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AN
INAUGURAL DISSERTATION
ON THE
SENSORIUM.

AN
INAUGURAL DISSERTATION

ON THE
SENSORIUM.

SUBMITTED TO THE EXAMINATION OF THE PROVOST,
THE TRUSTEES, AND MEDICAL PROFESSORS OF THE
UNIVERSITY OF PENNSYLVANIA.

FOR THE DEGREE OF DOCTOR OF MEDICINE.

BY ROBERT MAYO,
OF VIRGINIA.
ON THE 27th OF APRIL, 1808. 21, 3 80

All Nature is but art, unknown to thee;
All chance, direction which thou canst not see:
All discord, harmony not understood;
All partial evil, universal good.—

POPE.

PHILADELPHIA:
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1808.

The Author, on a more deliberate perusal of this essay, has seen many errors of orthography, &c., which escaped him when examining the proof-sheets: of which he only notices two; leaving the rest to be corrected by the reader, in some instances, and by the recurrence of the same words with their proper constituents, in others.

In Page 7 line 4 for Bottany read Botany,
31 line 15 for perpetration read perpetuation.

painful, pleasant, or indifferent. I. Of the painful. 2. Of the pleasant. 3. Of the indifferent. III. Of the motions of Sensation that are excited by the sensorial powers in a state of accumulation; which are always painful.

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TO
THE PROVOST,

THE TRUSTEES, AND THE MEDICAL PROFESSORS OF THE
UNIVERSITY OF PENNSYLVANIA.

Gentlemen,

You will readily perceive that this essay does not embrace all of the matter contemplated by its title-page. My apology for presenting it in this unfinished state, is the insufficiency of the time allowed for the performance of so difficult a task; a considerable portion of which, too, I have been deprived of by indisposition.

I may be asked why I undertook so intricate and extensive a subject? For the intricacy of the subject I have no apology; for its extent, I must observe that few know the extent of their undertakings till they have completed them. And in this case it was not my expectation to have taken up the half of these sheets.

A section on Emotions, that concludes the chapter on Sensation; a chapter on Irritation; one on Volition; and a concluding one on Tempera-

ments, are in their rough draught; but the want of time to make some adjustment of them, for a final copy, prevents their appearance.

With gratitude to the Professors of Medicine in this University, for the advantages that I may have derived from their invaluable lectures, permit me to conclude a pupilage of arduous study.

ROBERT MAYO.

TO

BENJAMIN SMITH BARTON, M. D.,

PROFESSOR OF MATERIA MEDICA, NATURAL HISTORY AND
BOTANY, IN THE UNIVERSITY OF PENNSYLVANIA.

IN looking about me for a patron to whom I should inscribe this first product of my pen, you preeminently arrest my attention.

The honor and distinction with which you fill your several professorial chairs in this University;—the zeal with which you communicate instruction to your pupils, and encourage them to aspire to excellence in the cultivation of natural science, jointly with their chosen profession,—the unabating assiduity with which you encourage the tyro in science, to expect the happy reward of perseverance,—entitle you, beyond the possibility of a rival, to the thanks of your country, and the gratitude of your pupils. With the continuation of your exertions, you will greatly compensate in the New, for the daily devastations of the sword on the cause of science in the Old, world.

Accept my unfeigned thanks, as a member of our common country, for the services that you are daily rendering her.—To make an appropriate acknowledgment for the individual advantages that I have derived from your instructions, is impossible. Language knows not the expression of perfect gratitude. It steals silently, but eloquently through other channels,—the tongue utters it not.

That health may long preserve you for your family and country, is the fervent invocation of your friend, the

AUTHOR.

PREFACE.

THE following Dissertation was penned for the examination of the Provost, the Trustees, and the Medical Professors of the University of Pennsylvania, for the Degree of Doctor of Medicine. It was projected, and finished, under circumstances peculiarly embarrassing. After the service of a laborious study, through the winter, to prepare for an examination which was to test the success of that exertion; when the mind was nearly exhausted of its powers, and craved an idle moment to repair its wasted strength, a new exertion, requiring even more athletic powers than had been employed, was yet demanded by a rule of the University. It was to prepare a Thesis, as a further evidence of the authors medical acquirements.

Yet undetermined, as late as the third of March, what subject to elect for this object, I proposed a consideration of the passions. After bestowing some reflection on their nature, I found them materially to involve the nature of the ba-

sis, or spirit, of animation at large, in whatever light it might be considered,——whether as an unit, or as an assemblage of distinct agents, associated, and conspiring to one common end. I therefore resolved, in order to be better understood on the subject of the passions, to give as clear and concise a view of the sensorium, as my reading, reflection, and time, might enable me. I mention these circumstances, as they are the best apology that I can offer for the imperfections of this dissertation. Perhaps it may be replied, that I might have saved the pain of an apology, by withholding the essay from the press. I grant it: and do aver, that it was the most distant of my intentions to expose such a hasty, crude, and, without doubt, unpopular production, to the criticism of the world, till some severities which it received from some of the respectable body for whose examination it was written, rendered it necessary for *it* to plead its vindication at another bar. Whether it meets with a better, or a worse reception from the press, I shall be reconciled to its fate.

The whole of the essay as it now stands, was not finished as an inaugural essay, as may be learnt, together with the reasons for it, from the preceding address to the Provost, &c. of the University. From a comparison, also, of the present arrangement of this essay, with the third

paragraph of that address, it will be found to differ a little from that which was given it, when it was presented as an inaugural dissertation. The reason for this change will readily suggest itself, as being,—that the parts of any system must be seen pretty clearly evolved before their affinity can be discerned; by which rule, only, can they be allotted to their proper places.

Having taken some liberties with language, by applying a few terms differently from their usual acceptations, which was unavoidable; I beg leave to submit the following explication of them; of which, I hope I shall be indulged with the adoption, at least during the perusal of this essay, otherwise, whatever may be its merit, it cannot but be unintelligible nonsense.

SENSORIUM is a generic term, embracing three modifications of matter, viz. Sensation, Irritation, and Volition, which owe their modifications to the process of secretion, and their relationship to their common property of excitability, by which, with the assistance of stimuli, when they are put into action, or excitement, all of the phenomena of life are exhibited.

SENSATION is that sensorial power which is secreted in the brain, and has its residence, and

expenditure, there; and in a state of excitement, exhibits the phenomena of mind.

IRRITATION is that sensorial power which is secreted in the substance of the hollow muscles, and has its residence, and expenditure, there; and in a state of excitement, digests aliment, circulates the fluids, secretes, assimilates, &c.

VOLITION is that sensorial power which is secreted in the substance of the voluntary muscles, and has its residence, and expenditure, there, and in a state of excitement, executes the motives of sensation.

ASSOCIATION is the connexion of the sensorial powers, through the medium of the nerves, by which a state of excitement, or accumulation, of one, or more, or of parts, of them, may excite one, or more, or parts, of them, into actions called associated, or catenated actions.

The **EXCITABILITY** of sensation, is termed sensibility, that of irritation, irritability, and that of volition, voluntariness.

Any other liberties that I have consciously taken with language are so slight that they need not be noticed here.

CHAPTER I.

GENERAL VIEW OF THE SENSORIUM.

1. Progressive developement of Science.
2. Principal improvers of the Science of life.
3. Sensorium.
4. Materiality of—
5. Also a secretion.
6. Nature of secretion.
7. Sensorium a generic term, including—
8. Sensation,
9. Irritation, and
10. Volition.—
11. Association.
12. Properties of Sensorial powers.
13. Internal and external stimuli.

1. MULTIFARIOUS and unintelligible as the operations of the Universe appear to a vulgar eye, yet *preceding Philosophers*, undismayed at the immensity of an undertaking, of which they knew not the extent, have far advanced in the task of attributing each to the particular *form* and *connexion* of matter out of which it originated.

Thus, having first investigated the properties of matter in the abstract, viz : Extension, Im-

penetrability, Figure, Divisibility and Density ; they have proceeded to the arduous investigation of the *adventitious* results of its relative existence. —And when this part of the task shall be completed, the *arcana* of Nature will be unveiled, the labor of Philosophers will be over.—Then will soul-inspiring ambition,—the mother of learning and enquiry, the guide of talents,—cease to act. And with this passion will man lose the most brilliant agent in his motive character.—Then will he descend, as in a swoon of apathy, from the summit of scientific glory to his pristine and native barbarity ; there to lull till the oblivion of past attainments gives new employment to dormant ambition.—But perhaps this is a crisis that knows no allotment on the wheel of human science*. For, the intimate nature of many branches of science seem to refuse a submission to the most diligent and ingenious scrutiny of Philosophers. Particularly,—that branch which has been denominated Physiology, or the science of life, owing perhaps to the attenuate and inaccessible form of matter on which it is founded, has not shared the same degree of successful cultivation with HER sister branches ; and will, in all probability, continue in more or less ob-

* That part of the laws of nature that ~~are~~^{is} capable of human investigation.

scurity when time shall be no more.—It is on this branch that I have ventured to offer a few remarks in the following essay.

2. AMONG those to whom mankind stand indebted for what is yet known on this interesting department of nature, the immortal Brown is foremost. Perhaps Dr. Darwin, with the assistance of Dr. Brown's labors, has been our more immediate benefactor, by putting us in the way of acquiring a more perfect knowledge on the subject than we otherwise might have done. But might it not, in turn, be questioned, whether Dr. Darwin would ever have explored so dark and intricate a way, were it not for the brilliancy of his illustrious predecessor?—But I will leave the relative merits and appropriate eulogium of these Philosophic heroes, to the more experienced and abler pen, while I proceed to the immediate subject of this essay.

3. THE principle on which the phenomena of life are exhibited, has been expressed by the terms *Spirit of Animation*, *Sensorial Power*, *Excitability*, *Sensorium*, &c., which last I shall adopt.

4. THAT the materiality of the sensorium should be disputed in the days of ignorance and superstition, when most of the phenomena of na-

ture were attributed to the immediate influence of preternatural agency :—when physical philosophy had not yet shown to mankind the immense resources of *modification* and *form* in the production of the phenomena of the world ;—that it should even continue to be disputed for some time after these resources began to be familiar, from the influence of habit, and the respect that is paid to antiquated doctrines, is not at all a subject of admiration. But that the present enlightened period should afford a dissenting voice to so evident a truth, is a circumstance more difficult of explanation.

In support of the materiality of the sensorium, I am aware that no positive argument can be adduced, as it is not a direct object of sense. But an argument, to me very conclusive, may be drawn from its indirect operation on the senses, by its influence over objects of sense. For example, the sensorial power of the heart and arteries, with the stimulus of the blood, produce pulsation in those organs, evident to the sense of touch, &c. And here let me ask if experience (the mother of all knowledge) ever taught, that two objects can act on each other except by the intervention of a common property? Can levity oppose gravity, or gravity levity? Can fluidity oppose solidity, or solidity fluidity? Do not expansion and figure exist in a void without ex-

clusion, or opposition?* Indeed these queries are but different modes of asking whether materiality and immateriality can act on each other, things† without a common property. Moreover, the language that is daily used to express the various degrees of exhaustion and accumulation of the matter of sensorium, can only be predicated on the supposition of its materiality.

I am not ignorant of the observation, that to attempt to establish an evident truth by reasoning, is to involve it in greater obscurity ; or to attempt to disprove an absurdity, is to admit that it has pretensions to plausibility. I shall therefore assume the proposition, without farther evidence of its truth.

* Levity, fluidity, void, &c., are terms without any real foundation ; originating entirely from the power that we possess, of conceiving of a negative to every thing that exists. Which truly is of great convenience to the commerce of mankind, though there be not an actual negative in nature. This will explain my denying that levity, fluidity, &c., can oppose gravity, solidity, &c., as, when these terms are used to convey ideas, negative of gravity and solidity, they have no real meaning or foundation ; and when they are used to express a less concentration of gravity and solidity, these properties are at once acknowledged to exist. And it is by the abstract properties of matter, only, that we know materiality.

† If Language would admit of it, I would avoid the word *thing*, or any other word that implies materiality, when speaking of immateriality.

5. That it is also a secretion, is apparent, not only from its various degrees of accumulation at different times in the same animal ; but from the analogous circumstance of its perfect dependence on the state of arterial excitement, as all other secretions are. Plethora not only predisposes to fever by the excessive stimulus of blood, but by the excessive secretion of the matter of sensorium. *Evacuate blood and you not only diminish the stimulus,* but check the excessive supply of the principle on which it acts. Stimulants are not exhibited in the Typhus state of fever for the design of increasing excitement only, but to increase the supply of healthy excitability ; as the increased excitement when properly managed, seems to supply, at each moment of time, a greater quantity of healthy excitability than it expends ; which restores tone to the system.

6. BUT as to the intimate nature of the process of secretion, nothing satisfactory is to be gathered even from the researches of the most sagacious Philosophers. To me the most plausible explanation seems to be, that the secreted fluid constitutes a part, and the most fluid part of the blood, as it passes through the ^scerning organs, and that the passage from the extremity of the artery to the commencement of the excretory duct, is only of sufficient diameter to transmit this thinnerⁿ part of the blood. How such a change

can take place in the mass of blood, as to furnish such a variety of fluids, independent of the immediate action of vessels, merely to be pressed through the extremities of arteries, into their proper receptacles, &c. as is seen in the secretions of the economy, may possibly be explained by the varying velocity of the circulation through the different parts of the body, influencing the chemical process that is continually going on in the blood, which is in something like an inverse ratio to the velocity of the blood. Also the different impregnations that the blood receives as it passes through different parts of the body may assist in the explanation. For instance, the bile is infinitely the grosest secretion of the body; and it is secreted from the blood that has nourished the abdominal viscera.

7. FROM the phenomena of many diseases, the sensorium seems not to be a single secretion only, owing its origin to one discerning organ, but to consist of several secretions, derived from different sources. The term of Sensorium, therefore, must, more strictly, be considered somewhat in the light of a generic term, comprehending the several sensorial powers, or secretions, as a species, and their modifications as varieties.

It is from the phenomena of diseases, as I have observed, that we are able to conjecture

that there are more sensorial powers than one, contrary to the former universal, and present very general, belief. For in health, such is the harmonizing conspiracy of these powers, to the general welfare of the economy, from the intimacy of their association, that we mistake them for one active power, incapable of division or discord.

8. That there is a distinct sensorial power on which the phenomena of mind are exhibited, having its origin in the brain, and its expenditure there, needs no other circumstances of confirmation, than such as occur in the daily experience of every one. This is termed by Dr. Darwin the sensorial power of Sensation, which term I shall adopt. But if I understand Dr. Darwin correctly, he does not distinguish this sensorial power, from his sensorial powers of Irritation and Volition, as perfectly as it is capable of being distinguished, which I shall endeavor to do in the following pages. And as the necessary conciseness of this essay will not permit me to take particular notice of those parts of Zoonomia from which I shall dare to differ, I must here beg leave to make a general reference to that work, as the surest mean of gathering the points of harmony and discord between the two. And I presume that a great many points of difference will be discerned, which furnished me with the motive for

this undertaking, though the mechanical parts seem nearly the same.

9. In diseases of local inflammation, distant from the brain, the phenomena are such as to found a belief that the sensorial power of the part is derived from the extremities of the arteries of the part, and not from the brain. For, granting that the sensorial power of the whole body is derived from the brain, how comes it about that it is distributed equally through the body in health, no part suffering an undue accumulation, or deficiency? Perhaps the explanation would be, that there is an affinity of equilibrium between the different parts of the body, and the sensorial power, so that when one part of the body has acquired the slightest degree of sensorial power above another part, this redundant quantity is immediately divided, with such facility, that there is no perceptible difference between their respective supplies. But in diseases of local inflammation, the part suffers greater excitement, and from its duration, must have a greater supply of sensorial power than the neighbouring parts.—Perhaps the disorganizing action of the stimulus had increased the affinity of the part for sensorial power. But were this the case, the neighbouring parts would uniformly have their natural quantity diminished, and excitement consequently reduced; which is not the fact; for the excitement of the neighbouring parts is more

or less increased ; which is very familiarly explained by the theory of contiguous sympathy, of Mr. John Hunter.

These remarks will, I presume, apply to all of the departments of the hollow muscles ; whether arterial, lymphatic, venous, or the alimentary canal ; whether in a gland, cellular-substance, or lining membrane ; in all of which the same sensorial power seems to reside. This sensorial power is termed Irritation, by Dr. Darwin, which term will be adopted here.

Another argument in favour of the distinct nature of Irritation, from other parts of the sensorium, is, that when the nerves of an extremity are divided, the circulation continues through the extremity, though the connexion between the brain and extremity is lost. If the nerves were the channels through which the body is furnished with sensorial power, this extremity should mortify.

10. The history of diseased volition in general, whether of excessive muscular action, as the paroxysms of epilepsy, chorea, and tetanus ; or of deficient action, as in palsy ; whilst the functions of sensation and irritation are but slightly disturbed, offers a very strong evidence in favor of the distinct nature, and origin, of the power of muscular contraction. But the circumstances of

the case just cited, to prove the origin of Irritation to be from the extremities of the arteries that nourish the hollow muscles, in which it is seated, viz: the destruction of the nerves of an extremity, are also very strong in support of the original of the power of muscular contraction from the extremities of the arteries that nourish the voluntary muscles. For, notwithstanding all connexion between the brain and extremity is destroyed, by which no state of mind can excite muscular contraction, yet this power can be roused into action by the application of powerful stimuli; of which electricity is the most familiar. It need not be asked, whence this muscular power is derived? The answer is too evident; not from the brain through the nerves, but from the arteries of the part. But the history of many cases of palsy establish, incontestably, the individuality of this power. The cases to which I allude, are those wherein this power is entirely lost; which we are justified in concluding frequently happens, from the frequent impracticability of rousing it into action by any stimulating agent, whilst the functions of Sensation, and Irritation, still go on. This power of muscular contraction I shall call *Volition*; restricting the term to much narrower limits than Dr. Darwin has done.

11. Dr. Darwin has conceived that there exists, in addition to these, a sensorial power of Associ-

ation. But I think that the connexion between the several functions of the economy, generally understood by association, may be explained, without calling in the aid of an appropriate sensorial power, on the principle of contact. For, without this circumstance of contact, after granting the existence of the sensorial power of Association, as physical agents, the several sensorial powers could have no effect on each other. And so universally is the maxim adopted, that actual presence is necessary to an effect, that gravitation, even, has been supposed to depend on an etherial fluid, connecting the gravitating bodies. The matters of galvanism, and electricity, act only by their presence, which is brought about by suitable conducting media. And may not the sensorial powers of Sensation, Irritation, and Volition, be associated, or brought into contact, by the conducting media of nerves? If Irritation is excited into action in any part of the body, sufficient to awaken consciousness, or Sensation, the sensitive motion is induced by the change produced in Irritation; and this change in Irritation, is perceived by Sensation, through the conducting media of nerves. And thus, a change produced in any of the sensorial powers, is perceived by the rest, and in such degree, by all, or either of them, as the welfare of the economy requires, if in health, but if diseased, the harmony is destroyed.—This is what I shall understand by As-

sociation. That there is no immediate nervous connexion between parts enjoying great associative connexion, is no objection to this mode of explaining association. For the whole nervous system is one continued unit, of which the sensorial power of Sensation, occupies the centre, and if there is deficient direct nervous communication between Irritation and Volition, the sense of change in the one, is perceived by Sensation, and through it, communicated to the other; as in the case of convulsive action of the abdominal muscles, in sneezing, which never takes place, however much the Schneiderian membrane is irritated, if Sensation is not excited.

12. The sensorial powers, no doubt, possess the abstract properties of matter; but, in a physiological point of view, these are not of much immediate consideration. It is that adventitious property, called excitability, by which they may be excited into action, on the application of stimuli, that exacts most attention.

The excitabilities of the several sensorial powers are not equally influenced by the same stimuli; —the Narcotic stimuli exciting that of Sensation and Irritation, without having much effect on that of Volition; and Electricity having very powerful effect on that of Volition, without proportionally affecting those of Sensation, and Irritation; and

the blood, and other fluids, uniformly exciting that of Irritation, in health, without affecting either of the other powers;—and, therefore, are entitled to specific terms for their distinction, which, as relates to Sensation, may be Sensibility, to Irritation, Irritability, and to Volition, Voluntarity.

13. The stimuli that excite the several functions of the economy, may be considered under the two extensive divisions of Internal and External, as relates to the sensorium. The sensorial powers themselves, in the state of excitement, or accumulation, form what I would distinguish by Internal stimuli. For the illustration of which, I will mention a case of the stimulant effect of sensorial power, in the two states of excitement, and accumulation. 1st. The excitement of the Irritation of the retina, by light, excites Sensation into the motion, or idea, corresponding to the Irritant. 2d. The accumulation of Volition excites Sensation into the corresponding idea, called irksomeness. All other stimuli, whether of the blood, aliment, gross secretions, or objects that act on the external surface of the body, or senses, I would term external stimuli, being external to the sensorial powers themselves.

The terms of Sensation, Irritation, and Volition, used by Dr. Darwin, and adopted here, are unhappy in their terminations, being that of ab-

stract nouns, expressive of modes of existence, or action, instead of substantial ideas, or real existences, which they are here used to express. But for the want of better, they have been retained in this latter sense, rather than arrogate the privilege of coining others.

CHAPTER II.

OF SENSATION.

Section I. General Remarks.

- I. Definition of Sensation. 2. Definition of Mind. 3. Sensation excited by internal stimuli only, either in a state of excitement, or accumulation. II. Of the motions of Sensation, excited by the sensorial powers in a state of excitement; which are painful, pleasant, or indifferent. 1. Of the painful. 2. Of the pleasant. 3. Of the indifferent. III. Of the motions of Sensation that are excited by the sensorial powers in a state of accumulation; which are always painful.

I. 1. SENSATION has already been defined, That sensorial power on which the phenomena of the mind are excited. And to avoid any misapprehension of my meaning, it is here intended to convey precisely the same idea that is understood from the faculty on which an act of perception, or an act of consciousness, is excited. In other words, it is the sensorial power of the mind, on which all of the operations that constitute mind are excited.

2. Without an excitement of Sensation no mind can exist. Mind being only a mode of existence of Sensation produced by stimuli ; that is, it is an effect of the joint action of stimuli, and Sensation. I know that Sensation, in a quiescent state, has been called mind, as well as when in a state of action ; but as it would be well to be a little more precise in the use of terms, than to apply the same to cause and effect, I shall here restrict the term *mind*, to the active state of Sensation, produced by stimuli acting on its excitability. Consequently, when Sensation is in a quiescent state, as in perfect Sleep, in some of the states of Coma and Epilepsy, there is a temporary suspension of mind.

3. The stimuli that act directly on Sensation, seem to be entirely of the internal kind. For we cannot find an instance of an external stimulus acting on Sensation, except through the intervention of Irritation, or Volition. Matter acting on any part of the external surface of the body ; as on the senses of seeing, hearing, taste, smell, touch, excites the Irritation residing in those organs, and the change induced in their Irritation, excite^d through the medium of the nerves, a corresponding motion, or change in Sensation, which is termed an idea in the mind, representative of the object exciting the Irritation of the organ of sense. The motions of Sensation induced by electricity, when it is applied to the system, are effected in-

directly; the excitement of Volition being the direct effect; and this excitement of Volition, the direct Stimulus to the change of Sensation. An excitement, or thought, of one part of Sensation, may also excite a motion, or thought, in another part of Sensation, understood by Association of ideas.

An accumulation only, of the sensorial powers, also, excites Sensation. As, an accumulation of Irritation in the stomach, and organs of generation, constituting the animal passions of Hunger and Lust; of Volition in the whole muscular system, constituting the passion for Muscular action; and of Sensation of a peculiar variety, constituting the passion of Ambition; each exciting a desire of its expenditure.

II. The motions of Sensation, excited by the stimulus of the respective Sensorial powers in a state of excitement, are either pleasant, or painful, in different degrees, or they are indifferent to either of these circumstances, being attended with consciousness only.

1. Of those excitements of the different Sensorial powers that produce painful motions of Sensation.

Irritation, in a state of excitement produced by a variety of external stimuli, produces painful

motions of Sensation. The pain attending a contusion, excessive light or sound, or the action of disagreeable odors, and sapid substances, is produced by the stimulus of the change induced in the Irritation of the organs of sense, acting on Sensation, through the conducting medium of the nerves. But why is not the stimulant effect of Irritation on Sensation a pleasant one in these cases? Here we must invert the usual order of reasoning, and explain the nature of the cause by the effect. The effect is detrimental to the constitution, and whatever tends to the general injury, should excite such motions as tend to the relief of that injury. But pleasure would tend to the perpetuation of the injury, whereas pain prompts to relief.—Drunkards feel a pleasure in intoxication, and therefore continue the practice of it, in spite of the injurious consequences. Labor is painful to the Phlegmatic, and therefore is shunned by them, notwithstanding the resulting good. But fortunately for mankind, there are not many conditions, in which present pleasure prompts them to do what will yield a future ill. And in such cases as do exist, the experience of their predecessors, will generally furnish them with a motive of greater influence than the present pleasure.

Volition, in a state of excitement, may produce painful motions of Sensation; as in cramp. The pain attending this spasmodic state of the muscle,

is the direct effect of the stimulus of Volition, in a state of excitement, acting on Sensation, and not of the mechanical action of the muscles on the Irritation of the part, and of Irritation on Sensation. For the pain is frequently greater than that arising from Irritation, in a case of contusion, though in the case of cramp, after the spasm ceases, the irritative power of the part is not at all injured, as in a case of contusion. But if the exertion of Volition had produced the painful motions of Sensation, through the intervention of Irritation, the organization of the part in which Irritation is seated, would have suffered an injury, more permanent than the duration of the spasm. Frequent shocks of electricity produce violent pain by their action on Volition, and of Volition on Sensation; and at last the Volition of the part is entirely destroyed, ending in palsy, without much affecting the Irritation of the part.

The excitement of one part of Sensation, may excite another part of Sensation into painful motions; that is, one idea may excite an associated train of painful ideas. As, the intelligence of family disgrace, or a disappointed Ambition, and others of a like nature, commonly designated as mental pain. When intense, and protracted thought, excite painful motions of Sensation, as in head-ache from that cause, they are effected indirectly by the protracted motions of

Sensation exciting the Irritation of the vessels of the brain, which change in Irritation excites Sensation, immediately, into painful motion. And I infer that this protracted excitement of Sensation, in thought, does not produce pain by its own direct stimulus, but through its influence on Irritation, from the circumstance, that pain brought on in this way is always attended with increased action of the vessels of the brain, and frequently to the degree of inflammation.

2. Of those excitements of the sensorial powers, that produce pleasant motions of Sensation.

Of this description is the *excitement* of the sensorial powers in the state of *accumulation*, which I would term the *gratification* of the passions. For, as has been noticed, the passions are accumulations of the sensorial powers, in different parts, exciting a painful consciousness of their existence, and, necessarily, the desire of their expenditure; and their gratification consists in this expenditure by the application of appropriate stimuli. And as the passions are seated in the different sensorial powers, the excitement of the sensorial powers by the appropriate stimuli, when in that state of accumulation necessary to constitute passions, uniformly gives pleasure.

This state of accumulation of the different sensorial powers, or parts of them, is not essential for the excitement of them to produce pleasant motions of Sensation. For, excitements of the sensorial powers, or parts of them, frequently excite pleasant motions of Sensation, when no previous passion for such excitement existed. As, to give a strong instance from the many that might be enumerated, the stimulus of the Nitrous Oxid gas in the lungs, gives pleasure so extravagant and new, as to induce "the Poetic Southey" as quoted by Dr. Wm. P. C. Barton in his inaugural dissertation on this subject, "to exclaim, that the atmosphere of the highest of all possible heavens must be composed of this gas."—But the repetition of similar experiments on the different sensorial powers, where no passion previously existed, never fails to produce a disposition in the part to modify the sensorial power on which the stimulus is so frequently exerted, and evolve a passion for similar exertions in future. Which was the case with Mr. Davy, and many other gentlemen who have breathed the Nitrous Oxid gas, and with Epicures who experience many modifications of the passion of Hunger, for particular articles of diet which they craved not till the frequent use of them.

According to the above doctrine, all pleasures and pains are necessarily connected with excitements of Sensation, that is they are Mental; though, through respect to general sentiment, the pleasant and painful excitements of Sensation that are produced by other excitements of Sensation, may be called Mental pleasures and pains; those produced by excitements of Irritation, Irritative pleasures and pains; and those produced by excitements of Volition, Voluntary pleasures and pains.

3. Of those excitements of the sensorial powers that excite consciousness only.

The excitement of the Irritation of the Retina by moderate light, and of the lining membrane of the internal Ear by moderate vibrations of air, excite motions of Sensation unattended with pleasure or pain, being only conscious of the ideas corresponding to the external irritants.

Volition, also, in the ordinary exertions of it, excites neither pain nor pleasure; and I doubt whether it ever excites consciousness, without some degree of pain or pleasure.

The excitement of one part of Sensation may excite another part of Sensation into action, attended with consciousness only; as in the ordi-

nary suggestion of an associated train of ideas, by another idea, on subjects that involve little or no interest either of the agreeable or disagreeable kind. Here it may be in point to ask, whether one can be conscious of a *single* idea? I judge not. But to determine the question by argument, would require more reflection than I have of leisure, and perhaps of ability, to bestow.

III. Of the motions of Sensation excited by the sensorial powers in a state of accumulation.

These are only a consciousness of the existence of such accumulation, uniformly attended with pain, and consequently, prompting to the expenditure of the accumulation that excites it. These accumulations,—1st of Irritation, are seated in the organs of sense, of generation, and the alimentary tract,—2nd of Volition, in the voluntary muscles,—and 3rd, of Sensation, perhaps throughout the brain. They are what I have already noticed as passions; and will be more particularly spoken of hereafter.

There are other painful and pleasant excitements of Sensation, produced by the sensorial powers in a state of excitement or accumulation, which also involve a general disturbance of Irritation and Volition, in a secondary manner,

and which, on account of this and other circumstances of them, are termed Emotions. Any consideration of them is declined here, as they are of sufficient importance to entitle them to a distinct section.

SECTION II.

OPERATIONS OF MIND.

1. Preliminary observation. 2. Simple, complex, and reflex ideas.
3. Faculty discussed. 4. Will. 5 Judgement. 6. Reason.
7. Memory and Reminiscence. 8. Imagination.

1. A MORE particular consideration of the motions of Sensation produced by the sensorial powers in a state of *excitement*, belongs to this section. These motions of Sensation constitute the bulk of human knowledge,—they embrace all of the operations of mind. For, those motions of Sensation that are excited by a state of *accumulation* of the sensorial powers, are simple perceptions of such accumulation, and whatever other motions of Sensation may succeed, are produced by this perception, or state of excitement of Sensation ; and thereby, acquire a place among the motions of Sensation that are the effects of the stimulus of the sensorial powers in a state of excitement.

2. The motions of Sensation have been divided into simple and compound ideas. The compound ideas have been divided into such as are original in Sense, and Imagination; which latter are called reflex ideas.

The ideas that are excited by the separate and individual properties of an object, are considered as simple. *That*, that is excited by these properties aggregated, impressing an idea of the object itself, is the complex idea. And when two or more of such simple or complex ideas, are re-excited by reflection, (association) so near to each other as relates to time &c., as to make one image, it is termed a reflex idea.

But I judge that there is no foundation for a distinction of ideas into simple and complex. For an idea has already been defined a motion of Sensation; and this motion must be simple, whether it is excited by a single property of a thing, or all of them combined. It were as well to call the motion in the diagonal of two conspiring forces, a compound motion. But no compound motion is admitted of, in Natural or Physical philosophy; and in my humble conception there is no other philosophy. In the phenomena of mind, if an object of a variety of parts excites an idea representative of itself,

this idea is but one simple motion, though the respective parts of which the object is made, are, each, capable of exciting their corresponding ideas distinctly. When two or more ideas are excited, by association, so near to each other as relates to time, as to make one image, this image, if painted or modelled, would excite a single motion of Sensation, corresponding to it, though the several parts of which it is composed, are, each, capable of separate attention.— But there can be no objection to distinguishing this image, or creature of the imagination, by the term “ reflex” idea, other to *idea* of sense.

3. The faculty of Sensation on which these motions or ideas are excited, is its property of excitability. And this property of excitability, somewhat varied in each sensorial power, has already been noticed as the basis of all of the functions performed by the different sensorial powers.

Metaphysicians have, no doubt, from the dawn of science, to the present day, harassed their intellect, to discover its own intimate nature, without advancing far towards a complete development of it. They have, in my opinion, fallen into two very capital errors on the subject. One of which is, That the mind is capable of an independent existence from the body, suffering

only a temporary connexion with it. The other is, That it is endowed with many faculties, which acting alone or together, exhibit the different operations of the mind. And some have so far forgotten themselves as to enumerate more faculties than operations. The first of these I shall notice in a few words, and then proceed more fully into the discussion of the other.—*And here, under prevailing prejudices, my boldness cannot fail to excite a fixed astonishment. But difficult as it is to stem the current of public opinion, and conspicuous as the opposition renders the individual, the conviction of truth emboldens me to the attempt, at the hazard of any consequence.*

To refute the belief of a power of independent existence in Mind, it will be sufficient to refer back to what has been said on the materiality of the Sensorium &c., where I think it is satisfactorily established, that Sensation, as well as Irritation and Volition, are Secretions, depending on the action of the heart and arteries. And as the quality of excitability of the several Sensorial powers on which the phenomena of life depend, is continually changing by the action of stimuli, requiring a fresh supply from their discerning organs, they can have no independent existence of these organs.

The error that Sensation possesses as many faculties as it is capable of operations (operations of mind), seems to have arisen from a mistaken notion in the philosophy of causation, that each effect is produced by an individual cause, leading rationally to the conclusion, that there must be a distinct cause for every effect. And in applying this error to the operations of mind, it has been supposed, that each operation is effected by its particular agent in the mind, which they term *Faculty*. But no individual object in nature can produce an effect without the co-operation of some other object. Let a ball be suspended in a void, insulated from the influence of any other object, and what effect can result? None. Subject it to the influence of some other object, and an effect is produced; change the co-operating cause, and the effect is changed; and thus *ad infinitum*, the effect would be varied by changing one of the causes, though the other continued the same. And why not all of the operations of mind, or Sensation, be the effects of so many stimuli acting on its excitability? I fancy that the delusion that has deceived philosophers into this mistake on the nature of causation, is the circumstance, that when an effect or change in the mode of existence of a thing is to be produced, *one* of the co-operating causes must be put into a state of motion in order to be brought into contact with the *other*, which cir-

cumstance is supposed to entitle *it* to the superior distinction of cause. But this is an error in philosophizing, that occasions many perplexities, where the subject would otherwise be easily handled. For, a moment's reflection will convince, that each of the subjects is equally necessary to the effect, independent of the circumstance that one is inactive, till the other impinges on it.

There is something delusive in the term faculty as used by metaphysicians. It being used by them to denote (imaginary) independent powers of mind, by which the functions of understanding, judgement, reason, imagination, memory, &c., are performed. That is, if I understand this class of Philosophers correctly, faculty is a generic term, comprehending the properties or attributes, by which immaterial things, as they conceive mind to be, produce their effects, and are affected. And here lies the delusion; things are assumed to be immaterial, and then armed with attributes, corresponding to the properties of the material world by which effects or changes are wrought in it. Which, indeed, is plausible enough after assuming immateriality. But I have attempted to prove, and I hope successfully, that the basis of the mind is material, and have assumed* it as a truth, that mind is but an assem-

* I may here be charged with a *petitio principii*, for assuming what may seem to require proof. In reply to which, I must observe,

blage of the operations or excitements of its base, Sensation. But a mere state of excitement or action, or change of a mode of existence, cannot possess properties; for properties always suppose the actual existence of *thing*, or *materiality* for their attribution. Therefore there can be no such attribute as a faculty of mind, and the term can only be retained as a synonym of quality and property. And in this sense it may be applied to the quality of Sensation, by which it is excited into operations, called mind. This property is the excitability of Sensation, specified by the term sensibility.

4. For the preservation, and furtherance of life, the motions of Sensation are capable of the greatest alacrity of association, in every possible manner that exigency may require. And such is the facility of this association, that man has fancied himself to be possessed of the entire control of his actions and thoughts, which he terms an attribute of free-agency, or faculty of will. But how inconsistent is such an attribute with the

that the position is so ultimate, and touching of the confines of knowledge, that no postulate can encompass it, by which it may be made to assume the character of a conclusion. It must therefore be postulated: which it will belong to the consistency of the theory that is in a measure constructed on it, with the daily experience and observation of the studious, to establish its correctness, as of other postulates that admit not of proof.

universal necessity that seems to prevail? Indeed the fact is but a seeming one, which vanishes at the test of inquiry. Where is the analogy in support of such an hypothesis? There is none. Every change in the inanimate world demonstrates its efficient cause. And every motion of Sensation, and every influence that it exerts over Irritation and Volition, would discover their efficient causes, were we adequate to a sufficiently minute examination of them.

This influence of parts of Sensation over other parts of Sensation, and over Volition, but rarely over Irritation, is called motive, by advocates for necessity. But from what has been said of the associative connexion of the several sensorial powers, or their stimulant effect on each other, whether in a state of excitement or accumulation; it must appear that the motives of Necessarians are the Stimuli of sensitive motions, exciting other Sensitive motions, and motions of Volition, though rarely affecting Irritation. For example, when an irritant acts on Irritation, and this change in Irritation excites a painful motion of a part of Sensation, and this change of Sensation excites many other ideas or motions of other parts of Sensation, such as previous experience may already have excited, relating to a mode of relieving the direct effect of the irritant, that plan of relief which experience teaches to be most proba-

ble of success, is immediately put into practice, by those ideas or changes of Sensation, stimulating Volition into the necessary exertions for such relief. And who will deny that this process may be entirely the result of necessity? But I may be asked if there is not a principle inherent in the mind, by which the sufferer is enabled to endure pain, without any effort to relief? as in a painful surgical operation, that is necessary for the preservation of the patient? I answer that no such independent principle is necessary to the explanation of this fact; for the idea of future advantage, counteracts the stimulus of present pain.—Which, by the by, constitutes fortitude.—This pain may be so violent, that no idea of future good can counteract its stimulus to the motions that tend to relief. But if there exists the attribute of free-agency, why does it not restrain every improper action? That there is a single case in which it is deficient, is, to me, a sufficient proof that it does not exist; independent of the additional irresistible argument, that the phenomena which it is instituted to explain, are explicable on more physical and intelligible principles. We are told that we can pursue a train of thought, vary it, or suppress it, at pleasure. I grant that we seem to have that power. But on an exact scrutiny into such a case, I am confident, that it will be found that some one thought in the train, or an obtruding thought, stimulated to a change of

the train, or proved a counteracting stimulus to the prosecution of it. Indeed an obtruding thought, from any cause, would be an interruption of the train, of itself. The most familiar argument to the Libertinarian, in favour of free-will is, that we can associate, or re-excite, in succession, the most dissimilar ideas in nature, or those that are most distant from each other, as relates to the time when they were originally impressed. I have already remarked, that all the parts of our knowledge seem to be capable of the greatest facility of Association, and in every possible manner that exigency may require. And man, in the course of his improvement in general science, being at last inquisitive as to the nature of the faculty by which he acquires this knowledge of external things, directs his attention to its operations, and among other imaginary attributes, is deceived into that of free-agency, by the great facility of association of ideas. And in support of this hypothesis, knowing that to say that we can re-excite a train of ideas in succession, that were originally excited by an associated train of external objects, might be answered by observing, that it could require no exertion of will to associate ideas that were impressed by associated objects; and conceiving that an Association of the most dissimilar ideas, and ideas the most distant from each other, as relates to the time of their original impression, would be a better argument; this Association actually takes place in as many

instances as pleases his (apparently) Voluntary power ; from which circumstance he derives his strongest argument. But it is the exigency of the occasion, or the idea that such an Association would be a good argument in support of the opinion he had embraced, that excited those dissimilar and distant ideas, in quick succession. If this explanation is not entirely satisfactory, it is, doubtless, more so, than to suppose an ungoverned, governing principle, that knows no control ; thwarting and frustrating the views of the economy, at pleasure. But I will be told that free-agency is not contended for on so broad a scale. — That the will is not held to be perfectly independent of the conditions of the system ; but that a degree of dependence is allowed to subsist between them. Certainly it will not be denied that in proportion to that mutual dependence, the attribute of free-will is abated. And who has marked the limits of its empire, or calculated the sum of its dependence ? I cannot resist the conviction, that experience warrants the doctrine of Universal Necessity.

But if an attempt to subvert the doctrine of free-agency, and multiplied faculties of mind, should eventually succeed, it does not follow that the terms which are used to express them, should be abolished. They may still be retained, to express those various changes of Sensation, in the

more limited, and I hope, more accurate, sense of operations. Thus, *Will* may continue to express those motions of Sensation, and the effects that they produce on Volition, &c., that are excited by an idea of future good, when we prefer a future gratification, and perhaps one of a different kind, to a present one ; in distinction from those motions of Sensation, and the effects that they produce on Volition, &c., that are excited by the immediate impulse of passion, the latter being more evidently motions of necessity. For when an individual, laboring under the immediate influence of a violent passion, takes on certain actions that tend to the gratification of it ; his will is said to be passive, and his passion to sway. But if an anticipation of the ill consequence of the gratification, and the advantage of restraint, should counteract the stimulus of the passion, he is said to make a vigorous exertion of will, because the motive, or necessity, that acts, is less evident than in the former case.

5. The motions of Sensation may be compared with each other, to ascertain the relationship of the things that they represent, and their degrees of fitness, one above the other, for the purposes of life. This operation is termed Judgment.

A comparison may be made, with one of two views. Either to ascertain the similitude, or

dissimilitude, between two ideas or objects. When it is to ascertain the similitude between objects, the idea excited by each object with its parts aggregated, is lost, and an idea corresponding to the individual parts of each object, is excited, and those ideas excited by the different parts of each object, that are alike, are retained, as expressive of points of similitude. But when the discovery of their dissimilitude is desired, the ideas corresponding to the several parts of each object, are excited, as in the other case, retaining only those that differ, as expressive of points of dissimilitude.

In comparing things that have no parts, we immediately perceive that they are wholly similar, or wholly different. For we can retain no ideas of difference, or of similitude (dropping ideas of similitude, or of difference, which is necessary in order to find objects partly to agree, or partly to differ) between objects without parts; as they are incapable of analysis, or can excite but one idea.

6. But two objects may be so circumstanced, as that they cannot be directly contrasted with each other; when we are compelled to resort to the middle term of Logicians. This middle idea is compared, first with one, and then with the other object; and the *points* of agreement or of

difference that the objects bear to the middle term, as *representatives* of the objects, are compared with each other, to ascertain their relationship; which relationship is expressive of the relationship of the objects themselves. As in discovering the relative sizes of two fields, we introduce the middle term of admeasurement; and then the *quantum* of admeasurement of the one, is compared with the *quantum* of admeasurement of the other, and their differences will express the difference between the two fields. This is termed a process of reasoning; but it is proven to be a multiplied judgement, or comparison; and precisely similar, is every species of reasoning; with this difference only, that the longer the train, the greater is the number of intermediate acts of judgement. Therefore, reasoning is but a multiplied judgement, designed to ascertain the relationship between two remote propositions. Whereas a single act of judgement finds the relationship between two objects, without the aid of any intermediate comparisons.—According to this statement of the operations of comparison, reason, and judgement; might not judgement be a generic term, embracing comparison, and reason, as species?

7. The power on which the WILL of Metaphysicians is said to act, in re-exciting past impressions, without regard to the order in which they were originally made, is called memory.

And the circumstance of an idea of an object, similar in some remarkable respect to another object, exciting the representative idea of that object; or of one idea, that was associated with another, at the time of impression, re-exciting this other, is termed reminiscence. But that these two phenomena of Sensitive motion are merely the stimulant effects of parts of Sensation, in a state of excitement, acting on other parts of it as suits the occasion, dropping all idea of a distinct faculty from that of the excitability of Sensation, is the explanation that accords with the foregoing parts of this essay, and seems to be a satisfactory one. Yet we would retain the terms *memory*, and *reminiscence*, to express these kinds of association.

8. The motions of Sensation that have already been excited through Irritation or Volition, may be re-excited, on the principle of Association, so near to each other, as relates to time, and in such order of succession, as to make one image, which if painted, or modeled, would impress an idea that could be derived from no actual existence in nature. This operation has been attributed to a distinct faculty of Sensation, called imagination. But the objection to its being distinguished as a faculty is already familiar; as, also, is the explanation of it as an operation. The modes in which ideas may be combined, and aggregated, to make

a reflex idea, or idea of the imagination, are various, and perhaps without limit; forming the basis of fancy, romance, figurative style, &c. &c.

After this view of the subject, it would be as useless, as it would be vain, to attempt an enumeration of all of the operations of mind. Nor would the scarcity of time, or the elementary nature of this essay, permit it, were any advantage to be expected from the attempt. I shall therefore proceed to the consideration of the Sensorial power of Irritation.

CHAPTER III.

OF IRRITATION.

1. Definition of Irritation.
2. The primitive origin of Irritation.
3. Irritation essential to living matter.
4. The associative connexion between this and the other Sensorial powers, and between its own parts as distributed over the body.

1. **IRRITATION** has already been defined, That Sensorial power, which, co-operating with appropriate stimuli, performs the several functions, 1st, of digestion; 2d, of circulation, and those of secretion, excretion, assimilation or nutrition, &c., that are dependent on that of circulation. And 3d, of sense, whether of the senses resident on the external, or internal surface of the body*; and has its residence in the hollow muscles, or vascular system.

* The alimentary canal, and arterial system, &c., certainly become organs of sense, when their excitements excite painful motion of Sensation.

2. The states of excitement of Irritation in performing its several functions, require not to be particularly noticed here, as they have already been more happily investigated by Physiological writers, than the author of these pages is even able to repeat. But it may not be superfluous to observe, what should have been suggested when speaking of the origin of the several Sensorial powers; that as their modifications have been attributed to the process of Secretion, and as this process cannot commence without Irritation, we must suppose the embryo of the fetus, in its very primitive state, was furnished with a portion of this power by its parent; as is the case of the embryos of vegetable seeds, and the eggs of animals.

3. Irritation forms an essential part of the constitution of all the animated or living creation. It is a matter of great disputation and doubt among Physiologists, whether vegetables and some inferior animals possess Sensation. The degree to which they are supplied with Volition is less a subject of uncertainty, as its effects are more evident to the senses. But Irritation is a never-failing attendant on organized matter, whilst it is cheered by the active Phenomena of life. And, not so favoured by the destiny of fate, as Sensation and Volition, which spend half their existence in relaxation, Irritation knows no inter-

mission to its labors, from the time of its quickening, till that of its eternal repose.*

4. The associative connexion between this and the other Sensorial powers, is not so intimate as to subject it entirely to their control in the ordinary scenes of life. But some states of Sensitive excitement, produced by some extraordinary threatenings to the welfare of the economy, frequently produce a temporary, and sometimes a permanent, suspension of irritative excitement. This effect of the associative connexion between Sensation and Irritation, will be noticed under the head of Emotions. Its inferior associative connexions with Sensation and Volition, and between its own parts, as distributed through the body, may be amply learnt from Physiological writers, particularly from Zoonomia, in the chapter on Association.

* Save the hibernation, or torpid state of animals and vegetables, and cases of suspended animation from other causes than cold.

CHAPTER IV.

OF VOLITION.

1. The importance of Volition. 2. Its subserviency to the Sensorial power of Sensation.—3. An interpreter of Emotions.

1. THE Sensorial power of Volition, which has its residence in the Muscles called voluntary, and is the power by which their contraction is excited; though simple in its nature, and at an imperfect glance, apparently of inferior dignity and consideration in the animal economy, yet on a minuter view of its nature and offices, swells into importance indispensable, and yields not to Irritation, or Sensation, the point of practical utility. Without it, locomotive animals, at least, would perish from the face of the earth.

2. The history of this Sensorial power in its healthy state, demonstrates it to be subject to no other stimulus, than that of Sensation in a state

of excitement ;* with the exceptions of the matters of Galvanism and Electricity, whose wonderful powers seem to be exerted directly on it, dispensing with the usual indirect and circuitous route through Irritation and Sensation. In health, it is the entire Slave of Sensation. It executes every motive. It reduces every *invention* (to use the familiar language), of the almost *creative* powers of Sensation, to their practical character. What would Philosophic researches and scientific deductions avail, without the power of applying them to art, for the benefit of mankind? Volition supplies this power. And to indulge in a figure, The mechanic, the sailor, the soldier,

* In the vegetable kingdom, the plant *Dionæa Muscipula* (Venus' fly-trap), tenth class, and first order of Linnæus's Sexual System, furnishes an exception to this position, if we grant that plants have no Sensation ; for when the serrated termination of its leaves (the armature of the plant) are irritated by the fly, or any other insect, this excitement of its Irritation immediately excites its Volition, or muscular power, by which the armature closes on the irritating object. Perhaps, also, this exception may furnish ground for doubting the universality of the position in the text, as it relates to animals ; and as regards man, perhaps the following case may be thought an exception ; viz : When one is in perfect sleep, an irritant to his nose, or other very irritable part, will excite muscular exertion. Whether is this muscular exertion produced by the indirect association between Irritation and Volition, through Sensation, or by direct association ? We know that a momentary excitement of Sensation frequently takes place in sleep, to answer a present purpose, without making a sufficiently permanent impression, to be re-excited, or recollected afterwards ; and of this nature, I am inclined to think, is the case just mentioned, and therefore it furnishes no exception to the position in the text.

nây, the practitioner of the fine arts, are to the Philosopher, as Volition is to Sensation.—They are the Volition of Philosophers. The latter improve the knowledge of mankind, the former apply it to utility.

3. The states of excitement, and relaxation, of the muscular power of the features of the face, are supposed, by some respectable authorities, to be the only true foundation for human Physiognomy. But so complete is the tyranny of sensation over Volition, that the art of dissimulation, in a civilized community, frequently baffles the most skilful attempt to discover the *acumen*, state of *excitement*, and *propensities* of the one, by any condition of the other. Nevertheless, something may be learnt of these circumstances of Sensation, from the states of the Volition of the countenance, in any state of civil refinement, as it is the principal external evidence of an Emotion; certain states of Irritation in *paleness*, *blushing*, and *syncope*, only aiding in the interpretation. But much more may be learnt from this interpreter of mind, in the savage, than the civilized man. In the former, nature is simple and unveiled. He knows not the advantages of deceit, because he feels not the necessity of it, and therefore practices not the art. But the latter, armed with all the chicanery that experience and intercourse can teach, or ingenuity can devise, for the most part bids defiance to a Lavater's eye.

To indulge in a small digression. I hesitate not in entertaining a belief, that there are other more infallible interpreters of the qualities, &c. of Sensation, *Viz*: The *solids*, and the *block* of the countenance, with the figure of the body at large; though an actual connexion, and the extent of it, between these external signs, and the qualities of Sensation, has not been sufficiently proven, even by the indefatigable zeal of Lavater himself. In fact, no perfect Physiognomy of Sensation, which must embrace its *acumen*, *propensities*, and states of *excitement*, can be inferred from an attention to the *form* and *proportions* of the body, and states of Voluntary and Irritative excitement, singly. The former can teach us, perhaps, the original acuteness of Sensation, but can say nothing of the changes wrought by Emotions, or the expressions of resignation acquired by the restraint of Emotions, which it is the province of the latter to teach. Nor can much be learnt of the original qualities of Sensation, from the states of Irritative and Voluntary excitement, they being more confined to expressions of Emotions, and the permanent effects that they impress. So that it is by their joint instruction, only, that we are to learn the most correct Physiognomy.

The associations between diseased Irritation and Volition, as also, of Sensation, are almost incalculable; but they are without the province of this essay.

Parts of the Sensorial powers are capable of an *accumulation* to the degree that shall excite a painful consciousness of the existence of such accumulation; which will be considered in the following chapter on the Passions.

The Sensorial powers are capable of a joint excitement, or modification of their excitement, proceeding from one cause; the consideration of which belongs to the chapter on Emotions.

They are also capable, jointly, individually, and parts of them, of different degrees of supply, either of excess or of deficiency, calculating from the average and healthy standard. The consideration of these states of the Sensorial powers will belong to the concluding chapter on Temperaments.

CHAPTER V.

OF THE PASSIONS.

I. 1. Definition. 2 Their evolution. II. Natural passions, *viz* : 1 That of taste, of smell, and Hunger. 2 Lust. 3. Passion of touch. 4. Muscular passion. III. Adventitious passions, *viz* : 1. Modifications of taste, smell, and Hunger, wrought by art. 2. Any modifications of Lust, of the sense of touch, and of Volition, that may be wrought by art, not noticed. 3. Passions for Light, and Sound. 3. Ambition. IV. Mixed passions—As Love. Identity of passion, and desire.—Passions the most uniform and extensive, spring to human actions.—They give rise to warfare, without government, and to friendship with it.—Joy, Grief, Fear. Anger, &c. are Emotions, and belong to the consideration of a distinct section.—Instinctive actions.

I. 1. PASSION, as has been, from the tenour of this essay, unavoidably anticipated, is an *accumulation* of Sensorial power, exciting Sensation into a painful consciousness of the existence of such *accumulation*—

(And such is the strength of association between all painful excitements of Sensation, and the motion that tend to their relief, that the latter immediately succeed the former, if not re-

strained by the counteracting stimulus of the idea of future ill; that is, by the Will.)—

That an *accumulation* of Sensorial power is essential to a passion, we are justified in the conclusion, from the unvarying fact, that in proportion as the impulse of the passion is stronger, the degree of the appropriate stimulus required for the gratification, is less, according perfectly with the long established, and invaluable maxim in medicine, That the *quantum* of stimulus being given, the effect will be in proportion to the *quantum* of excitability (Sensorial power) to which it is applied.

It may be urged as an objection to that part of the above definition, which requires that the *accumulation* should excite a painful motion of Sensation—that there is a degree of pleasure attending a passion, independant of the gratification of it. But this is only the indirect effect of the passion; the passion first exciting the painful idea of its existence, and this idea, by association, excites a recollection of a similar passion on a former occasion, and the pleasure of its gratification; and thus enables us, in some degree, to anticipate the pleasure of the expected gratification; giving rise to the mixed pleasure in question.

Whether these *accumulations* are distinct varieties of the several Sensorial powers, may be dif-

ficult to determine ; but I am inclined to the affirmative, as they require peculiar stimuli to excite an agreeable expenditure of them, the evident design of their accumulation.

2. The passions are not evolved together, and at birth, but at different periods, as the individual advances to maturity, and as accidental circumstances of exposure may encourage a quicker evolution of them. They are capable of an indefinite variety of modifications, according to the variety of subjects by which they are exercised.

The Sensorial power of Irritation, furnishes the basis of the passions of the Senses, of Hunger, and of Lust ; Volition, that of the Muscular passion ; and Sensation, that of Ambition.

As it is not very material, to consider the passions in the order of the Sensorial powers to which they belong, I shall follow another order, out of which more advantage seems to be promised. Which is, to arrange them under the two heads of Natural, and Adventitious. Those that are necessarily connected with the constitution of man, in whatever condition he may be placed, may be considered as Natural. Those modifications of these, or new ones, that may be evolved by local circumstances of exposure, or civilization, &c., may be considered as Adventitious.

II. Of the Natural passions, I cannot with confidence enumerate more than that of taste, that of smell, Hunger, that of touch, and that of Volition.

1. From the intimacy that subsists between the passion of taste, of smell, and Hunger ; from their perfect conspiracy directly to one end ; from their loathing, and craving, the same stimuli ; always acting in perfect concert, if not vitiated by the innovation of wanton habits, or the dissociating power of disease, we may infer that they are co-existent, and commensurate, with each other. Hunger is bestowed, to suggest to us the necessity of supplying the continual want of our systems, by food. But as its seat is so retired within our fabric, as to prevent it from being acted on directly, so as to excite a correct judgement as to the proper *means* for this supply, it is furnished, at the port of subsistence, with the *very* appropriate sentinels of taste and smell. And it is probable that this was the sole purpose of these senses, in the more necessitous conditions of man, as seems evidently so with other animals. Though leisure may, and does, apply them to their separate, and individual gratifications, without any view to that of Hunger ; which will be noticed presently, as Adventitious.

Again.—As the stimulus that these passions crave, are necessary for our subsistence from our

earliest existence, so must they be as early in their evolution. Without the passion of Hunger, the fœtus would begin to perish, from the moment that it leaves its vegetative life. Without it, young animals would have nothing to stimulate them to an examination of the properties of the things about them.

2. The passion of Lust has its seat in the organs of generation. It is later in its evolution than that of Hunger, and perishes before the extinction of life in old age. * * * * *

3. That *that* modification of Irritation which makes the sense of touch, is frequently in such a state of accumulation as to constitute a passion, is placed beyond a doubt, by the great desire that is felt, when combined with Lust, for a sexual embrace; or even for a simple pressure of a female breast; if on the part of the male. This passion must also be a natural one, as the lustful passion seems not capable of existing without it. That many other desires of gratification of this sense, may be evolved by art, I have no doubt. But I shall not attempt to enumerate any; to show that this sense is the seat of a passion, is all that I wish.

4. Volition may be so accumulated as to excite pain, known by irksomeness, which I have

called the Muscular passion. I have no hesitation in considering it as a Natural passion, because the infants of many races of animals, particularly those of the human race, are known to make muscular exertions, in extending their limbs, and writhing their bodies, before they can be supposed to design any operation on external things.

It is from the gratification of this passion, that we derive the principal pleasure of bodily exercise. Who has not felt the sweets of morning pandiculations? Whence the motive to a change of a protracted posture? Not merely to relieve the lassitude of exerted muscles, but to relieve the irksomeness of relaxed ones. And each of these circumstances is a source of pleasure.

This passion is found most perfect, in the most muscular, and active animals. To remove any doubt, that muscular exertion is sometimes resorted to for the sole purpose of expending accumulated Volition, to say nothing about the many cases that are familiar to the experience of every one, it will be sufficient to notice the case of the caged squirrel, whose dwelling is so constructed, on an axle, as to permit it to leap for minutes together, without gaining any other satisfaction, than the expenditures of his accumulated Volition.—Which exercise he daily alternates with the *accumulation* of his Volition.

III. As the Adventitious passions require the conveniences of situation, and art, &c., for their evolution, they are more or less numerous, in different individuals, according to these circumstances, conjoined with the capacity of the individual, thus circumstanced. So that one may enjoy the greatest multiplication of this moving power, whilst another scarcely feels an impulse, but from the agents supplied him by nature.

The passions of taste and smell, and Hunger, are jointly improved by the art of cookery, and the luxuries afforded by the cultivation of the earth. The modifications of these passions enjoyed by Epicures, add artificial branches, innumerable, to the natural stems. And the Epicure, alone, is able to do justice to the varieties of them that art can evolve.

But how inadequate are we, to reckon the evils that spring out of the abuse of these passions? The passions for sapid substances, and odours, suffer modifications, from the repetition of wanton practices, that have no view to the gratification of Hunger. Of which, are, the desire of the taste of certain preparations of tobacco, of alcoholic drinks, &c., &c.; and the desire of the odour of certain other preparations of tobacco, &c. Hunger is also frequently modified, by habit, into a desire for articles that are loathed by the natural state of

that passion. But are these the real objects of refinement and civilization? Far from it: The rational gratification of these passions, within bounds that offer no interruption to the higher views of lawful Ambition, and its mean of honest aggrandizement, is the utmost that should be countenanced in society. For, its welfare ceases to be promoted, under a greater indulgence of them. And he enjoys a more uninterrupted serenity and bliss, who applies them only to the preservation of life and health, whilst he judiciously cultivates the more useful passion of lawful Ambition.

2. The modification that the Natural passion of Lust suffers by civilization, I do not pretend to be acquainted with; though there is no doubt that it is much more exercised, as every active principle of man is. The same remark I apply to the natural passion of the sense of touch, and that of Volition. Nor is it very important to inquire minutely into the modifications of them, that art can evolve.

3. The passions seated in the organs of sight, and hearing, exert but little influence, in the uncultivated and barbarous state of human existence. In this state, the Irritations of these senses act as sentinels, and pilots to the system, guarding against injury, and pointing out the path of safety. Their business is to serve the

more important passions of Hunger and Lust, and to betoken a threatening danger. It belongs to civilization, and art, which give nature time to gambol a little on her journey through life, to afford leisure for the exercise of these senses, on matters of indifference as to her immediate welfare; and by the repetition of such exercise, to evolve the *variety* of desires (*passions*) for colours and sounds, that have no existence except in the civilized world; and in that, only in proportion to the remove that the individual enjoys from the driving lash of penury.

4. Whether Ambition (which has been already sufficiently defined) is a Natural, or Acquired passion, is rather difficult to determine. It seems not to be evinced by brutes, except those that are educated among men, or have cultivated society among themselves. Perhaps, it would not be found in the character of Man, if he could witness an existence without a civil bond. If it is not the entire creature of society, it is evidently immensely expanded, modified, and improved, by it.

This passion excites a desire of *preference* or *superiority*, on whatever subject emulation may be excited.—It is the excitant of emulation. It is at once the most fruitful source of happiness, and misery. Its gratification gives rapture

inexpressible ; its disappointment *maniacism* ir-retrievable. It is the judicious cultivation of it, that is to exhibit man on the highest pinnacle of his perfectibility.—That is to give him renown that shall be co-eval with his race.

IV. There is also another ample source of the multiplication of the passions, as exhibited in the practice of life, in all of its varying circumstances. Which is their capacity of acting in concert, or in combination ; producing a variety, of such equivocating nature, that all Metaphysicians have bowed with unhesitating submission to their mystery. The gratification of such a passion, gives pleasure incalculably superior to the most refined individual exertion of them.

Such mixed passions may be made up of the Natural, or Acquired passions, or both. Of this description of passions, I shall only notice that of Love. The innumerable other combinations of the passions, that, by their delicate touch, give such refined turns to the motives of men, as to evade the arrest of a Philosopher's pen, need not be attempted by mine.

After deliberate reflection, I have no hesitation in adopting the opinion, that Love is a mixed passion, of Lust, and that modification of Ambition, that consists in a desire of the esteem or

preference of a particular individual, above all others.

This desire of esteem, unqualified by Lust, is the basis of that *never-existent*, but *imaginary* sentiment, *friendship*. And *courtesy* is the *hypocritical* mean used to impose the pretence. Thus if a person desires advantage from the favours of another, and this other seems weak enough to be imposed on, he adopts a courteous and attentive conduct towards him. And if the esteem of the former promises any advantage to the latter, his conduct is reciprocated; in which event, these two persons are said to be friendly to each other. But suppose one of them sees no farther occasion for his *hypocrisy*, then his *courtesy* abates, to be sure; at least, he puts himself to no further cost to preserve a connexion from which no advantage is coming.—What makes the *appearance* of friendship, more permanent between the members of a family, is, that the laws and customs of society, have created an actual dependence, and reciprocity of interests among them; so that the good and bad deeds, and the good and bad reception, the fame and infamy of the one, are in a high degree shared by the rest; enlisting each, permanently, to support the character, and promote the welfare of the rest; these being, in some degree, a common stock.

And Lust, unqualified by the desire of preference and esteem, only prompts to a venereal gratification, as in the sexual intercourse of most inferior animals, and among the prostitutes of the human race.

But these two passions happily combined, perhaps with a preponderance of the former, makes that painful, yet fascinating sentiment with which the breast of a generous youth glows for its choice of the opposite sex.—It is Lust, then, that converts that selfish desire of esteem, which has been ornamented with the imaginary beauties of friendship, into Love.—It is, too, the desire of esteem that converts Lust into Love. And the consummation of this passion in the lawful mode of matrimony, may prove to be the greatest sweetener to the enjoyments of human life, or the bitterest poison.

I have as yet declined noticing an objection, that in all probability, will be made to this apparently vague use of the term passion, as including the several desires of colours, sounds, odours, sapid substances, &c. To which it would be a sufficient answer, to observe, that they seem to be intrinsically, possessed of the same characteristics, with the acknowledged passions of Hunger and Lust; that is, that they consist of *accumulations* of Sensorial power, and are attended with pain

or desire of expenditure. But to this I may add, that there is no real difference between a desire, and a passion, except that those passions that impell with less force, and occasion less pleasure in their gratification, have been considered as desires; whereas, those that solicit more persuasively, and occasion more pleasure in their gratification, have the exclusive title of passion, however unjustly.

From what has gone before, it may be easily discerned, that the passions are the only *uniform* and uninterrupted springs of the motive character of animal creation. Whatever other motive to action may arise, proceeds from a threatening, or actual, injury, from some external violence. Such motives are but few in a free and prosperous community; though more abundant in the savage state. They excite to the attainment of a negative pleasure, by the avoiding of an actual evil. With the exception of these, the passions are the authors of every twinge of human misery, from its slightest degree, to the utmost exacerbation of it. They are the authors of every pleasure, from the last discernible point of pain, to the most ravishing bliss.—What improvement of art have we, that is not the fruit of this stimulus? What scientific research? What feat of patriotic heroism?—But ye sons of malefaction, what circumstance is it that has interposed such

an immense span, on the scale of human perfection, between you and the benefactors of your race? Your natures teach us that you are automats, with the same moving powers. It must, then, be the injudicious exercise of these, that produces such a diversity of results.

Did I possess a fanciful genius, and time would permit the indulgence, a fairer theme for eulogium, could not offer, than the influence of the passions happily qualified by experience; nor a fairer one for lamentation, than their uncontrolled sway. The one exhibits the highest perfection of man, with the full dominion of mental vigour. The other exhibits him emphatically *weak*.—But however favourable the subject, or abundant the time, the want of the suitable talent would bar the task.

To show the advantages that may arise to the individual, and to society, from the proper cultivation of some of the passions, and the restraint of others; the disadvantages from their injudicious cultivation, and the diseases from the excess of their gratification; cannot come within the compass of this essay. Though this is no occasion of regret, as these points have been familiar, long before the intimate nature of Passion was aspired to. It is also well known in the *practice* of Legislators, that to divert the passions of

the members of their community, from their original conflicting route into one common channel,—that to change the sordid selfishness of man, by which he only seeks his individual welfare, for an interest of a more elevated and social kind, by which, he may advance the welfare of his country, at the same time that he promotes his own, is the duty of their convention—is the object of civilization. But even this community of interests, can only be established on the basis of the more sordidly selfish kind. For, what would it avail, to order an individual, to promote, in any way, the end of society, without connecting with that duty, a superior interest of his own? Is man, or any other animal, ever known to do that which eventually promises him a greater ill than good? Such a case would be a remarkable instance of nature's aberration from the path of wisdom. But nature (or necessity) never errs.—To this extent, the knowledge of human nature seems not sufficiently familiar to Legislative bodies; or law and government, would be more rapid in their progress to perfection. It is a want of this community of interests between governments, that perpetuates the war, and bloodshed, of savage life, on the theatre of the civilized world. But a community of interests, will never move the Cabinets of nations, till a common tribunal is established, to which nations shall be responsible, as individuals are to nations.—Man is a *savage*,

without law, even though reared in a metropolis. Man is *meek* and *civil*, under the influence of suitable laws that he understands, though reared in a wilderness.

Joy, Fear, Anger, Grief, &c., have been left out of the enumeration of the passions, as not being reducible under the definition that is here conceived more strictly to belong to passion; but will be considered under the head of Emotions, as being perfectly embraced by the proper definition of these Phenomena of sensorial excitement.

This view of the passions, will appear objectionable on another account. I have omitted the consideration of what has been called the passion for wealth and splendor, and such like. But this is by no means to be termed a passion. It is only an intermediate measure, or mean, resorted to, to insure the gratification of the passions that have been spoken of. It were as well to say that a person has a passion to go to market to purchase a piece of beef, because he is hungry. Truly it is the mean of gratifying his hunger, and he adopts it, as he does the means to the gratification of any other passion, before the gratification can be obtained: Which has already been explained on the principle of Association between the painful motion, and the motions that contribute to relief.

Before leaving the subject of the passions, I will say a few words on a class of actions that have been called instinctive.

From the accuracy, or inaccuracy, with which I have been able to examine this subject, an instinctive action seems to be definable, A *muscular exertion*, excited directly by a painful motion of Sensation, which is produced directly, by a state of excitement, or accumulation, of the Sensorial powers of Irritation and Volition. In this definition, I have made the instinctive actions to consist of muscular exertions, because I know of no action of Sensation, or Irritation, that has the distinction of instinctive, if not terminated by a *muscular exertion*. And to distinguish them from other muscular exertions, the definition requires that they should be excited directly, by a motion of Sensation that has been produced directly by an excitement, or accumulation, of Irritation, or Volition; as, if other motions of Sensation are allowed to be produced, (by Association) before the muscular exertion is excited, these other motions of Sensation may prove counteracting stimuli to the first act of perception, and change the nature of the muscular exertion; or they may co-operate with the first act of perception, and produce that muscular exertion that would have been produced by it alone. In either case the muscular exertion cannot be cal-

led instinctive, as it is produced directly, by what is termed a deliberation of mind; and any exertion that is the result of judgement, or reason &c., is denied to be instinctive.—It is required that the motion of Sensation, that excites the muscular exertion, should be excited by a state of excitement, or accumulation, of Irritation, or Volition, as no exertion that is excited by an idea produced by other associated ideas, is allowed to be instinctive; they being the effects of deliberation just noticed; and any accumulation of Sensation, amounting to a passion, as Ambition, is not supposed to be Natural, and is therefore apt to excite mental deliberation, before a voluntary exertion; it being evolved by habits of thought and experience. The motion of Sensation that excites the muscular exertion, is required to be painful, as an indifferent one never acts as a stimulus, and a pleasant one never excites a change of the motions that produce it. It is required also, for an instinctive exertion of Volition, that the excitement, or accumulation, of Irritation, or Volition, should act on Volition, through Sensation, as the muscular exertions produced by applying the matter of Galvanism to dead* animals, and the like exertions, are not allowed to be instinctive.

* Dead as to Sensation, and Irritation, but not as to Volition.

But these are instinctive actions only, of which we have been speaking. In what does *Instinct* differ from *Instinctive actions*? May it not be the stimulus that excites *them*? I see no objection to the idea. Then Instinct is of two kinds. 1st. An object of sense, that excites a painful idea; and 2nd, an accumulation of Irritation, and Volition, to the amount of passion. But the passions that are evolved by Nature, and by art, differ in an important point; the former in their commencement, exciting actions that tend to their gratification, without any previous knowledge of the relationship of things; the latter, being evolved principally by that knowledge, are gratified very much under its influence;—which circumstances render the former fit stimuli for instinctive actions, and preclude the latter from that office.

In an infant, that has acquired no knowledge of the relationship of things, Hunger excites mastication, and deglutition, and perhaps even a search after the milky fountain. An *Accumulation* of Volition (Muscular passion) excites pandiculation. A prick of a pin, or other external violence, excites exertions to relief, and these are purely instinctive, according to the definition.

I know that all of the actions that have been called instinctive, are not embraced by the de-

definition that I have given of that class of actions. But this class of actions is not so extensive as has been imagined. Animals soon learn the lesson of experience, and make *it* a mean of acquiring a present, or a future good. Instinctive actions only serve the primary, and indispensable calls of nature, whereas each moment's experience furnishes a more sure guide to prosperity.

CHAPTER VI.

OF EMOTIONS.

- i. Definition of Emotion. 2. Arguments in support of the definition. 3. Emotions excited by an excitement, or accumulation, of Sensorial power. 4. Joy, Fear, Grief, Anger, &c., are, strictly, Emotions. 5. Emotions are tonic, and debilitant.

1. AN Emotion is a quick succession of pleasant or painful motions of Sensation, produced by a doubtful-depending good or ill, imaginary or real, attended by a change in the motions of Irritation and Volition.

2. In favour of the first ingredient of this definition, it will be sufficient to observe that it never has been contended that Emotions, can exist without consciousness, but on the contrary, that they have been, by some, entirely confined to the mind. And that these Phenomena of mind should be painful or pleasant, is an essential characteristic, according to the general

sentiment of writers on the subject ; being distinguished by them into painful and pleasant.

In support of the second ingredient of the definition, That Emotions result from the contemplation of * * * * * *good* or *ill*, I state that no pleasure or pain can be experienced except from causes benign or injurious in their operation, to the welfare of the economy. And that the *event* should be *doubtful*, is an indispensable circumstance, as many cases may be enumerated, of causes, of pleasant or painful ideas, that would, according to the experience of every one, have produced very strong Emotions, if bereft of the circumstance of inevitable certainty ; Whereas, connected with it, no Emotion is excited. For example, a prospect of a jeopardy of life is productive of great Emotion. The event not being absolutely certain, and the mode of securing perfect safety being to be discussed, and perhaps in a moment, heightens the Emotion. But let the discussion be determined one way or the other, a calmness—a subsidence of the Emotion, ensues. That is, suppose it is perceived that a certain measure, perfectly in our power, will make security inevitable ; the cause of Emotion immediately ceases, as we have perfect confidence in our own inclination to persue the means of safety.—On the other hand, suppose the discussion were atten-

ded with a more fatal result, and death is discovered to be absolutely unavoidable; who will deny that calmness is the consequence? Is not calmness the characteristic of despondency? Does not the history of the severest executions show the convicts to be totally reconciled and calm, whereas, before conviction, they evinced marks of great Emotion? But if resignation is not perfect, even at this desponding conjuncture, the cause that protracts the Emotion, may be, the uncertainty of future destination.

I may be required to explain a case of Emotion produced by the *recollection* of an *event*; from which, it may be conceived, there should be no hope or apprehension of good or ill, the cause being in retrospect. The explanation that I shall give, is simply to recite a well known fact, That the motions of Sensation, may be, and frequently are, so vivid as to suspend the association between it and the senses, and thus to lose the relationship between the past and the present, in which case the cause of Emotion is an imaginary-impending event.

In support of the third ingredient of the definition, viz. That a change in the motions of Irritation and Volition, is involved; it may be observed, that the only sure index to this state of mind is the effect produced on Irritation and

Volition, evidenced in palpitation, syncope, and the motions of the muscles of the face and other parts of the body. But whether an Emotion cannot exist without affecting Irritation and Volition, may be a question? And this I think will be decided in the negative. We know that an effort to compose the external indications of an Emotion is attended with success, only in proportion to our mental resignation to the event, or conviction of its certainty. That is, in preportion to the abatement of the cause of the Emotion. And this conviction will depend on our familiarity with the circumstances connected with the cause of Emotion. Hence, we see that men of the world, with liberal information, are less subject to Emotions than men of contracted minds; other circumstances being equal.

3. It has already been noticed that Emotions are excited by the several Sensorial powers in a state of excitement, or accumulation. Those Emotions, that are produced by a state of excitement of Irritation or Volition, are effected indirectly, by the action of an external stimulus of a kindly or offensive nature, producing its corresponding motion of Sensation, and, by the assistance of judgement, a consciousness of its relationship to our welfare; and consequently, all the other parts of a complete Emotion. As,

when the presence of a Lion starts upon our sight, a corresponding motion of Sensation is produced, and our acquired ideas of his temper and character, touching our security, are immediately associated in train, with all the conscious jeopardy of our situation, and the other parts of a complete Emotion, as explained by the definition.—Or if the external stimulus of Electricity be applied to Volition, in the case of one entirely ignorant of the nature of that fluid, the Emotion of *Alarm* is excited, owing to his ignorance of what may be its effects upon him.

Those Emotions that are produced by a state of *excitement* of *Sensation*, in the first instance, bear no difference from those produced by the excitement of Irritation and Volition, except that the train of actions does not commence by the action of an external stimulus on an organ of sense, but by the recollection, or the reminiscence, of a pleasant or disagreeable idea formerly impressed. Emotions of this kind occur most frequently in dreams, and in reveries, when we lose the knowledge of actual relationships, by the suspension of the actions of sense; in which case the event is contemplated as a doubtful-impending one, being an *imaginary* cause of Emotion.

Accumulations of Sensorial power to the amount of a passion, may excite an Emotion; but

only when the prospect of the good of the desired gratification is of doubtful event. As whilst the lover's suit is doubtful, every trifle agitates his breast, and fills him with Emotion. But when it assumes a decisive form, and in favour of his wishes, an uninterrupted serenity of anticipated pleasures move his Sensitive power; or if all prospect of success is destroyed, kind indifference relieves his perturbations.

4. That those joint affections of Sensation, Irritation, and Volition, denominated Joy, Grief, Fear, Anger, &c., do come strictly within the limits, and touch every confine of the definition that I have given of Emotion, will be evident, I hope, on the slightest and most inattentive analysis of them. Indeed so sanguine am I in the confirmation of my conjecture, that, joined with the distressing scarcity of time to do as much justice to my undertaking as I feel of conscious ability, I shall decline their particular analysis.

5. These affections have been divided into stimulating and sedative passions. That they are not passions according to the test of the definition of passion afore given, is evident, as one essential point of that definition, is, a state of accumulation (not of excitement) of Sensorial power. Whereas an unvarying characteristic of each of these affections, is a joint excitement of the several Sensorial powers.

As to their stimulating power, if it is meant to attribute to them the power of exciting an action of either, or every, of the Sensorial powers, (which is all that is attributed to a stimulus,) without regard to their indirectly tonic or debilitating effect, I must contend that they have no such power. For every of the Sensorial powers are already necessarily in a state of excitement, to constitute an Emotion. But if, in attributing to them stimulating and Sedative powers, it is meant that their remote or indirect effects are tonic or debilitating, I most heartily concur in opinion. For, those Emotions that are produced by the contemplation of a doubtful-impending good, for the most part increase the tone of the Sensorial powers. And those produced by the contemplation of a doubtful-impending ill, for the most part impair their tone; which they effect by destroying the existing associations, and exciting new ones. I say that the former for the *most part* strengthen, and the latter for the *most part* impair, the tone of the Sensorial powers, because those Emotions that are produced by the contemplation of a doubtful-impending good, frequently produce debility even to syncope and death, as in the effects of an unexpected promise of a sudden elevation of life on some constitutions. And those Emotions that are produced by the contemplation of a doubtful-impending moderate ill, frequently produce the happiest tonic effects in

some chronic diseases. This irregularity in the effects of Emotions, is explained by the different degrees of *mobility* between the Sensorial powers of different constitutions, the kind of catenated actions that existed previous to the Emotion, and the proportion that the cause of Emotion bears to the existing tone of the system.

This *mobility* or intimacy of association between the Sensorial powers, may be increased or diminished by habits of encouragement or restraint.—The delicate and affected *Fair* are moved by every trifling incident. The man of courage, of science, and of the world, supports the dignity of his character under the severest apprehensions of ill, or the fairest prospects of prosperity.

From this view of Emotions, it must be clear that their degrees and modifications are as numerous as the goods and evils of the world, and the Temperaments of the constitutions in which they are excited. The *peculiar* characteristics of each Emotion elude the eye of the best qualified, and most attentive observer; how far short then must language be of a correct representation of them. Indeed, in some cases of the most marked and strong Emotions, we are obliged to refer to the cause, to enable us to speak positively of their nature.—Let us be contented then, with the conviction of knowing more, whilst we speak less.

CHAPTER VII.

OF TEMPERAMENTS AND DEBILITY.

1. Temperament defined. 2. Temperament and Debility distinguished. 3. Of Temperaments in particular. 4. Of Debility in particular. 5. Dr. Darwin's arrangement of diseases.

1. ON the subject of Temperaments, I can say but little. I shall consider them as Constitutional variations from the *standard* or common *average* of the Sensorial powers, possessing a sufficient degree of durability or tone, to support the action of the healthful stimuli, together with that of a considerable increase of them.

Viewed through this definition, we have the pleasure to find Temperaments as simple and as easy of comprehension, as the graduations of a Thermometric scale. And this is the light in which they were, originally, and are at present, chiefly, considered. But they have unfortunately, as I conceive, been viewed as predisposing the system to

disease. I say unfortunate,^{er} because, though from an attentive observation of the constitutions of individuals, we may be able to fix on an imaginary standard, by which to test the peculiarities of the Sensorial powers, or Temperaments in general; yet as Dr. A. Smith says of human beauty, it is only a caricature, made up of *average points*, which, though existing nowhere in an actual state of aggregation, yet, when aggregated by the imagination, are entitled to be considered as a correct standard.*

2. If it be true, then, that there is no standard of Temperaments, actually existing, (which should be, itself, exempt from a Temperament) every constitution must necessarily be in a state of predisposition to disease. But so vague and latitudinous an application of the term predisposition, absolutely confounds the constitutional peculiarities of the Sensorial powers, with their states of Debility; which, more powerfully, at least, if not solely, predispose to diseased actions. And should there not be a distinction? Indeed this confusion of them, has only been the consequence, as I imagine, of heedlessly considering Temperaments as predisposing to disease. For no correct Physiologist will deny, that there may be deviations of Sensorial power, from the general average of them, possessing, at the same time, durability or tone sufficient for all of the purpo-

* Moral Sentiments.

ses of health. Notwithstanding, it has, of latter times, even been attempted to show, that these constitutional peculiarities are actual states of Debility of the Sensorial powers, and consequently, that we are always predisposed to disease. But I hope that the time is not remote, when the real difference between Temperament and Debility will be placed in a clearer point of light.

I will not deny that the very standard of Sensorial power, did it really exist, might be excited into diseased actions, by the application of a powerful, disorganizing, stimulus. Much more readily, I will acknowledge, may constitutional peculiarities of Sensorial power, such as are in excess, be excited into diseased actions. Yet I contend that we should distinguish between these peculiarities of the Sensorial powers, and their states of Debility. And, to me, the most probable difference is, That the Sensorial powers, though deviating, some one, or more, or parts of them, in every individual, from the standard; yet, in this state of deviation, possess the quality of durability or tone, in sufficient degree to support the action of the usual healthful stimuli, and that of a considerable increase of them, without the production of diseased actions. Whereas, in their states of Debility, they have their tone so much impaired, and sometimes so totally destroyed, as that a very slight increase, and sometimes a less

degree, of the natural stimuli, will excite disease.—We shall be better able to judge of the correctness of what is here advanced, after a more particular view of Temperaments and Debility.

3. I shall not presume to fix the *standard* of Sensorial power, nor will such precision be necessary, as I shall only speak of such deviations from it, as will, indisputably, rise above, or fall below, that Average. These divisions I shall distinguish by Temperaments of the *plus* and *minus* states of Sensorial power.

The Sensation of Idiots is evidently in a *minus* state, and is, beyond doubt, entitled to the distinction of Temperament. Yet who will contend that Idiots are more liable to diseases of mind, than others who are better supplied with Sensation? Are animals of inferior intellect, more subject to mental diseases, than man? The corroboration of common observation, supercedes the necessity of argument to support the position, That there is as little incompatibility with health, in this state of Sensation, as in almost any other state of it. Though it be of inferior quality, yet it may, and does, possess sufficient tone to support the action of a considerable increase of the natural stimuli, without detriment to health.

The Sensation of men of distinguished and eminent talents, may be said to be in a *plus* state.

And does this state of Sensation directly predispose to disease? Men of this Temperament are more subject to the passion of Ambition, which, if injudiciously cultivated, exposes to innumerable disappointments, which involve a state of debility of Sensation among their consequences, predisposing to mania, and other slighter affections of Sensation. But without these disappointments, &c., which debilitate Sensation, the *plus* state of this Sensorial power is capable of as high a degree of tone, as any other state of it. This is proven by the numberless instances of men of extraordinary talents dispensing utility to their race, through the period of a long life, with uninterrupted health of intellect.

These two Temperaments of *plus* and *minus* states of Sensation, may exist partially in the same individual; that is, Sensation, as relates to its susceptibility of particular operations, may be in a *minus* state, as in defect of reason, of judgement, of memory, of imagination &c.; or in a *plus* state as relates to its susceptibility of particular operations, as in uncommon acuteness of reason, judgement, memory, imagination &c.; which may be distinguished as Temperaments of reasoning, &c., of the *plus* and *minus* states.

Though Irritation is so universally diffused through the system, and performs such a variety

of functions, yet such is the mutual dependence between its parts, that it must be uniformly in a *plus*, or *minus* state, in order to preserve its several functions in health. For, if the Irritation that is concerned in digestion, is in a *plus* state, as in Gluttons and Epicures; that of the lacteals must be in the same state; so must be that of the arterial system; and consequently those of the venous and lymphatic systems; in order to preserve a balance between the supplies, and expenditures, of the economy. Otherwise, plethora, or inanition, with the debilities and consequent diseases that they produce, must result.—Also, if the Irritation of the alimentary canal is in a *minus* state, craving less aliment for subsistence than usual, the Irritation of other parts must be *minus* in proportion, for the purposes of health, as just explained.

These two states of Irritation have, nevertheless, been subdivided into more particular Temperaments by those who confound Temperaments with Debility; viz: Alimentary, Arterial, Lymphatic, &c.; and the two former have been considered still more particularly, as they appear to be confined to certain parts of these organs, deriving their specific names from their locality. But, as will be noticed when I speak of *Debility*, these are, in fact,

Debilities, predisposing to diseases of the organs in which they are seated. And it may be easily conceived, as well as proven, that one of these parts may be in state of Debility, and actual disease, whilst the others enjoy their healthy tone ; As in slight diarrhoea without fever, not to mention others ; which may be explained by supposing that the Irritation of a part may possess less tone than the rest, and consequently, be sooner Debilitated, and actually diseased, by the action of stimuli, while the other parts preserve their health. Yet, for the purposes of health, all of the parts of Irritation must be either above or below the standard, making one uniform exertion, as do the wheels of a time-piece ; between the mutual dependence of whose respective parts, there is a very strong analogy.

These notions on the necessity of an uniform *plus* or *minus* state through all of the parts of Irritation, are rather hypothetically advanced, than positively asserted. For, my knowledge on the subject does not enable me to say, whether what is usually called the Sanguineous Temperament, which consists in a *plus* state of arterial Irritation, can exist conjointly with what is called the Lymphatic Temperament, which is conceived to be a *minus* state of lymphatic Irritation : Or whether the

Phlegmatic Temperament, which is a *minus* state of Arterial Irritation, can co-exist with very active digestive, and chylofactive powers. Yet, with all deference to opposing facts, I would maintain, that, theoretically, a uniformity of the *plus* or *minus* state of Irritation, through all of its parts, should obtain, and that instead of subdividing them into particular Temperaments, the subjects of these subdivisions are Debilities of the Irritation of those parts, as above, and hereafter to be, explained.

With respect to the Muscular Temperament, every one's recollection is supplied with instances of excessive, and of deficient, muscular strength (*plus* and *minus* states of Volition); in which the other Sensorial powers deviate but little from their general average. And here we may see very remarkably, the difference between Temperament and Debility, in the light that I have placed them. To be acknowledged, it requires only to be remarked, that persons of excessive voluntary powers are not particularly predisposed to spasmodic diseases ; nor persons of deficient voluntary powers, to palsy ; nor the reverse. For the diseases of Volition, depend entirely on the debility^{ies} that precede them, and the excitants; though the kind of debility is much influenced by the Temperament that is debilitated.

These inequalities and variations of Sensorial power, or Temperaments, may be the result of constitutional conformation, or they may arise from various adventitious circumstances after birth. In support of this position, there are many instances of fatuity succeeding to brighter states of Sensation ; As also, are there many instances of fatuity of native origin. Sensation is also brought to a high pitch of acuteness, by cultivation, from a point even inferior to the common standard. And exercise, and the neglect of it, are daily working similar changes on the natural states of Irritation and Volition. Thus Nature furnishes us with Temperaments, in the commencement of our career, which we seldom fail to change, and in some instances, frequently to change, in the course of an eventful life.

One, or more, or parts of the Sensorial powers, may have their tone impaired, or destroyed, by the inordinate action of, otherwise, healthful, or that of the most equally diffusive, stimuli ; and thus predispose the system to disease, requiring only an excitant to produce that effect. And if the tone be entirely destroyed, the natural stimuli, and a less degree of them than usual, will excite disease ; but most fre-

quently, the debilitating cause, by the continuation of its influence, becomes the excitant of disease.

I may be asked to explain the above fact, That a diffusive stimulus will debilitate one Sensorial power, or part of one, and eventually produce a partial disease, without admitting the existence of a predisposing debility in the part ? To which, I reply, that though I contend that deviations from the standard of Sensorial power, do not necessarily imply debility or predisposition to disease, which, on account of the universality of such deviations, would put every animal in a state of predisposition to disease, (from which I have already ventured to dissent,) yet I do not say that the Sensorial powers, or parts of them, in their state of healthy tone, possess equal degrees of tone. They may possess sufficient tone to support the action of a considerable increase of the natural Stimuli without being diseased, and thus relieve themselves of the imputation of predisposing the System to disease ; and yet, possessing different degrees of tone, may, one, or more, or parts of them, have their tone impaired, or destroyed, by the most equally diffusive stimulus, while the rest maintain their tone, and health. But where, then, it will be asked, is the dividing line between healthy Tone and Debility ? The strength

of tone necessary to constitute a healthy state of Sensorial power, and the reduction of it necessary to constitute debility, being undefined, must it not frequently be doubtful, whether healthy tone, or debility, prevails? This I will acknowledge. But, to illustrate with a simile,—The points about the Meridian Zone, which are doubtful as to their northern, or southern polarity, are but few; whilst the Poles, themselves, down to very low degrees of latitude, are perfectly distinct.

This concludes the consideration of the healthy states of the Sensorium; which, even, is more than I contemplated at the commencement of the undertaking. But as Temperaments have been greatly confounded with Debilities, I will venture to trace the subject through the Isthmus-like medium which intervenes between Health and Disease.

4. When a Sensorial power, or a part of one, is incapable of sustaining the action of the usual quantity of the healthful stimuli, or even that of a considerable increase of them, it is in a state of debility, or has lost its tone. This state of atony or debility, is entirely adventitious to the natural state of the Sensorial powers. It may be *suffered to supervene*, by the neglect of the healthful exertions of the several functions of the economy, or

any of them. As in the neglect of muscular exercise, of mind, &c. It may be *induced* by the excess of such exertions, effected by the excess of, otherwise, healthful stimuli; As in the excess of muscular, and mental action, gluttony, venery, &c.—It may also be induced by the action of noxious stimuli; which occur anomalously, or regularly; of which, the former are the innumerable incidental causes of disease, which prepare the debility for the eventual disease, when no pre-disposition pre-existed; and the latter are the causes that are evolved by the revolution of seasons, &c., first debilitating, if no debility pre-existed, then exciting the debilitated Sensorial power into disease.—There is no necessity to enter into a specification of the causes of debility (which become causes of disease, when they act on a debilitated sensorial power): For, the abstract idea of debility may be acquired, without a knowledge of every cause that may produce it.

Taking the above ideas on debility to be correct, no part of the Sensorium can be diseased, without being previously debilitated. However immediately a disease, of a, till then, healthy part of the Sensorium, may succeed the application of the exciting cause, a debility must be induced in the part, by the excitant, before the disease can exhibit. How numerous, then, must be the debilities, to which the three powers of the Senso-

rium, and their varieties, are liable? These debilities have generally derived their names from the names of the diseases to which they predispose, or from the part debilitated. Perhaps, it is immaterial how they derive their names, if that derivation does not lead to an erroneous conception of their nature.

Having shown reason to extend the number of debilities, to that of the diseases of which man is susceptible, I shall decline the enumeration of the debilities that have been noticed by Authors, as they are, comparatively with their real number, but few, and according to the above remarks on them, may easily be conceived of.

5. I cannot conclude this dissertation, without expressing my conviction, that Sensation, Irritation, and Volition; and the Associative connexion between them, furnish a basis for four natural Classes of diseases, in a correct Nosological arrangement. And therefore that ~~Mr.~~ Darwin's *D.* four Classes of diseases, are, to my conviction, unexceptionable: Though the names and arrangement of his Orders, Genera and Species, may be capable of great improvement, as he himself seemed aware of, from an acknowledgement made in his preface to Zoonomia.

FINIS.

The first part of the paper is devoted to a general
 consideration of the problem. It is shown that the
 problem is equivalent to a problem in the theory of
 differential equations. The second part of the paper
 is devoted to a detailed study of the problem in the
 case of a certain class of functions. It is shown that
 the problem is solvable in this case. The third part
 of the paper is devoted to a study of the problem in
 the case of a certain class of functions. It is shown
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