A discourse on the soul and instinct : physiologically distinguished from materialism : introductory to the course of lectures on the institutes of medicine and materia medica, in the University of the City of New York, delivered on the evening of Nov. 2, 1848 / by Martyn Paine.

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M. Harris Ramsey M.D

N.Y. City Lunatic Asylum

Blackwells Island

A

DISCOURSE

ON

THE SOUL AND INSTINCT,

PHYSIOLOGICALLY DISTINGUISHED FROM

MATERIALISM,

INTRODUCTORY TO THE COURSE OF LECTURES ON THE INSTITUTES OF MEDICINE AND MATERIA MEDICA, IN THE UNIVERSITY OF THE CITY OF NEW YORK.

Delivered on the Evening of Nov. 2, 1848,

BY MARTYN PAINE, A. M., M. D.,

Professor of the Institutes of Medicine and Materia Medica in the University of New York
Member of the Royal Verein für Heilkunde in Preussen; of the Medical Society of Leipsic; of the Montreal Natural History Society, and other Learned Associations.

"And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, *and man became a living soul.*"—Genesis ii. 7.

"The dust shall return to the earth as it was, and *the spirit shall return unto God who gave it.*"—Eccl. xii. 7.

"A chemist will reduce Divinity to the maxims of his laboratory, *explain morality by sal, sulphur*, and *mercury, and allegorise* the Scripture itself, and the Sacred mysteries thereof, into the philosopher's stone."—Locke, *On the Human Understanding*.

"Man that is in honor, and *understandeth not*, is like the beasts that perish."—Psalms, xl. 20.

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THE FOLLOWING ESSAY IS DEDICATED

To the Author's Brother,

CHARLES PAINE, A. M.,

LATE GOVERNOR OF THE STATE OF VERMONT,

As a Tribute

TO HIS VIRTUES, INTELLIGENCE AND ENTERPRISE.

PREFACE.

THE following Essay was originally designed as an introductory Discourse to the Author's Lectures on the Institutes of Medicine and Materia Medica, in the University of the city of New York.

Although the Discourse was addressed to medical gentlemen, the Author has been advised that it is equally suited to other classes of society, and has been urged to supply an opportunity for its general circulation. Having yielded to this request, he can only hope that neither his friends nor himself may be disappointed. But he will not suffer this edition to go forth without expressing his objection to popularizing works upon medical topics, and even upon physiology in its ordinary acceptation.

In this Essay the Author has had in view not only the characteristics of the soul and of the principle of instinct, in their moral and physiological aspects, but the importance of a right appreciation of their attributes in the practical pursuits of Hygiene, Pathology, and Therapeutics. He has also been actuated by the belief, that no subject can offer greater interest to the whole human family; and, from its intricacies and entire want of demonstration at the hands of physiologists, and more es-

pecially on account of the prevalence of materialism, he has supposed that a service might be rendered to every contemplative mind, to the materialist himself, by affording *reliable evidence* of the existence of the soul as an independent, self-acting, immortal, and spiritual essence.

"That the intelligence of any being," says D'Alembert, "should be able to reason, till he loses himself, on the existence and nature of objects, though condemned to be eternally ignorant of them; that he should have too little sagacity to resolve an infinity of questions, which he has yet sagacity enough to make; that the principle within us, which thinks, should ask itself in vain what it is that constitutes the thought, and that this thought, which sees so many things, so *distant*, should yet not be able to see itself, which is so *near;* that self, which it is, notwithstanding, always striving to see and to know; these are contradictions, which, even in the very pride of our reasoning, cannot fail to surprise and confound us."

But, more than all, the Author has supposed that, if the doctrine of materialism can be shown to be erroneous, and a perfect conviction of the existence of the soul as an independent, self-acting agent, could be established, it would hardly fail to enlarge and strengthen our conceptions of Creative Power, of our dependence upon that Power, and of our moral and religious responsibilities. Such a conviction, arising from demonstrative

proof, which appeals to the senses as well as the understanding, it appears to the writer, has been wanted by the human family, however they may be disposed, in the main, to accede to Revelation, or to listen to the natural suggestions of reason. If the writer have failed, he will enjoy the consciousness of knowing that he will have done no harm to morals or Religion, and that the worst of the issue will be the trouble that may devolve upon others in restoring the subject to its former obscurities and consequent tendencies.

The quotations which the Author has made from Scripture are not designed in the light of proof, excepting as they may concur with the demonstration. They are, therefore, introduced rather for the purpose of showing how far our own facts corroborate the Divine Authority.

The Author has added a Discourse on the general Philosophy of Life, as being, in his opinion, an appropriate companion to the Essay which relates to the Soul and Principle of Instinct; since each of these existences "is the compendium of various faculties, most wonderfully compounded and harmonized." It will be found, moreover, that the chemical philosophy of organic life necessarily involves an equal exclusion of any other interpretation of the acts of intellection. If a principle of life be denied in accounting for the endless and unique phenomena which appertain to the functions of the body, it is sufficiently apparent, independently of the avow-

ed doctrines of *materialism*, that the far more circumscribed phenomena of mind, from their connection with the same organization through which the functions of life are conducted, must be placed on the same physical ground. It would be an useless effort to controvert the chemical hypothesis of mind, while life is admitted to depend upon chemical processes. The former must irresistibly flow from the latter, so far as facts are concerned in inductive philosophy; since the phenomena of life are more multifarious than those of mind, and are equally unique and opposed to the chemical rationale.

But, in all fairness, it must be said that the doctrine of *mental secretion* is not liable to the same exclusive materialism as the chemical hypothesis, where the former is founded upon a principle of life acting through the medium of organization; though there are but few of this school who allow any other principle of life than such as naturally belongs to the elements of matter, but which are not manifested while matter exists in an elementary state. It is to the few, therefore, to whom the present remarks are applicable. So far there is something to contradistinguish the organic from the inorganic world. The moving power, in this case, is peculiar to animated beings; though the manifestations of mind would be on common ground with all the physical products. So far, therefore, this doctrine is less offensive to science than the chemical; although, as I have endeavored to show, it is abundantly contradicted by facts,

while it is equally, as the chemical, armed with the sting of annihilation. But the chemical is far in the ascendant, and will probably soon leave the vital doctrine of mental secretion "among the things that were," on account of the general acquiescence in the chemical doctrines of life.

Whoever, therefore, would arrest the progress of mental materialism, and promote a belief in a future state of being, with its attendant moral influences on mankind in their individual and social relations, will not fail to consider well the vast corruptions of the chemical philosophy of life, and how easy as well as a necessary consequence it will be to carry the same philosophy to all the intellectual and instinctive acts.

There are many Philosophers who are fully sensible that all the phenomena of life are entirely opposed to the physical and chemical interpretations, but are not inclined to admit the existence of any principle beyond those which appertain to the inorganic kingdom. They have, therefore, singularly enough, ascribed all the actions and results of life to the direct agency of the Creator. This is the most dangerous of all the spurious doctrines of life, for it confounds the Author of Nature with his own Works, and is equivalent to a denial of Creative Power.*

* See Author's *Institutes of Medicine*, Index, Art. God and Nature. Also, *Medical and Physiological Commentaries*, vol. 1, p. 46–54. Also, *Note* at the end of this Essay.

In my Essay on *Spontaneous Generation*, embraced in the *Medical and Physiological Commentaries*, I had occasion to refer to the charge of infidelity which has been often laid against the Medical Profession. I have there, too, as one of that Profession, defended it against so great an injustice, and have held responsible the proper Sources that have given rise to this imputation, and have shown, also, that it is greatly due to the chemical and physical hypotheses of life. These corruptions, it is true, have been creeping fast from the laboratory, not only into the walks of medicine, but throughout all the highways and byways of society, and mental materialism has been making corresponding strides. They are, however, of a common origin, and have been received upon trust,—without examination,—without even a reference to the graver consequences which respect the lofty attributes of the soul and its future destinies.

I have also said, in connection with this subject, that the steps are gradual from the incipient errors in philosophy to a disbelief in the Mosaic record of Creation, (now so greatly turned from its natural import to build up systems of spontaneous generation, or to meet certain supposed exigencies in Geology,) and that when we have ultimately reached the brink of the precipice, there is but one dreadful plunge, and we are then in the vortex of atheism. We may begin, as I have said, by a simple denial of the living powers of organized beings, when it will become, at last, an easy argument upon

this and analogous premises, that the Almighty had but very little, if any agency, in the most sublime part of existences. I would desire, however, no greater restraint upon free inquiry than such as is enjoined by the intrinsic value of facts; and I say again, let *Philosophy* interrogate Nature to its fullest satiety, under the direction of its Heaven-born principles; but let it be consistent, and maintain its dignity. And should it sometimes, as it must in its wide range of Nature, come in contact with Miracle, that is its limit, contented that it begins at the confines of Creation; yet still may it stretch into the regions of Eternity, past and to come; but now it is employed in its nobler work of sacrificing its relations to second causes, and in establishing relations with the First Cause of All.

DISCOURSE,

&c.

I speak of MAN:—a subject not yet exhausted, although the perpetual study of himself since the day of his creation. Something remains to be known of his organization. But that part of his condition is nearly ascertained; so far, at least, as its knowledge is of any practical interest. The absolute functions of his various constituent parts are, also, about as well known. But when we consider the multifarious and contradictory opinions as to the principles and laws upon which those functions and their results depend, one might be almost inclined to imagine that this vast and important field is a *terra incognita*. It is not so, however. It is only a collision between truth and error. The intellectuality which the subject involves is the occasion of all the discrepancies of opinion; and he alone will be right who brings to the inquiry a sound judgment and a clear discernment of the ways of Nature. To such an

inquirer the depths of physiology will appear to be laid open, and of no very difficult access. But the qualifications which I have mentioned are indispensable. Those who want them will either see in the conflicting doctrines an impracticable subject, or will mistake for the truth what is a libel upon Nature.

Perhaps I might occupy your time with some useful remarks upon this branch of our science; but I have been tempted to a yet more difficult enterprise, and to look at that physiological condition of man upon which his locomotion depends, and which enables him to think, and to speak, of his own being and nature.

Shall I, then, venture upon his spiritual essence, of which nothing has been yet said but what Revelation and metaphysics teach; while materialism has occupied the whole physiological ground, with the advantage of dedicating its labors to the senses, and to the indolence of mankind? May I venture to speak of so intangible, invisible an existence as the soul of man? I know that the demand now is for food for the senses. But shall materialism have the whole of the game? Shall the mind have no part in the chase,—seeing, especially, that it is itself the intended victim? Shall I be told that I am infringing upon settled

principles? that I am applying an extinguisher to great and shining lights? Shall I be silenced by the thunders against metaphysics? Shall it be said that physiology has no relation to incorporeal existences? Have not physiologists employed their pens in describing the emanations of mind as the mere product of matter,—mere eliminations from the blood by the intellectual organ? Have not others told us, that all the manifestations of thought are owing to a combustive process among the elements of the brain? And have we not patiently, credulously heard them? But some may still say, what connection has physiology with spiritual existences? Certainly the same in relation to man as the merest physics, so only the thinking part be of an incorporeal nature. It may not be as clear a subject for demonstration; since, especially, it is concerned about itself. Herein, indeed, has laid concealed the difficulties of the inquiry. The mind has wanted a medium through which it may be seen independently of its own direct manifestations; and this neglect of the secondary aid has left the subject to the grasp of materialism, or exposed it to metaphysical speculations. This want it is my purpose to supply.

If the thinking part be rightly turned upon the facts which it affords, and these be rightly applied,

I see not why a satisfactory amount of knowledge may not be obtained as to the main attributes of the rational, and also of the instinctive principle. It is peculiarly the duty of the physiologist to point out, as well as he may, the characteristics of the nobler part of man, and its relations to the body. The inquiry concerns, immediately, many momentous problems in physiology and the healing art; and may be turned, indirectly, to the morals, the dignity and the happiness of society; to the general cause of Religion; and to the special glory of the Almighty. Perhaps, too, the amount of attention which I have hitherto given to physiology entitles me to a candid hearing upon this subject.

But the physiologist should steadily consider mind in its relations to the body. Heaven, alone, can look upon mind in its abstract condition. As presented to the physiologist, the compound nature of man is the most lofty as it is the most noble inquiry.

"Of all organized beings," says Lavater, in his *Essays on Physiognomy*, "with which we are acquainted, there are none in which are so wonderfully united the three different kinds of life; the animal, the intellectual, and the moral. Each of these lives is the compendium of various facul-

ties, most wonderfully compounded and harmonized."

"To know, to desire, to act, or accurately to observe and meditate, to perceive and wish, to possess the powers of locomotion and resistance,—these, combined, constitute man an animal, intellectual, and moral being.

"Man, endowed with these faculties, with this triple life, is in himself the most worthy subject of observation, as he likewise is himself the most worthy observer. In him each species of life is conspicuous; yet never can his properties be wholly known except by the aid of his external form, his body, his superficies. How spiritual, how incorporeal soever, his internal essence may be, still he is only visible and conceivable from the harmony of his constituent parts. From these he is inseparable. He exists and moves in the body he inhabits, as in his element. This material man must become the subject of observation before we can study the immaterial."

So far Lavater, who confined himself to the surface alone; proceeding upon the simple proposition that, "The organization of man peculiarly distinguishes him from all other earthly beings; and his physiognomy, that is to say, the superficies and outlines of his organization, show him to

be infinitely superior to all those visible beings by which he is surrounded."

If such, then, be the external characteristics of man, the mere outlines of an organization which he enjoys in common with the brute, though with modifications corresponding to the outlines, what shall be said of that internal essence which is endowed with attributes that have no analogies in the brute creation?

It is this great prerogative, and the relation of the immaterial to the material part, which it is my present object to consider. I shall distinguish, therefore, what has been commonly designated the spiritual, from the material man, though it be obvious, that, however spiritual, how incorporeal soever, the internal essence may be, it is yet inseparable from the mechanism of the body. I shall carry the distinction farther than is recognized by any physiologist of our own times, and shall endeavor to sustain my conclusions by facts alone. I shall not, therefore, entangle you in any metaphysical obscurities, nor shall I, like the materialists, assume imaginary data, or like them, reason from factitious analogies.

It must be allowed a misfortune that the subject of mind has been, till a recent day, in the keeping of Metaphysicians. Learned, and able, and

devoted as they may have been to the prerogatives of reason, and with all the lustre they have shed upon mind, their ignorance of anatomy, and of the laws of organization, has led them to consider the spiritual part of man too abstractedly from his structure, and not unfrequently to wander from the path of Nature. Their abstract philosophy, and the well-meaning subtleties of the less gifted, have engendered a reaction which now assumes the form of undisguised materialism. Nor is that all; for with the correlative aid of innovations upon organic life from those philosophers who reduce the whole to the maxims of physics, the more revolting doctrine of spontaneous origin not only takes rank in the science of life, but is even practically illustrated in the *Acarus Crossii*,—side by side with the *Homo* Dei! And what part, think you, that these corruptions in Science and Religion have taken in the general insensibility which now prevails in relation to Divine subjects, and which led the distinguished President of Harvard University, in his late eulogy on President Adams, to speak of "a reverence for sacred things as almost obsolete"?

I have said that the bold materialism of our age is, in no small degree, the parent of the greater evils. And, that you may know the extent of the doctrine both as to the soul, and organic life, I

shall quote several of our most applauded authors. To many of you, I have no doubt, the opinions will be new and startling, because you may be yet uninitiated in the dogmas, which may have had no part in your former education. You may have only witnessed the remote consequences. But you are now entering upon inquiries where you will see the springs which have contributed most largely to the turbulent movements of the world; and they will be urged upon you as the fruits of a high advance in science, or of civilization. I say, of the world in its most comprehensive sense; for the revolutionary spirit is not confined to our own science, nor to general literature and philosophy, but strikes at the more absolute foundations of society. It has reached the purlieus of popular factions, and hails an *Ilias malorum* as its proudest trophy. In its wildest desolation it was shadowed forth by the prophetic ken of genius relying upon Retributive Justice.

"Vengeance, vengeance will not stay!
It shall burst on Gallia's head
Sudden as the Judgment-day
To the unsuspecting dead.

From the Revolution's flood
Shall a fiery Dragon start;
He shall drink his mother's blood,
He shall eat his father's heart.

Nurst by anarchy and crime,
He—but distance mocks my sight!
O—thou great Avenger, *Time!*
Bring thy strangest birth to light!"

"Prophet! thou hast spoken well,
And I deem thy words divine." *

Let the enlightened stand by each other in the terrific crisis. A single one of them may surpass in power all the Potentates of the earth. The "New World" looks on with almost unruffled composure, but with a moral bearing that will ultimately restore the equilibrium of society; while, for the present, a mighty people in Europe, through the same benign, though more active influences, is the immediate arbiter of the approaching destinies of the human race.

For many of the movements to which I have referred we can readily assign the proximate causes, and some of the instances, it is not improbable, may take the rank of reformations. But it is not so easy to comprehend the obliquity which sees nothing but matter in the constitution of mind, and nothing but accident in living beings. Far be it from me to impugn the motives which have flooded society with these unhappy opinions, or to detract from the learning and intellect which

* Montgomery's *Wanderer of Switzerland.*

have been engaged in the work. I am bound to believe in the sincerity of the one, and I cannot doubt the prowess of the other. Nor would I wish to restrain the outpourings of error by any other means than a display of truth.

I proceed, therefore, to state, in the first place, a prevailing doctrine of the spontaneity of living beings, as forming a part of the ground which has prompted this Introductory Discourse; and the following may be taken as a summary sketch by the *British and Foreign Medical Review*. It will also show you, in some degree, the extent to which this doctrine is sustained and promulgated by eminent physiologists.

"The doctrine," says the Review, "which Dr. Carpenter has propounded respecting vital properties, and which is essentially the same as that upheld by Dr. Prichard, Dr. Fletcher, Mr. Roberton, and *other able writers on the same side*, may be concisely stated as follows:—Certain forms of matter (especially oxygen, hydrogen, carbon, and nitrogen) are endowed with properties which do not manifest themselves either in those elements when uncombined, or in those combinations of them which the *Chemist* effects by *ordinary* means. But they do manifest themselves when they are united into those peculiar compounds

which are known as organic, and when those compounds have been submitted to the process which is termed organization. It is possible that the first of these conditions, (that is, organic compounds, and therefore, certainly organic life,) may be imitated by the chemist. No one can say that the properties do not exist in the elements of matter in a *dormant state* because they do not manifest themselves to him." "We argue that they (the properties of life) were as much present in the *Elements* as any of their other properties, which only exhibit themselves in certain conditions." So far the Review; and thus Dr. Carpenter for himself, in his "*Principles of General and Comparative Physiology*," when speaking of organic beings:—

"There is no reasonable ground for doubt," he says, "that if the *elements* could be brought together in their respective states and proportions by *the hand of man*, the result would be the same as the natural compound." The difficulty, he says, consists in our ignorance of the requisite means; but "we may believe," he says, "that *there exists in all matter a tendency to become organized*"! *

* And thus the eminent organic Chemist, Professor Mülder, in his *Chemistry of Vegetable and Animal Physiology*,—"The

It is also an unavoidable doctrine of this extensive and powerful school, that when man dies, and is resolved into the elements of matter, his vital properties, or his vitality, continue to exist in those elements; and that when the same elements become a part of the organization of inferior animals, or of plants, his vital properties will then animate, or constitute the vitality of the toad or mushroom. It follows, also, upon the great plan of materialism, that the soul must observe the

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elements of the organic kingdom, carbon, hydrogen, oxygen, and nitrogen, are susceptible of endless modifications. For that reason they can form, with minute changes, a great diversity of products; and by the operation of the *same primary forces*, they stand towards each other *in entirely different relations from those assumed by all the other elements;* so that *they can produce* a peculiar series of bodies which are called *organic substances.*" "Adhering to what we observe and know with certainty, we calculate that *every elementary body* is endowed with a great many specific properties, which, to a large extent, are dependent on the same principle that causes their combination, and thus on the proportion and character of the *chemical tendency.* If we adopt this idea, we have the advantage of seeing somewhat of *Vitality in Dead Matter. This is an idea derived* from the endless series of phenomena which are observed *in the Laboratory*, in daily occurrences, and in nature at large." "Any one who imagines that there is any thing else in action (in living beings) than a molecular force, than a *Chemical Force*, sees more than exists." "Upon the principles which have been stated, no reason is left for the dispute as to EQUIVOCAL GENERATION."—*Mülder.*

same rule of construction, appearing under the manifestations of instinct in animals, and in plants according to the nature of their organization.* This is the old doctrine of Transmigration, figuring under the auspices of modern science.

You readily perceive the conclusion of the whole matter. In plain language, the properties of life being assumed to exist in the elements of matter, those elements are supposed to be capable of organizing themselves into living beings, with an equally spontaneous development of the soul and instinct. Indeed, it is but a short time since we were presented with pictural views, in English and American Scientific Journals, of *an animal* said to have been created by Mr. Cross out of a solution of silex in water; and the *savans* actually bestowed upon it the name of its creator.†

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* The oldest satire extant, by the poet Simonides, is upon this subject. It may be seen in the 209th paper of the *Spectator*.

† The distinguished Author of the "VESTIGES OF THE NATURAL HISTORY OF CREATION" says that,—"The *Acarus Crossii* was a type of being ordained from the beginning, and destined to be realised under certain physical conditions. When a *human hand* brought these conditions into the proper arrangement, it did an act akin to hundreds of familiar ones which we execute every day, and which are followed by natural results, but it did *nothing more*"! The defence of La Place's system of the evolution of the sun and planets out of a fiery vapor, known in Astronomy by the name of *nebula*, proceeds upon the same specious assumption. And

I just now said, that a proper consistency in this plan of spontaneity should equally provide for a development of the thinking and instinctive

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now to justify, in ample extent, the propriety of this *Discourse*, I shall quote a passage of general import from the two leading Medical Journals in Europe, as embraced in elaborate reviews of "*The Vestiges of the Natural History of Creation.*"

And first, the MEDICO-CHIRURGICAL REVIEW, *London*, January, 1846. The beginning thus,—

"This is a remarkable volume, small in compass, but embracing a wide range of inquiry beyond the visible starry firmament, to the minutest structures of man and animals. No name is prefixed,—perhaps in order to avoid the snarls of the narrow-minded and bigoted *Saints* of the present day," &c.

The middle thus,—

"For how many millions and millions of years *this production and reproduction of animals* went on before man made his appearance on the scene, no human being will ever know. Our Author's speculations on the *how*, the *why*, the *when*, and the *wherefore*, this great event occurred, will not give satisfaction to the *present race* of mankind. His hypothesis is three or four centuries in advance of the *times*, and will be stigmatised by the modern *Saints* as downright *atheism*," &c.

And the end thus,—

"We have dedicated a space to this remarkable work that may induce many of our readers to peruse the original. The Author is decidedly a man of great information and reflection. He will have a host of *Saints* in array against him, and many will join in the cry, *from hypocrisy and self-interest*. As we said before, his doctrines have come out a century before their time."—*Med. Chirurg. Rev.*, pp. 147, 153, 157.

Next, DR. FORBES, in the BRITISH AND FOREIGN MEDICAL REVIEW, *London; also*, January, 1846,—

"This is a very beautiful and a very interesting book. Its

powers, corresponding with that of the general organization, and according to the unique phenomena of mind and instinct. But, as we shall soon see, it is not even imagined that the soul, or

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theme is one of the grandest that can occupy human thought,—no less than the Creation of the Universe." "We are also influenced by the abstract desire to place before our readers matter for their contemplation, which cannot fail at once to *elevate*, to *gratify*, and to *enrich* the mind."

Of La Place's nebular hypothesis, the Reviewer says,—

"So far from admitting the atheistical tendency which the *timid religionists* have attributed to the nebular hypothesis, we consider it the grandest contribution which Science has yet made to Religion," &c.

The reader, therefore, will have no difficulty in understanding the "conventional" nature of certain phrases in the following remarks by the Reviewer.

"That the Creator formed man out of the dust of the earth, we have *scriptural* authority for believing, and we must confess *our own predilection* for the idea, that, at a period however remotely antecedent, the Creator endowed certain forms of *inorganic* matter with the PROPERTIES REQUISITE TO ENABLE THEM TO COMBINE, AT THE FITTING SEASON, INTO THE HUMAN ORGANISM, over that which would lead us to regard the great-grandfather of our common progenitor as a chimpanzee or an orang-outang."

The "*Vestiges of Creation*" is thus quoted by the Reviewer,—

"We have seen powerful evidence that the construction of this globe and its associates, and, inferentially, that of all the other globes of space, was the result, not of any immediate or personal exertion of the Deity, but of *Natural Laws* which are expressions of his will. What is to hinder our supposing that the *Organic Creation* is also a result of *Natural Laws* which are, in like manner, an expression of h's will?" (*Vestiges*, &c.)—Upon

instinct, have any true existence, like the properties of life, in the elements of matter; but that their manifestations are mere physical results of certain changes which take place among the ele-

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the foregoing extract, which is a part of a more extended one of the same nature, the Reviewer remarks, that,—

"*The complete accordance of these views* with those some time ago *propounded by ourselves* (vol. 5, p. 342), must be evident, we think, to our readers. To the objection which some *timid religionists* may urge against them, that they are inconsistent with the Mosaic Record, we simply reply with our Author, that we do not think it right to *adduce that Record* either in support of, or in objection to, *any scientific hypothesis*, based upon the phenomena of nature," &c.—*Brit. and For. Med. Rev.*, pp. 155, 158, 167, 180.

The Reviewer assumes, of course, that all the misapprehensions and perversions of "the phenomena of nature" are paramount to any thing declared in the Mosaic Record.

There can be no better proof of the design to substitute physical agencies for a Creative Being, in the philosophy involved in the foregoing quotations, than the introduction of causes which are wholly superfluous; since no reason can be assigned for supposing that the Almighty did not create the original beings by a direct act, while, also, there is no part of organic nature that does not irresistibly enforce this conclusion. A single fact, predicated of physical laws, proves it; for *all that is known of the affinities between inorganic substances is to result in inorganic compounds*, and farther, also, that *their chemical influences are destructive of life and of organization.*

It will be readily seen that the first of the foregoing arguments is equally applicable to the formation of the systems of the Universe.—(See *Note* at end of this Essay.)

ments after their organization. It is universally conceded, in respect to all things else which manifest a series of enduring phenomena, that the sequences are the results, at least, of properties impressed upon the various material objects, which are the immediate causes of the phenomena. But even this attribute is not allowed to the brain in its co-ordinate function of intellection, but all the unique manifestations of mind and of instinct are placed by the materialists upon the same physical ground as they interpret the common organic functions and their results. In other words, the phenomena of mind and of instinct are ascribed to exactly the same physical changes in which the organic functions of the brain and of all other parts are supposed to consist.

Perhaps I should leave this part of my subject incomplete, did I not state that there is a section of this large school who start, in their philosophy of the spontaneous origin of living beings, with matter in an organic state. The eminent, and I may say able physiologist, Tiedemann, belongs to this section. He lays down their modification of the doctrine in the following manner, in his "*Physiology of Man.*"

"The most probable hypothesis is," says Tiedemann, "that the substance of organic bodies ex-

isted primitively in water, as matter of a particular kind, and that it was *there endowed with the plastic faculty;* that is to say, with the power of acquiring, *by degrees*, different simple forms of living bodies, with the concurrence of the general influence of light, heat, and perhaps of electricity, and of then passing from the simple forms to others more complicated; varying in proportion to the modification occurring in the external influences, until the point when each species acquired duration by the power of reproduction." *

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* The metamorphoses of insects, frogs, &c., and the slight variation of influences to which they are progressively liable in the varying exigencies of life, are assumed as a foundation for the hypothesis to which this note refers. But it proceeds upon a neglect of the established and immutable laws of organization, and a partial view of the manifestations of those laws as witnessed in different species of animals. The metamorphoses, &c., are as much the exact result of determinate laws, engrafted upon an original constitution of life, as the development of the human ovum, or of the seed of a plant, nor are they in any respect more fluctuating or less circumscribed. In all the cases the metamorphoses and other developments of structure, and modifications of life, take place in one uniform way, according to the species of animal or plant. All the special conditions, or potential whole, necessary to the progressive changes from the ovum through the larva and pupa to the fly, and in all analogous instances, are as perfect in the germ of the mutable tribes as in the ova of the highest order of animals, or in the seed of plants; nor can there be a departure from a precise and uniform succession of developments in any of

But whence came the organic matter? This question was anticipated by Tiedemann; for he says,—"Although we cannot here answer the question, *whence* came the water and the organic matter which it contained, yet this hypothesis is the one which accords best with the facts with which *Geology* has lately been enriched."

This difficulty evidently crowded itself upon the mind of our distinguished Philosopher, as he recurs to it again, and in nearly the same language. But as the statement is so varied as to show you how things are now-a-days rejected which man cannot imitate, or demonstrate by

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the species, respectively, and, therefore, no transmutation of species, or even an introduction of varieties. In respect to the variable physical agencies required by animals subject to metamorphoses, according to their several stages, the principle is implanted in the ovum itself, and equally so as in that of man, by which his development is started by one kind of vital stimulus, and is farther conducted through fœtal life by another kind, while other kinds obtain after independent life begins. It is a metamorphosis in all.

The same law of limitation applies equally to the speculations which are now going on among some amateur physiologists, and by which a spontaneity of being is inculcated upon the popular mind through the analogies in the organization of animals according to their respective ranks in the scale of animated existence; particularly the young of some species and the adults of other species next below, and through which it may be inferred that they have successively run into each other, according to the doctrine set forth in the text above.

experiment, I shall repeat it.—"If it be asked," he says, "whence organic matters proceed, how they are produced, together with the power of formation inherent in them, we are necessitated candidly to confess our ignorance on the subject, *inasmuch* as the *first origin* of organic matters and living bodies is altogether beyond the range of *experiment*."

And now, gentlemen, that great Reformer of the day in our department of Science, Professor Liebig, shall tell you how those special manifestations are generated which we have been accustomed to ascribe to a spiritual existence, known as the soul of man. "In the animal body," says Liebig, "we recognize as the ultimate *cause of all force only one cause*, the *chemical action* which the *elements* of the food and the *oxygen* of the air mutually exercise on each other. The only known ultimate cause of *vital force*, either in animals or plants, is a *chemical process*." "*All vital activity* arises from the mutual action of the *oxygen* of the atmosphere and the *elements* of the food." "Physiology has sufficiently decisive grounds for the opinion that every motion, every manifestation of force, *is the result* of a *transformation* of the structure or of its substance; that every conception, every mental affec-

tion, is followed by changes in the chemical nature of the secreted fluids; that every thought, every sensation is *accompanied by a change in the composition of the substance of the brain.*" "*Every* manifestation of force is the *result* of a transformation of the structure or of its substance."*

This is the broad chemical doctrine of all the manifestations of reason, instinct, moral and religious sentiment, the passions, &c. It is the theory of combustion, as propounded by Liebig, which supposes the union of oxygen with the combustible elements of the brain. But in my judgment, the only combustion about the matter will be found in "thoughts that burn." The doctrine appears in the celebrated work on Animal Chemistry, written at the invitation of the "British Association for the Advancement of Learning," and by them endorsed and published. The whole

* "The higher phenomena of mental existence cannot," says the Professor, "in the present state of science, be referred to their proximate, and still less to their ultimate causes. [Of course, therefore, not to a soul.] We only know of them that they exist." Again:—"The efforts of philosophers, constantly made, to penetrate the relations of the soul to animal life, have all along retarded the progress of physiology. In this attempt, men have left the province of philosophical research for that of fancy."—*Liebig's Animal Chemistry.*

work is remarkably distinguished by the same chaotic speculations, as I have abundantly shown on former occasions. Still it is hailed as the "march of *mind*,"—"a new era in physiology,"—"a new plan of instruction for medical colleges." But I have the satisfaction of knowing that my examination of this matter has met with the most distinguished approval, and that it has been clothed in the German language at the very door of the Reformer.

In respect to the subject of mind, there is a class of philosophers who defend the main ground of the Reformer, but admit the existence of a spiritual part.* While, however, they contend for the chemical theory of intellection, or the combustive process, they do not even hint at the allotted part of the soul in the functions of reason,

* In connection with this subject, it may be interesting to many to see the philosophy of intellection and that of *sleep*, as taught in chemical materialism, placed in their immediate relation. It will be found to be a consistent philosophy throughout, as expressed by Prof. Liebig; while it shows the depth of the abyss into which physiology as well as mind has been plunged by organic chemistry. Thus, the Baron,—

"Now, since in different individuals, according to the amount of force consumed in producing voluntary mechanical effects, unequal quantities of living tissue are wasted, there must occur in every individual, unless the phenomena of motion are to cease entirely, a condition in which all voluntary motions are com-

nor of instinct in its wonderful precision and indefinite transmission.

This chemico-spiritual hypothesis I have controverted in another article, to which I will now add that the supposition of the dependence of thought upon any chemical process in the brain necessarily excludes the agency of an immaterial principle, even if we allow so incongruous an association as the co-operation of a spiritual essence with chemical forces. The results would still be chemical, and nothing more. If oxygen unite with another element, and result in combustion, it takes place under a special law, and an exact chemical product ensues, which neither the soul can alter, nor imagination affect. The only part which the soul could take, according to any analogies borrowed from chemistry, and which

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pletely checked; in which, therefore, these occasion no waste. This condition is called *sleep*.

"Now, since the consumption of force for the involuntary motions continues in sleep, it is plain that a waste of matter also continues in that state; and if the original equilibrium is to be restored, we must suppose that, during sleep, an amount of force is accumulated in the form of living tissue, exactly equal to that which was consumed in voluntary and involuntary motion during the preceding waking period."—LIEBIG, *ibid.*

Is it not a sufficient objection to this philosophy that many who labor hardest, and sleep least, like the seafaring man, are apt to be the most robust?

must have been the part supposed, would be that of exerting merely a predisposing affinity among the elements. This predisposing influence of the soul, is meant to embrace whatever may be supposed to result from its action upon the doctrine of *catalysis*. In this view of the subject, which is the only one that can be propounded, the chemical tendency of the soul would no more react upon itself than that of platinum, and the only result would be a combustion of the elements of the brain, just as when hydrogen and oxygen gases are submitted to the catalytic action of the metal. And so of any other given chemical change. It always terminates in one way. If it be conflagration by the contact of potassium with water, it will not produce ice. But I should be less astonished at such an effect than to witness evidences of intellectual results.

When, therefore, oxygen unites with the phosphorus of the brain, according to the material doctrine of intellection, whether chemical or chemico-spiritual, it can form no other compound than phosphorous acid, whatever the supposed activity of combustion; or, if with those other combustible elements of the organ, carbon and hydrogen, the resulting compounds must be carbonic acid in one case, and water in the other. An

exciting, or predisposing, or any other agency of the soul, even were the soul a material substance, could in no respect affect those results; and, to imagine that the soul enters into either combination as a third element, and is yet in perpetual operation, *per se*, would be a chemical absurdity.

You would readily appreciate the difficulty, both here and in regard to organic results, which are equally ascribed to a chemical process, should you attempt to call in the aid of spirit, or the principle of life, in any of the manipulations of the laboratory. They are so far on common ground; and if the soul can promote combustion in the brain, or in any way modify its results, it should be equally competent out of the body, so only it could be brought into external operation. But no imagination can surmise the possibility of applying it in a chemical manner, and, least of all, eliciting by its aid the phenomena of mind from the most ingenious devices in organic chemistry. On the other hand, however, we have no difficulty in regarding the soul as a *cause*, acting through the vital constitution of an organ;* while, in so doing, we get rid of an unnecessary, as well as an unmeaning multiplication of causes.

* See this united action examined in the Author's *Medical and Physiological Commentaries.* Vol. 1, p. 82—106.

But suppose for a moment that the soul does exert some mysterious agency in promoting the union of oxygen with the combustible elements of the brain, what answer will the chemist make as to all the varieties, moral and physical, in the operations of reason, instinct, and the passions? We have seen that he must abandon any other supposed contribution to the chemical combinations *upon the laws of chemistry*. Nor can those combinations and those laws take any possible part in the acts of the soul or of instinct; and the chemical speculatist, therefore, is coerced to the alternative of ascribing all intellectual and instinctive functions to the immaterial principles in their co-operation with the vital constitution of the brain, or to deny the existence of those principles, and throw himself exclusively upon the chemical rationale. I will not imagine that he would attempt to propagate the latter doctrine under any disguise; for that would be the uncharitable fling of the ancient fabulist. If it stand, it must be upon its own merits, and not through any sophistry that may seem like a leaning towards the imagined truth, no gilding the material device, no concession of what may be considered the innocent but obstinate belief of the spiritual theorist, in the trust that he may finally discern the reality of his delu-

sion. Moreover, the organic chemist maintains that all the processes of life are owing to exactly the same combinations of oxygen with phosphorus, carbon, and hydrogen, and the same acid products, and water, as give rise to intellection. The brain is thus placed on common ground with all other parts. It is a chemical process, the same everywhere, and nothing more throughout; and it will be seen that precisely the same objections are applicable here as I shall soon present against the doctrine of mental *secretion*. And here I may also ask, if the soul or instinct make all the difference, as regards intellectual and instinctive manifestations, what makes the difference in respect to the corporeal phenomena? Let these questions be intelligibly answered, and the materialist will command an attention which is due to the highest effort of genius. The chemico-spiritualist is here on terms of equality with the exclusive materialist; for although he allow the existence of the soul, but without any conceivable employment for it, and even an encumbrance, these same philosophers deride the *principle of life, or organic force*, as "a phantom of the imagination," and give full scope to the chemical hypothesis where the moral sense of mankind will bear the exclusion. But it should be recollected that the

existence of the soul and the principle of instinct has been far less substantiated by demonstrative proof than the *principle of life;* and philosophers should be at least as ready to yield to the latter series of facts as to the former, especially as a multitude which are relative to the principle of life are of a demonstrable nature.

It would appear, therefore, that there is a total absence of proof for the combustive or chemical hypothesis of intellection, as entertained by the school of Liebig, or as modified by others in introducing the soul as taking a subordinate part in the combustive process. Nay, more; the whole of our proof, at this primary step, is fatal to either speculation. If any other than the spiritual theory of mind, as with all the physical hypothesis of life, be brought to a comparison with the phenomena, there is not a single manifestation but may be turned against it. But although an assumption, without a fact or analogy, the spirit of the age demands an elaborate contradiction.

There is a contingent fact attending both the chemical hypothesis of intellection, and of organic life, which is worth our attention. I mean the rapid ascendancy of those doctrines over the slow progress of the spiritual theory of mind, and the vital theory of organic processes. Such have

ever been the pace of truth, and the flight of error. The latter springs into being in a day, and its wings must be clipped again and again before it will come to the ground; but the slightest obstacle, a word of satire, may arrest the other in its gradual march through centuries of time. *Veritas latet in puteo;* or, as another has it,

> "Truth, like a single point, escapes the sight,
> And claims attention to perceive it right;
> But what resembles truth is soon descried,
> Spreads like a surface, and expanded wide."

Or, as Dryden has it,

> "Errors, like straws, upon the surface flow;
> He, who would search for pearls, must dive below."

Against the ground which I have now gone over I have been an inflexible opponent. I have seen nothing in it but thorns and "deadly nightshades." I have striven to mow them down, and had intended to retire from the contest. But I have thought that something more might be said on the nature of mind and its physiological relations to the body; and in again resuming that subject, I may say that it is with the design of presenting a series of facts which afford a demonstration that the soul of man is distinct in its

nature from his corporeal frame, and that its peculiar operations are more independent of organized structure than allowed by those physiologists who admit its existence as a special essence. I distinguish, also, between the soul of man and the instinct of animals; and although they have certain attributes in common, each is to be regarded as a distinct essence. To one, or the soul, is allotted a greater independence, in its operations, of the material part, than to the other, or the principle of instinct.

The evidence turns wholly upon physiological facts. My essential premises are relative to the nervous system, have been deduced from the most accurate and multiplied experiments, and are admitted by all. These must be briefly stated to render the argument intelligible to the student.

First, then, the brain is especially subservient to the soul and the principle of instinct.*

Secondly. The spinal cord, and the nerves which depart from it, are, among other uses, the organs through which the will transmits its influences to the voluntary muscles.

Thirdly. The ganglionic or sympathetic nerve is designed, particularly, to connect together, in

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* See *Institutes of Medicine*, § 455.

harmonious action, the involuntary organs, or those upon which life essentially depends.

Fourthly. The cerebro-spinal, and sympathetic systems of nerves, are intimately blended with each other, so that the brain is the great centre of both systems, and the spinal cord a less general centre; while the ganglia of the sympathetic are supposed, also, by many to be local centres to that nerve,* but, like the spinal cord, subordinate to the brain. The cerebro-spinal system has, in consequence, certain organic influences upon the essential organs of life. Physical irritations of cerebro-spinal nerves may be thus transmitted through the nervous centres and the sympathetic nerve to the involuntary organs, and the passions, by their direct action upon the brain, though not the will, may readily affect those essential or involuntary organs through the sympathetic nerve.† These organs, and the voluntary muscles, are also readily affected by mechanical or other irritants applied to the brain or spinal cord. So, too, on the other hand, from the same intercommunication of the cerebro-spinal and sympathetic systems, irrita-

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* This last is of no importance to my argument. See *Institutes of Medicine*, § 520—524.

† Ibid. § 476, *c*.

tions or other affections of the involuntary organs may be felt by the voluntary organs, through influences transmitted by the sympathetic nerve to the cerebro-spinal system.*

Fifthly. The nerves are composed of two kinds, one of which transmits the influence of the will and of the passions, and the effects of other causes, from the nervous centres towards the circumference; while the other kind transmits impressions from the circumference to the nervous centres. The first of these two orders of nerves is concerned in the development of voluntary and many involuntary motions, and are hence called *excito-motory* nerves. The second kind are nerves of sensation, or *sensitive* nerves; though the influences transmitted by them to the nervous centres are only *felt*, in the natural state, when propagated through the nerves which supply the organs of sense.† It should be also remarked, that while some of the two orders of nerves are wholly or mostly of one kind or the other,—either excito-motory or sensitive,—a very large proportion of the nerves are composed of fibres of both orders, though per-

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* See *Institutes of Medicine*, § 454—462½.

† Ibid. § 450.

fectly distinct from each other in arrangement and function. Such is the case with the nerves which go off from the spinal cord, the great sympathetic, and pneumogastric. All these, therefore, are known as *compound* nerves. Examples of entire and almost purely excito-motory nerves are rare. They are seen in the facial and third pair of cerebral nerves. The purely sensitive are nerves of special sense, and consist of the olfactory, the optic, and auditory nerves. This double order is perfectly established throughout the body, and has brought the physiology of the nervous system completely within the range of the most exact experiment, and has become the foundation of many laws which are as clearly ascertained as any in astronomy. The two orders of nerves or of fibres never interchange their functions; one of them being always employed in transmitting impressions to the brain and spinal cord, the other as purely centrifugal in its office.

It is also important to understand, that my demonstration is particularly concerned with the system of *excito-motory* nerves, or those nerves, or fibres of compound nerves, which transmit influences from the brain towards the circumference.*

* See *Institutes of Medicine*, § 462—475.

Sixthly. Influences, as I have said, may be transmitted from the brain and spinal cord towards the circumference by impressions made directly upon those centres; as when they are irritated by mechanical or other agents, or when the will or passions operate.* But impressions may be also made upon those centres through irritations produced in distant organs, and then reflected from the nervous centres upon other distant parts, and even upon the parts from which the irritations originally proceeded.† In this case, the original impressions are transmitted from the distant parts to the nervous centres through the sensitive nerves or sensitive fibres of compound nerves, and are reflected from those centres through excito-motory nerves, or the motor fibres of compound nerves, which are also called nerves of *reflexion*. This is clearly exemplified in respiration, in vomiting, in contraction of the iris, in spasms from teething or from irritations of the bowels, &c. In breathing, for instance, two principal nerves are concerned, and the *diaphragm* is the principal muscle which

* See *Institutes of Medicine*, § 476—494.

† This is called *reflex action* by some, and *remote sympathy* by others. There are good reasons for preferring the latter term. See *Institutes of Medicine*, § 512—524.

is moved. The pneumogastric is the sensitive nerve through which an impression, arising from want of air, is transmitted to the nervous centres, and which calls the diaphragm into action; and the phrenic is the excito-motory nerve through which the impression is reflected from the nervous centres, and through which the will operates upon the diaphragm in voluntary respiration. The other respiratory muscles have similar relations to the pneumogastric and to other excito-motory nerves, and the will operates as readily upon the intercostal muscles as upon the diaphragm. But the diaphragm is very conspicuously marked in this respect, and is only inferior in importance to the heart.

In *seeing*, we have the beautiful example of the motions of the iris, which are entirely of an involuntary nature; although the iris stands in the same relation to perfectly distinct nerves, in all its movements, as does the diaphragm. In *seeing*, the optic nerve, or second pair from the brain, not only conveys the impression which is recognized by the mind, but it is also the sensitive nerve for the iris, by which the pupil is exactly adjusted to the degree of light, while the excito-motory nerve of the iris is from the ciliary branches of the lenticular ganglion, through

its communication with the third pair of cerebral nerves. The brain is the bond of union between the two orders of nerves, in both the cases; but for an obvious final cause, the iris, unlike the diaphragm, is withdrawn from the will, possibly through its connection with the ganglion of the sympathetic nerve.* As the stimulus of light, however, is indispensable to the natural contraction of the iris, and is so far unobserved, you will readily understand how a similar impression upon the pneumogastric nerve in the lungs is necessary to the involuntary motions of the diaphragm. Indeed, there is no mode of destroying life so instantaneous, as by cutting off the influence which is transmitted to and from the nervous centres by the respiratory nerves. The whole brain, for example, may be sliced down to the medulla oblongata, or beginning of the spinal cord, without affecting, at the time, the organic functions; but as soon as the knife reaches the origin of the pneumogastric or sensitive nerve of the lungs, where

* It is probable, however, from experiments, that the ganglia of the sympathetic nerve are not relative to the will or sensation. Their main office is, beyond doubt, to co-operate with the cerebro-spinal system so far as the latter is concerned in influencing organic functions.

the influences for the respiratory movements are combined, the animal will instantly die. This, therefore, is the most fatal point in the body. Death is then mostly produced by arresting respiration, the immediate cause being the failure of the lungs to excrete carbonaceous matter from the blood.*

The principle, therefore, is exactly the same, whether impressions made directly upon the nervous centres give rise to motion in parts that are voluntary or involuntary, or, whether the impressions upon those centres be occasioned by influences transmitted to them from remote parts, and which, by reflection, equally give rise to motions. But, in all the latter cases the resulting

* We hear much, and very truly, of the indispensable importance of the oxygen of the atmosphere to the whole animal kingdom; and I would go as far as any man in allowing the force of the expression, "He breathed into his nostrils the breath of life." But oxygen is indispensable in a very different respect from what the chemical physiologist supposes, and how it is indispensable is seen, at once, in the effects of the foregoing experiment. The carbon of the venous blood, not the want of oxygen in that blood, is the destructive cause; and this is farther shown by the immediately fatal effects of transfusing a little of venous blood into the artery leading to the brain. It is equally true, also, and of all animals, that it is the poisonous action of carbon upon the brain, to which death is mostly owing in all the modes by which the access of oxygen gas to the respiratory organs is arrested. The great final cause, therefore, of the respiratory function is the re-

motions are involuntary; as are all in the other cases excepting such as arise from the operation of the will. But in the case of the direct impressions, it is important to remark that the motions which are produced by the passions are entirely involuntary, and therefore exactly analogous to such as arise from irritating the brain mechanically, or when convulsions follow teething or intestinal troubles, as the effect of irritations propagated to the nervous centres.

It may be finally added, that the two nervous centres, and *both* orders of nerves, co-operate together in giving rise to motion in the organs of organic life, so far as organic motions depend upon the nervous system; while only the brain

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moval of redundant carbon from the blood, not the absorption of oxygen.

I will also add, that, in an article which I have prepared for the press, I have endeavored to show that the chemical doctrine of the absorption of oxygen into the blood, in the process of respiration, is unfounded, and that its office is what was only lately supposed by chemists: namely, that of uniting with the redundant carbon of venous blood after its excretion by the mucous tissue of the lungs. The more recent hypothesis of the absorption of oxygen from the atmosphere is the sole foundation of the present interpretation of all organic and animal functions, including those of the senses, and all the rational and instinctive acts. The subversion of this single assumption will leave the whole stupendous system of chemical physiology as "the baseless fabric of a dream." (See this subject considered in *Institutes*, § 447½, *a*—*f*.)

and spinal cord, and the *excito-motory* nerves, are concerned in developing the motions which are brought about by the mind, or the instinctive principle, or by mechanical or other direct physical irritations of the brain. In ordinary respiration, for example, the sensitive fibres of the pneumogastric nerve are indispensable for the transmission of an exciting influence from the lungs to the nervous centres; but, in voluntary respiration the pneumogastric nerve is not concerned, but only the nervous centres and the excito-motory nerves of the respiratory muscles. In the former case the irritation of the nervous centres proceeds from the lungs; in the latter those centres are irritated by the will. The former is true of all involuntary motions when the nervous centres are not immediately irritated, and their irritation then proceeds from other parts; and the latter is true of all voluntary motions, and of all the involuntary when the irritating cause is applied immediately to the centres.

Seventhly. It is allowed that some invisible, intangible principle exists in the nervous system, commonly known as the nervous power, through the agency of which motions are produced when they are connected with the nerves. I have endeavored to show that the nervous power is a

vital agent, which is very variously brought into action, either by physical or moral causes; and whether, therefore, motion be produced by irritants applied to the brain, or by the operation of the will or the passions, it is in consequence of the development of this nervous power, and the direction of its influence upon the parts that are brought into motion. But it is not important to my present argument that any special mode of action should be conceded.*

From what I have now said of the ground of my reasoning, you begin to perceive the consequences which must logically follow. You begin to discern the force of the analogy between the effects of those elements of the mind, the will and the passions, and of mechanical and other physical agents when applied to the brain. You see, already, that if the brain be influenced by *something*, when physical agents acting upon it give rise, in consequence, to motion in the voluntary muscles, and in the heart, so must it be equally influenced by *something*, and *that something* must be as much an exciting and analogous cause, when the *will* gives rise to voluntary motion, or when the *passions* affect the action of the heart. From the close analogy in effects in

* See *Institutes of Medicine*, pp. 106—111, 323—332.

the two cases, there must be equally an analogy among the causes and their modus operandi; and therefore the soul, and the principle of instinct, of which the will and the passions are elements or properties, are as much distinct entities as are the mechanical irritants or other physical agents which determine the corresponding movements. I say, gentlemen, that such is your mental constitution you cannot help this conclusion, however prone you may be to materialism. Here is an animal whose brain is irritated mechanically, and spasms follow in the voluntary muscles as a consequence. You see the close analogy with the effects of the will. The movements are often so alike that you fail of distinguishing one from the other. Here is another, whose brain is irritated by the application of alcohol, and you see the heart beating more actively, as a result; and here is a third whose heart is enfeebled in action by the application of an infusion of tobacco to the brain,—just as it is excited by joy and anger in one case, or depressed by grief and fear in the other. You also witness the same spasms in the voluntary muscles from the operation of the passions as arise from irritating the brain by mechanical agents.* Consider, for example, a par-

* See *Institutes of Medicine*, § 476—494.

oxysm of *hysteria*, where convulsions of the voluntary muscles are brought on by some mental irritation, and where they are exactly the same as when produced by irritating the brain *mechanically*. Consider, also, how precisely analogous are the voluntary and the involuntary acts of respiration; one of them being determined by the direct action of the will upon the brain, and the involuntary act by an impression transmitted from the lungs to the brain. How precisely analogous, also, the involuntary contraction of the *sphincter* muscles, and their contraction as brought about by the will, and where the same philosophy in respect to causation is concerned as in the involuntary and voluntary acts of respiration.*

An universal analogy proves that motion, in all the cases, is brought about by a common proximate cause; that is, by a determination of the nervous power upon the muscles which are thrown into action, and to which it proves a vital agent. The will has no farther connection than this with voluntary motion, nor the passions with the various modified motions which they induce in the sanguiferous organs; no more so than the alco-

* See *Institutes of Medicine*, § 500; 514, *f*–514, *g*.

hol, or tobacco, when applied to the brain, or when mechanical irritations of that organ give rise to similar motions. You also see plainly from my premises, that if the movements which are excited by the action of physical agents upon the brain itself be remotely due to those causes, and not to any *primary change* in the brain, it must equally follow that the effects of the will in developing voluntary motion, or of the passions in modifying the action of the heart, cannot be due to any *primary changes* in the condition of the brain, but of necessity, to some cause as distinct from the brain as are the physical agents.

So far, then, the analogy is complete. But in the case of the physical agents, the causes are of a passive nature, and require other agencies to bring them into operation. How different, on the other hand, with the will and the passions! Here the causes are entirely *self-acting;* originating their own actions upon the great nervous centre. This, in itself, establishes a radical distinction between the nature of the soul and instinctive principle, and of all physical causes, and is utterly fatal to materialism. The *self-acting* nature of the soul and instinct, and especially of the rational faculty,* transcends even the principle of

* See pages 50—52.

organic life; for that principle requires the operation of stimuli to rouse it and to maintain it in action. But so far as action is immediately concerned, an analogy obtains, and we may reason, upon that analogy, from the *self-acting* mind to the existence of an *active* principle of life upon which organic motions depend. But we shall seek in vain, throughout the wide range of Nature, for any direct similitude with the manifestations of reason or of instinct; though if we pass the limits of Nature, we may discover in Creative Energy that analogy with the soul which shadows forth the "Image of God."

What has now been said is equally applicable to materialism, whether it regard the manifestations of mind as a chemical phenomenon, or as elaborated from the blood. In the *Institutes of Medicine*, where I have transiently called up this subject, there is an argument directed specifically against the doctrine of mental secretion; and as it is alike applicable to the chemical hypothesis, and as these two make up the whole sum of materialism, in its proper acceptation, to render the present examination more complete, I shall quote the argument there stated. I have there said that,—In former works I have presented certain facts which go to the conclusion that the mind or

soul is a distinct immaterial substance, and that the instinctive principle of animals is equally a distinct substance from the brain; and I will now add a few words, physiologically, in respect to the main argument of the materialists drawn from analogy, that the mind, like the gastric juice, bile, &c., is only a product of the organic functions of the brain.

The analogy is fictitious. Both the mind and instinct are entirely wanting in every known attribute of the product of other organs, and are *sui generis* in all their characteristics. This is sufficiently obvious. But there are other considerations which establish the distinction more fully, though they appear not to have engaged the attention of physiologists. What, for example, is the efficient cause of the production of bile, saliva, &c.? Certainly the blood, in connection with organic structure and organic actions; and while these actions go on, bile, saliva, &c. are uninterruptedly secreted; or, if arrested, it is from the failure of the organic processes. But it is just otherwise in respect to the mind and the instinctive principle. These are completely suspended, in all their manifestations, during sleep, and often so with great instantaneousness. And yet there is every reason to believe that the organic func-

tions of the brain continue to move on as perfectly as those of the liver, the lungs, &c.; especially when it is considered that sleeping and waking may happen in almost the twinkling of an eye. Indeed, were any change to befall the brain, it should be more or less manifested by some consequent modification of all the organic actions; particularly as those of animal life undergo complete suspension. The continuance of all the organic results proves that organic life is in perfect operation; while, by equality of reason, the suspension of all results in animal life proves that an agent, upon which these results depend, has ceased to operate. In one case, organic functions must go on without interruption, and therefore the moving causes upon which they depend must be in perpetual action. In the other, and for an equally obvious reason, the organs peculiar to the division of animal life must have repose, and therefore, by parity of reason, their spring of action, in man and brute, is constitutionally fitted for quiescence as well as action, and this, as respects sleeping and waking, corresponds with the alternations of thinking and not thinking during the waking time. There are various gradations in the suspension of mental and instinctive functions from their quiescence in the waking state to profound slumber.

Do you ask for the *modus operandi* of this constitutional peculiarity? Would it not be as reasonable to demand an explanation of the absolute nature of mind, or of the Deity Himself? Must not that be understood before the *modus operandi* can be known? Is not this problem raised like the difficulty of comprehending the works of Creative Energy, because "the *first origin* of organic matters and living bodies is altogether beyond the range of *experiment*."? (P. 20.)

Again, other peculiarities, which contradistinguish the mind and instinct from every organic product, are the quick transitions from sleeping to waking, and the occurrence of the change without any change in the organic functions of the brain. Take in connection the act of sleeping and the act of waking, the instant suspension and the instant reproduction of the intellectual operations, and in all their isolated aspects, and there must be conceded not only an entire want of analogy with any other phenomenon of nature, but that there must be a unique cause for such perfectly unique effects.

But, again, suppose some change in the organic condition of the brain as the cause of sleep; what is it, I say, that so instantly reinstates its organic functions when we pass from the sleeping to the

waking state? What arouses the organ to its wonted secretion of mind? Certainly not the blood. Are there any analogies supplied by the liver, or by any other organ? What is it, I repeat, that brings the great nervous centre into operation in all the acts of volition, in all the acts of intellection? This question must be answered consistently, or in some conformity with the argument drawn from analogy. If that can be done, (this simple physiological requisite alone,) then it must be conceded that the analogy is irresistible, and the argument in favor of materialism incontrovertible. So, on the other hand, should the argument fail in this indispensable requisite, materialism must stand convicted of sophistry, insincerity, and a leaning to infidelity.

The premises are perfectly simple. They are also sound so far as it respects all organic actions and results. The blood, as it is with all other organs, is the natural stimulus of the brain in its organic condition, and here as there all organic phenomena are distinctly pronounced. They proceed in all parts with uniformity, and without interruption. Nothing can suspend or modify them in the brain, or elsewhere, during their natural condition. So far the analogy is complete. Now, as it cannot be the blood, according

to our premises, which rouses the brain to action in *willing*, *reflecting*, &c., or which awakes us from sleep, I ask the materialist the nature of the stimulus which operates upon the brain in eliciting the phenomena of mind? *

Thus far the *Institutes* on that branch of our inquiry, and it will be readily seen that all which is here said applies equally to the chemical doctrine of intellection; since, as I have shown, the acts of intellection and all organic processes and results are placed by the chemist on common ground. If, therefore, it be the circulation of the blood in the brain, as in other parts, which gives rise to the union of oxygen with the combustible elements of the brain in the *organic* processes of that organ, what is it that starts the union of the same elements in the acts of intellection, or which rouses the chemical display so as to awake us from sleep? The chemico-spiritualist may answer, the soul! But has he a shadow of fact, or of analogy, for this hypothesis, and can he assign any possible agency for the chemical process? (*See page* 21.)

It will be readily seen that objections of this nature may be carried to an indefinite extent. Thus, what, for example, makes the difference

* *Institutes of Medicine*, § 175, *c.*

between the early riser and the sluggard; between him who awakes on the instant, and him who as habitually requires the sound of a bell, but a self-acting cause which is more energetic, or better disposed to act in one case than in the other? Or, why is one man capable of greater acts of ratiocination than another? Let us grant that it may be due, in part, to some difference in the development of the brain, or to some greater energy of the supposed combustive process in one than in the other; why then does an untutored mind come, by instruction, to the mastery of science? Or why do we witness in the unlettered boy a facility in instituting great truths, or of seizing upon vast principles, in science, of which even the erudite are incapable? I might refer, as examples, to Paschal in mathematics, Mozart in music, and other familiar names; but there is one so transcendently greater, and who has cast a shade upon the highest order of intelligence, that this single instance is abundantly illustrative of my subject. The recent statement, however, by the Rev. Mr. Stevens, of the apparently superhuman efforts of Truman Henry Safford, supersedes the necessity of a more extended reference to a display of mind altogether beyond any of the usual corresponding developments of or-

ganization, or rudimentary instruction. But it may be well to say, that, after a very superficial attendance at a country school in Vermont, with an attenuated frame and feeble health, this boy, at the age of nine years and six months, produced the "Youth's Almanac for 1846," having made all the calculations of eclipses, the rising and setting of the sun, &c., &c., without any assistance whatever; and that recently, in the 13th year of his age, and in the same unassisted manner, he calculated the orbit of the telescopic comet of November, 1848, and with an accuracy, as I am informed, which is corroborated by the best astronomers. At the age of ten years he was thoroughly examined by the Rev. Mr. Adams in algebra, plane trigonometry, mensuration of surfaces and of solids, pyramidal and spherical, cube roots, &c. The interrogatories were of a very difficult nature, resolved mentally and according to the rules of science, and generally with great instantaneousness. For the purpose of testing the reach of his mind in computation, he was finally asked to "multiply *in his head* 365,365,365,365,-365,365, by 365,365,365,365,365,365. He flew round the room like a top, pulled his pantaloons over the top of his boots, bit his hand, rolled his eyes in their sockets, until, in not more than one

minute, said he, 133,491,850,208,566,925,016,658, 299,941,583,225. What was still more wonderful, he began to multiply at the left hand, and to bring out the answer from left to right, giving first, 133,491, &c. Here, confounded above measure, I gave up the examination. This last performance is not so interesting an illustration of the logical power of the child, as others above given, but as a stupendous effort of computation it is absolutely inconceivable, and throws into comparative pettiness the largest calculations of Colburn, or any other similar genius with whom we are acquainted. We are impressed, indeed, with a sentiment of awe when we think what must be the power and fleetness of thought in the purely spiritual state, when such a child, by the mere accident of a peculiar organization, astounds us by such immeasurable compass and velocity of mind."—Nor was this early display of mind limited to mathematics, but took, in almost equal compass, every department of science with which it came in contact; and whatever the object of inquiry where books were the medium of suggestions, especially the high branches of mathematics, he commonly opened the works in their middle, and seized at once upon the antecedent premises upon which the inductions had been founded.

But again I say, if the admitted analogy between the soul and its Maker have any foundation, then, independently of specific facts, the soul of man is a self-acting agent; and since this conclusion must flow from each series of my premises, and from the analogies between the manifestations of the soul and the instinctive principle, as well as from the direct facts relative to the latter, the principle of instinct is also a self-acting substance. Independently, however, of the induction from analogy as to the soul, and looking alone at the plain matters of fact, I again ask the materialist what he can extort from the whole range of physics and chemistry that will afford the slightest pretence for grasping at the manifestations of mind which I have thus far indicated?

Seeing none myself, I shall return to a farther consideration of our subject, as relative to the comparative effects of the mind and its passions, and of physical agents, in producing movements in the voluntary and involuntary organs. The ignorant in physiology, or the caviller in argument, may assume that muscles are artificially brought into action without an immediate impression upon the nervous centres. There is always, however, an impression made upon those centres. If it be not from direct action upon

them, it is then indirect; that is to say, the impression is then propagated from remote organs to the brain and spinal cord through the sensitive nerves. This is equivalent to what results from the direct action of agents. It is even true of the involuntary acts of respiration during sleep, permanently so of the *sphincter* muscles, and of all the involuntary movements of muscles subject to volition. An irritation, or other impression, is somewhere set up in parts remote from the nervous centres, and transmitted to them through sensitive nerves. In all the cases there is a positive impression made upon the nervous centres by some remote cause, as a consequence of which the nervous influence is reflected from those centres, through excito-motory nerves, upon the muscles which are brought into action. That power, thus reflected, proves a stimulus, or depressant, to properties inherent in muscles, and which are the immediate causes in the production or modifications of motion. Take, as a clear illustration, an inflamed superficial nerve, or an inflamed tendon, or the condition of the gums in teething, where each affection propagates an irritation to the nervous centres, by which the nervous influence is rendered an exciting agent, and is reflected as such upon various muscles, and throws

them into convulsive action. Nux vomica, administered by the stomach, will produce the same chain of causation, ending in convulsions. Administer, now, an anti-spasmodic, as conia or opium, in any of those conditions, and a sedative effect will be exerted upon the excited nervous centres, through which the nervous influence is modified in a corresponding manner, and may arrest the spasms. (See Author's *Materia Medica*, pp. 170—181.)

The impressions upon the nervous centres, by which the nervous influence is developed, and determined with various effects upon distant parts, are all upon a par, in principle; whether they result from agents applied directly to the centres themselves, or are transmitted to them through the medium of parts remotely situated, or whether the will and the passions make their demonstrations. Take some of the common examples among the muscles which are both voluntary and involuntary. Let these, again, be the muscles which are concerned in respiration, including those of the face. Now, their several movements are liable to numerous modifications; some of which are natural, as in coughing, sneezing, yawning, laughing, and others more or less morbid, as in asthma, hiccough, &c. In all but two

of these cases, the movements depend upon the excitement of the nervous power through some sensitive nerve, which is generally the pneumogastric nerve, and the reflection of that power from the brain and spinal cord upon a part of or upon all the respiratory muscles. In each process, there is a special irritation of the nervous centres, and in each, the nervous influence is brought into operation in a peculiar manner, and according to that manner will be the nature of the movement. In *asthma*, a stronger irritation is propagated from the lungs to the nervous centres, and a more intense motor excitement is reflected from those centres upon all the muscles of respiration, (often including those of the face,) than in ordinary breathing, and in severe cases the *will* comes to the aid of the irritation propagated from the lungs to the nervous centres. Here, then, we see the *mind* and the *physical cause* brought into immediate co-operation in rousing the brain and spinal cord. The physical cause is insufficient to excite the movements of respiration, and therefore the mind lends its assistance. Both act in perfect harmony together; nor can the slightest difference be observed in the results of either, excepting as the mind acts with greater energy, and brings the respiratory muscles of the face into motion.

Take next the acts of voluntary and involuntary laughing. When the feet or armpits are tickled, laughing follows as the effect of an irritation propagated to the nervous centres by sensitive nerves supplying the skin of those parts;* for you should now understand, that in all the modified motions of the respiratory muscles, the nervous centres may be irritated through many other *sensitive* nerves than the pneumogastric, while in all the cases the same *excito-motory* nerves bring the muscles into action. A beautiful exemplification of this is seen in the new-born infant and other animals breathing with lungs, as I have expounded on a former occasion; since here the first impression is transmitted to the nervous centres through the sensitive nerves of the *skin*, in consequence of the contact of cold air with the surface.† That is the rationale of the *first* breath we draw,—standing alone in organic life. Ever afterwards the transmitted irritation goes from the

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* See Author's *Institutes of Medicine*, § 514, *d*.

† "The cause of the first inspiration," says the eminent physiologist, Müller, "appears to me to be solely the stimulus afforded to the brain and medulla oblongata by the blood, which immediately becomes oxydized in the lungs. The former had been in a comparatively sluggish, torpid condition; but the arterialized blood, in a few minutes, reaches the brain, when the respiratory movements immediately commence." (MÜLLER's *Physiology*, p. 355.) The

lungs. The same thing happens, as I also explained, when cold air, or cold water, applied to the surface, reproduces breathing in syncope; or, if it be ammonia, &c., applied to the nose, then the sensitive nerves are branches of the fifth pair of the cerebral. I will also now say that the function of the pneumogastric nerve is developed for the first time by the first act of inspiration, and fully developed, both as respects the lungs and the stomach.*

Now, as to involuntary laughing from tickling the feet, it is absolutely independent of the mind, and in opposition to it. And yet it is apparently the same as voluntary laughing. In this instance, the impression upon the nervous centres is obvious enough from the sensation; and the nervous influence is so far unceasingly determined upon the muscles of the face while the irritation goes on, that laughing may continue irresistibly till the irritability of the muscles becomes obtuse to the stimulus of the nervous influence, or their mobility exhausted. In a recorded case, a husband

English Translator remarks upon this, that, "before the arterialized blood can reach the brain, respiration must have commenced;" and inquires, "*how is the air first drawn into the lungs?*"

* See Author's *Medical and Physiological Commentaries*, vol. i. pp. 175--178; vol. ii. pp. 48—50.

bound the limbs of his wife, and tickled her feet until she died of laughing;* just as some die suddenly from a strong mental emotion.

In what I have hitherto said we find a ready explanation of the foregoing case. The act was mainly in opposition to the will. But at the beginning of the paroxysm of involuntary laughter, the impression which is propagated from the feet to the brain simultaneously rouses the nervous influence of the organ and the action of the mind. At this stage, therefore, the will concurs with the physical cause in a farther development of the nervous influence, and establishes a harmony of operation, which is at first mainly expended upon the muscles of the face. The propagated impression, however, soon becomes painful, and the will then endeavors to resist the cause which had called it into action. Now it is that the nervous power is wholly developed by the physical irritation, and if that be indefinitely continued, as in the foregoing example, the influence of the brain is ultimately extended from the muscles of the face, and with a destructive effect, over the whole system of organic life. The case now becomes exactly parallel with that in which sudden death

* Shakspeare speaks of the same thing, thus,—

"Which is as bad as die with tickling."

is produced by a paroxysm of anger or of joy, where the mind is the agent which acts upon the brain and develops the nervous influence. The rationale is the same as when respiration goes on in defiance of the will, the same as when a burn, or other injury of the skin produces general convulsions, or when tetanus arises from the wound of a tendon or nerve. And here I would ask the materialist what other construction he can apply to the cases of sudden death from joy and anger, than the powerful operation of some unseen cause upon the brain, and through that organ, upon organic life? What other condition, I say, than a violent shock of the brain from a cause as distinct in its nature from the organ, as the hammer whose blow upon the head is fatal through precisely the same physiological effects?* A case

* The following explanatory remarks are introduced from the Author's *Institutes of Medicine*. The nervous power may extinguish life with great instantaneousness. When rapidly fatal, the causes by which it is brought into operation must be violent and sudden in their action. Examples occur in the fatal effects of joy, anger, apoplexy, blows over the region of the stomach, drinking cold water when the system is prostrated by fatigue in hot weather, prussic acid, strychnine, aconitine, &c. In the case of joy, anger, apoplexy, and blows on the head, the nervous power is developed in a direct manner, and destroys mainly by its sudden determination upon the organic properties of the brain and heart; though it is also directed with violence upon the stomach and in-

precisely parallel in its physiological rationale occurs in syncope when produced by an emotion of the mind, as in hearing or seeing something offensive. Here the immediate cause, as in the case of death from joy or anger, is the instant and powerful determination of the nervous influence upon the heart, stomach, &c. But there must be something to *develop* that nervous influence in the brain, and the common sense of every one must assure him that it is a *conscious* agent which does the work. But for the fullest illustration of this subject, let us consider the physiological rationale of syncope as produced by offensive odors. Here the mind may have but little participation in the prostration of the heart, &c., but the effect be mainly due to the physical impression propagated to the brain through the olfactory nerve, and the nasal branches of the

testines, and upon the whole capillary system of blood-vessels. In the cases of blows and sanguineous apoplexy, the general effect is also increased by any disorganization which the brain itself may sustain. But in what is called nervous apoplexy, and which is the most immediately fatal form, there is no apparent disorganization of the brain, and this form is commonly owing to a pernicious impression propagated to the brain through the pneumogastric and sympathetic nerves by an overloaded stomach. This variety of apoplexy, therefore, results immediately from an indirect development of the nervous influence, and is parallel with the cases of sudden death from drinking cold water, prussic acid, &c.

fifth pair, which impression, in itself, greatly develops the nervous influence. But the mind may also contribute to that development; for if the odor were not perceived by the mind, no syncope might follow. Thus again we have associated the physical and moral causes in producing a common effect. Nevertheless, in cases of this nature, the mind generally endeavors to resist the effects of the odor, (when it is perceived,) and as syncope will happen in spite of the effort, it is evident that the depressing influence is mostly due to the direct action of the physical cause upon the brain. Now let us connect with the foregoing facts the syncope which follows blows upon the head, and we shall see, as plainly as we see that the physical blow upon the brain is the cause in one case, and the odors in others, that the mind inflicts the blow in the first of our series. The physiological effects prove conclusively, both in their nature and coincidence, that one cause is just as much an agent, acting upon the brain, as the other, and that both are equally distinct from the organ. These clear examples will readily suggest many others of a corresponding nature.*

* See preceding note.—To multiply the variety of illustration, I will avail myself of a pathological fact, which appears, in an opposite aspect from the preceding, to exhibit the mind as a dis-

So, also, if in convulsive or involuntary laughing from tickling the feet, as in involuntary respiration, some impression upon the brain by a cause perfectly distinct from that organ be indispensable, how obvious is it that an equally distinct cause must act upon the brain when the mind gives rise to exactly the same movements, whether it be voluntary laughing or voluntary respiration? And what other cause than the mind itself? An *antecedent* cause must operate upon the brain. To suppose the absence of such a cause is a *physiological* absurdity; and to suppose any other cause than the mind is a greater absurdity. Nay, more, the mind, the brain, and the nerves, are absolutely indispensable to all vol-

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tinct agent, as well as the relations which it bears to the brain, and indirectly through the nervous system, to other parts of the body. It is well known that in the delirium of drunkenness very large quantities of opium are often appropriate and necessary to procure sleep, though no suffering attend the wakefulness. Now, in these cases, such is the morbid irritability of the brain it can be subdued only by powerful narcotic influences. And should these fail of their intended effect, the mind continues in an uproar, shakes the whole animal and organic fabric, till death closes the tragedy. On the contrary, however, should the opiate overcome the action of the mind by its influence upon the brain, the patient is apt to awake in a state of convalescence. This action of the mind upon the nervous centres may be farther illustrated by the parallel which is seen in the effects of strychnine, and in traumatic tetanus, as set forth at page 55.

untary movements; while the motions of organs in organic life may go on without mind, brain or nerves. The heart will often continue to pulsate long after its removal from the body. The stimulus of the air is then sufficient. But should any cause, like sleep, suspend the operations of the mind, no voluntary motion can take place; thus proving that the mind, or instinct, is a more indispensable cause of motion than any other attribute of living beings.

I have said, that in the several modified movements of the respiratory muscles which I mentioned, all but two depend upon irritations of the nervous centres propagated through sensitive nerves of the lungs, or of other parts, and that in all the cases the *same excito-motory* nerves bring the muscles into action. The two exceptions are voluntary laughing and yawning. In the former case the mind rouses the brain without the intervention of any sensitive nerves, and determines the nervous influence directly upon the muscles of the face through their *excito-motory* nerves; which is also true of the blood-vessels of the face in blushing, and of the production of tears in weeping. In *ordinary* yawning, which is exactly a modified act of respiration, the mind, and a physical impression transmitted from the lungs to the nervous

centres, act in co-operation, just as happens in severe cases of asthma. But now observe how the mental and the physical causes appear, as it were, to identify themselves with each other in sympathetic yawning, or where one yawns on seeing or hearing another yawn, or in talking about it; for in one case an irritation is propagated both to the brain and mind through the optic nerve, and in the other cases through the auditory, and simultaneously the mind conspires with the physical irritations in exciting the nervous influence, and directing it upon the muscles of respiration.

Just so, too, in respect to offensive odors, when they produce *vomiting* instead of *syncope*. In all these cases, the mind is far more interested in the physiological effects than in the cases of syncope from analogous odors; since the odors are so far different in the two series that *disgust* is in active operation in one, but not in the other. The mind, therefore, in the cases of vomiting, and the nervous influence, are brought into simultaneous operation by the transmitted impression, and the mind now co-operates with the physical impression, and occasions a farther development of the nervous power, and thus increases the intensity of that degree which is created by the effect of

the physical impression upon the brain. But the mind is adequate to the entire effect, for it will produce vomiting by reflecting upon the former action of the odor, and which may have happened years antecedently. *Sympathetic* vomiting, on seeing or hearing another vomit, is mostly of this nature; though here the transmitted impression through the optic or auditory nerve not only brings the mind into operation, but contributes to the development of the nervous influence by its direct action. But here, too, as in the case of the odors, the mind alone may determine an act of vomiting by simply reflecting upon a disgusting spectacle which had, at a former time, upset the stomach.

Now the mind, in all these examples, is necessarily a substantive agent, acting of itself upon the brain, and the nervous influence which it develops is exactly equivalent to the action of an emetic upon the stomach. In the latter case the impression is transmitted to the nervous centres through the sensitive fibres of the pneumogastric and sympathetic nerves, and the consequent nervous influence is reflected through motor nerves upon the respiratory muscles, by which they are thrown into convulsive action. So, also, when the mind occasions vomiting, there must be equal-

ly *something* to develop the nervous influence and excite the nausea at the stomach, and the subsequent convulsive action of the respiratory muscles, as where an emetic produces exactly the same effects. That *something*, it is readily seen, can be *nothing else* than a *self-acting agent*, or something which brings itself into operation upon the brain. The physiology is the same as when vomiting is produced by an emetic, though the influences are a little varied. This variation should be understood, since it serves to explain a thousand analogous problems; though other parallel examples have been already stated. In the case, therefore, where the mind is the remote cause of vomiting, it develops the nervous influence, and occasions its transmission to the mucous coat of the stomach through the centrifugal or excito-motory fibres of the pneumogastric and sympathetic nerves, when an irritation similar to that occasioned by the direct action of an emetic is set up in that coat of the organ. This irritation is then returned to the nervous centres through the centripetal or sensitive fibres of these nerves, just as it is when occasioned by the direct operation of emetics. The remaining part of the process is precisely alike in all the cases. When vomiting arises from *tickling the*

throat, the mind has no connection with the effects, but the physiology is so exactly coincident with that which is relative to the mind, that it goes with the rest in showing how the mind is necessarily a substantive, self-acting cause. In the case of tickling the throat, the irritation is propagated through nerves, supplying that part, to the nervous centres, the nervous power developed, and reflected upon the mucous coat of the stomach, just as when developed by the mind, and when, also, as in the example of the mind, it irritates the stomach after the manner of emetics; and the remaining part of the process is the same as when the mind is the remote cause.

Whenever vomiting springs from disturbances, or disease, or any novel conditions, of organs remote from the stomach and brain, the same chain of causation always obtains as in irritating the throat; the point of departure being the affected part, and the nerves supplying it are the organs of transmission to the nervous centres. In all such cases, too, as in the example of the mind, the stomach must be first nauseated by a reflection of the nervous influence upon its lining membrane. Then follow the same associated physiological influences as when the mind is

the remote cause of vomiting. The experience of every one will almost enable him to trace out, in all the examples, the series of influences which I have indicated, and all of which are demonstrable by experiments upon the nerves. The sickness and vomiting which spring from sailing, whirling, riding, &c., depend upon the same chain of causation. In these examples, the remote influences are partly propagated to the brain by the mechanical effects upon different parts, and partly exerted directly upon the brain itself. In this manner they develop the nervous influence, which is next transmitted with a nauseating effect to the lining coat of the stomach ; and so on. In these instances, however, the mind often participates, more or less, in developing the nervous influence, through some emotion which grows out of the physical influences ; for it frequently happens that a strong determination to resist sea-sickness, for example, will prevent its occurrence, especially the act of vomiting. The nervous influence which is the direct effect of the motion of the vessel then falls short of the intensity necessary to vomiting. And so of other analogous causes, and so, too, when offensive odors, disgusting sights, &c., operate, or, when memory turns them again upon the stom-

ach. In all such cases, the mind, by resolving not to co-operate with the physical causes, or keeping down fear and disgust, may often yield no little protection to the stomach. (*Note*, p. 63.)

Finally, once more as to the *mind alone* in cases of vomiting; as when it arises from coming unexpectedly upon a precipice. In this case it is *fear* which starts the physiological work, and, at the same instant, and through the same nervous influence which it inflicts upon the stomach, it will bathe the skin with a cold perspiration, throw the voluntary muscles into a convulsive tremor, start the eyes from the sockets, agitate tumultuously the action of the heart, hasten the excretion of urine, and not unfrequently set up a diarrhœa.

Consider, next, and in connection with the example of *seeing*, as stated at page 35, the complex but perfectly demonstrable physiology of *sneezing*, when occasioned by a strong light impinging upon the retina of the eye, and where the primary exciting cause, or light, is felt through the eye, and the reflected nervous influence is felt through the nose, and in both organs as sensations of uneasiness. In this case the optic nerve transmits a different impression to the brain from that which occurs in *seeing*, and of such a nature that it de-

termines the nervous influence upon the lining membrane of the nose, though not through the olfactory or nerve of smelling, but through the motor fibres of the nasal branches of the fifth pair of cerebral nerves. This reflected impression sets up an irritation in the mucous membrane of the nose, which is propagated back to the brain through the sensitive fibres of the nasal branches, and again the nervous influence is developed, and reflected through the respiratory nerves upon the muscles of respiration, by which they are thrown into convulsive action. The irritation of the lining membrane of the nose, and the sensation, are similar to those occasioned by the action of snuff, or other errhines, upon the extremities of the nasal branches of the fifth pair. But, although the irritation is perceived in both the cases, the mind is not interested, in either case, in the involuntary action of the respiratory muscles. The nervous influence which occasions the sensation in the nose, is developed entirely by the physical impression transmitted to the brain by the action of light upon the retina of the eye, and its re-excitement in the brain and final determination upon the respiratory muscles are equally occasioned by the reverberation upon the brain of the physical impression set up in the lining membrane of the nose.

And now observe how perfectly the mind will do the same thing; since, by thinking intently upon a former paroxysm of sneezing, the mind will develop the nervous influence by its own direct action upon the brain, will determine that influence upon the nose, through the motor fibres of the nasal branches of the fifth pair of nerves, from whence it is returned to the brain through the sensitive fibres of the same nerves, as when tobacco is snuffed, and from thence reflected through the motor respiratory nerves upon the muscles of respiration. And so of vomiting.

Now, in these several examples of *sneezing*, it is, perhaps, superfluous to add, that the *primary* causes must be equally substantive agents; that is, the *light* which excites the brain through the optic nerve, the *nervous power* which irritates the membrane of the nose, and, also, throws the respiratory muscles into action, the *tobacco* which occasions the same irritation of the nasal membrane, and the *mind* which does the same thing when dwelling intently upon a former paroxysm of sneezing, just as in the case of *yawning* when simply thinking about it. The only apparent difference, so far as effects are concerned, between the physical and mental causes consists in the *self-acting* nature of the latter.

In all the examples hitherto stated in which the

mind is interested in the production of motion, it should be observed how clearly it appears from the analogy supplied by all other causes that develop motion through the instrumentality of the nervous system, whether in voluntary or involuntary muscles, that the mind, like the physical causes, is only an agent acting upon the nervous centres, while the immediate exciting cause of the muscular movements must be some influence generated in those centres by the several primary causes, and propagated from them upon the muscles which are brought into action. If the *mechanical or other physical irritant* which is applied to the nose, or feet, or lungs, or directly to the brain, be not transmitted to the muscles which they are remotely instrumental in bringing into action, so, also, *is not the mind;* but from the coincidence in effects, all the *primary* causes alike develop a certain special agent in the nervous centres, (known as the nervous power, and nervous influence, and nervous fluid,) which, by its transmission to the muscles in all the cases, is the *immediate* exciting cause of the motions produced; the power which actually produces the motions being implanted in all the parts, and brought into action by the nervous influence. If this species of evidence be not received, then must

all the attendant facts be denied, and every testimony of sense brought under the Berkleyan hypothesis. Nor can I imagine any other method by which the materialist can escape from the demonstration which I have made.

Let us, however, vary the illustration, by showing the complete analogy between the nervous influence, and causes acting directly upon any part of the body without the intervention of nerves; while, at the same time the proofs will multiply as to the substantive and self-acting nature of the mind. Take the simple examples of *excitement of the heart* by emotions of the mind, and *weeping* from the same cause, and the *flow of saliva* at the expectation of food. Here the mind develops the nervous influence by its direct action upon the brain, and determines it in one case upon the heart, in another upon the lachrymal glands, and in the other upon the salivary glands; and this influence starts the action of the heart, and the secretion of tears and of saliva. Now, that the mind is truly a self-acting agent in these cases, and the nervous influence a stimulus to the heart and glands, is unequivocally shown by pricking the heart, and thus renewing its actions, when extirpated from the body, and by the tears which are produced on irritating

the lachrymal duct in the nose by some physical agent, or the salivary ducts in the mouth, when the physical irritations are propagated immediately along the ducts to the glands, and increase the flow of tears and of saliva. The effects are equally the same in all the cases ; while, in the former series, the mind produces the effects by determining the nervous influence upon the several parts, to which the influence proves an excitant, and in the latter series the physical causes are the immediate excitants, since they bring the moving powers into operation by their direct action upon the parts, and without the intervention of the nervous influence, or, at most, but slightly so. Here the physical causes are equivalent both to the mind which excites the brain and the nervous influence which excites the heart and glandular organs. They are plain examples, also, of what is everywhere in progress, of various parts being brought into the same states of action by physical agents acting directly upon them, and by the nervous influence as brought into operation by its antecedent development by the mind. In one case the hand, for example, provides and applies the pin to the extirpated heart, in the other the mind provides and applies the nervous influence to the organ. Or, according to former explana-

tions, the nervous influence may be equally excited and determined upon the heart, and with the same exciting effect, by physical impressions propagated to the brain from remote parts, as by pungent vapors applied to the nose, cold water to the surface, pricking the skin, tickling the feet, &c. The mind, the nervous influence, and physical agents, are all on a par, in principle, as it respects their character of substantive causes in relation to effects. In farther regard to the heart, in the foregoing examples, the coincidence between the mind and physical causes, as substantive agents, is not less unequivocally shown by the application of alcohol to the surface of the brain, when the heart is instantly thrown into increased action, just as it is when emotions of the mind operate, and just as when it is pricked after its extirpation from the body. You cannot fail of observing a common principle in all the cases,—*something* irritating all the organs.

Such are plain examples, among a multitude of analogous ones. But we must consider others less obvious, that materialism may not oppose us with specious problems in organic philosophy, for it may be divested of even a shadow of foundation. It may, for instance, be asked, how will you explain the movement of the limbs during

sleep, upon your doctrine? The ready answer is, exactly upon that doctrine; since the facts are of the same nature with those already stated. In these cases, the act may be either voluntary or involuntary; but throughout, it arises from some impression exerted upon the nervous centres. Sleep may not be so profound as to suspend entirely the action of the will; or, in other cases, the motion is remotely owing to unusual impressions propagated from the limbs to the nervous centres. These remote impressions arise from some constrained position, or analogous cause, and may not awaken perception, or call the will into exercise. The phenomenon is then precisely coincident, both as to cause and effect, with the motions of decapitated animals; as when, for example, a decapitated tortoise draws up its leg on being pricked, or as a bird flutters or runs on striking off its head. It is well settled that these motions are involuntary, and that the nervous influence, in such cases, proceeds from the spinal cord.

In respect to the movements of the limbs during sleep, it seems highly probable that they generally involve a sense of consciousness, and an act of the will, when it is considered how remarkably the operation of the will is under the influence of

habit; and how impressions upon the brain are constantly perceived without special attention. Such may be the case, in certain degrees, with the ordinary acts of respiration during the waking hours; but in perfect sleep, from the universality and regularity of respiration, the will can have no connection with that process. (See *Institutes of Medicine*, § 451, *c. d.*)

The impression upon the nervous centres, in these cases, is similar to that which proceeds from the organic viscera, and by which their actions are influenced. But in all there is a distinct foreign cause in operation upon the great central parts of the nervous system; and so perfect is the coincidence throughout, that it follows, irresistibly, that the mind and the instinctive principle, are as distinct from the brain as are the other causes.

Let us next suppose that the materialist will demand of us an explanation, upon our general facts, of the influences which are concerned in sleeping in the erect posture; which is common to many animals. The physiology of voluntary and involuntary respiration, and of the action of the constrictor muscles, and the exact coincidence between the voluntary and the involuntary acts, in either case, respectively supply an answer to

the interrogatory. You will bear in mind that an unceasing nervous influence, developed in the nervous centres by special remote causes, and thence determined upon those muscles, is the immediate exciting cause of their involuntary action. It is plain, therefore, without farther demonstration, that in sleeping in the erect posture, the muscles are placed by the will in a state of tension which determines upon them an unceasing nervous influence after the action of the will is suspended, and in a manner analogous to that which holds the sphincter muscles in a state of permanent contraction. Indeed, the two cases are so much alike, as there is always a certain degree of involuntary nervous influence operating upon the voluntary muscles, and of course, independently of the will, by which their antagonism is balanced. This is shown by the division of nerves, as when those on one side of the face are divided, or paralyzed, the opposite side is drawn away. Another example occurs in the wry neck.

The same explanation is applicable to the contracted leg of the bird, in roosting. The whole principle, in all its manifestations, according to the nature of the animal, and the uses of parts, has its foundation in consummate design; and if

we may not trace out the exact mechanism, or the remote causes, in all the cases, there are a multitude of analogous facts which have been clearly ascertained, and which as clearly interpret the less demonstrable problems to every right-thinking mind. The route of the nervous influence among the organic viscera, and even among the voluntary muscles, is often eluding the knife of the anatomist; and well may he often despair of success, yet rest in the conviction that Nature operates by general laws, when he considers the fact that the will determines its influence upon whatever voluntary part it chooses, may compound its actions upon a great variety of parts, isolating many intermediate nerves, or elect one only, and far removed from its own seat of operation. And so he shall equally find it in organic life, where the passions play their part, at one moment upon the heart, at another upon the skin, or kidneys, or raise the blush of modesty in the capillaries of the face, or strike us dead in an instant; and he may witness far greater demonstrations of the same principle in the action of remedial agents. But the operations of the will alone, in its connection with physiological analogies, are enough to substantiate my conclusions with every understanding. You almost see the self-act-

ing principle enthroned upon the great centre of the nervous system, wielding at its inexpressible pleasure, and through the instrumentality of its organ, that amazing power which as far surpasses electricity in its compass and variety of phenomena, as the effulgence of the human mind transcends the glimmerings of instinct. The will but commands, and all its associate faculties obey, or tumultuous passion settles down in tranquil submission. With inconceivable rapidity of action it directs all the muscular movements, which form the various feats of dexterity, the flight of animals, and the melody of song.

Observe, also, an instance which exemplifies the manner in which the will may restrain the deleterious action of physical agents, and where it displays its most profound and far-reaching power. It may be often summoned to the prevention of colds, sea-sickness, various epidemic diseases, &c. In all these cases it operates, however variously, by holding fear in subjection, which, by increasing the susceptibility of organs, predisposes them to be acted upon injuriously by physical causes.

Who, then, shall go on to imagine that all this wonderful display of a single element of the mind, operating through a variety of organized structure, can depend upon chemical mutations of the

brain, or any organic function of that organ, and where we should be left with more than a paradoxical problem as to the *cause* of the cerebral movements?

In what I have said on former occasions of the distinct nature of the soul and instinctive principle, and of their connection with the brain, my remarks have had special reference to the mind and instinct in their immediate relations to the body, as established through the medium of the cerebro-spinal system.* But I will now say, that the brain is subservient to the soul, independently of its relations to the body, and in all its highest

* See *Institutes of Medicine*, § 234, *f.* 241, 500, &c.

The following remarks occur at § 500, *p.* In respect to the subserviency of the brain to the operations of the mind, I will add in farther explanation of what I said in § 241, that we have the best reason for believing that the brain is especially designed for the subserviency of the will and perception, and has comparatively little connection with judgment, reflection, &c.; and less with perception than with the will. The great final cause in respect to the soul and instinct, particularly with the latter, is to serve as a medium of communication with the voluntary muscles, through the nervous power. The will is, therefore, a stimulus to the brain, while the organ supplies, in consequence, the nervous power by which the voluntary muscles are brought into action.

In respect to perception, we discover the relation of the mind to the brain in another aspect, and, also, another analogy between the will and physical agents as vital stimuli. Through sensibility the brain is acted upon, and this impression rouses the mind, or its property, perception, and sensation is the resulting effect.

functions; while it manifests no such subserviency to the instinctive principle of animals. The instrumentality of the brain, in the former case, comes through that property of the soul which is known as perception, and to which the senses are subordinate. The same property belongs, also, to the instinctive principle; and so far as mere sensation is concerned, or as it may give rise to volition in its simple relation to animal life, the results are apparently the same in man and animals. But it goes no farther in animals, though in man, perception, as resulting from sensation, is the great fulcrum of reason, and the fountain of intellectual knowledge. But that knowledge, garnered up, stands in relation to reason as the fruits of the harvest to the husbandman. Every avenue to the mind may be shut, but the harvest of facts remains, and may now be multiplied, cultivated, embellished, by the light of reason alone. We have seen, indeed, indisputable proof, and in very forcible examples, that the mind is capable of profound inventions in its uncultivated state, and where no contributions are made through the medium of the senses. (P. 51.) And here I will add another proof as to the individuality of the soul in correspondence with what I have said, on another occasion, of the distinct nature of the principle of

life; and it will be also seen that they corroborate each other. The facts which are treasured up are ever present from childhood to decrepit age. But as the brain is constantly subject to renewals, the facts should go with the parts upon which they are impressed, if the brain alone be their receptacle. Or, in the language of organic chemistry, all former ideas should burn out as the parts of the brain upon which they are impressed may undergo combustion. It should be the same in this respect as with the transcript of ideas upon paper after the paper is burnt. Nor can any loss of knowledge be assumed as a proof that such an obliteration of ideas is owing to the supposed combustive process, or to any other mutations of the brain; since that is contradicted by the indelible nature of a greater amount of knowledge through the lapse of years. Why are the events of childhood fresh to the octogenarian, when those of the day are speedily forgotten? Why may memory be trained with especial reference to particular subjects, and to a forgetfulness of others, or disciplined to the general compass of knowledge; or why is it the tendency of *mnemonics* to impair the whole mind? Materialism must here be consistent, and stand on its own philosophy. But the soul, as also the instinctive principle, being of an unchang-

ing nature, (as proved by these very facts,) holds fast the treasury of knowledge, or the improvements it may gain. And so of the principle of life and those permanent impressions which come to it through the medium of the body.*

In respect to knowledge, and its independent improvement, the will alone may summon, through other elements of the mind, a host of intellectual images, and render them tributary to those abstruse processes by which the laws of the Universe are scanned, and mind itself analyzed and understood.

Here, too, we discover a more elevated office of the will in the control which it exercises over the highest attributes of the soul. There is nothing like all this in animals. It is all instinct with them, while it is only feebly shadowed forth in man.† And this leads me to indicate the most fundamental distinction, in a physiological sense, between the soul of man and the instinct of animals; nor am I aware of any well-founded exception to the distinction which I make. Their principle of guidance is limited exclusively to the

* See *Institutes of Medicine*, pp. 84, 87, 383—397, 423—426, 520.

† See *Institutes of Medicine*, p. 122—125, where the terms *understanding* and *mind* are examined, and a fact set forth to prove the identity of species in the human race.

uses of the body. It is in complete operation at the moment of their birth; when its dawning has hardly begun in the human species. It is as perfect in the ant as in the elephant. "The ox knoweth his owner, and the ass his master's crib"; and that is the compass of their knowledge. It has no higher aim in the brute than *the mere wants of organic life*, and it never operates without manifesting effects, either active or passive, in *the mechanism of animal life*. That is its grand characteristic, and its broadest contradistinction from the mind. It terminates there; and reason, therefore, must prompt the conclusion that the instinctive principle perishes with the body. But how different with the soul, which spans the sciences, rolls up its vast acquisitions from the depths of analogy, the majestic stream, which, as Horace has it, *labitur et labetur in omne volubilis ævum*, and sees in itself "the Image of God"! All its noblest functions have no relation whatever to the uses of the body. The untutored savage has all the perfection of life that is enjoyed by a Newton. He may become a Newton without a gain to his corporeal being. Here, in the exercise of reason, all physiological analogies fail. There is no participation of the nerves, no influences seen upon any part of the organism.

We look upon its manifestations as apparently emanating from itself alone.* By parity of reason, therefore, as it respects instinct, we must conclude that the soul will continue to exist without the body. Nay, more, the conclusion derives no little support from the argument drawn as to the perishable nature of instinct. The facts, in both the cases, concur together in advancing the demonstration. If I might, also, be permitted to deviate, for a moment, from my physiological ground, to final causes of a moral nature, I would

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* This is manifestly allied to Creative Energy, and is probably what is meant by the "Image of God," since, also, it is the grand distinction between the soul and the principle of instinct.

"The soul," says Addison, "considered with its Creator, is like one of those mathematical lines (the asymptotes of the hyperbola) that may draw nearer to another for all eternity without the possibility of touching it; and there can be no thought so transporting as to consider ourselves in these perpetual approaches to Him, who is not only the standard of perfection, but of happiness!"

Here, also, see Addison's beautiful metaphysical argument upon dreams, as to the nature of the soul, in *Spectator*, No. 487.

To facilitate a farther analysis, through physiological principles, of the subject, as embraced in the note at page 82, I may say, that while the rational properties, as judgment, reflection, &c., act, as it were, in behalf of reason, and in apparent independence of the brain, the *will* manifests a like independence in directing the processes of reason. The operation is then realized only through the medium of consciousness. But, in all its manifestations upon the voluntary muscles it rouses the brain

point your attention to the manifest uses of animals for the human race, as a farther proof of their absolute extinction when those ends are fulfilled; and on the other hand, to the noble and sublime objects of man in his no less obvious companionship with God, as equally conclusive of the perpetuity of his being.

Still, the analogies between the soul and the principle of instinct are such, that if one be a distinct essence from the brain, so must be the other. But the great practical final causes of

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into action, develops the nervous influence, and directs it upon the organs which are set in motion. This variety in the functions of the will, and which is demonstrable in respect to the muscles, is very expressive of the relations which the soul and the principle of instinct bear to the brain, though operating in animals only in the lower aspect of volition. But its combined prerogatives in man show us forcibly the self-acting nature of mind, and that the brain, in its relations to the body, is especially designed as a medium through which the soul and instinctive principle may govern the animal fabric; while the organs of animal life do the mutual office, through the same medium, of conveying impressions to the immaterial part. It may be also farther said, that, since there is nothing in the manifestations of the will, when it operates in the processes of reason, which denotes any development of nervous influence, while that influence is strongly displayed when the action of the will refers to the organs of volition, this distinction in its moral and physical functions corresponds exactly with my inductions as it respects the general constitution of mind, and the relation which the mind bears in other respects to the body.

the soul and the principle of instinct, independently of our other facts, are broad fundamental distinctions between them; nor have they, within my knowledge, been hitherto indicated. It is, however, only a display of the common law of analogies which prevails throughout organic nature. The coincidence and the distinction between reason and instinct are far less remarkable than the corresponding analogies and distinctions which are supplied by organic life in its greatest extremes; for there is not a single organic function performed by man that is not equally so by the lowest plant. With greater reason, therefore, should we argue the identity of man and plants, than of the soul and the principle of instinct.

I am finally conducted to some more circumstantial, but brief remarks upon my special proposition, that certain properties of the soul, as judgment and reflection, or those elements which constitute the reasoning part, act in greater independence of the brain than has been supposed by any physiologist. This conclusion I endeavored to sustain, on a former occasion, by certain direct facts,* and I will now add a physiological consid-

* See *Medical and Physiological Commentaries*, vol. 2, p. 139, *note*

As examples of the facts which are there collected, I may re-

eration which appears to me demonstrative. In any event, I should be glad to see another interpretation.

In the mean time, let me not be misunderstood. Far be it from me to imply that there is not a certain co-operation of the brain in all acts of intellection, and that the full exercise of the intellectual faculties, as well as of instinct, re-

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peat the following. The celebrated Saussure was affected with extensive disorganization of the brain for the space of five years without any sensible alteration of the intellectual powers.—Mr. Howship relates a case where, in consequence of a slight blow on the head, the whole middle lobe of the brain was found in a state of *scirrus* forty years afterwards. But with the exception of occasional pain, the subject had no other symptoms till towards the decline of life, when she became gradually sleepy and stupid.—Here is a case which interests also certain physiological and phrenological doctrines. A lad aged 11 years received a kick from a horse, which fractured the frontal bone. "In two hours after, he recovered every faculty of his mind, and they continued vigorous for six weeks, and to within an hour of his death, which took place on the 43d day." "He sat up every day, often walked to the window, frequently laughing at the gambols of the boys in the streets," &c. On dissection, in presence of other physicians, "the space of the skull previously occupied by *the right anterior and middle lobes of the cerebrum* presented a perfect cavity, filled with sero-purulent matter; the lobe having been destroyed by suppuration. The *third lobe* was much disorganized. The *left hemisphere* was in a state of *ramollissement* down to the corpus callosum." This case should be compared with the celebrated one by O'Halloran, where there was great destruction of the brain without any derangement of intellect.

quires, in a general sense, a natural condition of the organ; and their greatest exercise, at least of the former, developments of the organ beyond the natural standard. This is inferrible, not from the direct manifestations of mind, but from what we observe of their relations to anatomical characteristics, natural or morbid. Equally true is it, also, from the co-operation of the soul and the brain in the processes of reason, that excessive exercise of the mind is felt in the organs of organic life, and too often permanently felt. The proper development of the brain is also arrested, and thus, in its turn, the mind suffers a corresponding injury. My general premises would lead to this conclusion, and our primary schools confirm the principle in the lamentable amount of broken constitutions, and smothered intellect. Nothing like this has ever been witnessed from the most severe discipline of the instinctive principle. On the contrary, by untiring zeal, and the lash of instruction, it is often susceptible of artificial impressions in the *infancy* of animals, and *only then*. It is just the reverse with reason. It should be observed, however, that what has been thus supposed to be a "*cultivation* of instinct," is, in reality, no such thing, since it subserves no useful purpose, and only

manifests itself under the special influences, respectively, by which the several impressions were originally produced. The "tricks," &c., of the animal, wherever there is a deviation from the natural operation of instinct, require suggestions from the associate causes. Unlike improvements of the rational faculty, the artificial conditions of instinct do not operate without the presence of these primary causes, or their equivalents, and then always in exact conformity with the nature of the external cause. In other words, (for the distinction is important,) reason operates independently of remote causes; the artificial conditions of instinct require the agency of such causes to bring them into renewed manifestations. In the former case, the senses are not interested; in the latter, impressions must always be made upon sense (as in seeing and hearing) and transmitted to the brain, when instinct will operate in an automatic manner. It is only a display of those low analogies with the soul to which I have referred.*

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* *Imitation*, as seen in parrot-talking, belongs to the same principle. But in these cases it is more constitutional, and will therefore display itself as an offspring of nature, and as a matter of habit, and without any extraneous prompting. What is thus acquired from man by the parrot, and magpie, and which has been supposed, even by Mr. Locke, to evince a rational faculty,

Even the promptings of instinct, which impel animals to search after food, whether for present or future use, have their origin in sensations transmitted from the stomach to the brain. The same physiological influence of hunger, in respect to immediate wants, operates in the infancy of man, though without discrimination, for the infant will as readily suck at all things else as at the breast. Its apparent instinctive impulses go no farther than the movement of the mouth; and that is *all* the display of instinct it evinces, unless farther shown by its cries when hunger remains unappeased. Yet even is this urged as a parallel example with the promptings of instinct in animals, that an identity may be established between instinct and reason. But as soon as reason obtains its development, it displays an endless variety of inventions for the sustenance of life, which

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is derived by other birds from other songsters, particularly by the American mockingbird, and catbird, who appropriate the notes of all other warblers. Now, there is nothing more in parrot-talking than in these last examples. They go towards the illustration of our subject in showing how instinct is adapted to the peculiarities of organization in different animals, while in man the will is enabled through the rational faculties to imitate every variety of voice and vocal music, and to perform almost endless combinations of muscular movements which are never executed by animals.

are wholly irrespective of associations with the original physiological incitements. "It casteth bread upon the waters, that it may find it after many days." Whatever similitude may seem to exist between these acts of intelligence and the acts of the animal in procuring food, or providing for the future, organic influences are interested in the latter as often as hunger returns; and so far as the processes are dependent, in animals, upon the inscrutable constitution of instinct, they are contradistinguished from all the analogous manifestations in man, by their undeviating uniformity in animals, and according, also, to the species of animal. Man, it is true, is, like the animal, protected in his organic condition by a sense of hunger; but it operates in him, in supplying the wants of nature, in an endless variety of ways, and at times only when most compatible with other occupations, or most conducive to a "feast of reason and a flow of soul"; or, the impulse may be resisted till starvation takes place. In animals, on the contrary, the sense of hunger is the time for eating. That is its aim and end, and the whole of its compass.*

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* "Thou makest darkness, and it is night; *wherein all the beasts of the forest do creep forth.* The young lions *roar after*

Hence, also, it will be seen that memory is different in man from its nature in animals. In the former it is often relative alone to acquirements which the mind has made through its own processes of reflection, and they may be as vast and profound as the elaborate inductions which led to the discovery of the universal law of gravitation, and thence to the calculation of the existence of the planet Neptune. Nor does memory require any extraneous aid, like the apparently corresponding function in animals. It is a rational function in one, independent of sense; an instinctive one in the other, and dependent upon sense. In one it may involve a vast complexity of ideas; in the other it is relative to the single impression which had been transmitted to the brain by some external cause, and which can be recalled only by renewed applications of the same or analogous causes. By extending the analysis in this manner, it will be seen that it is all soul in man, and all instinct in animals. Nevertheless, it is due to

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their prey, and seek their meat from God. The sun ariseth, they gather themselves together, and *lay them down* in their dens. *Man* goeth forth to his *work* and to his *labor* until the evening." "In the *sweat of thy face* shalt *thou* eat bread." "Behold the *fowls* of the air; for they *sow not, neither do they reap, nor gather into barns;* yet your heavenly Father *feedeth them.*"

truth that it should be conceded that some of the manifestations of instinct appear to be insusceptible of explanation upon the physiological grounds which lie at the foundation of my demonstration; such, for example, as the migration of animals, the unerring flight of the carrier-pigeon, and the return of the bee to its hive through miles of trackless air. Exceptions, however, of this nature are but few, and if they be admitted to surpass our present knowledge, the probability will be allowed, through the weight of analogies, that even these problems will be seen to be related to the common physiological laws which rule the instinctive principle in its ordinary operations, and more especially so as they refer, in common with the rest, to the wants of organic life. It should be also considered that each act is distinguished by its simplicity, is peculiar, in certain respects, to each species of the animals so endowed, while the endowments, and their several peculiarities, respectively, are forever attendant on every individual of the species, always operating in one uniform way.

But if such be some of the difficult problems in the physiology of instinct, they may be applied with abundant effect in establishing the distinction between instinct and reason; since the latter

is incapable of the same achievements, and therefore a proof of their dependence upon a principle which is very different from reason. But the most curious problem in the history of instinct is its natural mutations in certain animals, and which carry with them an abundant proof of the radical distinction between that principle and the soul, and that the former is designed for the mere purposes of organic life. It has been seen in a *note* at page 18, that many animals are subject to what is called metamorphosis, but that there is no other principle concerned in the successive developments of structure in those cases than what obtains in the evolution of the human ovum. A common law prevails in that respect throughout the animal and vegetable tribes. But in many of the instances the changes of organization, which have acquired the name of metamorphosis, are far greater than in the rest. This is especially true of insects, a large proportion of which have four stages of existence,—the egg, the larva, the pupa, and the imago, with corresponding instinctive habits in the last three. But, in many insects the metamorphosis is far from being complete, and these partial changes are seen to pass by gradations into the progressive developments of structure among fishes and birds. A series of connect-

ing links, or universal principle, or great law of analogy, thus stretches itself from the insect which undergoes the most perfect metamorphosis to the highest order of animals. The same thing, indeed, is witnessed, under a great variety of aspects, in every thing which relates to the whole organic kingdom, whether of structure, functions, or laws. In respect to the metamorphoses, where they are most remarkable, some of the organs undergo such modifications as to require a change of conditions in the stimuli of life which could not be realised without corresponding modifications in the promptings of instinct. This is strikingly illustrated by the difference in the wants and habits of those animals which at one period breathe in the water with gills, and subsequently in the air with tracheæ, and in the larva of bees, borers, saw flies, ichneumon flies, and the full grown insects. Now all the corresponding mutations of instinct have palpably an exclusive reference to the varying conditions of organic life, and nothing, bearing any analogies, can be more unlike the characteristics of the human mind. Like the law of development which is engrafted upon the ovum of insects, a corresponding law obtains in respect to their instinctive essence, which shall harmonise in its mutations with those modifications of organic life

that distinguish the several stages of metamorphosis.

The same contradistinction is broadly shown in all the phenomena which are most allied between man and animals. The peculiarity of instinct, for example, in each species of animals, and its transmission, universally, to the same species, by which many lay wait to entrap their food, but variously, although always exactly in a certain way, according to the nature of the species, while others wait until the food is delivered to them, and neither species takes forecast beyond the present sensation of hunger, but in yet other species the principle seemingly operates after the quiet manner of reason in providing for their future wants. In all these cases, as in the others, every individual of the species, and throughout all generations, seeks its food in the same exact manner, to the same extent, and with precisely the same apparent forecast as to the future. All this, too, is clearly allied to those suggestions of instinct which I have provisionally excepted from known physiological influences; but this very alliance, and the obvious relation which the devices for procuring the means of sustenance bear to the wants of organic life, are a substantial ground of induction that the apparent exceptions are founded in corresponding

physiological laws.* The pigeon returns to his distant home for his accustomed supply of food, and the bee to lay up for the future. That correspondence between the peculiarities of instinct and the mechanism in animal and organic life is so strikingly full and perfect in its design, and so unlike any of the manifestations of the human mind in their connection with the organs and functions of either division of life, that a glance at the former will contribute farther aid in distinguishing the soul from the instinctive principle, and in proving the absolute existence of instinct as a distinct essence of the brute creation. Now, it will be found that in every species of animal, excepting man, the promptings of instinct, in the pursuit of food, have a direct relation to the peculiarities that may exist in the organization of the stomach, and the modifications of the special endowments of the gastric juice, in each of the species, by which one species is enabled to convert flesh, another nuts, and another hay, &c., into one homogeneous substance, called chyme, and which, from man to the lowest tribes, is apparently alike in all, whatever the nature and the variety of the food. But the agreement between man and

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* See *Institutes of Medicine*, § 353.

brutes is limited to that result; and what is true of the precise adaptations of instinct to the organic conditions, and its invariable operation in one established way, according to the nature of the animal, is in no way true of the human mind; for the latter operates, in this respect, according to other acts which involve the exercise of judgment, &c., and very variously, also, according to individual suggestions of reason, passion, love of sensual gratifications, the exigencies of disease, &c.; or, in the vast uncivilized regions, no provision is made for future wants.

Since, therefore, instinct has its special constitution conforming to the organization of the stomach and the peculiarities of the gastric juice, we shall see how far it is related in its peculiarities to other varieties in the organs of organic life, and to the varieties in the mechanism of animal life, by considering how all these peculiarities in every species, respectively, have an equally direct reference, as the peculiarities of instinct, to the special organization of the stomach and special constitution of the gastric juice. If, therefore, such be the relation of the whole mechanism of animals, both organic and animal, to the special condition of the stomach and gastric juice in their adaptation to the va-

rieties of food, in the several species, it is obvious that instinct in all the species, respectively, must be constituted with a corresponding reference to every part of the organization. Now an intestine, claw, tooth, hoof or any bone of an unknown animal being given, we may construct a skeleton, say from the bone, that shall be nearly true to nature in all its parts. We may then proceed to cover it with muscles, provide it with claws, or hoofs, and special kinds of teeth, &c., and lastly, we can tell from that tusk, or claw, or hoof, or other bone, what was the structure of the digestive apparatus, and to what kind of food the gastric juice was specifically adapted, and what were the peculiar instinct and habits of the animal; so special is the adaptation of all other parts of the organization, both in animal and organic life, and all the habits and instincts of animals, to the peculiarities of the digestive organs in every species.

How different with man in all that relates to his organic wants! His means are endless, as various as the individuals, critically referring to his constitution, fluctuations of health, &c. They are intellectual means, in which judgment and reflection take the lead.

However the inquiry may be pursued, it will

always result in a uniform way. To enable you to pursue it most readily, I may point your attention to the correspondence between the instinct of animals and their weapons of defence; each species of animals, and all the individuals of the species, acting defensively or offensively according to the special weapons with which they are provided. These means of protection embrace not only such as are actively employed, like horns, but others of a passive nature, varying from the quills of the porcupine to the armor of the rhinoceros and the scales of fishes. All the natural animal poisons fall, also, under the same denomination, as do, likewise, the galvanism of the electrical eel, and the ink of the cuttlefish. Many of the important members of animal life embrace, also, among their designs that of self protection; such as the claws, teeth, beaks, &c., of beasts of prey. So, too, the poison of serpents, and the weapon of the swordfish, are designed as well for self-preservation, as for procuring the means of subsistence. Again, certain animals, and those, too, of inferior orders, such as cockroaches, some species of worms, often affect the appearance of death when closely pursued; and where this is seen in one animal, it is common to all the individuals of the species.

Other animals, as many birds that keep near the ground, are protected by the color of their plumage; and in these cases instinct displays itself in conformity with the special means of protection, and the animal lies close. It starts only when discovered, and then the wings or legs become the means of safety. The peculiarities in all the species are perpetuated with so little variation, that they show themselves like the results of some well-contrived machinery. In all the cases there is a manifest unity of designs, which conspire together for the well-being of organic life. Or, where the means of safety which I have mentioned are wanting, substitutes exist for their flight or retreat, &c., and where instinct is equally and exclusively adapted to the physical provisions. In all the cases, too, the means of defence, of offence, of flight, or of whatever variety or modification, are adapted to all the mechanism in animal life, to special sensation, &c.; and, according to the whole, will be the special promptings of instinct for the protection of the individual. Fear, in its ordinary acceptation, therefore, is not the impulse which sets in motion the means of safety, in animals, or only so, at most, in a limited number; and this is seen especially in the numerous species whose mode

of defence is aggressive. I need not add how entirely otherwise it is with man, who adopts all modes of defence, and how obviously dependent upon totally different promptings.

It is farther worthy of observation, as showing, by analogy, how universally related, and how entirely restricted, is the instinctive principle to the exigencies of organic life, that we find numerous species of plants provided with various means of protection, but forever the same in the same species, and for exactly the same security as the corresponding endowments of animals. Such, therefore, are the provisions of nature for the protection of organic life where reason cannot wield its power.

But observe another fact which equally separates instinct from the soul. The young animal will turn from danger about as impulsively as the old, while the human infant will thrust its hand into the blaze of a candle sooner than it will seize the nourishment which is simultaneously offered. In animals, indeed, the most exquisite sensitiveness to danger prevails, transcending even the promptings of hunger. The predominance of the principle in animals is designed alone for the preservation of organic life, and such are their exposures, and so limited their

conceptions, it is made to operate with great uniformity and instantaneousness. In man, on the contrary, its impulses are comparatively feeble and slow, and, so far as it obtains, it aims at a variety of objects. Examples are often adduced either of an apparent cultivation, or of a natural exaltation, of the instinctive perception of danger, with a view to the identity of instinct and reason. One of the strongest is seen in the elephant on crossing a bridge, or when embarking on a steamboat, as he first presses the bridge or the boat with a single foot to learn their stability. Instinct is here constituted with reference to the weight of the animal, who would be otherwise exposed to frequent injuries, and the associations that are indispensable to safety are early formed. But they go no farther, and this particular demonstration is seen only in animals that may break a bridge or sink a boat. It is, however, only an instance of the ordinary impulsive associations which are always in operation in cases of danger, and is exactly similar to the careful tread of the smooth-shod horse when about stepping upon ice, (though not the rough-shod,) and to the doubling of the hare as pursued in the chase, or the wariness of the fox in eluding the trap, or the squirrel in his curious expedients to

escape from the sportsman, &c. The variety in these examples is almost as great as the species of animals, and they all belong to that exquisite principle which warns them of approaching danger. It is often seen, indeed, in the aspect of mutual protection among animals of the same species, when it always operates according to the nature of the species. The crow has his sentinel, and the affrighted ant throws the whole hive into the same alarm. And now, if this analysis be pursued through an obvious series of analogies, it will be found that the habits of bees in relation to their queen, and many other remarkable problems in the history of instinct, are allied to the principle which I have just considered.

Another shade of difference in the general principle occurs in an example which has been presented by metaphysicians to illustrate the supposed identity of instinct and reason. It is that of the dog, when making for a boat, who has been seen once, at least, to lay out the plan of first ascending the bank of a stream above the boat, that the distance between may compensate for the motion of the water, which would otherwise carry him below his destination. I present the example in its strongest light, and as implying all that can be surmised of a rational process. But,

with all instances of a similar nature, it falls within the common laws of the instinctive principle, which are just so far operative, according to the species of animal, as shall subserve the exigencies of life. In the case of the dog, this animal is more or less addicted to the water, and his instinct is therefore adapted to the emergencies that may attend that temporary mode of life. He early acquires, in consequence, an impulsive apprehension of the effects of strong currents of water, and he is so far capable of forming associations as may be necessary to his safety, or to his natural wants. The instance of the boat is one of safety and of want, and is exactly parallel with that where all dogs will elect a bridge of 500 feet in preference to swimming a width of a dozen feet. The knowledge of the effects of a current of water exceeds but little that of its quality of wetting; and when, therefore, a dog is moved by the desire of bathing, he neglects the bridge and takes to the water.

Various prejudices and misapprehensions relative to supposed instinctive acts abound in the community, who are prone to the most favorable comparison of the brute with his lordly associate. The rarity of apparent evidences of reason in brutes, and the enjoyment of what is thus unex-

pected and wonderful, lead the multitude to seize upon what is accidental, and carry it to the account of instinct. An example of this, which has often gone the round of the public, is that of the elephant and apple, where the latter, being just beyond the grasping range of the animal's trunk, was made, by a forcible projectile blow, to rebound within its reach from an opposite wall. But this was an act of irritation; the blow being designed in the same resentment as when provoked by any other cause.

The speculatist points to the care with which animals provide for their young, and the apparent analogy between their attachments to offspring and that of man, as evidences of the supposed identity of reason and instinct. But I answer that the analogy is more seeming than real, and that however the principle may have an ultimate reference to the well-being of organic life in the infancy of man, it embraces in him far loftier objects, and prompts to an endless variety of useful purposes in the care of his progeny which have not the least relation to the exigencies of organic life, but which, on the contrary, are greatly relative to the culture, the enjoyments, the morality, the religion, the eternal welfare, of their spiritual part. It follows them

through all the stages and vicissitudes of life, rejoices in their happiness, and grieves for their adversities, with a never-ending joy, or a grief that is only equalled by the suffering of the offspring. When intercourse fails, every expedient is devised, from the tardy messenger to the electric telegraph, to impart renewed expressions of affection, and fresh hopes of prosperity. And how is it on the part of the offspring? Does not every heart beat responsively to the Divine command to "honor thy father and thy mother"? And can there be imagined a broader distinction between the attachments of animals and of mankind than what Scripture implies and what man approves? The very attachments which man contracts for favorite animals flow from the divine sentiment which is impressed upon his soul. And then all that kindred display of sympathy and friendship among companions of mutual thoughts, or of heartfelt kindness towards the faithful and trusty servant, or the relative partialities between the master and the slave, or the universal characteristic known as the sentiment of humanity,—where, I say, shall we look for the dawning of these mental attributes in the constitution of instinct? And what of the instinctive movements of animals towards their immediate offspring? Wherein is the impulse

related to human affections? Does it not operate alone for the preservation of life, and thus incidentally for the mere perpetuation of the species, as conclusively shown by the total and abrupt disappearance of brute attachments as soon as the offspring can provide for and protect themselves; and this, too, at ordained times according to the species of animal? Nay, more, parents and offspring mutually abandon each other at the allotted times, and turn upon each other.

Finally, the same distinction exists between the loves of the sexes in the human race and what is observed of the brute creation, and is not less opposed than our other facts to the assumed identity of reason and instinct. The former is kindled by Divine love, solemnized by Divine authority, and takes in its scope the loftiest sentiments of mind, and anticipates all the intellectual endearments of domestic society, and yields a grateful tribute to its munificent Author. Nor can there be a parallel between reason and instinct more degrading to man or more unjust to his Maker, or more characteristic of a perverted mind, than that which is so often drawn in respect to human and brute affections. Yet he who makes it has a better opinion of himself, and only thinks so of the rest of his race.

And this leads me to speak of the very remarkable distinction between the soul and instinctive principle known as *conscience*. I employ the term in its popular acceptation, as meaning the ability and the impulse of man to decide on the lawfulness or unlawfulness of his own actions and affections, and to instantly approve or condemn them according to their nature. Nothing like this has ever been manifested by animals. It has a clear reference to the moral, religious, and social well-being of the human race. It may be said, however, in objection, that the dog, for example, manifests a sense of wrong when he surprises the game in a manner opposed to his instruction, or does other analogous acts. But this manifestation happens only under the influences of those physical causes which led him to act more habitually in a different manner. The sense of wrong does not originate from the act, or on account of the act, but is inspired by the presence of his master, whom he associates with the suffering which he endured when his instinct was undergoing discipline, and thus resolves itself into dread of punishment. It is, therefore, exactly analogous to all the other functions of instinct which I have indicated, and forms the limit of associations of which animals are capable.

May I not, therefore, avail myself of the metaphysical induction, that the process by which we arrive at the distinctions between reason and instinct is a conclusive proof of the correctness of my distinction between them? Is it even probable that animals have any conception of their own existence beyond what may arise from present sensation?

So far, then, these facts go with the rest in establishing the several conclusions already deduced. But it does not follow from what I have said, that the rational may not act in greater independence of the brain than the instinctive faculty.

My argument to this effect is founded upon the distinctions which I have indicated between the soul and instinct, and upon the analogy which obtains between the brain of man and of the highest order of animals; though just the opposite conclusion has been deduced from this analogy. But the inference as to the equal dependence of the operations of the soul and of instinct upon a concurrent action of the brain has also depended upon a neglect of the distinction in their attributes, or an assumption that there is no difference. The analogy in such a case would be sound and conclusive. But our premises are indisputable, that all the higher acts of intellection, every thing

which falls within the province of reason, have no existence in animals. It is the only thing, indeed, which essentially distinguishes man from the brute. And since, therefore, the organization of the brain of the higher animals is greatly like that of man, and since instinct is as perfect and as comprehensive in many of the lowest tribes where a ganglion takes the place of a brain, and is often as mature in the new-born as in the adult being, and far transcends, in all, the analogous manifestations in man, we must logically conclude that what is so absolutely peculiar to the soul, and, as generally granted, allied to God himself, acts in greater independence of the brain than does simple instinct. Our demonstrations show, indeed, that even instinct is capable of originating actions in the brain. But so inscrutable are its connections, like those of the soul, with the organ in which it resides, that I shall not trespass beyond the limits which are prescribed by observation. Our facts terminate abruptly at this point, and mystery begins. But we may pursue the facts, and reason upon them as upon the most tangible evidence. We will, therefore, interrogate other proof in support of my conclusion.

We have seen, that every variety of cerebral structure, from its approximation to man's in the

higher animals to its disappearance in a scarcely appreciable ganglion in the lowest tribes, is attended throughout with equal manifestations of instinct, though according to the nature of the animal, while they are only feebly seen in the human species. This, in respect to instinct, is conformable with all analogy as it regards other organs where the results depend upon anatomical structure acting through the principle of life. There is every variety, for example, in the organization of the liver, from its great elaboration in man and the higher animals, until we meet with it in lower orders as a bundle of tubes or a simple sac. Yet in all it generates a fluid which is nearly the same, and which performs the same office throughout. And so of the kidneys, salivary glands, stomach, &c.

So far the analogy is complete between instinct and its organ, and the principle of life and the body which that principle animates. But instinct must not, therefore, be confounded with organic products. The analogy goes with our other facts in showing that it is the *cause* of certain results through the brain and nervous system, as the principle of life is the *cause* of other results through every variety of structure.

Coming to the brain of man, the foregoing anal-

ogy totally fails as it respects the manifestations of reason. There is something here which declares a relation between the soul and the brain differing from what obtains in respect to instinct; something which shows an independence and individuality of mind as distinctly as we know the organ with which it is associated.

Again, we have seen that in the infancy of man the mind is inoperative, while the instinctive principle of animals is nearly as active and comprehensive in their earliest as their latest stage of existence. We have also seen that instinct is susceptible of artificial impressions, resembling education, in the infancy of animals, and only then. This distinction can proceed only from a radical difference between the soul and instinct; and the attendant final causes of that difference consist in the special design of the soul for rational functions, and of instinct for the simple uses of the body. The necessity of instinct, it may be farther said, is superseded in man by the endowments of reason, while no such protective care can be extended by the instinctive principle to the new-born animal. Nor is this a small confirmation of the distinction which I make between the soul and instinct, since there is nothing in Nature that denotes superfluity.

Hence, also, it is that instinct is in full operation at the birth of animals, when there is no display of it in the human race, and while the soul is only slowly developed in its operations. And thus do the physiological and final causes concur together. And now comes up the remarkable anatomical fact, which goes, also, to the same conclusion, (although it might be perverted if left without its physiological solution,) that instinctive acts are irrespective of the progressive stages of cerebral development, while those of the human mind wait for that development. This corresponds, in respect to animals, exactly with what we know of the perfection of the functions of all other parts at all stages of life, and with what we have seen of the objects of reason and of instinct, since instinct must be in early operation for the exigencies of organic life, while reason, in the complexities of its functions, is only ready, in a general sense, to act when the brain shall have acquired sufficient maturity for those endless physical impressions which come through the medium of the senses, and from which the soul gathers its earliest treasures of knowledge. This, then, is the relative aspect in which must be regarded the correspondence between the progressive development or hardening of the brain and

the operations of the mind in early life ; the development or maturity of the brain having as well a reference to the multifarious physical contributions from the senses, as to its co-operation with the soul in acts of intellection. The soul, therefore, may be, abstractedly considered, in as perfect a state in infancy as at any stage of life ; and thus does the physiological demonstration sustain the metaphysical induction, that the soul of the infant is in a state similar to paper without inscriptions. And so may the metaphor be extended to the brain, especially by supposing the paper, like the brain, to be in a soft condition, and that it must acquire condensation and maturity before the inscriptions can be made. The brain, in its soft and immature condition, cannot receive the physical impressions requisite for knowledge, and, of course, the soul can only gather and appropriate impressions in proportion to the maturity of the organ which is destined to receive them from the external world, and which are the sources of its first acquirements. Besides, therefore, the physical development which is requisite for the external impressions, that maturity of the brain is, also, generally, as a part of the design, a necessary medium through which the soul may appropriate the impressions. Having made these

advances, the soul comes to act in more or less complete independence of sensation, and to multiply knowledge by its own efforts. Nevertheless, it is peculiarly useful to my purposes that even this development of the brain is not indispensable to efforts of reason that are without parallel in the history of the human mind, as we have seen illustrated in a most unequivocal manner in the *puny* and *sickly* boy, Truman H. Safford. But the brain of animals is on a par with all other organs. And thus do the contrasts between the soul and instinctive principle correspond with the anatomical contrasts both as they relate to the brain of man and of animals and to the human brain and other organs in the state of infancy, and with the coincidences in function between the brain of animals and other organs at all stages of life. And here, too, should be brought into review what has been said at page 91 of the injuries which are inflicted upon the mind and its associate organ, and, through those media, upon the whole organism, by crowding the mind in early life, while no such injuries are sustained, but the contrary realised, by a severe exercise of instinct in the infancy of animals.*

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* See *Institutes of Medicine*, § 563—568.

But I have something yet farther upon the topic immediately before us, and which not only forms a most imposing contrast between instinct as manifested at all stages of the life of animals and the displays of the soul in early childhood, but can leave no room for doubt as to the perfection of the soul in its essential condition in the infancy of man, and of its self-acting nature. This, indeed, should be obvious enough from the complete exercise of instinct in the infancy of animals and from the analogies between the manifestations of instinct and of the human mind. The foregoing comparison of the early condition of mind with the blankness of paper is undoubtedly true so far as it respects innate ideas; and, for a certain period of infant life, it is also true as to the insusceptibility of the brain, in its connection with mind, of receiving impressions by way of the senses that shall form the basis of knowledge. Nor is it less probable that all the earliest ideas of man are prompted by impressions exerted upon the senses by external objects. But this will not affect the proposition that, after a certain maturity of the brain, and before sensation shall have provided the mind with any relative elementary facts, the self-acting principle may originate a labyrinth of ideas. And this

brings me to the specific proof of the perfect constitution of the soul in the infant state, as well as of its capability of originating ideas as soon as the brain has acquired the maturity which it obtains in early childhood, and independently of any knowledge imparted by sensation. My proof will be found in examples already adduced, Mozart, Pascal, Safford, &c., examples which seem, as it were, to have been ordained to aid in the demonstration about which I am employed. In these instances there had been only the most slender antecedent, relative knowledge acquired through the medium of the senses, but the soul itself originated its own vast attainments, carried them into a variety of practical applications without the instrumentality of foreign aid, and to an extent where erudition, with all the appliances of sense, falls far short of equal achievements.

Now it cannot be doubted, that, in all onr reasoning and conclusions, we must take the facts as we find them; and, throughout the range of intellectual and instinctive manifestations, we meet with nothing that conflicts with the laws or with other phenomena of living beings. Peculiarities are necessarily attendant upon the operations of mind and instinct; and we may be surprised only that principles so endowed do not manifest a

greater independence of organic structure, espe cially the rational principle. Such would be the natural conclusions of the limited apprehension of man, when he regards the mind, in all its highest purposes, as *acting for itself*, and without reference to the uses of the body. But, when he duly considers all the surrounding facts, the analogies of Nature, Unity of Design, &c., he is prepared to find the self-acting principle, though *existing for itself*, so connected with organized structure that it shall receive from that structure important contributions to its own great final causes, and simultaneously, and in mutual harmony, subserve some of the uses of its physical abode.

May it not also be well to inquire into what is meant by *ideas*, and whether there have been any definite conception of their nature, and by ascertaining the facts, thus show that the earliest acquirements through the instrumentality of the senses completely demonstrate the self-acting, and *originating* nature of mind; while it is distinguished, at its very dawning, from the instinctive principle, by the characteristic of forming ideas of the nature of objects? This inquiry, like much of the rest, belongs alone to the physiologist. How, then, does sensation give rise to

what are recognised as ideas by reason? The impressions transmitted to the brain through the organs of sense do not certainly constitute the ideas, as is generally supposed, and, according to my demonstration, the impressions made upon the brain cannot, by any physical or chemical influences upon the organ, elicit the ideas from the organ itself. The impressions, therefore, must, of necessity, call into action a principle by which the ideas are alone formed; from which it appears that the process, by which the mind seizes and appropriates impressions transmitted through the organs of sense, is similar to that by which it multiplies or originates ideas. It is the soul, therefore, which essentially does all the work, while, in respect to ideas of sensation, external objects only supply the materials. This is enough for my purposes; and it will be as vain to inquire into the *modus operandi* of the mind in its abstract operations, or in its perception of external objects, or how impressions are made upon the nerves of sense, or what their nature, or how they are transmitted by the nerves to the brain, or how they call the mind or instinct into action, as to interrogate the *modus operandi* of Creative Energy.

Now, therefore, from all the demonstrations

hitherto made, and the coincidence among them, must I not irresistibly draw the conclusion that, inasmuch as the early maturity of instinct, and the whole compass of its final cause, are designed for the exigencies of organic life, however much it may be rendered subservient to sensual gratification, so, on the other hand, the absence of all corresponding indications of instinct in the early stages of man, their correspondence with the operations of reason in all their subsequent display, and, above all, the entire quiescence of the soul in all its higher acts of intellection till the brain, and the whole mechanism of animal life, are so developed and matured as to render the operations of reason and the acquisition of knowledge of any practical use, evince the predestination of the soul for totally different purposes from the objects of instinct, and an independence of constitution and a final destination beyond the corporeal medium through the instrumentality of which its primary knowledge is obtained?

To such conclusions the evidence of anatomical and physiological facts has successively led; nor have I any doubt, that others will see in this demonstration that man is only an animal in his physical being; that in mind he is far less allied to the things of the earth than he is to their Au-

thor; and will realize a harmony with their own conceptions, that the soul and instinctive principle possess relations to the brain so far different as implied by the ultimate existence of one in an abstract condition, while the other shares the fate of organic life. They will see, I say, in the proof I have offered, a new ground of belief in the immortality of the soul, and of the perishable nature of instinct. And if this be so, they will see in my premises and conclusions, a contradistinction between God and Nature, and what is equivalent to a demonstration of the existence of a Creative Spirit in which the soul of man can have had its origin alone. And coming to other details in relation to man, they will see in the Mosaic declaration that "The Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, *and man became a living soul*," the inspiration of Him who "created man in His own image," and repose with equal confidence in the assurance that although "The dust shall return to the earth as it was, *the spirit shall return unto God who gave it.*" They will abide in the emphatic distinctions between the dust, the breath, and the soul, and regard the spirit as a special gift, a new creation, and the body and the breath as referring to materials already in be-

ing, and which were designed, in their organic state, to connect the spiritual part with the material world. They will also see in the exclusion of the analogous principle in animals and the limitation of the statements to the soul of man, what is the ultimate destiny of instinct. Or, if what is thus so clearly implied be not within the ready apprehension of all, they will find it enforced in the unequivocal statement that—"Man that is in honor, and *understandeth not*, is like the beasts that *perish*;" where, in the figurative parallel between the neglect to exercise reason and the operations of instinct, a broad distinction between them is drawn;* and where, also, in the specific affirmation relative to brutes, the immortality of the soul and the perishable nature of instinct are clearly indicated.† Nor can they fail to observe, that the foregoing revelations must be taken as a whole, and that the admission of one of their parts necessarily involves that of the others; nor can it be mistaken that the anatomi-

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* Again,—"The ox *knoweth* his owner, and the ass his master's crib; but Israel *doth not know*, my people do not *consider*."

† Again,—"Who knoweth the spirit of man that goeth *upward*, and the spirit of the beast that goeth *downward to the earth?*" Eccl. iii., 21.

cal and physiological demonstration sustains, as far as it goes, what is thus revealed.*

Hence it follows, if Revelation be received as to the *immortality* of the soul and the *death* of nstinct, it must be received, also, as revealing a fundamental distinction between them, and should operate as a perfect barrier with all, who uphold the Scriptures, against the common prejudice of identifying instinct with reason, as confounding the revealed distinction, and therefore promoting infidelity in its aim at materialism and annihila-

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* Although not immediately relative to my subject, I may also say that, if the foregoing citations be allowed to rest on Divine Authority, the same literal construction must be given to the equally specific statements which distinguish so remarkably the whole Mosaic Record of Creation, and which admonish us to look for the import of words in their connection with each other, and with the objects of their author, whose context is the true dictionary of his thoughts, and to pause at the "medals of the rocks," and other geological discoveries, as being possibly susceptible of interpretations that shall not obliterate the seal which the Creator has impressed upon the Narrative of His works; although in thus saying, it must be allowed that the facts which may be disclosed in geology can be reconciled to the most obvious import of Revelation only through the principles which science has established. Assumptions in opposition to the laws of Nature, or forcing Creative Energy into conflict with those laws, for the purpose of meeting the exigencies of apparent contradictions of Revelation, have always contributed to the strength of the adversary, however much the same laws may have been violated in speculative geology.

tion. That fundamental distinction, indeed, is very forcibly declared in the account which is given of the Creation of man and animals, and the affinity of the soul to its Author as clearly announced. However familiar may be the Narrative which sets forth the Beginning of all things, the specific statements to which I refer must be presented in immediate connection with my subject, that the language may be duly considered and its proper import attentively examined. Thus—

"And God said, Let the earth bring forth the living creature after his kind, cattle and creeping thing and beast of the earth after his kind; and it was so.

"And God made the beast of the earth after his kind, and cattle after their kind, and everything that creepeth upon the earth after his kind, and God saw that it was good.

"And God said, Let us make MAN in OUR *image*, *after* OUR *likeness*, and let them *have dominion* over the fish of the sea, and over the fowl of the air, and over the cattle, and over all the earth, and over every creeping thing that creepeth upon the earth.

"So God created MAN in *His* OWN *image*, IN THE IMAGE OF GOD CREATED HE HIM; male and female created He them.

"And God BLESSED THEM, and said unto them, Be fruitful and multiply, and replenish the earth, and *subdue it*, and HAVE DOMINION over the fish of the sea, and over the fowl of the air, and over every living thing that moveth upon the earth."

It would be mere tautology to attempt a plainer interpretation of what is revealed in respect to the Creation of man than is conveyed by the Narrative itself. But as some commentators esteemed ingenious have assumed that the soul is not a distinct creation, but only a part of Deity Himself, and, as it would follow upon our premises that instinct must observe the same rule, I shall introduce what I have said on a former occasion where I have availed myself, incidentally and as a correlative aid only, of a statement in Scripture to corroborate my proof of a distinct creation of the principle of life, in opposition to the numerous physiologists who deny the existence of any such principle. It will be seen that the language is very explicit, and, when taken in connection with the foregoing extracts, which distinguish organic life from the soul, the declaration as to the distinct creation of both becomes very emphatic. In my former attempt, I was employed in showing that the revealed statement did not relate alone to the *soul*, and now it is my object to show that it does not relate alone to *life*, by which I hope to be able to meet both classes of the adversary. Thus, in the *Medical and Physiological Commentaries* I have said that—

"Addressing ourselves to those who strictly

believe with us in the Mosaic history, we think we may find in Revelation some proof that even the forces of life are unique and have no types in any other department of nature. We premise, however, that we have no belief that any knowledge has been imparted by Scripture in relation to special matters of science; but that much may be inferred from the account of Creation as to the nature of the forces by which living matter is governed. On looking, then, at the account given by Moses, we find a very extraordinary and specific description of the manner in which man was brought into existence, and which distinguishes his Creation from that of inorganic matter. 'And the Lord God formed man out *of the dust of the* GROUND, and breathed into his nostrils the breath of LIFE, and man became a living SOUL.'

"Here was no agency of the chemical or physical powers. The whole plan, also, was perfectly distinct from that of inorganic matter. The fabric of the new being had no analogies with the former, and his phenomena were all distinct and without a semblance to anything that existed before the beginning of vegetable life. This, in itself, supplies an irresistible proof that new forces (or the same as designed for animals and vegeta-

bles,) were created for the government of his organization, and to constitute the essence of his life. But, as if to convey a full and distinct impression that man is not the creature of the physical forces, nor amenable to their operation, the inspired writer, after informing us that all the varieties of organization were direct and specific acts of God, and thus contradistinguishing organic from inorganic matter, proceeds to state the manner in which life was imparted to the miraculous fabric of man :—'He breathed into his nostrils the breath of *life*, and man became a living *soul*.' Now, it cannot be philosophically contended that this act relates alone to the *soul* of man; for, in the first place, the annunciation refers as well to *life*, in its ordinary acceptation, as to the soul. The original language imports a distinction which clearly substantiates the foregoing construction, and leaves no room for cavil.

"In assuming Scripture, therefore, as a ground of argument, it is manifest that man was completed in his structure without life before he became endowed with a soul,* and that the act which created

* This, and its analogies, are the only instances in which it can be said that the Act of Creating did not involve the simultaneous production of the forces by which matter is governed. The whole work of Creation was the direct result of Creative Energy, and

his soul, bestowed also, the vital force. One appears to be as much a new creation, distinct from the forces of dead matter, as the other. When man was already perfected in his structure, he was without life. But by the act of breathing into his nostrils, his peculiar physical life and his soul were simultaneously created. And how perfectly in harmony is all this with the exit of man. His soul and the vital force leave the corporeal frame simultaneously; nor will either be restored but by another act of Creative Energy.

"But again, it cannot be said that the *soul* itself constitutes the *life* of man,—leaving out all phy-

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therefore not connected by any analogies with the subsequent processes of Nature excepting as it instituted those processes. Throughout the Mosaic account, the plan of Creation is represented as progressive in all things. The several Acts were successive steps, both as to the earth and living beings. Each must be regarded as complete in itself. The Creation of matter and its endowment with special properties was one step; the formation of the body another; and then followed the grand Creation of organic life, the soul and instinct, which were, therefore, superadded principles. In all these we see a forcible consistency with the statements as to the distinct Creation of light, of the firmament or atmosphere, &c. This harmonious order of events, together with its correspondence with Unity of Design, are an internal proof of the Divine Origin of the Record. But it is only an example of a profusion of similar proof with which the first Chapter of Genesis is urged upon our faith.—*See Note at the end of this Essay.*

siological facts,—since brute animals and plants have as much the specific force of life as man,—and since, also, reason and Revelation enforce the belief that animals and plants have no soul.

"But it is objected, perhaps, that plants and animals were created antecedently to man, and that we have no such account of the creation of the same vital force which equally appertains to animals and plants; though we think, in a modified state as it respects the latter. We grant the objection is apparently reasonable; and could it not be obviated, it would affect the validity of our argument. But let us try. In the first place, all will admit that the expression of 'breathing into the nostrils of man' is probably figurative, and intended only to imply a perfectly specific act of creation,—that nothing analogous to the creation of the vital force and the soul had been performed till animated matter was created. The inspired writer, however, chose the most intelligible and emphatic mode of conveying the information,—since nothing is so familiar to man as that he lives especially by breathing. And this, also, is another proof to our mind, that the inspired writer intended to be fully understood, and in that most obvious sense which reason dictates. He was speaking to the ignorant, as well as to the man of

science, and upon a subject about which all mankind are intensely interested. So, also, God said, 'Let us make man', because this familiar language is natural to man, and adapts the subject better to his apprehension. For a like reason, also, we are told that the sun stood still at the command of Joshua; and even in these astronomical days, we continue to speak of his rising and setting. And yet such is the consistency of man, the miracle has been denied, because science has discovered that the sun is always at a stand. Even now, should the earth's rotation cease, the expression of Joshua would still prevail. Whatever is figurative is plain, and is designed to aid the understanding, however it may be warped to the purposes of sophistry. The manner, therefore, in which the creation of man is announced, is clearly intended to contradistinguish the materials which compose his structure from the principles which animate it. His lifeless body was made of the earth; his vital and mental principles proceeded, as it were, in a more direct manner from the Almighty Himself. Or, in matter of fact, the language implies a higher work in Creation in the latter than the former case; and hence, again, the most intelligible mode of conveying the latter knowledge was after the manner

of man. Solomon understood the subject in this way, when he said—'Then shall the *dust* return to the earth *as it was;* and the *spirit* shall return unto *God who gave it.*'

"Lucid brevity, also, is a sublime characteristic of the account of Creation. It was enough that the account of man's creation should be fully stated, to enable the greatest skeptic to understand that the same life which appertains to animals and vegetables was created in the same way. Man was taken as an example of information on this subject, being the most perfect of created organization. The analogies amongst all their vital phenomena, and the equal disappearance of those phenomena after death, are so perfectly plain, that none can doubt the identity of the forces upon which they depend, (especially amongst animals,) or that they came into existence by analogous acts of their Creator. But we have, however, in relation to brute animals, exactly the same account of their formation out of the earth as in the case of man, the inspired writer seeming little disposed to leave any ground to the unbeliever. It is true, there is nothing said, as in the case of man, as to the successive steps observed in their creation. But it is just so in respect to woman, of whose creation there is no-

thing said in the way of repetition; the general plan having been indicated in the account of man. It is said, however, that she was made out of a rib of man, as this was a distinct circumstance, and illustrates very emphatically the relation which the sexes bear to each other. Man is also connected with animals by very many close analogies.

"Even in respect to the vegetable kingdom, a remarkable analogy prevails. Moses affirms the creation of 'every plant of the field *before* it was in the earth, and every herb of the field, *before* it grew; for the Lord God had not caused it to rain upon the earth, and there was not a man to till the ground.'

"We have said that man (and animals also) was at first an *inanimate* apparatus. But had the forces of inorganic matter been *adequate* to carry on the operations of organized matter, man would have been a living body *before* the act of 'breathing into his nostrils,' or, in language divested of a highly expressive metaphor, before the act of creating his living essence. The physical forces, already existing, would not have been *created anew* for the special use of organized matter. This reasoning is only in conformity with the admitted fact, that the Almighty does nothing su-

perfluous,—nothing that is useless. The vital force of man, then, came into existence with his soul, as did that of animals along with instinct. And pursuing the descending analogy, we come to *simple organic life*, as manifested in the vegetable world."

So far the Author's *Commentaries;* and it will be seen that the argument is as specifically applicable to the soul as to organic life.

From what has now been said, it will readily occur to those who are acquainted with physiology, that I might draw upon the phenomena and laws of sympathy, in their connection with the nervous power, for many other analogies in farther confirmation of my inductions as to the soul and instinctive principle. If, also, the almost endless series of diversified facts, which are supplied by this astonishing function of the nervous system, be utterly insusceptible of explanation by any of the laws or analogies known in physics, how vain must be the attempt to refer the operations, or the phenomena, of the soul or instinct to the laws which rule in the inorganic world.* Again, therefore, I ask the chemist, and the physical philosopher of life, to explain the mechan-

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* See *Institutes of Medicine*, § 222—233¾; 452, 453; 500.

ism and the laws of sympathy by the application of any principle in physics or chemistry. Let the chemist, I say, consider, that in every process of remote sympathy there are involved very diverse yet very precise effects, and that he must have one species of chemical change for the transmission of impressions through the sensitive nerves to the nervous centres; another for the impressions exerted upon those centres; another for the reflection of the influences through the excito-motory nerves; and yet another for the effects exerted at the ultimate destination of the amazing round of never-ending influences, as indispensable to the process of respiration alone; and coming to morbid states, there must be another series of chemical changes, conforming, respectively, to the nature of every morbid influence and product. Take any single attribute of the nervous system, and we shall find it as remarkably distinguished from all things else as is the mental principle. The power which appertains to that system, and presides over the whole life of animals, is just as unique in all its operations. The distinction alone, in various aspects, between the condition of the *sensitive* nerves, and those which are appropriate to the *motor* influence,—those which convey impressions to the

central parts, and those which transmit them to all parts of the organization, to the organic structure of the fountain itself,—those, I say, which serve to awaken the mind, or to stamp on the nervous centres, with all the precision of thought, an inconceivable variety of influences which are unceasingly in progress in every other part, but with no other appreciable result than the movements which follow in all the organic constitution, contrasted with the totally distinct prerogative of those nerves, and those fibres of compound nerves, which give rise to the distant movements and changes,—place, at an unutterable distance, all analogy with the recognized imponderable substances, and with every other agent or power in the inorganic kingdom. Nor can we be surprised at the exquisite functions of the nervous power and sensibility as performed through the nervous system, when it is considered that the same system is the medium of all the rational, voluntary, and instinctive acts, which transcend, immensely, any of those vital influences which I have set forth as its characteristics, and which harmonize, so wonderfully, with the rational and instinctive manifestations. And, if we bring the mind into its relations with the nervous system, what can task the understanding

more than the step in the process of intellection as connected with the functions of sense; beginning with light and its properties, or with the odor which none but the dog can discern, distinguishing that which is impressed upon the footsteps of his master, or of a savage foe, from that of all other men, and that upon the track of one animal from all other animals, or the abstractions that convey to the mind all the varieties in taste, or the modified undulations of air which render so distinct from each other all the gradations in sound from the Æolian harp to the braying of a jackass; the impressions of each undulation of light—seven hundred billions of the violet ray, and only less for all the rest, in a second of time—and of incalculable numbers in respect to the air; the impressions, I say, of each undulation, or of the indefinable odor, upon the extremities of the nerves of sense, one alone upon the eye, another alone upon the ear, and another upon the nose alone; the transmission of these impressions along the trunks of the nerves to their other extremities in the brain; their excitement of the brain, and the simultaneous operation of reason or of instinct, by which the nature of the primary impressions is discerned, and the external objects realized by the inward immaterial

agent according to their real material existence?* And if we now carry this philosophy one step farther, we shall be in the midst of that profound labyrinth of designs where the impressions upon all the senses meet harmoniously together,—often simultaneously from a common source, as in the effects of gunpowder, on the discharge of a gun, upon every sense, when each impression transmitted to the brain confirms the report of the others through that immaterial principle which recognizes the exact amount, individually, or any discrepance of the whole. Or, through what other imaginable principle can it be, that sounds, odors, &c., are unnoticed when we are intently engaged on other subjects, yet exert their full force on the instant that the abstract occupation ceases? Or why, if physical results be alone the source of sensation and perception, do not the remote causes produce the same effects in the former as in the latter case?† I say the inward immaterial

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* "No language," says Dr. Fordyce, "has ever yet become so copious as to express the varieties in the senses." See Author's *Institutes of Medicine*, § 450, 451.

† As the chemical interpretation of the various sensations has become incorporated with physiological science, I may here refer the reader who is disposed to investigate the subject to an attempt of this nature in the *Institutes of Medicine*, p 90—95. I may

agent, for I cannot doubt that the substance on which instinctive actions depend is immaterial. It is the first link in the great chain of spiritual ex-

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farther add, also, that the only exposition of the process which has been made is relative to vision, while the other functions of sense are left to be expounded by that philosophy. But it will be readily seen that each of the senses is distinguished by such peculiarities in the subsidiary mechanism and their physical agents, that the chemical philosophy of vision is entirely inapplicable to either of the rest, while the doctrine which assumes the dependence of vision upon the union of oxygen with some combustible element of the retina, or any other chemical rationale, is contradicted by the strict analogies which subsist between seeing, smelling, hearing, tasting, and feeling. The nerves and nervous centres are the organs in all the cases, and a great common principle is the physiological basis of the whole. That principle involves what are denominated sensibility, sensation, and perception. Any doctrine, therefore, of the physiology of vision, in its essential nature, must be equally applicable to all other sensations.

Admitting, therefore, the assumption that external agents give rise to vision through the supposed chemical influences upon the retina, the philosophy should be the same for all the senses, and in conformity with what is known in chemistry of the coincidence of causes for coincident results. Now, in the case of vision, light is the supposed agent which affects the supposed chemical changes in the retina, and, therefore, something at least analogous to light shou'd start the chemical changes in the expanded olfactory, auditory, and other nerves which are the organs of these other sensations that are so nearly allied to vision. But there is no resemblance, in their nature, between light, and all those volatile substances which impress the sensation of smelling, or those intrinsic causes which produce all the varieties of tasting, or the endless impressions which result in as many modifications of feeling, or

istences; and agreeably to the law of ascending analogies, the manifestations of a spiritual essence in animals should be very low; but it is remarkably to my purpose, that many of the lower, where there are only rudiments of a brain, as the ant and the bee, evince the greatest stretch of in-

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the intonations which are produced by the undulations of the atmosphere.

But that is not all; for here, as everywhere else in organic chemistry, the philosophy cannot proceed without a multiplicity of causes, and these of the most incongruous nature. Such chemists as allow the existence of a thinking principle, call in the aid of that. This is admissible, and, at least, gives dignity to the speculation. But it is also assumed that, in seeing, the light, or its supposed undulations, are actually transmitted to the brain; thus leaving the assumed oxydation of the retina, or other supposed chemical change exerted upon that organ, without any conceivable use. But, as like results require like causes, so must the undulations of the air that give rise to hearing, the sapid virtues which impress the tongue, the various odors which are recognised through the olfactory nerve, the heat or the cold, the tickling or the pinching, or whatever may affect the sense of feeling, not only exert an oxydizing influence upon the expanded nerves in all the cases, but each of the causes must be regarded as a substantial agent, and equally with light transmitted to the nervous centres.

The confusion of causes now mentioned, independently of their want of consistency, should, in itself, be fatal to any hypothesis which professes to interpret the simple problems of Nature. But the chemist often goes much farther with this multiplication of causes, and is coerced to the admission of "a vital force," "a vital principle," though always with him resolvable into chemical force. But he employs the term, gives it significance in the emergencies

stinct.* There are no violent transitions in nature. The *material* existences, especially the organic, pass gradually, as it were, into each other. And so, it can not be doubted, it is with the spiritual, from brute to man, from man to angels, from angels to God.

> "Of systems possible, if 'tis confessed
> That wisdom infinite must form the best,
> Where all must fall or not coherent be,
> And all that rises, rise in due degree;
> Then, in the scale of *reasoning life*, 'tis plain,
> There must be somewhere such a rank as man;
> And all the question (wrangle e'er so long)
> Is only this, if God has placed him wrong?"

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of life, and assigns the nerves as its conductors. Such is the case with Liebig, and his powerful school. (See *Institutes of Medicine*, p. 152--178.) But even this confusion of causes would be deficient without that element whose demonstrations astonish the mind as well as the senses; and, accordingly, the electric fluid, which has been regarded by many as identical with the nervous power, but clearly shown by others to have no other agency in organic processes than as a vital stimulus, is incorporated by the chemist among the forces essential not only to vision, and all other results of organic processes, but to thought itself. (See examination of the supposed identity of *galvanism* and the *nervous power* in *Medical and Physiological Commentaries*, vol. 1, pp. 63--67, 107—119.)

* "There be four things which be little upon the earth, but they are exceedingly wise. The *ants* are a people not strong. yet they prepare their meat in the summer: The *conies* are but a fee-

The most exalted have been sometimes embodied with matter, clothed in our own corporeal frame. Or was there no spirit there? Nothing but material eliminations of mind from their blood, or a product of a conflagration of the elements of the brain? For so you must have it, and so it is *meant*, where the same mental phenomena are so interpreted in man. Nay, more: so complete is the analogy between the acts of ratiocination and those of the Creator, as seen in the humble designs which are devised and executed by man, it would unavoidably follow upon the doctrines in materialism, (if it admit a Creative Power,) that all the designs of the Almighty Being were equally the result of chemical or organic processes!

The induction as to the immateriality of instinct is farther and forcibly shown by my premises in relation to mind, and the analogies between mind and instinct. But the extinction of anything, as of instinct, will not affect the principle of analogy in relation to existences. We know nothing of the order of Providence, (excepting what is revealed,) after the system of ascend-

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ble folk, yet make they their houses in the rocks: The *locusts* have no king, yet go they forth all of them by bands: The *spider* taketh hold with her hands, and is in kings' palaces." *Proverbs*, xxx., 24—28.

ing analogies among existences is broken up; and all reasoning from analogy is then at an end.

It will have been seen that *materialism*, in its proper acceptation, and the question as to the *materiality* of the soul, are distinct from each other, since the former denies the existence of the soul as a substantive agent, while the latter admits it, but contends for its materiality. My object has been to substantiate the *existence*, more than the nature of the soul as to its immateriality. But the proof of its immateriality has constantly attended all that I have shown of the *self-acting* nature of the soul and instinctive principle, which contradistinguishes them from every known attribute of matter. Their nearest approximation, in the light of analogy, to *what may* be material, is to be seen in the principle of organic life; and here the resemblance consists in action alone.* But the principle of life requires the operation of other causes to bring it, and maintain it in sensible action. It is impossible, therefore, to adduce a single phenomenon of mind or of instinct that bears a resemblance to the manifestations of matter. They are perfectly contradistinguished from

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* See Author's *Medical and Physiological Commentaries*, vol. 1, p. 94—106.

each other in their most essential and fundamental attributes, remarkably so in the *self-acting* nature of the soul and instinct; while matter is characterized by its *inertia*, its incapability of originating motion or action, and is utterly without the power of bringing other matter into existence, or of multiplying itself. These remarkable contradistinctions will be taken in connection with the variety of proof which I have offered, and I present their collective force as an abundant confirmation of the meaning intended by the inspired writers in designating the thinking part of man as a distinct essence, by the name of *spirit*, and as immortal in its nature. And since we have reason to believe that the ancient writers were destitute of the anatomical and physiological testimony, we must yield to the conclusion that all their knowledge in regard to the soul was revealed by Heaven. But, as our facts enforce the belief that the soul is a distinct essence, and that it is entirely distinct in its nature from all matter, and as they also confirm what is revealed, they become thus substantiated by the seal of Divine Authority,—bearing the indelible impress of *spirituality* and *immortality*. It will be readily seen, also, that the same reasoning is applicable to the authority of Scripture as to the perishable

nature of instinct. But, Scripture aside, (for the whole of this subject must be met by reason itself,) there is something farther which goes to demonstrate not only the immateriality of the self-acting soul, but that the doctrine of its materiality is deeply degrading, and is only secondary to that of pure materialism (or the total denial of such an agent) in its tendencies toward infidelity. The proof is this, nor will it be opposed by any one who admits the clearest testimony supplied by the analogies of surrounding Nature. I mean that, such is manifestly the alliance between the human mind and the Divine Mind, if one be immaterial, so is the other, and *vice versa*. But, it is very questionable whether any true believer in a Being who is omniscient, omnipresent, and omnipotent, entertains the supposition that He is like the inert matter of which He is the Author; and as little, therefore, can he imagine that the rational soul is material. The analogies which subsist between the operations of mind, and the evidences of design which abound in organic nature, should, indeed, be sufficiently demonstrative of the existence of a principle in man as substantive as the Almighty Being and partaking of the same intelligent and self-acting nature. It therefore becomes a matter of interest to observe how my

demonstration borrows, by a reciprocity of proof, a reflected light from the "Image" in which man is said to have been made.

These premises being admitted, it follows that immateriality is indispensable to the infinite duration of the Almighty, and therefore that it must be rendered equally so to the immortality of the soul. Strange, indeed, that man should have seen in the manifestations of matter such allurements as to induce him to resist all the opposing phenomena of mind, and to assimilate his soul to the nature of those materials of his body which originally existed and will again exist in the form of gases or other mineral substances.

I have no apprehension that my earnest convictions upon this subject, as of others in this Essay, will not be fully conceded; but I am too sensible that error may be rendered plausible, even as fascinating as the *nebular hypothesis* of the solar system, or as the *spontaneity* of living beings, either through the impulses of ambition or unchastened imagination, and too anxious for the truth, not to invite the most rigid scrutiny; nor do I wish for myself any greater indulgence than I yield to others.

In respect to the nervous power, I would as little speculate upon its nature as upon that of the

soul, or I may say of the nature of the most tangible matter, of either of which we know nothing but from their manifestations.* I would not even assume for the nervous power a place among the imponderables, which the physical philosopher, upon no better evidence, unhesitatingly avows as the condition of light, heat, and that more inscrutable substance magnetism, which awakens no sensation, and produces no effect upon organic life. The true physiologist attempts no problems which have no apparent relation to principles and laws, and which divert philosophy from its practical uses. It is true, he argues the existence of the soul, of the principle of instinct, of the principle of organic life, their remarkable attributes, their contradistinctions from each other, and from all other agents, upon the ground of the physical philosopher, that he may meet the obtruder with his own ratiocination. He tells him that his premises are the same, only more various, distinct in their nature, and more demonstrative.

Our inquiry may be variously pursued, especially upon the great basis of analogy. It is one of no

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* See Author's *Medical and Physiological Commentaries*, vol. 1, p. 83, &c., and *Institutes of Medicine*, § 222—233¾, 234, *g*.

little moment at the present day, and the materialists must abide their own facts and method of reasoning; a ground, however, which nothing can shake when presented according to its ordination in Nature. In the present case, the admitted facts are coextensive with all animal existences, and they are bound together in the different races by close resemblances. Indeed, in each of the series the facts differ only by shades. The evidence here is of the strongest possible nature, not only on account of the universality of the facts, but because they are founded in the unchanging character of organic beings. It is the ground upon which mankind have stood in the great range of inquiry. And since the whole superstructure of knowledge rests greatly upon analogy, if materialism can lay its foundation here as it regards intellectual manifestations, or can drag from the inanimate world a similar basis for the processes of life, I shall hold myself open to any just conviction. But, resting, for the present, in the conclusions which I have now expressed, and anxious for their greater prevalence against a progressive, and already wide-spread, materialism, I have been led into this discussion in the hope that it may remove some of the obscurities of the subject. The province of the physiologist ex-

tends beyond the mere physical relations of matter and mind. Of these relations he is the only expounder. But it devolves upon him, also, to seek in the depths of physiology for the constitution of mind as distinguished from matter; and thus, also, contribute towards a right faith in a future state of being. Wherever, indeed, he turns his inquiries into organic nature, he sees in the mechanism of every part, individually and collectively as a harmonious whole,—in every function and product, separately or relatively,—in the properties by which they are carried on, and in the laws by which they are governed, the most perfect evidences of consummate design. It is the duty of the physiologist to turn all this immense weight of proof against those crude doctrines of materialism, mental and medical, which have had their origin either in the closet of the speculatist, or in the laboratory of the organic chemist.* But while I would not identify the

* It is usual to set forth anatomical structure, and its general office, alone, as forming the highest proof of design. But the universal principles upon which vegetable and animal organization is founded, and the analogies throughout, the special designs of every part and their concurrence in the production of special results, the harmonious contribution which each receives from all the rest, the assemblage of the whole into one great universal design by which the individuality of animal and organic life is con-

chemical interpretations of organic life with the coincident philosophy of intellection, nor with the doctrine of spontaneity of being, beyond the avowed capabilities of the laboratory, it cannot be denied that the simple tampering with organic life has been tributary to the bolder doctrines. And when it is affirmed by Liebig, and adopted by so many disciples, that "Physiology has sufficient-

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stituted, so that the former is founded upon the latter as an integral part, the vast and exact variety in the physiological constitution of every tissue and parts of tissues, and according to the nature of the specific being, with their corresponding products and susceptibilities to the action of physical and moral agents, the almost endless and undeviating modifications of the organic products of every part according to the nature of the being, the various and compound physiological influences which are often concerned in a common function, along with a highly complex mechanism, as in respiration and vision, the exact adaptation of the digestive organs and fluids to the varieties of food consumed by different species of animals, and, especially, the vital relations of atmospheric air and water to every species of animal and plant through a wonderful variety of mechanism and stupendous laws, the precise adaptation of instinct to the special exigencies of organic and animal life in the various species of animals, and, lastly, the involution of the laws by which each part, and the whole in the concerted action of all parts, are governed, forms the evidence by which the advocates of spontaneous generation are shown not only to disregard an incalculable amount of the clearest and strongest evidence, but, in so doing, to betray a disposition to reject the Divine Author of all things. (See *Institutes of Medicine*, Index, articles DESIGN, and GOD AND NATURE.

ly decisive grounds for the opinion, that every thought, every sensation, is accompanied by a change in the composition of the substance of the brain, and that every manifestation of force is *the result* of a transformation of the structure or of its substance," it behooves the *physiologist* to deny the existence of a single fact, or a single analogical induction, that can give the least plausibility to the statement, and to hold the materialist convicted till he shall have produced the "grounds" which are said to be "sufficiently decisive." Let that be done, and he who now speaks will confess his injustice, and the triumph of materialism. The physiologist will retire from a field which he had fancied was adorned with the choicest designs of Heaven, but where he had been, through so many ages, the victim of a deluded imagination.

It has been said, that "an undevout astronomer is mad." But we have looked with complacency upon marshaling a chaos of stars into systems of worlds, that science might pluck a laurel from Heaven to give it back again to the stupendous philosophy of gravitation;—and we have looked even with admiration upon the "nebular hypothesis." Reason has been neither shocked, nor the

astronomer considered "mad," because, perhaps, there was no absolute manifestation of design in the orbs themselves, or only so in their motive power. True, indeed, there is nothing in their abstract condition to raise our conviction of Creative Power beyond the evidence supplied by the smallest fragment of matter. But a multitude of worlds are seen when we mount to the stellar heavens upon the analogies supplied by our own planet. In this relative sense, a series of vast designs crowd upon enlightened reason, and he who is true to his reason must come to the conclusion that it is with every star as with the Earth,

"Such as Creation's dawn beheld, thou rollest now."

Such, indeed, is the conclusion to which the astronomer is fast finding his way by his own mechanical inventions, and by his supposed discovery that comets are among the lightest of gaseous bodies. But I waive the fanciful analogy supplied by the latter, and only mention it to show how one hypothesis becomes a groundwork for another. It is enough that we point to the nebulæ alone,—to the climax of the Plutonic doctrines of Creation. Those nebulæ, so long a liquid fire to grow into systems like our own, (one of which, according to Arago, would have occupied all space,) are now

seen as a "powdering of stars," receding in the distance, pile upon pile, as if a cone stretching out beyond the bounds of imagination.

Reason, the analogies of Nature, Unity of Design in the great plan of Creation, have had no part in the Astronomer's conversion from a chaotic state of the heavens to a symmetry of worlds. The telescope alone has dispelled his illusion; but it has gained a fact which goes with all former knowledge in proving, that every fabric of the human mind which is entitled to the appellation of a science is founded in consummate Design. The astronomer, it is true, still clings to the vestige of his dream, and lingers upon the fathomless abyss of light where myriads of stars mingle their effulgence to his physical eye; but he lingers with a hope, which the very next step he may take in mechanical optics will prove to have been as faithless as his former visions, and will carry him upwards and onwards through other telescopic worlds, but forever bounded by the halo which had been the *ignis fatuus* of his philosophy.

However beautiful, therefore, the nebular hypothesis of Creation, and however reluctant its surrender to the glory of the Almighty, it must fall, and with greater precipitation than it rose; for it

is the astronomer himself who is demolishing the fabric. And with it must pass into oblivion the whole Plutonic scheme of the Earth's formation, so long an analogical basis of the nebular theory of the heavens; or only remembered among those eighty other systems in Geology which were grouped under one general condemnation by the French Academy.

The astronomer, however, enjoys a pretext for his factitious philosophy far beyond the propagandists of materialism and spontaneous generation. The former may see in matter and its laws a Creative Power, and imagine, in opposition to all that is known of secondary causes, that He, who "spake and it was done," who tells us that, "*Thus* the heavens and the earth were *finished*, and all the host of them," did, nevertheless, consign His chaotic work, with all its ultimate designs as a symmetrical whole, and in its vast and critical relations to life, to the operation of the laws impressed upon it. He may "see gods in clouds and hear them in the wind." His inquiry may stop there; and overlooking all final causes, he may confound the agencies of matter with Creative Energy. But not so with the physiologist; for the organic being, whether in reason, instinct, organization, func-

tions, properties, laws, is the embodiment of Infinite Wisdom.*

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* See Author's *Institutes of Medicine*, § 353—361. The properties and forces which are impressed upon matter, and the laws which they obey, have never been known to bring any design into being. On the contrary, they are ultimately and universally destructive of all elementary combinations, and, therefore, of the designs into which they may have been associated. But the Creator, having formed the designs, substituted for his Creative Energy the special laws by which they have been carried on. The rudiments of organic beings have been perpetuated in connection with the properties of life, and the laws impressed upon them, since they came from the hands of the Creator, and are the present source of all animated beings. If we deny this, we must equally deny the Creation of matter. (See *Institutes*, &c., as to the supposed *eyeless* fish of the Kentucky cave, § 74.) The laws, however, can operate only while the constituent parts of the designs exist. This is strikingly manifest in the living being. Here lies the great error of the closet speculatist. Hence the sophisty of the argument which assumes the existing laws that preside over the works of Design as having evolved those designs out of chaotic matter. They can have no other operation, without the mechanical design itself, than what is seen of their destructive effects in the mineral kingdom; and what should confound the sophist is the fact that the moment the principle of life, the peculiar force which truly carries on the functions of organic mechanism, becomes extinct, those other forces, to which he ascribes the evolution from the merest matter of all the wonderful designs on earth and in the heavens, speedily lay waste the entire organic fabric, and crumble it into its simple elements. The whole tendency of the physical and chemical forces impressed upon matter is to destroy, not to create or improve. (See *Institutes of Medicine*, § 360.) Even gravitation would bring worlds into contact without the centrifugal force; and this force as appertaining to

comets is proof of its origin in Design throughout the systems which obey its laws. All physical agents, also, as light, heat &c., contribute alike destructive influences upon inanimate compounds of an organic or inorganic nature. But the living compound resists their action as completely as it does those of the chemical properties which are impressed upon the elements of which the living being is composed. But, although the destructive forces which are impressed upon matter are held in subjection by the principle of life, and which effects combinations in direct opposition to them, the extraneous physical agents, like light, heat, oxygen gas, &c., develop the energies of life in the seed and egg, and are its indispensable stimuli at every instant after the development of the living fabric begins. But, as soon as the resisting cause is withdrawn, they turn with destructive effect upon the fabric which they had been instrumental in rearing up, and pour their united force upon those chemical tendencies which were impressed upon the simple elements, and through whose combined agency "the dust returns to the earth as it was."

Now let us see how far the statements of Scripture agree with what is manifestly fundamental in Nature. We are told, for example, that man and beast were created entire out of the earth; but had it been said that the materials of the earth organized themselves into living beings, the Narrative would be rejected as an imposture. Nay, more: had it been affirmed that man was created in the condition of an infant, and thus left to grow up to maturity under the influence of the laws which actually govern his organization, the statement would be unanimously pronounced absurd, even by such advocates of spontaneous generation as are quoted at pages 10—20. The *infant*, without a ray of instinct, (*pages* 93, 105,) destitute of volition and muscular power, the personification of *Helplessness*, and for years dependent on maturer age, growing up to manhood under physical circumstances alone! Yet is this doctrine extensively propagated through the delusion that "the Creator endowed certain forms of *inorganic* matter with *the properties requisite to enable them to combine,*

at a fitting season, into the human organism." Glaring as the absurdity is, in relation to man, especially, it seems not to have been considered in the haste to represent "the *Organic Creation* as the result, not of any immediate or personal exertion of the Deity, but of *natural laws* which are expressions of his will." (*Page* 15, *note*.) How much more absurd, therefore, the opinion of spontaneity of being which requires the elements to organize themselves and to conduct the whole process of development and growth, till the being shall have obtained sufficient maturity of mind and body to aid in the acquisition of nutritive matter which had, up to that stage of existence, devolved upon the elements themselves and the compounds into which they had united? (*See page* 10—20.) Were there nothing beside to substantiate the Revelation of Heaven, the proof which is offered by the *infancy* of man, in being conclusive as to his own origin, would extend itself to every other statement in the Mosaic Record.

Since, therefore, it is so palpably manifest that man must have been brought into existence with a maturity of both mind and body that should qualify him for self-preservation, and since, also, it has never been surmised that the spontaneity of living beings began otherwise than with the elements of matter, or at most with organic matter in its most simple form, (*pages* 10—20,) the analogy which is supplied by the facts in relation to man, establishes, "*inferentially*," (as the author of the *Vestiges* would say, page 13,) the literal construction of the statement as to the Creation of animals and plants in a state of maturity. But what I have thus said as to the absolute exigencies of man, who has neither instinct, reason, or muscular ability, to guide him in early life, is as applicable to all mammiferous animals in respect to the nature of their early food, who would, of course, immediately perish without the sustenance offered by the parent. But the organization of animals lower in the scale, (the *Acarus Crossii*, for example, whose suppositious creation by man has received no little countenance,) is on a par in respect to design, living functions, &c., with that of man; and whoever, therefore, admits or attempts the creation of

such an animal, necessarily places the whole upon the ground of spontaneity of being.

Again, as to my purpose relative to original Design, and the ultimate substitution of natural laws for Creative Energy, we do not read that God created even plants in the state of seeds alone, but, in wonderful consistency with what is affirmed of man and animals, we are told that He "created every plant of the field before it was in the earth, and every herb of the field before it grew." Nevertheless, such is the difference between the two departments of the organic kingdom, as to their growth and perpetuation, there would have been no violation of Nature or of probabilities, had it been said only that God created the seeds of plants and committed them to the earth; and this, especially, as their whole economy of nutrition is relative to the simple elements of matter. As if, therefore, in the progress of human knowledge, these facts should become known, and Unity of Design in creating all things in a state of perfection might be overlooked, certain reasons are assigned for "creating plants before they grew." And surely they will be allowed to be very *philosophical* reasons.

It may here be worth a moment's pause for the purpose of saying that numerous passages may be cited from Scripture which will bear no latitude of construction, and which confirm the literal interpretation of those statements in the first chapter of Genesis which have been so generally warped to meet the supposed exigencies in Geology. But, if the general outline of Creation, as set forth in the first chapter, be allowed to bear the impress of Divine Authority, then, also, must the details, as embraced in the second; and wherever the affirmations are specific and unequivocal, where words cannot be distorted, nor sentences admit of but one meaning, and that one of an absolute nature, they must be received in that precise acceptation. (*Note* at page 127.) Now let us look, as an example, at what is affirmed relative to the Creation of plants, and observe how completely it contradicts the geological hypothesis of the slow formation of the globe, and the gradual appearance of the vegetable kingdom. Thus,—

"These are the generations of the heavens and of the earth

when they were created, in the day that the Lord God made the earth and the heavens; and every plant of the field before it was in the earth, and every herb of the field before it grew; for the Lord God had not caused it to rain upon the earth, and there was not a man to till the ground. But there went up a mist from the earth, and watered the whole face of the ground."

This statement is either exactly true or altogether false, since by no sophistry can it be otherwise interpreted. It is not simply an affirmation as to the Creation of "every plant of the field before it was in the earth," &c., but it is enforced by other important affirmations as reasons for an Act so completely abstracted from those laws of Nature which were subsequently to take charge of the perpetuation of the vegetable kingdom. It is, then, I say, either absolutely true, or absolutely false, that "every plant of the field was created *before it was in the earth*, and every herb of the field *before it grew*,"—(a double affirmation;) and it is, also, as true or false, that there had not been antecedently any "rain upon the earth," and that subsequently, and for the first time, "there went up a mist from the earth, and watered the whole face of the ground." The statement, I say, is remarkable for its exactness; and the affirmation as to the Creation of the vegetable kingdom in a state of maturity is protected against all ambiguity by its reiteration in the same clause, and by the assignment of the reason for anticipating the order of Nature; while the corresponding Creation of man and animals was left without a reason from the manifest impossibility of their ever attaining the adult state from the embryo condition, or even from infancy, without the Creation of mature progenitors.

If this, therefore, be received as the Word of God, then, according to the existing order of Nature, the beginning of which is admitted to have taken place at the time of the first appearance of plants, and is farther confirmed by the statement as to the "mist," I say, it follows that the earth was created only a very short time anterior to the Creation of the Vegetable Kingdom, since there had been no "rain upon the earth" till plants were

brought into being, and since, also, "a mist went up," and rain fell immediately afterwards, according to the physical laws which were ordained, and intended to operate, as soon as the earth was created. We thus gain, also, the true meaning of the Almighty as to the length of the days of Creation, whose clear and oft repeated and emphatic declaration is so much questioned, and notwithstanding, also, it forms the basis of the fourth Commandment.

Now, if the foregoing argument be incontrovertible, as it seems to me, the question of truth must lie between the Sacred Statement and the modern fabric of Geology. There appears to be no escape from the alternative, and I especially and respectfully ask for it the attention of the Minister of Religion. That statement alone, if received as Divine Truth, establishes the literal interpretation of the entire Revelation, and is, in itself, utterly subversive of the present system of Theoretical Geology. The direct affirmation will be conclusive upon that subject, while the analogy which it supplies in regard to the Creation of man and animals is even stronger than that afforded by the latter, and from which we must have deduced the complete Creation of the vegetable kingdom, had Revelation been silent upon the subject. The analogy is, therefore, of a reciprocal and forcible nature, is corroborated by Unity of Design and the necessity of things, by direct affirmation, and by the internal proof which is supplied by the reason assigned for Creating plants in a state of maturity. Nor must the force of the expression that "a mist went up and watered the ground" immediately after the Creation of plants, especially in its connection with the statement that no rain had fallen antecedently, and with that relative to the Creation of the earth and the subsequent step in the Creation of plants, be allowed to fail of its proper weight in directing our conclusions. Let it be also considered in this connection that no little confirmation of the Divine Origin of the Record, and of its literal interpretation, is afforded by the statement that man and animals were created out of the materials which form the earth; since the fact has been only recently ascertained by man, and since, also, it is one of the most improbable conjectures that could have been made, or that would have been received but from a belief in its Inspiration, either in the early dawnings of the

human mind, or up to the time when science confirmed the statement. If it be objected that there is an apparent exception in regard to woman, especially as to a perfect Unity of Design, and that more should have been said as to the Creation of plants, I would ask the objector to examine my construction of this subject at page 135. Is there not, also, something remarkable in the affirmation that the whole animal and vegetable Kingdom were created in a state of maturity, when contrasted with the doctrine of spontaneous generation as advocated at this enlightened age; especially as a little reflection will assure every mind that man, and all mammiferous animals, and all unfledged birds, could not have been otherwise perpetuated?

The demonstration which I have now made appears, therefore, to prove the literal meaning of all the statements recorded in the first and second chapters of Genesis; while the reflecting mind cannot avoid the conclusion that the Creation of the vegetable Kingdom, which was designed entirely for the subsistence of the animal, was followed immediately by the creation of the latter, as set forth by the Word of God, and as enforced by all that is known of His Designs, which are perfected altogether, and not in isolated parts. Least of all should it be entertained that He brought the animal and vegetable tribes into existence in fragmentary portions. Before such imputations, along with "remodelings of the globe," "extinctions" of a world of living beings and successive "creations" of new ones, "spontaneity of organic nature," "a reign of insects," "reign of serpents," "reign of fishes," "the reign of mastodons which immediately preceded the reign of man," and other analogous things which strike at the imagination, be alleged upon geological grounds against the Word, and the perfection of the Works of God, it would be better to consider more maturely whether the "facts with which geology has lately been enriched" may not be consistent with the Sacred Narrative.

Let us next admire the manner in which it is stated, (and according to the very best *philosophy*,) that the Great Author of plants "before they grew," substituted certain forces and laws for His Creative Energy, to preside over and perpetuate the Designs which He had brought into being in a perfect state. After having

informed us of the Creation of plants, and of the reasons for so doing, we are told that those reasons soon ceased to operate, and that vegetation was committed to the forces and laws impressed upon the Designs which had been brought into existence. *Philosophy* anticipates the Narrative in supposing the completion of Design by starting vegetation according to the peculiar laws which it was destined to observe. All its demands are satisfied by the declaration that,—" The Lord God planted a garden eastward in Eden, and there he put the man whom he had formed. And *out of the ground* made the Lord God *to grow* every tree that is pleasant to the sight, and good for food." This detail refers to the general statement ; and if we now turn to that, we shall find that the Almighty, while creating the vegetable kingdom, provided for its perpetuation according to the laws which it was destined to observe. Thus,—" And God said, let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, WHOSE SEED IS IN ITSELF UPON THE EARTH."

Philosophy is thus harmoniously met by a very remarkable exposition of consistency of Design in respect to the Creation of plants in their special characteristics, and in their relation to the other events ; and the same principle will be found to be true in respect to animals. All this, however, and much more of the same nature, I shall set forth more critically at a convenient season.

The foregoing circumstantial order of events, which are related in the chapter of details, brings to our notice the comprehensive statement as embraced in the general account, and where, it will be seen, a very *philosophical* distinction is made as to the modes in which plants and animals were destined for multiplication. Thus, of the former :—" And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself, upon the earth ; and it was so."

No methodical mind can want assistance in the farther application of the great Principle to all that is revealed in the Sacred Record, or to the summary declaration that,—" THUS the heavens and the earth were FINISHED, and all the host of them."

"The Chosen People" received these declarations in the spirit of *faith;* and I will not forego a warm tribute of admiration, that, while the doctrines of materialism, spontaneity of being, remodelings of the globe, extinctions and reproductions of old and new races of beings, partial inundations instead of a general deluge, and perverted views of the Mosaic Narrative of Creation, have sprung up in the Christian world, the isolated Race have clung to their original faith, and with such undeviating uniformity as to have become one of the most characteristic evidences of the truth of Prophecy, while the fulfilment of the Prophecy may be regarded as an illustration of the truth of the Mosaic Record; and, if we consult the statistics of crime, we may find that the Jewish manifestations of faith are founded in principle.

It seems that in the opinion of many, the "Old Testament" should be passed to the same account as other things that are old, while the "New Testament" is still consecrated by them among the substitutions for the obliterated past. But, I cannot doubt that he who would reject the Narrative of Creative Energy, as set forth by Moses, must have equal doubts as to the "Theocracy" of the primitive world, and the miracles of Christ. What is *old*, however, in religion, even its fundamental precepts which require an exercise of faith, may be chronicled among the allegories or the fictions of a barbarous age, through an accustomed disregard of antiquity, without raising an apprehension that there has been any violence done to the Revelation of Heaven. Let it not, however, be forgotten, that much of what is revealed in Genesis, and that which is most important, is indelibly impressed upon the works which it reveals, while the miracles of our Saviour rest alone upon the testimony of man. The latter, too, are as much an act of Creative Energy as the former. There is not an object in Nature, especially Organic Nature, which does not abound with the most unequivocal proof of its origin in Omniscience, and as set forth in the Mosaic Record; but where shall we look for a corresponding proof of the Miracles of Christ, or of the Primitive Theocracy whose statutes are received by every portion of mankind to whom they have been disclosed? Let there be consistency or no disguise.

Several years have passed since I expressed an intention of submitting to the world an examination of geological facts, with a reference to the statements in the Mosaic Record of Creation and of the Deluge. I had then prepared a large work upon the subject, in which all the facts of importance in Geology, up to that period, are reviewed, and none of them found, in my judgment, to conflict with the most obvious interpretation of the Narrative. I was led to make the attempt of reconciling the disclosures of Geology with what is revealed, and in its literal acceptation, so that it should meet with the consent of Science, from a conviction that it could be done only by one acquainted with Physiology. It has been the misfortune of those who have attempted this work by the force of Revelation to have defeated their cause and strengthened their opponents' by glaring assumptions; while the Geologist has adhered to facts according to their apparently natural import, and founded theoretical speculations upon them. The enterprise is surrounded with apparently formidable difficulties, which must be explained in conformity with facts and philosophy. The fruitful topics relative to the extent and orderly disposition of fossils and fossiliferous rocks, the general details attending the incrustation of the globe, the numerous and complicated enigmas of the coal formations, must be resolved according to natural laws; the Neptunian and Plutonic hypotheses must be disproved, and the Creation of the earth, according to the Narrative, placed upon such probabilities as shall not conflict with the analogies of Nature, though brought within the time assigned by the Mosaic Narrative. The Mosaic Genealogies of the human race must be also sustained, and it must be shown that there is nothing in Geology to contradict the supposed age of the earth as founded upon those Genealogies. If no error have crept into them since their Revelation, they must be placed upon the same ground as the Narrative of Creation; while, also, they embrace a strong internal proof of their Divine Origin, and are fully corroborated by the admitted brevity of man's existence upon the globe. This being shown, it will be readily seen that it reacts as a strong corrobora-

ting proof of the literal truth of the Narrative of Creation; and no small array of geological facts, and fundamental principles in science, may be brought to the disproof of all theories which conflict with the obvious interpretation of the primeval history of the earth and its inhabitants down to the time of Moses. Indeed, there is abundant evidence in the coal formations alone to subvert the whole system of theoretical Geology, so far as it conflicts with the Mosaic statements; and the primitive rocks bear an overwhelming testimony that "He spoke and it was done."

When I had thus nearly accomplished my undertaking, new professional avocations devolved upon me, other and laborious professional writings urged themselves upon my attention, which, in connection with unintermitting infirmity of health, compelled me to lay aside my geological work. The subject, nevertheless, has been constantly more or less before me, that I might give greater maturity to the past by the progressive researches of geologists and by others executed by myself.

I have thus made this explanation on account of my former allusion to the subject, and will also add, that it is now my purpose to bring out an abridgment of the manuscript as soon as the state of my health, and other avocations, will admit, and to complete, at my leisure, the more enlarged work; or, in the event of my failure, the manuscript will be left to the disposal of my son. I believe it is free from speculation, certainly from assumptions, nor has it been prepared without those practical observations which are indispensable to success in all difficult inquiries.

In making the foregoing attempt, I am fully sensible that it must be performed through recognized facts, and without reference to what is revealed; though having effected the main purpose by demonstrative evidence, and endeavored to show that there is nothing contradictory of Revelation, I have appended an exposition of the Mosaic Narrative as corroborating testimony. That Narrative abounds with the most indisputable proof of its Divine Origin, and that, by no possibility, could it have been the fabrication of man. But this is not the species of testimony upon which reliance may be placed, when its authority is controverted.

It has been often tried, and its professional Expounders now quietly or actively yield to what they are told are the exigencies in Geology, and the "spirit of the age." An allowance is undoubtedly to be made upon this ground, and the Interpreter of Religion is not required to forego unequivocal demonstrations in philosophy. But he has no reason to fear the imputation of ignorance, or of intolerance, while surrounding the truth with the panoply of facts. He is equally warranted in doubting the just application of others whenever it may conflict with what is revealed in language of obvious import, and especially when it is sustained by the very nature of things, as, for example, by the works of Creation, or where, as in the fourth Commandment, the days of Creation are exactly defined in presenting their time, specifically, as a reason for hallowing the seventh. That Commandment, indeed, must be abandoned as spurious, if the days of the Mosaic Record exceed the period of those to which the Commandment has an immediate reference. Such is the plain alternative. There can be nothing figurative in the language of the Commandment, which is designed for the practical purposes of mankind, and it is, so far as my proof is concerned, an exact repetition of the Narrative itself. The minister of Religion must, therefore, make up his mind either to the belief that there are some important defects in theoretical Geology, and adopt the obvious interpretation of the Mosaic Narrative, or to surrender the fourth Commandment. This logic, I presume, will not be disputed. But before the latter step be taken, let us consider how much evidence there is in the very nature of things to assure us that the most remarkable part of the Narrative of Creation must be received in its literal sense, and that much of that proof has been only known to modern science; and secondly, let us duly consider the emphatic reference to the days of Creation in the great Commandment which hallows the seventh,—presented to the faith of mankind with all the force of a stupendous *reason* to induce obedience.

"For, in six days the Lord made heaven and earth, the sea, and all that in them is, and *rested the seventh day*. Wherefore, the Lord blessed the Sabbath-day, and hallowed it."

So, the Commandment. Now for the foundation upon which it rests,—

"THUS the heavens and the earth were finished and all the host of them. And on the *seventh* day God ended His work which he had made; and He rested on the *seventh* day from all His work which He had made. And God blessed the *seventh* day, and sanctified it; BECAUSE that IN IT He had RESTED from all His work which God created and made."

It appears, therefore, that such are the specifications, and such their coincidences, as presented in the fourth Commandment and in the Narrative of Creation, that if the former be truly the Word of God, so is the latter, and that we may safely conclude that there will be no revelations in Geology which will affect the correspondence between the length of the days of Creation and those of the Commandment, except in the mind of the Infidel. All others will make the proper discrimination between events which were the direct result of Creative Energy and such as have sprung from the order of Nature, and will as patiently, as undoubtingly, await the reconciliation of geological problems with what is so distinctly and emphatically pronounced by the Author of Nature. But when it is considered why the General Deluge was brought upon the human race, and how idolatry prevailed in the immediate personal presence of the Almighty, it can scarcely be expected that the "Medals of the Rocks" will not stand up before Him with as much defiance as the "Golden Calf."

Returning to the main object of this note, I may say, that, in respect to Divine superintendence, it must be allowed to be equally coextensive with all secondary causes; but apparently acting in conformity with the ordinary operation of those causes.

It is assumed by many late Physiologists, as Drs. Carpenter, Prichard, &c., after contending for the existence of *vital properties in the elements of matter*, and the organizing agency of the forces of Chemistry, that, nevertheless, all the results of living beings are owing to the immediate acts of the Almighty. This, therefore, as with the Author of the *Vestiges of the Natural His-*

tory of Creation, is only a circuitous method of confounding nature with God. Let us, however, suppose that there is a Supreme Being in their opinion, who is the Author of Nature, and that He is the Power who presides in living beings, and regulates all their processes, and we shall see that the doctrine abounds with absurdities. Its advocates generally carry this sophistry so far as to affirm that the particles of matter are constantly maintained in union by Almighty Power, that the results of chemical affinities are nothing but manifestations of that Power, that gravitation is only a constant emanation of the Deity, that digestion, circulation, secretion, excretion, &c., are only immediate acts of God. It is plain, therefore, that they can allow no other God than the nature of which He was the Author.

But let us try this hypothesis upon their own physiological ground. Living beings are made up of matter, which, it will be at least conceded, is distinct from the properties and forces with which it is endowed, and which are assumed to be equivalent to the Almighty. If we regard, next, the results of vital stimuli, we have a palpable proof that they elicit actions and physical results through principles which possess the power of acting, whatever their nature, or we must take up the absurdity of supposing they act upon God Himself, so only the foregoing hypothesis be truly entertained. The same must be affirmed of poisons, medicinal agents, &c. But this will not hold either in Religion or Philosophy. Nevertheless, it is evident that something is acted upon and brought into various active conditions, or, at other times, all power of acting is extinguished. If stimulants be applied to the nose, the heart may be thrown, on the instant, into increased action, and there may be an attendant paroxysm of sneezing. Of course, it cannot be entertained that God is the agent acted upon in such a case, any more than when prussic acid destroys life with the same instantaneousness, unless God and nature be truly the same. From these premises it follows that God, in the acceptation of a Creator, cannot be assumed as the immediate cause of the healthy and natural functions, and, therefore, of none of the phenomena of the natural world.

It has unfortunately happened, that many philosophers have embraced this most insidious sophistry, in the belief that they would thus enlarge our conceptions of Almighty Power according to the whisperings of its inventors, without considering the inevitable consequences to which it must lead, or that He who could create a particle of matter must have been equally capable of speaking the Universe into existence. Admit the first step in Creation, and all the rest will follow, of course. We shall then no longer hear, according to an eminent astronomer, that "Organic Nature is the mystery of mysteries." He, therefore, who has a proper view of Creative Energy, can obtain no more exalted conceptions of its Power than what is afforded by matter itself. And it appears to me that this construction redounds more to the Glory of God than such as requires a more extended testimony. But the higher attributes of matter, in its condition of systems of Design, reveal far more distinctly to the great mass of observers the operations of mind, and if, therefore, these evidences of Creative Energy be ascribed to the inherent properties of simple matter, the chances are great, at least, that we shall fall into theoretical, if not practical, atheism. And, although matter require for its Creation the same Power as the designs into which it is organized, it is also certainly true, that the more we contemplate the works of Design, the more do we become impressed with the Beneficence of the Creator, the extent of our responsibilities, and our absolute dependence. And true it is, that every demonstration of Creative Power which Nature affords, and which man may turn into demonstration, is not only conducive to the foregoing objects, but is too often necessary to satisfy the mind of the nature of Infinite Power. (See Author's *Institutes of Medicine*, INDEX, Art. GOD AND NATURE, and DESIGN. Also, § 14, *c.*; 170, *a.*, for Author's proof of the existence of Creative Power as derived from the constitution of inorganic and organic matter.)

P. S. In the discussion of difficult or controverted questions, I have been in the habit of seeking opinions and facts for support or illustration, which had either been employed by others for other

purposes, or which had been designed for conclusions opposite to my own. This postscript is intended to introduce one of the former nature, to show, farther, the extent of the will in its control over other properties of the mind, how it may turn with deleterious or with salutary effect one passion or another upon particular parts of the body, or may withdraw their influence from such parts, as set forth at page 81, and in a *note*, page 87, and how clearly the several properties of the mind are susceptible of analysis, and, lastly, to offer one proof more of the individuality and self-acting nature of the soul as a distinct essence.

The proof and illustration to which I refer occurs in a *Note* to a Pamphlet on the *Cholera*, by J. P. Batchelder, M. D., published since the foregoing Essay was printed. It will be seen that it has the advantage of being exactly the converse of my own; that is to say, while my exposition is designed to represent the control of the will in averting the morbific action of fear from the entire body or from particular parts, it is Dr. Batchelder's object to show that "this passion, by turning the attention inward, and fixing it on the stomach and bowels, has a great influence as an exciting as well as predisposing cause of Cholera." Thus,—

"This passion, by turning the attention inward, and fixing it upon the stomach and bowels, has, in addition to the general contraction of the capillaries which it induces, a great influence as an exciting as well as predisposing cause. One lady in full health was introduced to the bedside of a patient in the worst form of Cholera. After witnessing for a few minutes the sufferings, she became sick, and desired to be helped into another room, where she died of the disease in about five hours. By mental sympathy, her attention was fixed on the same parts in her own person as were affected in that of the patient whose suffering she witnessed. If inquired of, the timid will tell you that they are prone to this exercise of the attention, and experience an aggravation of the abdominal uneasiness whenever they think of the viscera alluded to."

To the foregoing cause must be ascribed many of the cases of Cholera with which individuals, already predisposed, have been attacked during, or immediately after, a short attendance on subjects of the disease, and which have been strangely enough attributed to contagion.

A

DISCOURSE

UPON

ORGANIC LIFE,

AS DISTINGUISHED FROM THE CHEMICAL AND PHYSICAL DOCTRINES,

INTRODUCTORY

TO THE AUTHOR'S COURSE OF LECTURES ON THE INSTITUTES OF MEDICINE AND MATERIA MEDICA, IN THE UNIVERSITY OF THE CITY OF NEW YORK,

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"The Science of Nature, rightly interpreted, is the knowledge of things through their *causes*." "Effects are frustrated by an ignorance of their cause; but a knowledge of the cause becomes a rule in practice."—LORD BACON.

1849.

DISCOURSE, &c.

In looking abroad upon organic nature, its most remarkable feature is the variety by which it is distinguished. So great, indeed, is the diversity of form, of organization, and of vital characteristics, the careless observer regards the assemblage as a mass of heterogeneous objects which have few affinities, and often without a remote relationship. He looks upon man as fundamentally distinct from the brute; and whenever specific differences are strongly marked, the same isolation obtains as we descend in the scale of existences. Coming, at last, to the vegetable kingdom, there is so little apparent analogy with the prominent features of the animal race, that none but the physiologist can detect a shadow of resemblance between the two departments of the organic kingdom. How different, however, with him who has explored the whole by the light of science. Whatever the color or the conformation of man, he is always endowed with certain attri-

butes which give to the critical inquirer as perfect an assurance of identity of species as the clearest demonstration enables the ignorant to decide that there is no other difference than color in a brood of chickens.* By the same course of observation the philosopher, after descending along the thousands of species which make up the tribes of animals, finds himself wonderfully imitated in form, structure, and functions, by apes and baboons, and taking in his way other species which are as nearly allied to the ape as the ape is to

* I need scarcely say that all the essential attributes of species are common to the whole human family, and that this rule of identity must obtain with man as with the different species of animals and plants. In organization, the nature of food, the relative proportions of atmospheric air concerned in respiration, the character of the secreted and excreted products, and in every fundamental point, the several races of mankind are exactly the same. We know, also, that no varieties of species, either of animals or plants, have been created, but that all the varieties, so far as known, have been the result of the gradual operation of physical causes. These may not have given rise to the color of the Negro, nor is it probably owing, as supposed by many, to the mark set upon Cain. (See *Medical and Physiolog. Comm.*, Vol. 2, p. 640.) But the fact in relation to Cain allows a consistent supposition that the color of the Negro may be of the same miraculous nature ; while the facts which identify the human race as one species are incontrovertible. Besides those which are relative to organic nature, I have set forth another, in the *Institutes of Medicine*, which, in itself, seems to be conclusive of the common descent of mankind. That fact consists in the coincidence

man, he obtains more humiliating resemblances in yet inferior animals; and by thus pursuing the chain of close affinities as one species is only a little removed from the next above, he is ultimately brought to the startling conclusion that he is on common ground with the worm of the dust, as it regards the great plan of organic life. Nay, more, when he penetrates the world of plants, he sees his semblance in every tree, in every herb, and submits to a close alliance with the mushroom and the parasite.

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which obtains in reason and instinctive impulses between the races. All analogy enforces the conclusion, since there are no two distinct species of animals that do not manifest certain well-marked peculiarities of instinct. We have thus, then, the mental and physical characteristics concurring together in establishing the identity of mankind.

With the foregoing premises, therefore, I may now bring Revelation to the aid of this question; since, if it correspond with the known facts, we may find something in it which will corroborate the testimony of science, and equally prove, through the instrumentality of science, the Divine origin of the Narrative of Creation. The reciprocal proof is this: In the first place, the affirmation of the descent of mankind from a common ancestor; and, secondly, as none will doubt that the black man existed at the time of Moses, it must be allowed that this writer, unless inspired, would have assigned a distinct origin to the two races, in his ignorance of the attributes of species, and especially so, as modern physiologists overlook those attributes, which they so well understand, and found a distinction of species upon slight differences in the skin.

He partakes, in common with the whole, the same elementary composition, the same principle of life, the same functions by which he came into existence, the same by which his growth is carried on, and is finally alike resolved into those elements which he was incapable of uniting into organic compounds, but for the union of which he was dependent upon vegetable structure. He enjoys, however, but only in common with all other animals, a superaddition to his essential or vegetable life in the nervous system and the organs of sense which are particularly associated with it. In certain moral attributes, such as willing, and perceiving, he offers points of resemblance to many of the most humble in the scale of being; but in respect to the *special* functions of instinct, they have either scarcely an existence in man, or put on the manifestations of reason. Man, therefore, finds himself contradistinguished from the vegetable tribes, in respect to the great plan of life, in little else than a more complex structure; and what is superadded to answer the purposes of sensual enjoyment, he holds in common with the kingdom of which he is the head. So far, then, he is only *primus inter pares*,—the first among his equals.

It is true, he walks erect, and has distinguish-

ing powers of articulation, though there are none of us who sing so sweetly as the birds. But who else than man could have traced out this magnificent system of affinities, or have shown his relationship to every moving thing, and to every plant that grows? That is his prerogative alone, and it is that thinking, immortal principle which separates him so widely from all other created existences as to establish a relationship, a companionship, with God himself. In this aspect of his nature he stands alone upon earth, and looks up to Heaven for an intimate alliance with that Supreme Intelligence who had laid the plan of his general economy in harmonious relation to those objects which were created for his uses and happiness. In the one, he realizes an Infinite Wisdom and Power in his physical connections which attend his being upon earth; in the other, he equally sees that the end of those connections separates him completely from matter, and leaves him alone related to the Spirit in whose Image his intellectual part had been ordained and associated with perishable Nature.

It is mine, however, to speak of man as he exists upon earth, to point out his affinities to the objects which surround him, and to indicate the influences and changes to which he is liable. It

is, however, only a glance at some small portion of this vast field which can be taken in an hour; and a life-time could not compass what is useful to be known in the walks of physiology, and as they traverse the recesses of pathology and therapeutics. Before we can begin, however, to investigate the functions of living beings in their healthy and morbid states, we must know something of the structure through which they are performed; and this is distinguished by great variety, especially in the animal kingdom. Numerous complex organs are here introduced which have no existence in plants; and where the office of each organ is the same, the structure of each is variable in the different species of animals. It is in plants alone that we meet with little else than what is strictly essential to organic life; and so perfectly coextensive with animated nature is the fundamental plan of life, that what composes the essential structure of plants is also at the foundation of animal existences. It is in those vessels, or in such as are closely analogous, which carry on the processes of assimilation and secretion in the vegetable world, that we must look for growth, nutrition, secretion, &c., in animals; and what, therefore, is superadded to the organic mechanism of the latter, is at most but incidentally sub-

sidiary to the fundamental structure.* The same order of simplicity prevails, also, throughout all the mutations to which animals and plants are liable. If disease beset the plant, it is but a modification of the physiological states of the vascular apparatus, and when the latter gives way, it is only a restoration of the more natural processes. And just so with man and animals. The diseases of each are only variations of the ordinary condition of the simple instruments of life, and as that condition fluctuates, so will there be health, disease, or convalescence.† Whatever may befall a complex organ, it is to its minute apparatus that we must look for the radical evil, and it is there our means of correction exert the salutary changes which they may introduce.

But, the mechanism of which I have been speaking would be as useless as the watch without its spring, were it not moved by a power equally adapted to all the processes of animated nature. The same stillness would prevail in one as in the other. There could be no manifestations of life without an active principle of life;

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* See Author's *Institutes of Medicine*, § 170—174; 177—187; 394—396; 410, 411; 526, *a*.

† See *Institutes of Medicine*, § 895—901.

and since the results in organic mechanism are everywhere nearly the same, we unavoidably infer a common moving power throughout,—the same in plants as in the higher kingdom. Thus also we find a universal resemblance in the essential mechanism and in the power by which it is maintained in action.

To this power, for conventional purposes, it is convenient to apply a name. That which moves the mechanism of a watch, we call a spring; and whenever the term is applied in connection with that mechanism, it is suggestive of the office which it performs. I doubt not that all of you regard it as a convenient, and even useful name. The spring of a watch reminds you at once of the mechanism which it controls, and even of what is going forward in relation to time. Coming to the mechanism and phenomena of organic beings, we witness nothing in inorganic nature or among the contrivances of art which bears a resemblance to either of the former. We therefore infer the existence of a power, by which one is moved in giving rise to the other, as unique as organization and its results. This power, for conventional objects, as in the other case, has been generally called the *vital principle*, or the *principle of life*. The term, also, as in the other instance, is sug-

gestive of much of the diversified mechanism to which it appertains, and of very many of those unique results of which it is the efficient cause. It is a term which most men have understood, and have employed as significant of a peculiar power, till quite recently it has been given out that life is a dream of the imagination, and that not a little of all this phantom may be represented by the cunning devices of man. But being determined myself to follow the well-beaten path of nature, and to hold on upon Truth, rather than to seek eclat in violations of either, it will become my pleasant duty to place you honestly in pursuit of both, and to show you the snares by which they are surrounded. I speak, however, in a general sense; for there are those who have as honestly imbibed and promulgated the errors which sap the foundation of medicine, and for whom I cherish the deepest respect as philosophers in those departments of science which it is their province to cultivate.

We have now before us, then, a principle of life;—something, to be sure, not quite so tangible as the spring of a watch, but quite as well understood by the results to which it gives rise. But remember well—never to speculate as to the *nature* of this principle, or, indeed, of any other ex-

istence. Study the mechanism and the phenomena alone, and through them ascertain the laws and the principles. It is to a neglect of inductive philosophy that the instability of medicine must be ascribed.

Let us, then, by a rational method, look a little farther at this spring of life. Do you see nothing else than an unvarying movement of wheels; nothing besides some special result as simple as that of the index of a dial? Do you not see the plant uniting the elements of matter into organic compounds, while the animal carries forward those compounds to yet greater perfection? Do you not find a great diversity of secreted products in every plant, and that according to the nature of the species,—according even as every part differs from another part,—and that, too, for ever the same in the natural state of the being? What variety of odors, what an exact but endless variety is offered to the taste and to vision! What strange diversity, yet always precise; while the action of this almost endless series of organic products is always the same upon every part to which it belongs; and yet that which is the product of one part is often destructive to all other parts of the same being by which it is generated.*

* See Author's *Institutes of Medicine*, § 135—137; 170—175.

But we have no time to pursue what is apparently without end. The brief suggestions which I have made will remind you of a thousand others of a similar nature, and satisfy you at your very first step in the vegetable kingdom, at the very threshold of life, that you have entered a world which has no analogies in composition, in structure, in powers, in functions, in tangible and intangible results, with any of the conditions or phenomena of inorganic nature. Glancing again at the animal kingdom, it is all the same as respects the essential conditions of life, the same exact variety, the same functions, products, and other endless phenomena, with smaller differences in respect to each than such as distinguish that elaborate structure where all the important processes are carried on.*

You begin, therefore, to realize the necessity of a peculiar power for all this unique variety, and the convenience of some term which shall distinguish it from every other power, and which, as far as possible, shall be expressive of its important offices. You are already prepared by this superficial view of the beginning of our demonstrations to take up your steady march along this

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* See Essay on the *Soul*, &c., p. 115.

fascinating path of nature, to be conducted along rather by the steady light which she may afford, than by those gleams or flashes with which art may attempt to beguile your imagination. I freely concede that one is a task, while the other is a pastime; that one involves the widest and a toilsome research, while the other is so purely a matter of sense as to admit of nothing else than an agreeable exercise of vision. Such of you as may prefer the former, will become enlightened physicians, will find in organic inquiries the best of your enjoyments, and will realize in yourselves what gives the highest value to man; but such as will be satisfied with the illusions of sense, as they abound in the outskirts of medicine, will become the victims of sense, and your patients the victims of error.

As you advance in the knowledge of Physiology, you will see that the effects of life are so various, and so obviously influenced by natural agents, and even by what is within—by the mind itself—you will necessarily conclude that the principle of life is also unlike all the other powers in nature in being endowed with certain properties, and liable to certain changes, which are totally unknown to the inorganic world. You will see, for example, that this principle is

variously acted upon—and according to the nature of the agents, and that motions and other effects ensue more or less in conformity with the influences which are exerted. These phenomena have given rise to an analysis of the principle of life; and practical uses as well as philosophy have ascribed to it a property of *irritability*, as well as of *mobility*;—just as they have to the soul the properties of *judgment*, *reflection*, &c. Mobility implies the power of acting, and is a very convenient name among those who are inclined to understand each other. Irritability has been long in use to denote a peevish mind, and by a little modification of its import in that relation, we shall find it a very convenient and useful term to denote the property in organic life upon which all things make their direct motory impression, and through which the moving power brings the mechanism into action.*

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* See Author's *Institutes of Medicine*, § 177—215; 253—267; 452—461, where this subject is extensively considered. Also, as related to the modifications of irritability in man and the different species of animals and plants, and through which certain morbific causes will induce disease in one species and in no others, and for physiological facts disproving the contagiousness of diseases which are known to be often produced by miasmata and other atmospheric agents, see, in connection, § 133—152; 191; 652, 653. In respect to this mooted question, it is

So far, then, and much farther, all things are common to plants and animals ; the whole assemblage of which constitutes their essential or organic life. But there are certain things peculiar

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unimportant whether the well-established dependence of intermittent and yellow fevers, &c., upon miasmata or other atmospheric causes, or their assumed dependence upon admitted hypothetical "animalcula," or "fungi," be received ; for it is just as absurd to suppose, (as imagined by some writers,) that the human organism can reproduce the animals or plants, (which is only a phase of spontaneous generation,) as to attribute to it the generation of those specific atmospheric agents which are commonly supposed to be the prevailing causes of yellow fever, intermittents, the malignant cholera, &c , in man, or another analogous cause to determine the "potato-rot," or another to produce an epidemic among horned cattle, or another among horses, according to the nature of the atmospheric poison and the exact nature of the plant or animal. So, on the other hand, if the virus of the smallpox, and of other contagious diseases, be generated by the living organism, it cannot be reproduced by chemical decompositions, and such diseases are, therefore, propagated alone by contagion. The facts and the philosophy are equally good in both the cases, and mutually sustain each other. But I would willingly waive the specific facts at the risk of those upon which the philosophy is founded, and thus rest the doctrine upon the immutable laws of organic life and as they are distinguished from those which govern the mere physical world. To the wavering upon this question of contagiousness of cholera and yellow fever, especially, and to effect a substitution of a profitable attention to the cleanliness of cities for the useless system of quarantine, I may also introduce, in this place, a combination of laws which I formerly set forth as distinguishing those diseases which are truly communicable without contact from all other affections, namely, that they have never

to animals, and, therefore, as there is reason to believe, are totally wanting in plants. The latter, for example, neither see, nor hear, nor smell, and these are functions which many are apt to sup-

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been known to arise from any other source than human contagion; that they are distinguished by definite symptoms, a regular course of rise and decline, and actually terminate at a definite time which cannot be accelerated by art; and that they rarely affect us a second time. (See Author's *Medical and Physiological Commentaries*, Vol. 2, p. 507—514.)

In connection with the foregoing subject, I will not neglect saying that there are no speculatists in medicine so great as they who insist most strenuously upon nothing but facts. If proof of this be required, it may be found in the assumption of *animalcula*, and *fungi*, and *ozone*, as the causes of epidemics, and the specific treatment which proceeds upon those assumptions, not only to the neglect of the absolute pathology, but of the symptoms of disease; or an extensive survey of the subject may be seen in the Author's *Institutes of Medicine*, § 4—5; 349; and in the Article on the Writings of Louis, in the *Medical and Physiological Commentaries*, Vol. 2, p. 679—815.

Though not relative to my subject, I will embrace this opportunity to say that my views respecting the pathology and treatment of the malignant Cholera, as expressed in my Work upon that disease, remain without change; that I still regard the disease as a congestive fever, of which the collapse is the stage of universal invasion, or cold stage of fever, as is well understood by all who have been so fortunate as to witness the stage of reaction, and the subsequent slow progress of recovery,—that all the antecedent symptoms proceed from local derangements, and that the diarrhœa, therefore, is only a contingent symptom which commonly precedes the explosion of the constitutional malady, and is only so far on a par with many other symptoms which mark the ap-

pose are the very essence of life. But this is a very false conclusion, for the animal would live just as well without eyes, nose, or ears. This is distinctly seen in the condition of the fœtus, and

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proach of other fevers, or as that same symptom, under a modified state of the abdominal secretions, often precedes an attack of typhus fever, and the pathological cause of which is very apt to become the immediate exciting cause of either of the general affections. The intestinal affection is not at all necessary to the malignant Cholera, nor is the suppression of urine. I have known the former to have been wholly absent, and in the East Indies, and among the negroes of the Mississippi, there have been a multitude of similar cases. That form is called, by physicians in Louisiana, the *Cholera sicca!* I have also known the urine to have been freely passed "in two cases during protracted collapse, and in which the patients were pulseless from the beginning, in the private practice of C. A. Lee, M. D." (Paine's *Letters on the Cholera Asphyxia of New York*, 1832, p. 117.) This has been common in Paris in 1849. The suppression of urine, however, is much more uniform than the absence of diarrhœa, and hence some writers have supposed that the disease consists essentially in that symptom, while a greater number regard the diarrhœa as the *sine qua non*. These unhappy views in pathology have engaged my attention in the *Institutes of Medicine*, where they may be found particularly under the articles *Astringents*, *Antispasmodics*, *Diuretics*, and *Expectorants*, by those who are interested in the inquiry. Also, in my Essay upon the *Writings of M. Louis*. Were the prostration of the circulatory organs, which is always present, assumed as *the significant symptom*, it would have some point as it respects the general pathological condition. The name of the disease has been an unfortunate one, having led to much of the error in respect to its pathology, and to a great deal in its treatment.

even during sleep; for then organic life is alone in operation. Looking, also, at the internal structure, we find a remarkable system of organs in animals, of which no trace can be detected in

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Finally, it is still found that they are the most fortunate who are admonished of the probable or possible approach of the malignant Cholera by the occurrence of diarrhœa, since, as a symptom of the access, it is very easily arrested, a powerful exciting cause withdrawn, and the patient thus restored to health; while, on the contrary, if an explosion of the general malady supervene, there is as much more to be done than to subdue the intestinal affection, as when the disease occurs without diarrhœa. I therefore consider the diarrhœa well designated as "a *premonitory* symptom," since it implies a condition of disease which is very local, and which will readily yield to abstinence from all food, rest in bed, some form of opium and camphor, and a frequent succession of hot poultices, or counter-irritants, to the abdominal region. In that stage I employ no other remedies. When the general malady supervenes, I depend upon calomel, opium, and camphor, but employ the calomel in smaller doses than recommended in my Work,—doses varying from one to five grains once in an hour to four or five hours. This treatment by calomel is also expedient when the intestinal discharges are of a bad character, and do not yield to opium, &c. A large blister over the stomach and bowels is then, also, very important, although I do not see it recommended. It is useless after collapse, but highly salutary in bad forms of the antecedent diarrhœa. They go deep, while mustard cataplasms and cayenne pepper exert but very little curative effect. (See, on this subject, Article *Counter-Irritants*, in *Institutes of Medicine*.)

Acetate of lead, in the treatment of cholera, which has been much recommended, is evidently injurious. Its administration has been founded upon erroneous views of the *modus operandi* of

plants. That system, according to its different parts, goes under the names of brain, ganglia, and nerves, and it is found to be especially subservient to the senses, and to the soul and instinct. It also establishes harmonious relations among the more complicated organic structures of animals; and it is a medium through which that harmony may be disturbed. There is nothing like this in plants; and yet they have as much of what is truly essential to life as the most perfect animal.

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opium, which does not exert its effects after the manner of *astringents*, but by subduing the irritability of the intestinal mucous membrane. (See, on this subject, Articles Narcotics and Astringents, in the Author's *Institutes of Medicine*, and his *Therapeutics and Materia Medica*, p. 291—293; 318—321.) Before, however, any settled views will prevail as to the treatment of the epidemic cholera, there must be more definite conceptions of its pathology, and it must be seen that like smallpox, measles, scarlet fever, continued fever, intermittents, &c., the malignant cholera and cholera morbus are only allied in having some prominent symptoms in common in a large proportion of cases; but that the resemblance terminates there. This is shown by morbid anatomy, by the alvine secretions, by the aggregate symptoms, by the frequent absence of vomiting and purging in the asphyxiated disease, by the progress of both affections, by the epidemic nature, and, therefore, by the essential remote cause of the malignant form,* by the difference in effects of certain remedies, as the mercurials and loss of blood, and by the almost universally fatal nature of the epidemic "in the stage of collapse."

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* See Institutes of Medicine, p. 414—427.

What is superadded to the latter is for his convenience, his enjoyments, and to balance nicely his more compounded structures.

The peculiar functions of which I have now spoken are assembled into two genera, one of which is called *sensation*, and the other *sympathy*. Sensation comprehends seeing, smelling, hearing, tasting and feeling; while sympathy is the office by which harmonious relations are established among the complex structures. The latter function is also called *reflex-action*. You perceive that they are very good names, and are quite expressive of what they are intended to mean; though here, as with everything else which implies the existence of life, many have been disposed to quarrel them out of the language of science.

Thus we have got two comprehensive functions which are peculiar to animals,—sensation and sympathy.*

These functions imply the existence of two properties of the principle of life, which are as peculiar to animals as are the functions which originate in them. One of the properties is called sensibility, the other the nervous power. Sensi-

* See Author's *Institutes of Medicine*, the Index.

bility, therefore, is the property upon which sensation depends, and the nervous power is the agent of sympathy; while the nervous system is the part or organ in which they reside. You perceive, also, that these are very good names, and are very significant of what they stand for. It is true, that many have made the great mistake of supposing that the nervous system is intrinsically concerned in the organic processes of animals; but since those processes and their results, such as growth, secretion, &c., are essentially the same in plants as in animals, and as plants are destitute of nerves, and possess no nervous power, you readily see the nature of the blunder. Finally, sensibility is a good deal allied to irritability; since, while all things make their impressions upon irritability in absolute life, it is upon sensibility that agents operate in giving rise to sensation. Thus, for example, it is upon the irritability of the heart and blood-vessels, and upon the sap-vessels, that the blood operates in one case, and the sap in the other, and thus maintain the several parts in action. Cathartics do the same in respect to other organs, and heat acts upon the same property throughout the universal body both of animals and plants. And so of all things else in the main department of life. Coming to sensi-

bility, this is acted upon in the retina by light, in the acoustic nerve by the vibrations of the tympanum, &c., in the Schneiderian membrane by odors, and so on. You readily see, therefore, the distinction between irritability, which is common to plants and animals, and sensibility, which is peculiar to animals.*

What I have now said of the superaddition of certain organs, properties, and functions to animals, has given rise to a division of their life into two parts; one of which embraces what is truly essential to life, and belongs equally to plants, and is called organic life; while the other, or non-essential, and which is peculiar to animals, is called animal life. Nevertheless, it should be understood that such parts as are most essential to organic life pervade all the organs which compose the division of animal life, since growth, nutrition, &c., are as perfect there as in plants themselves. The nervous system, also, being rendered subservient to the organic life of animals, is carried into all parts of their organization; although the cerebro-spinal system belongs, intrinsically, to the division of animal life. The nervous

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* See *Institutes of Medicine*, § 194—204; 222—233¾; 450—475; 500.

power is thus rendered an agent by which all parts are balanced in their healthy functions, by which all parts are rendered sensitive to the condition of each other, and by which, when one becomes disturbed, another, or all other parts, may be thrown into disordered action. In the natural state, for example, if the skin be chilled and perspiration checked, the nervous power immediately excites the kidneys to an increased secretion of urine. Another plain example of an analogous process occurs in every act of respiration, and the process of respiration exemplifies exactly what is or should be meant by sympathy. The mind and its passions are also constantly bringing the nervous power into an endless variety of influences, both in organic and animal life. In the former case, we see its operation directed upon the stomach when vomiting is brought on by the imagination, and upon the capillary blood-vessels of the face, when shame or anger suffuses the countenance. There is nothing like all this in plants.*

We have thus a great symmetrical system, in structure, properties, functions and organic re-

* *Ibid*, § 222—233¾, 500, which embraces a summary view of the doctrine which I have propounded of the functions of the nervous power.

sults, which is alike common to all animated nature, while certain additions are provided in animals to answer some special ends of their being.* You all see that it is a consistent, a harmonious plan, and that it is only when we depart from the obvious path of nature, that incongruities begin to appear. I say you are already convinced that truth in physiology is just as simple and as easily comprehended as it is everywhere else. To beget conviction, it is only necessary

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* Much confusion has prevailed upon this subject, in consequence of too great a distinction which had been drawn by Bichat between the life which is common to plants and animals, and which is known as *organic life*, and the superaddition of certain organs and functions to animals, and which is called *animal life*. Bichat conveys the impression of two distinct lives, as appertaining to animals, while, in point of fact, what is peculiar in their life is engrafted upon organic life. There is but one principle of life; but in animals, besides what is common to it with the vegetable tribes, it possesses certain other endowments that do not manifest themselves in plants. For the sake of brevity and convenience, however, we may speak of *organic* and *animal* life; but, in having so done, I wish to be understood that I recognise but one life, though modified even in its purely organic aspect in the two departments of living Nature. (See *Institutes of Medicine*, § 183—185.)

In the work to which reference is here made, I have endeavored to analyse the whole of this subject, and to bring it out of the confusion in which it had been involved, and redeem it from the metaphysical mystery with which it had been charged by the physical theorists.

to present it in its naked simplicity, and it will then be self-evident to any mind that has not entangled itself in the prejudices of error. Hence, too, you will readily appreciate the importance of beginning right, and with a determination to reject whatever conflicts with the self-evident propositions of truth. Whatever infringes upon the consistency and the unity of the great plan of organic nature, you may depend upon it, is the spurious work of man. I do not mean, however, that you should turn your sight from error as it dances before you; for whatever is dignified in truth will always gain by any just comparison; and you should know the false that you may assist in restraining its progress.

Such, you see, gentlemen, is my solicitude for your safety, that I have again wandered from my subject to show you the importance of not departing from it yourselves. But I can only now present you the great landmarks which should guide your steps throughout all that domain of nature which it is our province to cultivate. Nor have I done more than make a general survey of animated existence as presented in its most natural aspects. Looking at this alone, we should imagine that it is all without change, and that every living being is destined to live on for ever.

There is nothing in the perfect state of animals or plants which denotes their mutability beyond what is incident to growth and nutrition—nothing of the liability of all to disease, or death. All this is inferred from another series of observations;—and here we pass into the vast fields of pathology and therapeutics. But there is no possibility of entering those regions but by the great domain of physiology. It is true, shorter cuts have been often attempted, and in recent times it would seem almost as if they had been overrun by foes and plundered of all that is valuable, or which entitles them to our respect or attention. Your help is wanted in maintaining the integrity of nature; in repairing the breaches that have been made in the bulwarks which she has erected. You will find much in the artificial systems of physiology that is so estranged from nature that you will have no chance of smiling even at a clumsy caricature; and when you turn to pathology and therapeutics, as managed by the same philosophers, you will be amazed to see how these three branches of science have been stripped of their relations to nature. Should you, however, be inclined to follow those inquirers who have been guided by the light of truth, you will find all my assurances sustained by your own ob-

servations. You will find nothing inconsistent in any branch of your pursuits, and that the whole is bound together by the closest affinities. You will find that physiology, in its connection with organization, lies at the foundation of pathology and therapeutics, and of all those intermediate changes which make up the transient or permanent differences among individuals of the same species. All the changes that may befall the most natural state of the being, from the most aggravated forms of disease to temperament itself, are intrinsically nothing more than the physiological states more or less turned from their natural standard; while therapeutics is only the method of turning them back again. For great and wise purposes, the properties of life are rendered mutable, and as one cause or another, and according to its virtues, may make its impressions upon irritability or sensibility, so will it be felt, and corresponding effects will follow. The progress of structural development from the beginning of life, especially such as marks the different eras, both in animals and plants, as, for example, from the embryo and seed to the evolution of the structure, and again remarkably at the age of puberty, is partly due to modifications which the organic properties undergo; since all the processes of life

are carried on by these properties acting through the medium of organization.* The same properties are rendered more transiently mutable to carry out the act of gestation and lactation in animals, and fructification in plants. In the former cases, the changes are abundantly manifest; and then the powers of all other parts must be so constituted as to adapt themselves to those transient modifications through which gestation and lactation are accomplished. And since, therefore, the organic properties are rendered mutable for those great natural ends, and susceptible of various influences for the purposes of life, they are unavoidably but contingently liable to changes of a morbid nature when certain unnatural causes may happen to exert their effects upon them, and those morbid changes are even analogous to those of gestation and lactation. So, also, for the same reason, when other causes operate, they are liable to other artificial changes; and it is found from observation that, among these latter causes, there are many that will produce such changes as will enable the morbid properties to take on their natural tendency towards a state of health. If, there-

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* See *Institutes of Medicine,* (Age and Sex,) p. 373—383, p. 393.

fore, it be miasma which operates upon them, fever may ensue, and then, perhaps, a cathartic, or an emetic, by a different impression, will place nature in the way of passing again to her ordinary state. All the changes, too, which constitute the different forms of disease, are attended by such modifications of irritability and sensibility, that the subjects of such changes are very differently affected by physical agents than in the condition of health.* All this, too, will be according to the combined circumstances which make up the nature of the change; and it is the finding out of these circumstances in every case of disease, and at all stages of its progress, and adapting our means of cure in conformity with them, which form the greatest difficulties in practical medicine.

Now, gentlemen, this mutability of the properties of life is at the very foundation of the healing art. When they are driven from their natural standard to a morbid state, it is more or less their tendency to return to their healthy condition. This tendency may be often greatly promoted by art; but in many instances, as in the self-limited diseases, it so far transcends all artificial

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* See Author's *Institutes*, &c., § 137—160.

impressions, that, in a general sense, it will admit of little or no interference. This great law, therefore, is at the very basis of medicine. Without it, remedial agents would be powerless; the knife of the surgeon, and his caustics and poultices, would have had no existence. It is the sole dependence of plants and of the brute creation. All animated nature, indeed, would utterly perish without it. Galen in one line expresses beautifully the whole extent of the doctrine. "*Natura malum sentiens gestitat magnopere mederi.*" *Nature cast down desires greatly to be assisted.*

The general tendency, of which I have now spoken, in the properties of life to return from their morbid to their natural state, whether spontaneously or brought about by art, has been long known as the *Vis Medicatrix Naturæ—the recuperative power of Nature.* It is a great organic provision, which is often through misapprehension, and not seldom ironically, represented as a principle of intelligence; while it is nothing more than a natural law impressed upon the constitution of all organic nature. Hence it is that all right-thinking physicians have regarded and designated Medicine as the "Handmaid of Nature." You perceive, therefore, gentlemen, that

this also is a very good name, so only you agree to understand alike its proper import. None understood it better, or has expressed it better, than the father of Medicine. "*Natura deficiente*," he says, "*quicquam obtinet medica ars, perit æger.*" *If Nature come not to the aid of the medical art, the sick man dies.* And Celsus to the same effect: "*Natura repugnante, nihil proficit medicina.*" *If Nature do not co-operate, medicine is useless.** Or, as the poet has it,

"When Nature cannot work, th' effect of art is void."

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* It is from the want of a proper understanding of the recuperative efforts of Nature under circumstances of disease, and too often from no understanding of the subject, that so many physicians rely altogether upon art for the cure of diseases; while, in truth, art can only place the morbid states in the way of curing themselves. Nature does all the rest; and therefore it is that the best practice often consists in doing nothing more than keeping all obstacles out of the way of Nature. All this is conspicuously seen in diseases that have a certain allotted course and duration, as smallpox, measles, scarlet fever, mumps, &c. This principle, indeed, is at the foundation of the success of homœopathy and animal magnetism, more or less aided by confidence and hope. The work of cure, in this popular practice, is left to the spontaneous efforts of Nature, while the mind is agreeably entertained and encouraged by the powerless and inoffensive doses that are administered under the disguise of remedies, or by an appeal alone to the imagination.

Were it not, therefore, for the natural tendency implanted in the constitution of the properties of life to return from morbid to

I have said that physiology is so completely at the foundation of all the changes which befall the living being, that the same great principle

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their natural states, there could never be a recovery from disease.

But something more than this natural recuperative tendency is necessary in grave diseases. There must be either help from art or other help from Nature. But it is only a small proportion of mankind, and but few of the brute creation, that can have the benefit of art; and, from the fallacies of human judgment, art itself is often imbecile. Nature has therefore instituted a great variety of processes for her own protection and preservation, though they all depend upon a few simple laws, or, more comprehensively, what I have denominated the *law of adaptation*. We see the principle first exhibited in the various permanent provisions for self-defence, such as thorns, horns, the galvanism of certain animals, the poison of serpents, of insects, &c. (See page 103) The most obvious step in the chain of analogies is the variety of provisions for perpetuating the species; such as relate to animal and vegetable reproduction, the wings and burrs of seeds for their dispersion, &c. Then comes another class for the preservation of every individual; such as the various contrivances for procuring food, &c.; and here, too, should be included the food itself, the air, &c. Now, with all these provisions for the maintenance of life in a state of health, it would be absurd to suppose that a fundamental principle has not been implanted in the properties of life for their direct preservation, when they may become deranged by various causes. That this is so, is a matter of constant observation; and this observation of the spontaneous subsidence of disease, or as the most violent poisons of the materia medica may contribute to its removal by establishing changes that are more favorable to the recuperative process than such as are brought about by the ordinary causes of disease, enforce still more the conviction that it would have been the greatest possible defect in the general plan

stretches from disease to those differences among mankind which are known as the temperaments, and even to the changes which are effected in

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of preservation had morbid conditions been left alone to the contingencies of art. One of the most obvious subordinate means is the privation of appetite in a vast proportion of diseases, that the individual may avoid his habitual food. This provision is strongly pronounced in all animals; and that it does not obtain equally in man is owing to the artificial nature of his habits.

As to the direct means which Nature employs for the removal of disease beyond the recuperative tendency appertaining to the properties of life, striking illustrations occur in the effusions of lymph, of serum, of mucus and of blood, which are set up in inflammatory diseases; of bile, perspiration, &c., in fevers, &c., and which contribute greatly towards their removal. In all diseases, during their increase or decline, there is a constant succession of pathological conditions, however nearly allied. When the changes are of a favorable nature, the vital properties and functions will ultimately attain that modification which results in a free production of the natural fluids, or effusions of serum, or of lymph, or pus, or blood. As soon as any of these products take place, they operate as depletory remedies, and hasten the favorable changes in which they originate, and especially so as the effusions proceed directly from the small vessels which are the instruments of disease. As these effusions, too, are Nature's ultimate effort at relief, we thus derive from her a valuable guide for our treatment of inflammations and fevers.

The tendency, therefore, of the vital conditions, when diseased, to return to a healthy state, and, in the progress of those favorable changes, to bring on results which hasten their complete restoration, is one of the most remarkable exemplifications of Design; since, without it, the whole human race, the entire animal kingdom, would become extinct. Our whole materia medica, as I

plants by cultivation, by changes of climate, &c., and in animals by analogous influences. And here I have thought that I cannot do better than

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have endeavored to show, extensively, in the *Institutes of Medicine*, does but establish new pathological conditions; but its several agents alter the morbid states in such ways as enable the properties of life to obey more readily their natural recuperative effort. The only difference, therefore, between the morbid states induced by the ordinary causes of disease, and the changes which arise from the action of remedial agents, is, that in one case the alteration is more profoundly and permanently made, while in the other it is of such a nature as to subside spontaneously.

The established laws of living beings are so full of provisions for the maintenance of the great ends of Creation, that we find Nature instituting morbid processes for the removal of evils of a very different nature from disease, whilst in the end she accomplishes the cure of the disease which she had instituted. Wounds, for instance, are an injury which Nature endeavors to repair, and they are, therefore, made the cause of inflammation, that the edges of the wound may be united by an effusion of lymph, and this effusion becomes a part of the natural cure of the inflammation. Again, a hard, irritating eschar, or a mortified part, is an evil to the adjacent tissues, and through a common law of the properties of life, it institutes an inflammatory action by which either is thrown off through the suppurative process, while the formation of pus is the natural cure. A bullet, or other solid substance, penetrating the organization, as the muscle of a limb, is an offending cause, and the irritation it produces brings about that pathological state of the vital conditions which constitutes inflammation. This form of disease, therefore, when thus produced, is a salutary process of Nature to get rid of the offending cause, and it must not be disturbed unless the offending cause be artificially removed. The steps in the process are very curious. Suppura-

to illustrate this subject by a brief analysis of the temperaments of mankind; and for this purpose I will be indebted to a page which I have alrea-

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tion takes place on all sides of the foreign object, attended by ulceration, and absorption of the living parts which intervene between the foreign substance and the surface of the body. But, on all other sides, a little beyond the foreign body, coagulable lymph, instead of pus, is deposited, by which the cellular tissue is agglutinated, and the purulent matter thus prevented from diffusing itself through the adjacent parts. Finally the foreign body reaches the surface, and is expelled, and Nature then institutes the eschar by which the opening is healed. In the mean time the morbid process is made, progressively, the means of its own cure by the effusion of pus and lymph.

But, another curious expedient of Nature, and by which she endeavors to avoid the necessity of a morbid process for her own relief, consists in the frequent production of cysts or sacs around the foreign body, especially if it happen to be smooth and free from irritating angles, like bullets. In these cases a slight inflammation is excited, and an effusion of coagulable lymph, instead of pus, takes place and results in the cyst or sac; and this new formation, being but imperfectly endowed with vital properties, is not offended by the presence of the foreign body. The little inflammation originally produced is overcome by the effusion.

No wonder, therefore, that when physiology was less understood, Van Helmont, Stahl, and others, should have supposed that the healthy and morbid actions are under the guidance of an intelligent Agent.

I have endeavored to illustrate, in a summary manner, in the *Institutes of Medicine*, (page 679—681,) the whole philosophy that is ever concerned in the production and cure of diseases, in an example supplied by the *Seton*. See, also, my *Materia Medica and Therapeutics*, p. 174—181.

dy placed before the world, but too recently, however, to have engaged your attention.

The temperaments may be regarded as embracing the innate as well as acquired peculiarities of constitution; for although the latter depend upon causes that are relative alone to the individual, the former or innate constitution has been brought about, at some anterior generation, by the physical agencies of life. This is the true temperament, and belongs to masses of mankind.

Idiosyncrasy is only a variety of temperament and constitution, and like those, therefore, depends upon some peculiar modification of the properties of life, especially irritability; but only so in relation to a very few particular agents. It is peculiar to individuals, rather rare, and may be hereditary or acquired. This peculiarity is not unfrequently the cause of the favorable or deleterious effects of certain remedial agents, of certain kinds of food, &c. We see the important principle illustrated every day, every hour. Here is a subject who is salivated by the external application of a few grains of mercurial ointment, and in whom various diseases may be speedily extinguished by this simple use of the remedy. But here is another, in whom the internal ad-

ministration of an ounce of calomel may produce no constitutional result, and make no impression upon disease. Or, it may be in another case of extreme susceptibility to the action of mercury, that the agent always displays the effects of a profound poison, aggravating fever and other affections, or, in the absence of disease, greatly deranging all the functions of life. Most men are poisoned by the slightest contact with the Rhus vernix; but now and then an individual handles it with impunity. Muscles and some other animals are always poisonous when eaten by some people, though generally good articles of food.

Constitution comprehends all the peculiarities of the individual: the temperament, idiosyncrasy, conditions relative to age, sex, habits, &c. It is, therefore, liable to many variations at all periods of life. The prevailing characteristics of each of the elements may remain, but yet so modified, that what is known as constitution may be "broken down."

The same principle is concerned throughout, whether in respect to constitution, temperament, or idiosyncrasy. It is the same as prevails habitually in respect to the naturally modified irritability of different organs in man, and in all animals, and in plants; that which renders the pro-

duct of one organ innoxious to some parts, but morbific to all other parts,—that which renders the eye susceptible to the undulations of light, the ear to the undulations of air; and so on. The principle, and its everlasting, unchanging laws, are everywhere, in all that relates to organic beings, whether in respect to the system in its abstract condition, or as relative to external agencies. It is a great and wonderful principle, a perpetual study for the philosopher, ever pregnant of variety, ever illustrative of the peculiar character of the properties of life, of their natural modifications, of their instability, and forever supplying fresh sources of interpretation of the laws which the properties and actions of life obey.

It is evident, therefore, that temperament, constitution and idiosyncrasy are constituted by certain acquired or transmitted conditions of the vital properties, which form a part of the natural or habitual state of each individual, and from which arise various degrees and kinds in the susceptibilities to the action of physical agents, and certain peculiarities, also, in the material condition and conformation of parts, especially the external. By studying these sensible peculiarities, as well as the phenomena of life in their natural and morbid conditions, we infer the peculiarities

of the natural vital conditions in different individuals, or their natural constitution and temperament, or any more remarkable idiosyncrasy. They reach, also, to the mind, which is apt to bear certain relative peculiarities to those of the organic states.

In the farther consideration of this subject, I shall regard those peculiarities of constitution which are mostly of a determinate character, and include them under the general denomination of temperament.

The physiological differences between temperament, idiosyncrasy, and constitution, are neither great, nor of much practical importance. Indeed, so allied are they in principle, that a common philosophy determines the remedial treatment, which is always more or less modified by temperament. Each should be considered along with the modifying influence of habits, climate, &c.

Temperament and constitution do not depend, as supposed by some writers, upon the special development of particular organs; though this is true of some of the vicissitudes of age. The former have their foundation in the system at large, and are apt to be transmitted by one or by both parents; or, the transmitted peculiarities

may come from a remote ancestor, and not from the immediate progenitor. This last peculiarity is analogous to one of the characteristics of the scrofulous diathesis, where it passes over one generation and reappears in the third.

It appears, therefore, that temperament, whether innate or acquired, is due to the slow operation of causes upon the vital constitution, just as it is in respect to the habitual use of tobacco, of opium, &c., or as it respects certain morbific causes.

In the latter case, the modifications are more or less transitory; but may be so ingrafted as to be transmitted, for a time, like the permanent temperaments, from parent to child, as seen of some diseases, such as rheumatism and gout, or of predispositions to diseases of a transient nature, as in smallpox, or even ordinary fever. Coming to hereditary diseases of a permanent nature, as scrofula, we run from the transitory phenomena of vital habit, which respects the use of tobacco, opium, &c., by an intimate analogy, into the permanent temperaments; and from these we are conducted by the same philosophy, which respects the operation of physical agents in modifying the properties of life, to those more remarkable peculiarities which spring up in an-

imals from domestication, and in plants from changes of climate and soil.

It is scarcely probable that differences in temperament have, often, any appreciable effect on the elementary composition. Differences, however, obtain in respect to structure, as seen in the general form, the proportions of the limbs, the features, &c., while more remarkable corresponding analogies are witnessed in the herbaceous and arborescent habits of the same plant, as it may be subject to the influences of a tropical or cold climate, as the Ricinus communis.

Great differences arise not only in respect to the influences of the same remedial agents, from the mere circumstances of temperament, but morbific causes may be equally various in their operation. The same causes may be very apt to affect one temperament, while they will rarely have an effect on another temperament.

The temperaments, as designated by the ancients and retained by the moderns, are divided into the Sanguine, the Melancholic, the Choleric, and the Phlegmatic. The artificial habits of the moderns have added a fifth, or the Nervous.

It is not usual to find all the attributes of each temperament united, while some of the whole may be blended in the same individual. Never-

theless, the characteristics of one or the other generally predominate.

Temperament is most distinctly pronounced at adult age.

1. *The Sanguine Temperament.* Unlike the other temperaments, the characteristics of the sanguine are perpetuated from infancy, and perhaps, therefore, may be considered the most natural. The skin remains soft and delicate; the limbs rounded and full; the superficial veins, unlike those of infancy, large, conspicuous, and blue, especially about the head and temple; the complexion fair, florid and animated; the eyes large and blue; the hair light, or red, or of intermediate hues.

Sensibility and irritability are strongly pronounced; the great development of the latter giving the principal determination to the sanguine temperament. The blood, in consequence, stimulates the heart to more frequent, high, and regular action, maintains the capillaries in a lively and plethoric state, and thus determines the redness and softness of the skin. Other vital stimuli, also, operate with greater intensity than in other temperaments. For the same reason, the secretions and excretions are rapid and copious, and are little liable to vacillation in the ordi-

nary conditions of health. All things else move on in a corresponding manner; the whole assemblage of which beautifully illustrates the true philosophy of life.

The great development of sensibility contributes, also, its considerable part to this temperament. The senses are ever on the alert; and here, as with irritability, external objects make their impressions with great effect and rapidity. Perception is rapid, reflection quick, imagination lively, memory prompt. The succession of ideas is too rapid for comparison, and hence the judgment is infirm, unless associated with genius; when it is distinguished for eccentricities. This is exemplified in the poet Byron, and in the warrior, the Marshal, Duke of Richelieu,—"that man so fortunate and brave in arms, light and inconstant, to the end of his long and brilliant career."

Inconstancy and levity are the great moral attributes of the sanguine. Variety and enjoyment never satiate. Devoted to sensual gratifications, they are in love with all female beauty, and are inconstant to a mistress, if not to a wife; yet are they honorable in all things else.

The sanguine is eminently generous or prodigal, and the end of gain is the purchase of pleasure. Quick in anger, he is soon cool, or he is

impelled to hasty decisions that are soon regretted. A challenge to a duel would be gladly abandoned, did not a sense of pride urge him on to the combat. Revenge and envy have no hold upon this constitution.

It is evident, therefore, that the prevailing diseases of the sanguine temperament are inflammatory; that the organs sympathize readily and greatly with each other, and that the sympathetic affections are disproportionately greater than the primary affections. Infancy always partakes of this temperament; but if it be truly constitutional, the infant is liable to extraordinary demonstrations of its fundamental nature. The irritation of a tooth, for example, is more apt to produce convulsions, and intestinal derangements still more so, or to lay the foundation of cerebral diseases, &c. Anger being quick and vehement, here displays its instant effect in developing inflammations and hemorrhages. But love is instable, and as envy, grief, and jealousy torture not the mind, so do they not the body.

As external causes, whether natural or morbific, make their impressions rapidly and profoundly upon the sanguine temperament, and its diseases being active and violent, remedial agents should be prompt and decisive, as in infancy; but here, also,

for the reasons which are relative to the first period of life, remedies are also profound and speedy in their operation. And since the prevailing disease of this temperament is inflammation, bloodletting is the principal means of cure, and will require but little co-operation from other agents. If early applied, and carried to its proper extent, it will nearly extinguish the most violent inflammations during its first application. The test of this extent will be also more exactly determined in this, than in other temperaments, by the subsidence of symptoms during the progress of the operation. It is in this temperament, also, that the philosophy of the vital influences of loss of blood is most evidently shown.

2. *The Melancholic Temperament.* The melancholic temperament has certain points of resemblance to the sanguine, though they are strongly contradistinguished. The general external aspect of the sanguine is cheerful; that of the melancholic, dry, stern, or gloomy, and excites no liveliness in others, though it command respect, and even admiration. The solids predominate in the melancholic; the capillaries show less blood, though the veins are large and more prominent, but less transparent than in the sanguine; and unlike the latter, the skin is darkish, or inclining to yellow,

thick, coarse, and hard to the lancet. The blood flows more freely from the sanguine when the skin is pricked; and this exemplifies the state of the capillary circulation at large. The same principle obtains, therefore, in the pulmonary circulation, and hence in part, the blood is darker in the melancholic than in the sanguine. The eyes of the former are darker and less prominent than in the latter; and the hair is dark, coarse, or stiff, eyebrows large, black, and often projecting; the muscles and tendons, like the superficial veins, stand out, from the absence of that cutaneous fat which gives rotundity to the body of the sanguine.

It is easily seen, therefore, that irritability and sensibility are comparatively dull in the melancholic. External objects do not make the strong and rapid impression upon the senses as in the sanguine: and from the obtuseness of irritability, the action of the heart is slower, the capillary blood-vessels are less charged with the vital fluid, the secretions and excretions less and more slowly performed.

The melancholic temperament is the principal abode of genius; embracing a large proportion of those great men who have unfolded the laws of nature, or have made the highest advances in the arts, or have astonished the world with deeds in

arms, or with the achievements of the statesman, or the orator, or the painter, or the poet. Here is witnessed the highest intellectual renown at the very dawn of manhood; and here it is that we often meet with genius struggling with those adversities which arrest the ambition of other temperaments. The melancholic is forever indomitable; rising in determination as obstacles rise before him. Inflexible in purpose, the passions are disciplined to urge on an arduous enterprise, or, if allowed to become impetuous, it is to accomplish the decisions of the understanding. With equal facility he concentrates his mind upon abstract inquiries, or at the next moment sends it abroad over the widest theatre of its operations. He is bold and brave, never fearing death, nor wantonly incurring danger. He moves steadily forward, though he does not move, until he has explored the path before him. His imagination, therefore, is of the highest order, being disciplined by the sterner faculties. It is such an imagination as is always an element of genius; such as contemplates the realities of life and the truths of Revelation. He is thoughtful, grave, or sad, but may tune his mind to great elevation, and great sublimity and enthusiasm, and often soars on poetic wings through the regions of hea-

ven. The sanguine on the contrary delights in the *romance* of fiction.

Honor holds its empire in this temperament, however it may be wanting in human sympathies. If pledged to a good or bad action, it is fulfilled. The melancholic is generally fervent but dignified in his attachments, or looks with indifference or with scorn upon humanity. A few, like Tiberius, are fearful, perfidious, suspicious, and cruel ; and others, like Nero or Richard, insensible to danger, and ever ready for the work of death.

As with sensibility and irritability in their natural aspects, so it is in their relation to morbific and medical agents. The coincidence is universal. The former are slow in establishing morbid changes, many are inoperative which readily light up the flame of disease in other temperaments ; and the passions are subdued by the melancholic into mere agents of the understanding. But when morbific causes have made their impression, the dullness of irritability and mobility explains why disease is apt to be obstinate, and why remedial agents operate with less rapidity than in the sanguine. The vital properties and functions being slowly susceptible of morbid changes, they are slowly altered from their morbid states.

It is easily inferred that the diseases of the melancholic are mostly of the digestive organs and that their removal is tedious. It is also manifest that these, and other affections, are slow in developing diseases of other parts, and that the brain and the mind must be most likely to sympathetic disturbances. Hence it is that hypochondriaism and insanity are apt to supervene in the melancholic temperament.

Cathartics are demanded more by the melancholic than by any other temperament; though their exigencies have a special relation to the disorders of the digestive functions. Bloodletting, also, is often necessary to reach these chronic maladies; and although its delay in the grave forms of inflammation be less hazardous than with the sanguine, its necessity is as great, and its extent and frequency of repetition are greater. It is here, too, that the greatest demand is made upon the materia medica for auxiliary means.

3. *The Choleric Temperament.*—The choleric is intermediate between the sanguine and melancholic temperaments; and although it forms the sanguineo-melancholic, it possesses characteristics which give it an individuality. The skin has greater fullness of the capillaries than in the melancholic, and therefore greater softness

and warmth, but less than in the sanguine. The pulse is intermediate in fullness and frequency. The secretions and excretions moderate and uniform. The healthy functions performed with regularity and ease. The choleric is tenacious of his own rights, but less disposed to infringe upon the rights of others than the melancholic, while he has less generosity than the sanguine. The higher faculties of the mind correspond with the other characteristics of this temperament, being generally distinguished for their moderation.

Irritability and sensibility holding an intermediate degree between those of the sanguine and melancholic, external agents operate with a relative effect and rapidity; so that the organic functions move on without frequent or profound interruptions, and diseases yield to a more compound treatment, though less readily than to the simpler means required by the sanguine, but more speedily than in the melancholic.

4. *The Phlegmatic, or Lymphatic Temperament.*—The phlegmatic is characterized by slothfulness of mind, and by a simpler display of vegetative life than any other temperament. The flesh is soft, the countenance pale, the hair delicate, and the fat amounts to an incumbrance. The limbs are rounded, feeble, and without expression.

The veins are small, and lie deep. The pulse is small, feeble, and soft; arteries small, and the capillaries deficient in blood. Irritability is dull. Sensibility is obtuse, and perception weak, which greatly circumscribes the senses as an avenue to the mind; while

"Fat holds ideas by the legs and wings."

But, with all the intellectual dullness and bodily indolence, which distinguish this temperament, it is obstinate, fearful, suspicious, and avaricious.

The organic functions of the phlegmatic are easily liable to interruption, though morbific causes, unless intense in their nature, make their impressions feebly. The mind, and its predominant passions, have, of course, but little agency in the production of its diseases. Disturbances, however, seem to arise from the mere inertia of the vital powers; and when morbific causes make strong impressions, the properties of life often go down, at once, to near the verge of extinction. So, also, do active remedial agents operate with a relative effect. Emetics are scarcely admissible; violent cathartics prostrate excessively; and any unnecessary extent of bloodletting breaks down the whole energies of the body. This temperament therefore requires great moderation of treatment.

5. *The Nervous Temperament.*—The nervous temperament displayed itself feebly among the ancients, but has been brought to a high maturity by the progress of civilization. It is the only temperament where the primary causes may be traced, which consist mainly of such as are attendant on indolence and sedentary pursuits. It involves alike, therefore, the rich and the poor, the sensual devotees of fashion and the plodding shoemaker, the laborious student and the readers of romance.

The nervous temperament is founded upon the sanguine, or the sanguineo-melancholic, and is either transmitted, or springs up originally in the individual. It is therefore the most artificial of all the temperaments, and is susceptible, individually, of great improvement. It is shown externally by a general aspect of feebleness, a spare body, and small, soft muscles, which are incapable of much exertion.

An unusual predominance of sympathy is the leading characteristic. Irritability is also strongly pronounced. Hence, slight disturbances, even of unimportant parts, give rise to greatly disproportionable sympathies in the more important organs; and these secondary results will be still more intense if the primary disease be seated in

any important organ. The functions are constantly subject to irregularities, especially those of the abdominal viscera. If the subject be addicted to the causes of this temperament, he is rarely free from indigestion, and an attendant train of other evils, according to the nature of his indulgences or pursuits.

Diseases, however, are not as violent as with the sanguine, nor as profound as with the melancholic. The mind is irritable, but the passions not violent, though they readily disturb the organic functions. Such as display themselves depend much upon the habits and occupation of the individual.

Remedial agents operate with power, the same coincidences existing between their effects and those of a morbific nature, as in other temperaments. Moderate impressions, therefore, made upon the alimentary canal, are sensibly felt by remote parts; and in this temperament, particularly, the peculiar principle upon which leeching operates is well illustrated.

What I have now said, specifically, of the temperaments, is liable to certain qualifications.

Different epochs of life appear often to partake of a particular temperament; one subsiding into another. The sanguine is most characteristic

of infancy and childhood; the melancholic and choleric of middle age; and the phlegmatic of old age.

The several temperaments are also often blended more or less with each other, in the same individual. When thus combined, they are called the sanguineo-melancholic, the sanguineo-phlegmatic, &c.

They are also liable not only to the foregoing modifications from age, but from sex, climate, habits, education, &c. So great, indeed, is the influence of climate, that a change of residence (as from a northern to a tropical country) will sometimes gradually transmute one temperament into another; and this is particularly true of the sanguine, the melancholic and the choleric.

Accidental influences are sometimes such as to generate anomalies, in which it is difficult to recognize any distinct features of the prevailing modifications of temperament, and which may disappear with the individual, or be transmitted to his descendants.

All the varieties which I have now stated are more or less liable to modifications of a common form of disease, and require corresponding variations in the details of treatment. They concur together, therefore, in forming a part of the diffi-

culties of medicine, and in demonstrating the complete abstraction of organic beings from the forces and laws of the inorganic.

I say, organic beings in their most comprehensive sense. For are not the varieties which have sprung from domestication and cultivation, among animals and plants, and which are equally and more perfectly transmitted than temperament, constitution, &c., in relation to man, integral parts of a common principle? Exactly the same philosophy lies at the foundation of the whole, and is another broad field of evidence to substantiate the unity of the vital principle, of its common laws and functions throughout animated nature, and presents the whole in a magnificence of grandeur, a harmony and unity of unfathomable designs, which forms an unutterable contrast with the physical hypotheses of life.*

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* Such as are disposed to see this subject continued by the Author in its relation to *Age, Sex, Races of Mankind, Climate,* and *Vital Habit,* will find the investigation in the *Institutes of Medicine,* at pages 363—383; 391—400. *Death,* at page 401—404.