

GIBBES (ROBT W.)

A LECTURE

ON THE

MAGNETISM OF THE HUMAN BODY.

DELIVERED BEFORE THE

APPRENTICES' LIBRARY SOCIETY OF CHARLESTON.

BY

ROBERT W. GIBBES, M. D. OF COLUMBIA, S. C.

"The facts of nature, not the theories of man, are the only infal-  
libile tests of the verity of alleged discoveries."—*Bacon*

"The power and corrigible authority of this, lies in our wills."—  
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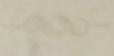
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## LECTURE.

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Sir David Brewster has said truly, "Man has, in all ages, sought for a sign from heaven, and yet he has been habitually blind to the million of wonders with which he is surrounded. Modern science may be regarded as one vast miracle, whether we view it in its relation to the Almighty Being by whom its objects and its laws were formed, or to the feeble intellect of man, by which its depths have been sounded, and its mysteries explored; and if the philosopher who is familiarized with its wonders, and who has studied them as necessary results of general laws, never ceases to admire and adore their author, how great should be their effect upon less gifted minds, who must ever view them in the light of inexplicable prodigies." And what is there more deserving of our attention than the beautiful and wonderful structure and relations of the human body? "Know thyself" was a maxim of antiquity in relation to moral man. As truly may we call for its application to his physical attributes, and say with the poet,

"The proper study of mankind is man."

Having lately directed my attention to the investigation of the curious phenomena of Mesmerism or Animal Magnetism, by which powerful physical influence is exerted by one man over another, producing extraordinary effects, both on his mind and body, I became particularly interested in experiments with the magnet.

It had been stated, that during the peculiar cataleptic condition induced by this remarkable influence, the head and hands of the subject were attracted by the magnet—and that the brain possesses *polarity*, one side of the head being attracted by one pole of the magnet, while the other was repelled;

and that opposite results were apparent from the application of the other pole. I made the experiment, and found that if the N. pole of a strong magnet be placed near the upper part of the forehead, on the right side, it produces, in a few minutes, a sensation of "pushing" the head from it, and in some cases, a strong repulsion; if placed on the opposite side of the head, it produces a feeling of "pulling" the head towards it. The opposite effects are produced by the S. pole. This experiment I have repeated on seven or eight susceptible subjects with similar results. On two young ladies, who are very sensitive of mesmeric influence, I find these results appreciated by them in their waking state—and the experiments having been repeated under circumstances when there could be no suspicion of deception, I became entirely convinced of the fact, *that the human body is magnetic, and possesses polarity.*

Dr. Sherwood, of New York, in a pamphlet on "the motive power of the human system," has given experiments of an ingenious character, which tend to shew that the brain has polarity, reasoning by analogy from magnetic experiments, and comparing them with the knowledge derived from the action of the magnet on mesmerized subjects. The Rev. Mr. Sunderland, of New York, is satisfied of the fact, and reasons upon it, in his publication "The Magnet," to the construction of various theories, in relation to the "*magnetic nature*" of man.

The phenomena of mesmerism, however, being still denied by those who have not had proper opportunities of personal experience of its truth, no influences observed in that state can be considered strictly as settled, which are not supported by direct experiment on the body in its ordinary condition. I will, therefore, for the present, refer to no farther effects on mesmerized subjects, until I give you the opinions of others in support of my proposition.

The influence of the magnet on the body, has been recorded in the works of many medical men of established character, but scientific men have denied it, because the reciprocal influence of the body on the magnet, has never been shewn.

This is the *experimentum crucis* which has been called for to settle the question, but has never been exhibited. Prof. Henry, of Princeton, N. J., who has rendered himself eminent by his discoveries in magnetic philosophy, in a lately published letter says, "Of the electro-magnetism of the human body, I know nothing, and I can say, with certainty, that no branch of science bearing this name, has an existence in the circle of the positive sciences of the present day. Nothing like *polarity*, has, as yet, been shewn to exist in connection with the brain.\*

I have discovered a mode of shewing *upon the needle directly* the magnetic polarity of the human body—and I anticipate that the study of the magnetic properties of the nervous system will furnish us with a key to unlock the mysteries of Animal Magnetism.

The limits of a single lecture will not allow me to go into a full consideration of the arguments which have been brought forward, founded upon experiment, to prove the identity of Electricity, Galvanism and Magnetism, but such a belief is very general among scientific men of the present day. Nor can I enter very fully into the enquiry as to the identity of the nervous fluid with this power or these powers. Dr. Faraday, who is high authority, says of the former:

"After an examination of the experiments of Walsh, Ingenhous, Cavendish, Sir H. Davy, and Dr. Davy, no doubt remains on my mind as to the identity of the electricity of the torpedo, (*animal electricity*), with common and voltaic electricity." Yet he candidly goes on:

"Notwithstanding the general impression of the identity of electricities, it is evident that the proofs have not been sufficiently clear and distinct to obtain the assent of all those who are competent to consider the subject."

Whether this be so or not, is not of much importance to my proposition, as I think it will be apparent that, whether there be one or several agents involved in electric, galvanic and magnetic effects, the human body exhibits the results of

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\* Magnet. p 39. vol. 1. July, 1842.

the several modes of procuring these influences. I am not satisfied, myself, of their being different states of intensity of one fluid, but my opinion should have no weight against the mass of authority on the other side. With regard to the identity of the nervous fluid, or power, with galvanism, electricity and magnetism, in the present state of our knowledge, we have not enough facts to settle that question; still there is much to induce a belief of it.

That the animal body is *electric*, is probably within the knowledge of all who hear me. The phenomena of sparks being seen to follow the removal of flannel or silk from the person in dry weather, and the stroking of the back of a cat, dog or rabbit, are common. Some individuals appear to have less conducting power than others, although their bodies are generally good conductors. In proportion as they are so, they shew the presence of electricity in a stronger degree. Perhaps deficient perspiratory function may be the cause of the accumulation of it.

A correspondent of Silliman's Journal states that, "On the evening of January 25th, 1837, during a somewhat extraordinary display of the northern lights, a respectable lady became so highly charged with electricity, as to give out vivid electrical sparks from the end of each finger to the face of each of the company present. This did not cease with the heavenly phenomenon, but continued several months, during which time she was constantly charged and giving off electrical sparks to every conductor she approached. This was extremely vexatious, as she could not touch the stove, or any metallic utensil, without first giving off an electrical spark, with the consequent twinge. The state most favorable to this phenomenon, was an atmosphere of about 80° F, moderate exercise and social enjoyment. It disappeared in an atmosphere approaching zero, and under the debilitating effects of fear. When seated by the stove, reading, with her feet upon the fender, she gave sparks, at the rate of three or four a minute; and under the most favorable circumstances, a spark that could be seen, heard or felt, passed every second. She could charge others in the same way when insulated, who

could then give sparks to others. To make it satisfactory that her dress did not produce it, it was changed to cotton and woollen, without altering the phenomenon." Similar cases are occasionally reported to our medical journals—and I was consulted, professionally, by a gentleman, as to the reason why his wife should attract a great many fire-flies around her when in the dark, and no others of his family be similarly troubled. She was much annoyed at times, by observing so many sparks about her, and was afraid, for some time, to mention it, as she thought she would be ridiculed.

"Saussure and his companions, while ascending the Alps, were caught in the midst of thunder clouds, and were astonished to find their bodies filled with electricity, and every part of them so saturated that sparks were emitted with a crackling noise, accompanied by the same painful sensations which are felt by those who are electrified by art."

Larrey, in his memoirs of the Russian Campaign, mentions his having seen similar effects. On one occasion, he says, when the cold was excessive, the manes of the horses were found electrified, in a manner similar to that mentioned by Saussure. Rousseau has described eloquently the extraordinary elasticity of spirits which he experienced in ascending some of the higher regions of the Alps. Dr. Madden asks:

"Who has ever experienced the effects of the sirocco of the South of Europe, the poisonous Kamsin of the East, or even the summer S. E. wind of our own climate, (England,) without feelings of indescribable lassitude, not to be accounted for by any alteration of temperature, but obviously owing to the electrical changes superinduced? During the prevalence of these winds, the atmosphere is almost altogether deprived of electricity, and the nervous system simultaneously is deprived of its vigor. In damp weather, likewise, when electricity is absorbed rapidly by the surrounding moisture, every invalid is aware how unaccountably dejected his spirits become, and how feebly the various functions of the body are performed, especially those of the digestive organs. This state of morbid irritability in the whole frame, continues till the north or

west wind “awakes,” as Brydone has well expressed it, “the activity of the animating power of electricity, which soon restores energy, and enlivens all nature.”

In 1835 I was called to see a young lady who had been struck by lightning. She had been sitting near a window, stringing beads. A storm arose, with thunder and lightning—suddenly she saw a blaze of light in her lap, felt hot and became insensible—she fell, and was caught by her mother, who was near—cold water was thrown over her, and she was put to bed—had spasms in the arms and legs. She recovered her consciousness in about ten minutes. When I saw her, a half hour after the occurrence, she complained of great intolerance of light—could not bear to unclothe the eyelids, although the room had very little light in it—complained of stricture across her chest—numbness in the head, neck, and sides of the face. She had, occasionally, for two days, spasms; but on the third was relieved, and felt better. Although the room was closed from light, *whenever rain clouds passed* near the house, she felt very much oppressed, and when another storm arose, she again had violent spasms, which lasted two hours. On the fifth day she seemed as well as usual, and had no return of the nervous irritability.

“In the south of France, there are whole vineyards in which numerous electrical conductors are attached to the plants, for the purpose of increasing the progress of vegetation, and of invigorating the vines. In the same manner does electricity act upon the animal body, quickening the circulation by its stimulus,” &c.

We all know the sensible influences of change of weather on rheumatic and paralytic patients, and old persons, with most chronic diseases.

Sir Humphry Davy speaks thus:

“*Electricity* seems to be an inlet into the internal structure of bodies, on which all their sensible properties depend; by pursuing, therefore, this new light, the bounds of natural science may possibly be extended beyond what we can now form any idea of; new worlds may be opened to our view, and the glory of the great Newton himself, may be eclipsed by a

new set of philosophers, in quite a new field of speculation." Dr. Paris, in his biography of Sir H. Davy, mentions that "Sir H. supposed the heat of the animal frame to be engendered by electricity; taking it furthermore to be *identical* with the *nervous fluid*—*sensation being*, in his view, motions of the nervous ether exciting medullary substance of the nerves and brain."

The experiments of Prevost and Dumas induced the expression of the opinion, that "muscular contractions result from the action of a nervous fluid, which, if it be not the electric fluid, possesses at least the same properties; and the analogy which exists between the phenomena of secretion and those produced by the action of an electric pile, is, they say, very remarkable; for when an electric current traverses a liquid containing salts and albumen, serum for example, an acid will be produced at one end of the pile, and an alkali at the other, and the animal substances the liquid contains, change their natures. Now this is precisely what takes place in the organs of secretion; though secreted entirely by the blood, the liquids these organs contain, differ from it in their chemical qualities. The physiologist Milne Edwards says:

"The recent experiments of M. Becquerel on the influence of electricity upon the vegetation of plants, support the opinion at present entertained by many physiologists, that the nutritive as well as the muscular movements of the living body, are carried on by a nervous influence analogous, and perhaps identical with the physical force that produces the electro-chemical phenomena."

Professor Miller of Baltimore, from experiments, has found that a stream of electricity passed through dark venous blood, will change it at once to a rich colored arterial fluid. This effect is usually attributed to the action of oxygen in the lungs, combining with carbon, and, according to Liebig, with iron. Now carbon and iron are the perfect conductors of electricity, and are *positively* electric—oxygen is negatively so, and we know that it is the agent of essential importance to the support of life. Sir Humphrey Davy, and chemists generally,

consider its elasticity owing to electricity, and during its combination in respiration and in the blood, as in all cases of chemical action, there is no doubt *electricity* is set free.

“Pouillet states that all gases, in combining with other elements, give out a certain amount of electricity. He illustrates this proposition by the case of *carbon*, 15 grains of which, in becoming carbonic acid gas, by union with oxygen, give out enough electricity to charge a common sized Leyden jar. By this estimate, how much electricity would be formed in the body? Let us see—it is estimated that 17,811 grains of carbonic acid escape from the lungs in 24 hours; then, by calculation, enough electricity would be generated by the formation of this gas, to charge 333 common sized Leyden jars, which average two feet each of coated glass. If we assume but half of this, we shall still have a very large quantity of electricity, formed by the union of oxygen with carbon, in the various tissues of the body, traversed by good arterialised blood.” (W. H. Muller, M. D., in the *Magnet*, vol. 1, p. 194.)

*Galvanic* phenomena are witnessed in animals. Humboldt discovered that the muscles of a frog have contractions excited in them by touching the nerve and muscle at the same moment, with a fresh portion of muscle. Muller, of Berlin, has repeated this experiment several times, and confirms its accuracy. Buntzen formed a weak galvanic pile with alternate layers of muscle and nerve; and Prevost and Dumas state that a circle, formed simply of one metal, fresh muscle, and a saline solution of blood, affects the galvanometer. If to the conductors of the galvanometer, plates of platinum are fixed, and a piece of muscle of several ounces weight is placed upon one of these plates, the conductors being then immersed in blood, or a saline solution, a deviation of the magnetic needle of the instrument takes place; or if to one of the conductors a piece of platinum, moistened with muriate of ammonia, or nitric acid is attached, and to the other a portion of nerve, muscle or brain, and the two conductors are made to communicate, the same deviation of the needle is produced.” Majendie. *Journ.* tom. 111.

“Kaemtz has shewn that efficient galvanic piles can be constructed from organic substances, without any concurrence of metals.” Schweigger. Jour. 56, 1.

The magnetism of the living human body has never been satisfactorily shewn, before my experiment. The following one we find in the *Medico-Chirurgical Review* for January, 1837, but thermo-electricity is here concerned, and we have not seen it noticed elsewhere, nor had an opportunity of trying it.

Dr. Donne of Paris, publishes the results of his enquiries, of which one of his corollaries is,

“The external acid and internal alkaline membranes of the body represent the two poles of a galvanic pile, whose effects are appreciable by a galvanometer. For if one of the conductors of this instrument be placed in contact with the mucous membrane of the mouth, and the other conductor be applied to the skin, the magnetic needle will be found to shew a deviation of from 15 to 20, or even 30 degrees; and the direction of the needle proves that the mucous or alkaline membrane indicates a *negative* electricity, and the cutaneous or acid membrane a *positive* electricity.

My experiment was brought about by the following circumstance. I observed that mesmerizers (or rather *magnetisers*) after throwing their subjects into the *magnetic state*, direct their fingers with energy towards their eyes, as they say, to render that state more intense, or, in common language, to deepen the sleep. I thought it not improbable that magnetism (motive power,) which is not apparent while the limbs are at rest, might shew its peculiar influence during muscular action. I procured a long delicate magnetic needle, made a strong effort as if throwing off something from the fingers, and brought them carefully to the needle, avoiding to produce vibration of the air, and to my satisfaction, I found *my right hand repel its North pole*. I repeated the experiment, and found it *attract the South pole*, proving *north polarity* in that hand. I now tried the left hand, and found it to exhibit *opposite polarity*, attracting the *North* and repelling the *South pole* of the needle.

I have practised the experiment repeatedly, and seen a great many do so, and the fact is positively shewn. The influence is only momentary, but clearly apparent. If it were the result of a current of air, the effects on both ends of the needle would be similar.

This is an important fact in magnetic philosophy, and I think will assist us materially in explaining many interesting phenomena, and most likely give us the means of understanding those of *Mesmerism*.

Bodies similarly electrified or magnetised repel each other, while in opposite states they attract. The *North* pole of a magnet attracts the *South* of another, and repels the *North*, &c. Electrified bodies have a tendency to impart electricity to all surrounding bodies. The magnet communicates magnetism to iron or steel, if placed in contact with it, inducing in the former temporarily, and in the latter permanently, a state similar to its own. All bodies may be more or less magnetic, but not exhibit effects, except under certain circumstances, iron and steel having a greater capacity than others, to acquire and to give out the influence.

The North pole imparts S. polarity, and the S. pole, N. polarity, and the process is called *Induction*. Now, if the right side of the body possesses different polarity from the left, when the magnetizer sits opposite to his subject, they are rightly placed to produce the phenomena of attraction, and for the former to impart to the latter his magnetism. It would seem here, however, to be expected, that the individual of strongest magnetic force would charge the other, as the stronger magnet controls the weaker, and changes its poles—which is the case. The fact of subjects putting the operators into the magnetic state is common, and assists our theory, and the subsequent attraction of the magnetized subject by the magnetizer, is a result to be expected.

A gentleman who is in the practice of magnetism had three attempts made by different persons to influence him, two out of the three fell into the magnetic sleep themselves. I have personal knowledge of one case, where a lady attempted to magnetize her husband, and he, to amuse himself,

exerted his will strongly to put her to sleep, and she fell into it herself.

The magnetizer's influence over his subjects is lost if he is exhausted, or becomes weak—if his nervous power is weak, he cannot put them into the magnetic state, or if he should, he cannot keep them so—they wake up immediately on being spoken to or shaken by others. Frequently when I have felt badly and dull, the subject would be sluggish, upon my taking a glass of wine, I could then make them act with more spirit and animation.

Before I attempt to deduce any practical inferences from the success of the experiment detailed, I will continue my references to others, that will support my proposition.

The facts which I have mentioned being known, the phenomena exhibited by *electric fishes* appear less extraordinary, although the power of producing electric discharges exists only during life and an undisturbed state of the nervous system. The experiments of Walsh, Fahlenburg, Gay, Lussac and Humboldt are our sources of information relative to these fishes; the *torpedo ocellata* and *marmorata* in the seas of the south of Europe—the electric Eel, *gymnotus electricus*, found in several rivers in South America—the *silurus electricus*, met with in the Nile and in Senegal. Several others have been named, but are less known.

The effects produced by them on animals are perfectly analogous to electric discharges. The shock from the Torpedo, when the fish is touched with the hand, reaches to the upper part of the arm. My late friend, Dr. Cooper, had personal experience of its shocks, which I have frequently heard him describe.

Muller, in his late work on Physiology, observes:

“Substances which are conductors or non-conductors of electricity, are equally so to the influence communicated by the Torpedo or Gymnotus, which are the only electric fishes that have been hitherto accurately examined with reference to their electric action; a shock is propagated through a chain of several persons when those at the extremities of the chain touched the fish. Walsh procured sparks from the Gymno-

tus, which were seen by Pringle, Magellan and Ingenhous. Fahlenburg also procured them by the same experiment. More recently, Linari and Matteucci, have succeeded in obtaining sparks from the Torpedo."

Although no effect has been observed on the electrometer, Dr. J. Davy discovered that the electric organs of the Torpedo have really an action on the galvanometer. He also succeeded in decomposing water, and in rendering *needles magnetic*, and found that the electric discharge was conducted through a bar of iron several feet long. Linari and Matteucci have also communicated the magnetic property to needles, have decomposed water, and have observed marked deviations of the galvanometer at the moment of the discharges. A very remarkable fact is also stated by Muller.

"The power of producing the discharge, is quite *voluntary*, and depended on the integrity of the nerves of the electric organs, which are largely supplied with them. The heart may be removed, and the shocks will be continued, but with the destruction of the brain, or division of the nerves going to the organs, the power ceases. The discharge does not take place every time the fish is touched, but depends on a voluntary power, hence it is necessary to irritate it."\* Some think it has power to direct the shock, as when Humboldt and Bonpland held the head and tail, both did not always receive the shock. Matteucci, who experimented on one hundred and sixteen torpedoes on the shores of the Adriatic, during two months, is convinced that they can discharge their shocks *when they please*, but not *where*. He says :

"Where the animal is endowed with a great vitality, the shock is felt, whatever part of the body is touched. In the proportion as the vitality ceases the region of its body in which the discharge is perceptible is reduced to that which corresponds to the organs commonly called electrical."

This fact accords with the loss of nervous power in the

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\* Professor ELLET, of the South Carolina College, last summer, had an opportunity of experimenting with a *Gymnotus* about four feet long, in New York. He informs me that he procured the spark from it, and that the power of the fish is certainly voluntary.

human body—the extreme filaments losing their power first. He made a number of interesting experiments which shew that the electric power of the fish increased with the acceleration of the circulation and respiration. Among them was this: He took a very small and weak torpedo whose respiratory motion was at times scarcely perceptible, and from which it was very difficult to obtain a discharge. He placed this torpedo under a bell full of oxygen gas. The animal immediately became agitated, opened its mouth several times, making strong contractions, and at the same time gave him five or six strong electrical discharges, after which it died.\*

He also found that cutting, or tying and compressing the nerves of one of the organs, the discharge ceases on that side, while it continues on the opposite side. Does not this have an analogy with the paralysis of the human body?

He shows that the chief electric organ is the last lobe of the brain, which he calls “the swelling of the elongated marrow, from whence the nerves proceed,” &c., answering to our *medulla oblongata*, which gives our nerves of motion.

He also shews, by experiment, that no trace of electricity is found in the fish, except when it discharges itself. This is very extraordinary, and adds to our theory of the electric or magnetic action of our bodies being under our will, and only apparent during muscular motion. The very curious experiments of Matteucci, may be found in Sturgeon’s *Annals of Electricity*, vol. 2. 1838.

In the last number of the *Medico Chirurgical Review*, which I received a few days ago, is an excellent review of a late work of Dr. Carpenter, on physiology, which is lauded in very high terms. Dr. C. mentions of electrical fishes, that their electric nerves have an origin similar to that of the 8th pair in the human body.

The Reviewer remarks, “Now, the circumstance that the electrical nerves in the Torpedo should be analogous to the 8th pair in the higher vertebrata, is one of a highly striking

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\* I trust I may be excused in tracing the influence of facts on mesmeric action. Mr. Townsend mentions that his mesmeric influence is stronger and developed more quickly when he breathes rapidly.

nature. Of all nerves in the human subject, the 8th pair, (*par vagum*) is that which, with the organs to which it is distributed, appears to exhibit the most intimate sympathizing connection with cerebral impressions. The influences of fear and anger, (which are probably the chief exciting causes of the instinctive electric discharges) of hope, affection, and indeed, of all passions, whether of an exciting or depressing kind, are inevitably manifested more or less on the heart, lungs, and stomach, larynx, &c., and which derive their nervous influence, partly through the branches of the *par vagum*. The analogy is even farther carried out by pathology. For in hydrophobia, a disease in which the nervous energy is in paroxysms, exalted to the highest pitch, and the secretions of parts, to which the 8th pair is supplied, are exasperated into a poisonous quality—the chief lesion discovered after death, has been said to be found in the trunk of the 8th pair, where it issues from the skull.”

Dr. Davy observed, that after the removal of the brain of a Torpedo, no more shocks were given when the nerves of the electric organs were irritated. In one instance, when a small portion of brain had accidentally been left in connection with the electric nerves of one side, the fish gave a shock when irritated.

Muller expresses the belief that, “electricity is generated in living bodies,” and that it “does not appear possible for the various chemical changes which take place in them, to occur without some development of electricity.”

The experiments of Pfaf and Ahrens, reported in Meckel’s Archives, (v. III. p. 161) among other results shewed, that the electricity of the human body in a healthy state is positive—that excitable persons of a sanguine temperament, have more free electricity than indolent persons of a phlegmatic temperament—that when the body is cold, no evidence of electricity is shewn, but gradually it becomes manifest as warmth is restored—that during the continuance of rheumatic affections, the electricity of the body is reduced to zero, but is manifested again as the disease subsides. Humboldt also thinks, that rheumatic patients have an insulating

action on the feeble current produced by a single galvanic circle.\*

It was attempted to be shewn by Matteucci, that the nerves were electric, but no effect on the galvanometer has been detected, even when the current of a galvanic battery is passed through them—hence, even if there were electric currents in the nerves, they would not be detected by the galvanometer, unless the direct influence of the denuded nerves could be experienced. I do not think this has been attempted, and I propose, when at leisure, to examine into it. Within a few days, I have received in the London Lancet, the notice of a report by M. Shuster, to the French academy of Sciences, to prove that electricity is not serviceable in medicine, unless it be applied through acupuncture needles. Administered in this way, he asserts it may be employed with success in many diseases, chronic, rheumatism, paralysis, amaurosis, &c. He says it acts by directly stimulating the sensibility, contractility and absorbent function.

It is a well known fact also, that needles used in acupuncture, become magnetic—this aids his idea, of forming a direct communication with the nerves.

In cases of serous effusions, the eminent Le Roy D'Etioilles has also been successful with the above mode of application.

My experiments shewing magnetic influence on the needle only during motion of the muscles, derive additional support from the fact of there being no action developed by electric currents passed through the nerves when quiescent, and the latter experiment renders it probable that human electricity is modified by vital power, or perhaps the influence of mind, until muscular action, under the control of the latter, is commenced.

It would occupy too much time to quote the multitude of curious experiments which go to shew a similarity in effects

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\* I find since this lecture was written, in the "Magnet, vol. 1. p. 193, that Dr. Muller, of Pittsburgh, has published experiments to prove that the *electricity* of the body is developed *during motion*, so that the electrometer is affected.

of the nervous power with electricity, galvanism and magnetism. I would not, in the present state of our knowledge, give a fixed opinion as to their identity—effects attributable to all these fluids, supposing them distinct, and all possessed by the body, have been exhibited. Farther experience may shew us that whether one fluid in different states, or several, some vital principle or mind, modifies their action in the body. We know that our motive power is under the control of our *will*, and that sensation involves consciousness, and without consciousness, there is no *will*. If the nervous power is weak, the will can only make it act feebly, and without a strong will, great effects of nervous power are not shewn. The will controls the nervous system of animal life, while it does not influence that of organic life. This is worth noticing in relation to mesmeric or magnetic influence, where the operator controls the will of the subject, and what his will controls, but does not affect the organic functions. Insanity or mental disorder deprives us of the power of will, and thus of the control of animal life, but organic actions are not necessarily impeded. When the mind is sane, muscular motion is mostly under the control of will, if the organs are sound. Bichat has clearly shewn a difference between *the nervous* system of animal life which ministers to the mind, and is under the *will*, and carries on the functions indispensable to the continuance of life, and the nervous system of organic life which is not subservient to the will and does not transmit sensations, except when the sensibility of a part is highly exalted by irritation, and then we perceive its action. The natural stimulus of these separate nerves is in like manner developed. That we derive sensation and perception from the external world, through nervous communication, no one doubts, because if you divide or compress the nerve, the sensations are not communicated to the brain—an influence developed on the nerves and communicated to the brain, gives us perception. If the power of sensation was in the nerves (which are only vehicles of it) the brain would not be of so much importance—it has no sensibility when irritated—the nerves receive

impressions and convey them to the brain, the organ of *mind*, which power notices and appreciates them.

Experiments to indicate that the motive and sensorial power of the body is galvanic or electro-magnetic, are very numerous. Among the most singular are those of Weinhold, related in the *Journal des Progres*, vol. x, 1828.

“He beheaded a cat, and after pulsation and muscular action had completely ceased, he removed the spinal marrow, and filled the vertebral canal, with an amalgam of mercury, zinc and silver. Immediately the throbbing of the arteries re-commenced, and the muscular actions were renewed, which it was impossible to distinguish from those which are produced by the influence of the spinal marrow; the animal made many leaps. When the irritability appeared exhausted, Weinhold, by means of a metallic arc, placed the heart and voluntary muscles gradually in contact with the artificial medullary substance, and he revived again general but feeble contractions.”

“He filled with the same amalgam, the cranial and vertebral canal of another cat, which did not give any sign of life; the animal became, during about twenty minutes, in such a state of vital tension, that it raised its head, opened its eyes, looked steadily, attempted to walk, and endeavored to rise after falling down frequently. During all this time the circulation and pulsation were very active, and continued for a quarter of an hour after the chest and abdomen were opened. The secretion of gastric juice was evidently more abundant than ordinary, and the animal heat was perfectly reestablished.”

“He filled also the cranium only of a dog with the same amalgam, he examined then the principal functions of the senses, and observed that the pupil still contracted, that the animal manifested still a desire to avoid the light when a lighted candle was placed near it, and that it listened when a person struck with a key on the table.”

In support of this very singular experiment, we have a paragraph from Muller's late work.

“In the eye, a feeble galvanic current excites the special sensation of the optic nerve, namely, the sensation of light. In the auditory nerves, electricity produces the sensation of sound.

Volta states that when the poles of a battery of forty pairs of plates were applied to his ears, he felt a shock in his head, and a few moments afterwards, perceived a hissing and pulsatory sound like that of a viscid substance boiling, which continued as long as the circle was closed.”

It is a generally received opinion, that *nervous power* produces sensation and motion—what this is, we have not settled. Sir Charles Bell has demonstrated, however, that the posterior roots of the spinal nerves, are the origin of nerves of sensation, while the anterior roots are for those of motion. Majendie has shewn that “the spinal marrow is composed of two distinct cords in juxtaposition, the one endowed with exquisite *sensibility*, whilst the other almost completely unconnected with this property, seems to be reserved for *motion*.” Upon this, a theory has been based, that an ascending current of electricity by one cord causes *sensation*, and a descending current by the other causes *motion*—or perhaps there is a negative and positive portion of the cord, the one constituting the agent of sensation, and the other that of motion.

The experiments of Muller have proved that “the application of galvanism to the anterior roots of the spinal nerves, after their connection with the cord is divided, excites violent muscular twitchings; the same stimulus applied to the posterior roots is attended with no such effects.” These galvanic experiments support the facts determined by C. Bell.

The late discoveries of electro-magnetism strongly incline to the opinion that motion and sensation are produced in the body by it.

The convulsive and violent muscular action produced on the bodies of criminals immediately after death by galvanic action, clearly makes it appear that it can cause motion in animal bodies, and acts on nerves and thus through the organs of motion. Liebig says, “By means of *nerves*, all parts of the

body, all the limbs, receive the moving force, which is indispensable to their functions—to the production of mechanical effects. Where nerves are not found, motion does not occur. The will certainly has an influence over motive power, while the organ to be moved has its nerves sound—*how* it acts we know not. The will directed to our vocal apparatus causes any sound which we can utter to be given forth—*how* it is effected, and why the sound is acute or grave, we can only explain as the result of will.

If Electricity, Galvanism and Magnetism be separate powers, their peculiar combination or supply in different proportions by the pile or chemical action which produces them, may account for varied susceptibility, and idiosyncrasy, according to the predominance of one or other.

There are objections to their identity which I have not time to enumerate: the permanence of the needle pointing in the same direction, unless mechanically obstructed: magnetism is not impeded by glass, and electricity is—you can insulate the latter and not the former—touching with the hand removes nothing from the magnet, and deprives an electrified body of its electricity instantly, &c. With 200 feet of copper wire, and 200 feet more interposed in the turns of the spiral, and 120 pairs of plates 4 inches square, the current made *magnetized* needles, but did not affect the galvanometer. Faraday.

That magnetism produces motion in inanimate matter, is shewn by the polarity of the needle, which if placed E. and W., and left to itself, turns to the N. and S. Call this attraction or what you will, oscillation and motion result. The magnet will hold up by its inherent power a weight heavier than itself. Connect with it a galvanic armature and it will lift forty times its own weight. The human strength is capable of raising four or five times the weight of the body. I know an individual weighing less than 300 lbs. who has lifted from the ground 1300 lbs.

The following case illustrative of electro-magnetic action on the human system, is reported in the London Lancet.

At the Middlesex Hospital a man was admitted about six

hours after having taken an ounce of laudanum. At this time he was apparently lifeless, the surface of the body was cold, countenance pale and livid, lips purple, pupils contracted to a mere point, respiration was scarcely perceptible, pulse hardly to be felt. The laudanum was removed by the stomach pump, but in spite of every exertion the pulse became more unfrequent, and was at times imperceptible; when recourse was had to electro-magnetism, which was applied by means of a small battery with coil and contact breaker. One wire was applied to the neck, and the other to the region of the heart, or epigastrium, and by these a succession of very powerful shocks was given. The good effects were very apparent. The muscles of respiration were set in motion, and the diaphragm contracted powerfully; the chest was more fully expanded, respiration was more powerfully carried on, and a corresponding improvement was observed in the countenance. The pulse improved and became more powerful, becoming steady when the current was interrupted for a few minutes. The application was continued for several hours, and was finally successful, and the patient restored.

In the last (April) number of the *American Medical Journal*, is a similar case reported with the same results. It occurred in March, 1842, at Valparaiso. A gentleman was poisoned by a powder which was given to him as Cubebs; after the most violent symptoms, and continued unavailing efforts to relieve him, "he now appeared to be sinking. The surface was cold and covered with a clammy sweat. The face was pallid, with a purplish tinge, the jaw and eyelids were fallen. The pulse was hardly perceptible at the wrist, if at times it was at all to be felt. Stimulants were continued. There were no signs of reaction, and the features wore the aspect of death. Worn out with fruitless efforts, the medical attendants desisted from further exertion. Dr. Page thought of the electro-magnetic battery, and proposed its application, as they felt justified by the desponding circumstances to make the experiment." He says,

"It was immediately tried, and with the happiest results. With an assistant rapidly rotating the wheel, I applied the

balls at first to each side of the neck, and ran them down behind the clavicles. The arms and body now moved convulsively, but the patient lay as unconscious as before. I now passed one ball over the region of the heart, and the other to a corresponding point on the right side. In an instant his eyes opened widely, and with a ghastly expression of countenance, his head and body were thrown convulsively towards me, and he groaned. He now sunk back into his reclining posture, and was again asleep. The balls were reapplied in the same situation, with similar results, a third and fourth time, and he cried, "no more." Reaction was now positively established. The heart had received a strong impulse. The pulse was becoming rapidly developed, and the whole surface warm." Reaction continued satisfactorily, and there was no farther occasion for the battery.

"When he recovered his consciousness, he says all had been blank, until he felt as if a gun had been fired off within him, which thrilled through and shook him to the very extremities." This was the application and effects of the electro-magnetic battery.

This case is reported by Dr. T. S. Page, and was witnessed by Dr. Houston, of the Royal Navy, and Dr. Barrabino, of the United States Navy, attached to the schooner Shark. A few weeks previously, a French gentleman, who took the same medicine from the same shop, lost his life. Upon an analysis of an equal quantity of the powder, 30 per cent. of opium, (75 grains,) were found in it, which accounts for its melancholy effects.

The results of the experiments in these two cases, fully warrant us in the belief that the *post hoc propter hoc* may fairly be presumed here, and that electro-magnetic action supplied the place of nervous power in the human body. In vol. 4, p. 482, of Sturgeon's Annals of Electricity, are some interesting experiments with galvanism on dogs. Three puppies were drowned, and left in cold water fifteen minutes. All vitality had apparently ceased—no motion being perceptible. They were taken out; one was submitted to successive shocks from a voltaic battery, and *restored to life*—

the other two were left as they were—they remained so. Three others were drowned in warm water, and left immersed forty minutes—two of them were restored in the same manner. In the “Discourse on the Study of Natural Philosophy,” the philosophical Herschel says :

“The principle once established, that there exists in the animal economy a power of determining the development of the electrical excitement, (speaking of the torpedo,) capable of being transmitted along the nerves, and it being ascertained, by numerous and decisive experiments, that the transmission of voltaic electricity along the nerves of even a dead animal, is sufficient to produce the most violent muscular action, it becomes an easy step to refer the origin of muscular motion in the living frame to a similar cause; and to look to the brain, a wonderfully constituted organ, for which no mode of action possessing the least plausibility had ever been devised, as the source of the required electrical power. If the brain be an electric pile constantly in action, it may be conceived to discharge itself at regular intervals, when the tension of the electricity developed reaches a certain point, along the nerves which communicate with the heart, and thus to excite the pulsations of that organ. This idea is forcibly suggested by a view of that elegant apparatus, the dry pile of Deluc, in which the successive accumulations of electricity are carried off by a suspended ball, which is kept by the discharges in a state of regular pulsation for any length of time.” This same idea of the cause of the pulsation of the heart appears to have occurred to Dr. Arnott. The stronger pulsations of the brain during high excitement, favor this hypothesis.

Many more experiments might be offered in support of the identity of the nervous power with electric, galvanic and magnetic influence, both as to the production of motion and sensation.

I have not noticed the evolution of *light* during decomposition or chemical change, of which some curious cases are recorded, arising in the human body.

“Sir Henry Marsh observed in a patient, dying of con-

sumption, about ten days before her death, a very extraordinary light which seemed darting about the face and illuminating all around her head, flashing very much like an Aurora Borealis. She had been that day seized with suffocation, and was extremely nervous. At night this luminous appearance suddenly commenced. The maid said she had seen it before, and it had dazzled her eyes, but that she was afraid to speak of it, as she would be called superstitious. It continued for an hour, and disappeared. Three nights after he saw it again. The evening before she died, he saw it again, but fainter, and it lasted about twenty minutes. The state of the body was that of extreme exhaustion. Her breath had a peculiar smell, which led him to suppose some decomposition was going on. Sir H. Marsh has collected, in all, four cases similar to the above. He considers it as resulting from decomposition, as seen in dissecting rooms—from chemical action, in peculiar conditions, evolving light through electrical phenomena." We know the decomposition of animal matter, especially fish, produces phosphorescence, or electric light.

The influence of light on animal development is strikingly pointed out by the experiments of Dr. M. Edwards. He has shewn that if tadpoles be nourished with proper food, and are restored to the constantly renewed contact of water, (so that their branchial respiration be maintained,) but are entirely deprived of light, their growth continues, but their metamorphosis into air-breathing animals is arrested, and they remain in the form of large tadpoles!

Here is a fact which we are forced to believe, which we cannot explain.

When the queen bee in a hive dies, or is removed, do we understand how the bees have the power of converting into queens the neuter eggs? and yet do we not believe this? Do we not see a different animal in the general form of the body, the proportionate length of the wings, the shape of the tongue, jaws and sting, and in many other respects, than would otherwise have been produced—yet can we explain how this is effected?

I might relate cases of spontaneous combustion, under circumstances strongly inducing a belief in the agency of electricity in its production.

The direct influence of the Magnet on the human body, has been a subject of frequent experience among medical men. I have, myself, witnessed cases where positive effects were felt. A lady of cultivated intellect and much intelligence had neuralgia of the arm for several months, with intense sufferings—the N. pole of a magnet applied to it, relieved her pain temporarily, while the S. pole increased it violently. This same effect, I have seen in several cases of rheumatic joints. These influences are not perceived by all, but only by those of highly sensitive nervous systems. All who are susceptible of mesmeric induction, feel the effects of the magnet when applied to the head; in some, it produces giddiness, headache, and even convulsions.

The Editor of "The Magnet" mentions that he held a magnetized steel ring over the head of one of his subjects, while awake; "in a few minutes she dropt into a state resembling sleep." On removing the ring, he found it impossible to wake her up, or to control her at all. "The entire system seemed to be paralysed, the breathing was much increased, and difficult, and she continued in spasms about twenty minutes, when she was relieved, and came out 'in a shudder,' like the lad described in the article below.

The following letter "from an intelligent minister of the gospel, well and extensively known," published in "The Magnet," presents singular facts.

"Rev. and Dear Sir:—Agreeably to your request, I herewith transmit the facts respecting the influence of the *magnet*, in producing the magnetic sleep in the case of my little son. I first magnetised him about the 20th of February, 1842. His age is 15. For some days, he was put to sleep each day, for about half or three quarters of an hour. After that, each alternate day, for about three or four weeks.

"About ten days since, he was playing with a small horse-shoe magnet, capable of sustaining about 12 or 14 ounces. In a short time, I perceived that he was asleep, and exhibited the usual symptoms of the magnetic state. I attempted to

arouse him, and he immediately opened his eyes, but said "I am in the magnetic state, I can see every thing just as when I am magnetised." I attempted by the usual passes to remove it, but found I could not. He said, "it is the magnet that has produced this state, and you cannot take it off." I then took the magnet in my hand, and tried the effect of making the several passes with that; but it only increased the difficulty. I then proposed to send the magnet away to a distant place, but he objected with great earnestness, and even with tears. I then persuaded him to go with me into another room, 20 or 30 feet distant from the magnet; and after staying there a short time, he consented to have the magnet removed.

"I again tried, by the usual passes, to remove the influence from him, but could not. He remarked that nothing I could do would remove it, but that it would pass off, of itself, in about an hour, and that he should "*come out of it with a shudder.*" During all this time *his eyes were open.* He could hear and converse with me and with persons *who were very near him,* after they had been near him for a few minutes, but with no others.

"He was playful, and apparently happy. In about an hour, he started suddenly, and with a violent spasmodic shudder, and appeared to be restored to his natural state. Of nothing that had passed, had he any recollection, and the only difference that I could discover between this and the state in which he had usually been when magnetised, was that in *this, his eyes were open*—he had none of the usual attachment for me, all seemed transferred to the magnet, and I had no power to remove it. The magnet had been removed to a distant chamber. But he expressed a strong desire to go to it. I then took the magnet away, *unknown to him,* and passing out of doors, carried it *by a circuitous route,* and placed it in a pile of lumber, distant about 70 or 80 feet. It was past 9 o'clock at night, and very dark, and he had no means of knowing, by the ordinary senses, that it had been removed. He said, however, that it had been removed, and went on to tell me which way he would take

to find it, and said he would not go directly to it, but would find it by a circuitous route—that he would go out round the house, in about the same course that I had taken in conveying the magnet there! But he said the magnet was wrapped up in a paper, and put in a pile of lumber, which was the fact.

“I then went and removed it to a still greater distance, where I left it till the next morning. He said that he had a *strong impression on his mind*, that it had been removed to a more distant place, as I have described it, and that from that time he lost all interest in it. This was more than an hour from the time that he came out of the magnetic state with a shudder, as above described. Since then, he has manifested no desire for the magnet, but when it was afterwards brought near him, even within several feet, he said, after a few minutes, that he felt the same influence coming over him, and immediately caused it to be removed.

“I might add, that the application of living magnetism in his case, was in a course of medical treatment for a spinal disease, and was generally applied under the direction of experienced physicians, and apparently with very happy results.

Respectfully yours,

Philadelphia, April 17, 1842. \_\_\_\_\_

When Casper Hauser, who had been isolated from the ordinary influences of the external world for eighteen years, had the N. pole of a small magnet held towards him, he described a *drawing* sensation produced outwards from the epigastrium, and *as if a current of air went from him*. The S. pole affected him less, and he said *it blew upon him*.\*

Professors Daumer and Herman made several experiments of the kind, and calculated to deceive him, and even though the magnet was held at a considerable distance from him, his feelings always told him very correctly. These experiments always occasioned perspiration, and a feeling of indisposition. He could detect metals placed under oil cloths, paper, &c., by the sensations they occasioned. He

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\* Millengen.

described these as a drawing, accompanied with a chill, which ascended according to the metal, more or less, up the arm—the veins of the hand exposed becoming visibly swollen.

The influences felt by him from the magnet are precisely such as it produces in the cases of my experiments—and the paralysis of the arm of a susceptible individual, by making him grasp a rod of soft iron or copper, is effected with the same feelings on the arm, described by Hauser from his touching a metal.

The sensitiveness of this boy to the impression of metals is well explained, when we reflect that the eye, when kept from light, increases in its susceptibility to its influence; and its sudden application to this organ, will destroy its vision, while slowly accustomed to its influence it is its essential stimulus.

A gentleman of high respectability informed me lately, that he knew from personal experience, that the body is magnetic. He was a surveyor, and had observed frequently, that in dry weather, at midday, his needle would vary whenever he approached it.\*

The conducting power of the body varies with different individuals, some shewing electrical influences, and others, none—Now in terrestrial magnetism, Mrs. Somerville says, “The effects of induction depend upon the facility with which the equilibrium of the neutral state of the body can be overcome; a facility which is proportioned to the conducting power of the body; consequently, the attractive power exerted by an electrified substance upon another substance previously neutral, will be much more energetic, if the latter be a conductor, than if it be a nonconductor.”

This may also be applied to organized bodies, as well as inorganic.

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\* Since this lecture was written, I have succeeded in magnetizing needles, by the same effort of the arm and hand over them. The fact of rendering needles magnetic by the *passes* continued for a long time over them, is mentioned in the “Magnet.” I succeeded in a short time by my process—which I have repeated five times successfully. Whether this can be effected only in certain electrical conditions of the body, is to be learned.

Dry animal matter, as bone, or horn, or leather, are non-conductors of electricity—moistened, they become conductors. It is not improbable, that at a future time, we may refer the phenomena of *fever* to the free electricity of the body accumulated on the surface, when the perspiratory function is impeded—carried off, as it usually is, by the restoration of the latter. The calorification of the body is still unsettled, and is open for examination.

The sources of magnetism would give us an interesting subject for investigation, for we know that the sun's rays are magnetic. Milton beautifully describes the constellations, as governed by the magnetism of the sun.

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“as they move  
 Their starry dance, in numbers that compute  
 Days, months and years, towards his all-cheering lamp  
 Turn swift their various motions, or are turn'd  
 By his magnetic beam that gently warms  
 The universe, and to each inward part  
 With gentle penetration, though unseen,  
 Shoots invisible virtue ev'n to the deep.”

Liebig attributes to “the unequal degree of conducting power in the nerves, those conditions which are termed paralysis, syncope and spasm.” This eminent chemist also says, “As an immediate effect of the manifestation of mechanical force, we see that a part of the muscular substance loses its vital powers, its characters of life; that this portion separates from the living part, and loses its capacity of growth and its power of resistance. We find that this change of properties is accompanied by the entrance of a foreign body (oxygen) into the composition of the muscular fibre, (just as the acid loses its chemical characters by combining with zinc,) and all experience proves that this conversion of living muscular fibre into compounds, destitute of vitality, is accelerated or retarded according to the amount of force employed to produce motion. This is corroborative of the identity of nervous power with electro-magnetic influence.” He goes on to say, “the moving force certainly proceeds from living parts.” “It is obvious that the ultimate cause, the vital force, &c., has

served for the production of mechanical force; that it has been expended in the shape of motion."

That the nervous power is derived from a source within the body is certain, as it varies with its healthful or disordered action—it becomes exhausted by muscular action, and excited by stimulants, which act on our material structure; it is lost by continued wakefulness—and intense pain debilitates it excessively. Steady application of the mind also fatigues the brain and weakens nervous power, and rest alone restores it. While the brain and nerves are sound, our nervous power of motion, (and to some extent that of sensation) is under the control of the will, the existence of which involves consciousness in our ordinary state. In *somnambulism*, in which consciousness is absent, some modification of reason, allied to what we call instinct, seems to control them. This is for the enquiries of the metaphysician as well as the physiologist, and deserves our study. It is well known that in *somnambulism*, the intellectual functions are not only active, but frequently more developed than when the individuals are awake, and in their actions and locomotion they are more cautious.

Whether the nervous power extends without our bodies, and how far, we are yet to learn. The phenomena of Mesmerism would seem to indicate that it does, and produces effects on other living organization. Dr. Holland observes:

"We cannot assert this to be impossible; and one or two high authorities have affirmed its probability."

The emanations from animal bodies, by which dogs scent them in the chase, and which the Hindoos, living on vegetables, perceive in Europeans feeding on animal substances, shew perceptible influences extending around us.

The curious phenomena of what is called *sympathy*, are physical results yet to be explained. We know that mind acts upon matter, but the *quo modo* is as yet inexplicable to us. Can we explain that mysterious influence by which a nervous disease affects the minds, and finds its way to a diseased structure, as an electric shock is communicated from body to body by contact? Can we explain how, when this occurs, a loss of will is the result, similar to the fascination

of a serpent over its prey? Yet, do we deny the well authenticated facts, relating to the convulsionnaires of France—the *jerks* of our own country, and the 4000 cases of St. Vitus's dance in England?

Can these be the results of imagination alone? Is the imitation of the wise and good, prompting us to simulate and rival them merely, “such stuff as dreams are made of?”

If nervous power originated from mental action, it would be less variable—but we see the mind as strong and active when the body is weak—and the strength of the latter depends on nervous power. Coleridge, who thought as much as most men, says, “illness never in the smallest degree affects my intellectual powers. I can *think* with all my ordinary vigor in the midst of pain; but I am beset with the most wretched and unmanly reluctance and shrinking from *action*. I could not, upon such occasions, take the pen in hand to write down my thoughts for all the wide world.”—It is not mind, for we conceive that to be indestructible, eternal, therefore, not liable to disease and decay; the bodily organs through which it develops its influence on matter, may be disordered, and communicate its powers imperfectly, hence we become familiar with what is called *mental* disease, which is strictly paradoxical. A man drinks liquor, his brain becomes oppressed with blood—as this increases mental confusion comes on, and then a loss of mind takes place—if the blood be thrown out and apoplexy result, it is permanently gone. Intense mental action produces fulness in the vessels of the brain, which frequently is followed by similar effects. The melancholy example of this lately exhibited in the condition of the poet Southey, will readily present itself to the mind.

If the electricity of the body varies, (which experiments prove,) this will enable us to understand how sensitive nervous persons experience so readily atmospheric changes, electric influences. In the animal economy, solids are constantly passing to fluids, and fluids into solids and gases, and changes into electrical conditions, and as to temperature, are always going on. When the bodily health varies, and

the nutritive function is impeded, as well as other vital actions, we must expect this to be the case.

Pfaf and Ahrens have shewn, that in health the electricity of the body is positive, yet sometimes it is negative, and much oftener so with women. In the 5th volume of Tilloch's magazine, there is an article on animal electricity, with original experiments, by a Mr. Hemmer, of the Electoral Academy at Manheim. From 2,422 experiments he came to the following conclusion:—That electricity is common to all men; that it is sometimes negative, oftener positive, and sometimes wanting; that it is produced without friction with the clothes, and is evolved from the naked body; that its quality is altered by certain circumstances, and changed from the one to the other kind by sudden and violent motion—from positive to negative by cold, or lessened in amount by it; that continued mental exertion increased the positive electricity, &c. This latter fact is very important, if verified. When Casper Hauser held a cat by the tail, he was seized by a shivering, as if he held a metal, and felt as if he had received a blow. If mesmerism depend upon magnetism or electricity, the power of the magnetiser may be derived from his capacity to communicate his nervous power of motion and sensation to his subject—if so, he should control both his motions and sensations; *this he does*, while his influence over him lasts.

Sensitive persons are most easily affected by mesmeric induction—weak and sensitive persons experience electrical and atmospheric changes more readily—they also part with nervous power more quickly than strong and healthy persons. The touch of metals produces painful sensations in some persons, and paralyses the muscles of others.

The variation of the electrical state of the bodily organs, may enable us to appreciate varied susceptibility to disease in different persons—and may also account for susceptibility, as to magnetic induction. The predominance or deficiency of the magnetic or electric conditions, may, perhaps, assist us, with more advanced knowledge, in investigating temperaments, sympathy, special fancies and antipathies.

Dr. Elliotson, of the Royal Medical Society of London, says, "I am not aware that one *temperament* is more susceptible of *mesmeric* influence than another. The same person may be susceptible at one time, and not at another. I have had a patient insusceptible for four weeks, and then become highly susceptible."

I have, myself, had a case of an intelligent lady, in delicate health, whom I tried seven different times without effect, for an hour at each sitting—on the eighth, she was fully influenced in fifteen minutes, and continued in the magnetic state until I waked her.

I cannot here avoid a quotation from an eminent author, Dr. Holland, who says of the *origin* of nervous power, "Physiological science, on the matter in question, seems at this moment to be on the verge of some great discovery; resembling, in this respect, the actual state of other physical sciences—those of light, heat, electricity, chemical forces, and perchance of gravitation—which the course of modern inquiry is ever tending to reduce to certain common laws. It is a question of deep interest already referred to, whether the relation here, is not closer than that of mere analogy; and whether future research may not associate some of the functions of the nervous system, with the more general elements of force and action in the physical world. Vital laws, and what we term physical laws, stand precisely in the same relation to our knowledge. They are continually approximating as this knowledge advances; and may not impossibly in the end be submitted, even in human comprehension, to some common principle embracing the whole series of phenomena, however remote and dissimilar they now appear. All science tends to prove the unity of creation, through the evidence it affords of mutual and universal relation of parts."

Dr. Carpenter expresses a similar idea.

"That the rapid progress of generalization in physical sciences renders it probable that ere long, a simple formula shall comprehend all the phenomena of the inorganic world; and it is not, perhaps, too much to hope for a corresponding simplification in the laws of the organized creation."

Did time allow me to consider sympathy, cases might be presented to you, as interesting and extraordinary as the apparent miracles of *animal* magnetism.

Having trespassed long on your attention, I will hasten to a few deductions from the experiment on the needle which I have mentioned; while I add that "THE FACTS OF NATURE, NOT THE THEORIES OF MAN, ARE THE ONLY INFALLIBLE TESTS OF THE VERITY OF ALLEGED DISCOVERIES!"

1. The human body is magnetic, and possesses polarity. May I be allowed here to allude to the beautiful analogy, which the innate principle of our being, pointing to the Great First Cause, has to the mysterious tendency of the needle to the pole? Our benevolent and wise Creator may have intended the same power, with which he regulates the terrestrial movements of our planet, to be the instrument of communication between matter and mind, and mind and his Divine influence.

When we see an influence imparted by one man's mind to that of another, communicating thought and impulse, is it mere imagination to suppose that this view may be consistent with the mechanism of our moral government? Can we not better appreciate the Divine influence over our own minds, when we have personal experience of the influence of our own finite power over that of others? Surely we can.

"Man, the servant and interpreter of nature, understands, and reduces to practice, just so much as he has actually experienced of nature's laws; more he can neither know nor achieve."

2. Individuals of stronger magnetic power, can charge weaker with their magnetism, which gives them a control over the will and actions of the latter, while the charge or communication lasts. Persons of equal magnetic power, do not produce any perceptible influence on each other.

Perhaps future experiments may indicate that the polarity of individuals varies, and susceptibility to induction may depend on one reversing the polarity of another.

3. The *will* controls and puts in motion the magnetic force, perhaps analogously to the supposed influence of the sun giving motion to vibrations producing light.

4. As iron is charged, and parts with its magnetism if the inducing power is removed, so human bodies become more so by the influence of others, and lose the additional force when the cause is removed. This accords with experience.

5. As magnets once charged, when they lose their magnetism, are more easily charged again; so the susceptibility to induction increases with individuals.\* Once affected, they become more easily influenced at each subsequent experiment.

6. As the capacity of iron or steel for magnetism varies, when soft or hardened, so does peculiarity of temperament, constitution and circumstances, modify the influences of human magnetism.

The laws of human magnetism are yet to be learned, but we are now fairly started in their investigation.

In the 19th century, it is remarkable that man's pride should exceed his ignorance, and that the study of natural causes of physical phenomena, reported by credible witnesses, should be deemed beneath the notice of scientific men. Or as Sir William Temple remarks,

"When man has looked about him as far as he can, he concludes there is no more to be seen; when he is at the end of his line, he thinks he is at the bottom of the ocean; when he has shot his best, he is sure none ever did or ever can shoot better or beyond it;—his own reason he holds to be the measure of truth, and his own knowledge, of what is possible in nature."

In this age of philosophy, the discoveries of science are daily becoming productive of facts, which ought to humble the pride of arrogant man, and teach him with how much more reverence he should

"Look through nature up to nature's God."

May I be allowed to hope that the time will arrive, when

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\* This fact in relation to magnets is stated by many, but is not settled.

“a decent respect for the opinions of mankind” will protect students of science from the discouraging and illiberal course pursued towards them, by those whose position in communities, gives them the opportunity of a ridicule, which too often destroys their ability to add to the common stock of human knowledge.

It is ungenerous, it is unjust, it is unwise, to heap unmerited censure and charges of insanity or collusion with imposture upon those, whose interest is in the common advancement of science, and whose enthusiasm is necessary in the mechanism of scientific enquiry to supply the place of self interest, which is the great impelling power in the ordinary pursuits of life.

To such as are engaged in the study of truth I would say, in conclusion, in the language of one whose intellect has had a powerful influence on the world,

“Crafty men contemn studies, simple men admire, and wise men use them”—and to those who oppose them, “read not to contradict and confute, nor to believe and take for granted, but to weigh and consider.”





