morbid appearances of these glands, and making them to constitute one of its essential attributes, when they should more properly be regarded as symptomatic, and therefore, of secondary consideration, in arranging its treatment. From the organization of the lymphatic system, it is to a considerable extent removed from those occasions, which excite active inflammation in other tissues. The altered character of constitutional symptoms, which ensue upon a state of actual inflammation of these glands, as distinct from those which are generally considered as evidence of their simple obstruction, is worthy of notice. Where one or more of the superficial glands of the thigh become acutely inflamed, as in cases where the venereal virus has been absorbed, we are presented with a train of symptoms, indicative of such inflam-

mation, as fulness and rapidity of pulse, a grade of fever, varying in intensity, according to the increased action of the parts, with its accompanying circumstances. But it requires an exciting cause of much violence, to induce such a condition of a lymphatic gland; and the virus just mentioned may be considered of that nature. Far different is the appearance presented by a lymphatic gland of the neck, tumefied and obstructed, if the phraseology may be allowed, by the absorption of the scrofulous virus. Here, without the evidences of inflammatory action, we have, with, perhaps, the exception of the florid visage, and, in certain states of the disorder, an irregularly excited condition of pulse, that class of symptoms which mark a depraved habit, and is distinguished by many of the signs, which belong to the *phlegmatic temperament.* We have advanced in the text an opinion, that the previous existence of inflammatory symptoms, was not necessary to the developement of Phthisis Pulmonalis; but, that such as are characteristic of irritation, existing in a greater or less degree, do commonly occur. To this, the practical observer will object those severe acute pains, which are sometimes felt, previously to the occurrence of those symptoms, which more especially designate consumption. That these pains are sometimes, perhaps, frequently felt, cannot be denied; but it is not believed that they are necessary to the production of this disease, but are rather of an accidental character. When occurring, they probably arise from an inflammation communicated to the pleura, or that reflexion of it which covers the lungs; or it may be that the mucous membrane of the lungs may become thus excited, as well as the membrane just named. It is not unreasonable to suppose, that the same causes, which are capable of calling into exercise that peculiar diseased action, which marks the lymphatic glands of the lungs, or those of any other part of the body, may excite in contiguous membranes, of a highly organized structure, the kind of action which is more peculiar to them, and that is inflammation. But whether this be, or

be not, the origin of the pains, which are thus experienced, they have no intrinsic connexion with that disease of the glands of the lungs, converting them into the substances styled tubercles, and which we believe to constitute the *genuine* character of consumption. To inculcate such views, has been our object in maintaining this position.

Note K.

The expression of M. Bayle, to which the present note refers, might seem in opposition to the sentiments before expressed in the course of the work, viz. that the tuberculous degeneration did not attack glands of that simple character, which distinguishes the mucous follicles of the bronchia, but attached itself to those of more complicated kind. May not, however, these follicles assume this appearance, in consequence of their contiguity to the lymphatic glands of the lungs, much rather than from any disposition in themselves to assume such appearance, as indicative of a more general diathesis? M. Bayle, as may be observed, has enumerated many other parts of the body, as exhibiting the tuberculous affection, in connexion with the disease of the lungs; but the distance of many of these parts from this centre of the circulation, with other circumstances, render it extremely probable, that such appearances arose from other causes, than those which produced similar results in the pulmonary texture.

Notwithstanding the care taken in the correction of the proof sheets, several typographical errors occur in the preceding pages. The reader will particularly notice *confined*, page 77, 10th line from the bottom, for which read *expired*. The same at page 78, seven lines from the bottom. At page 81, twelve lines from the bottom, for *habitus* read *halitus*. The other errata will be readily detected upon perusal.