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ORDINARY MEETING, April 16, 1888.

W. N. West, Esq. (Hon. Treasurer), in the Chair.

The Minutes of the last meeting were read and confirmed, and the following Elections were announced :—

Life Member.—G. W. James, Esq., F.R.A.S., F.R.H.S., United States.

Associate.—Rev. G. J. Perram, M.A., London.

The following paper was then read by Mr. H. Cadman Jones, the author being unavoidably absent in Ireland :—

A PHYSICAL THEORY OF MORAL FREEDOM.

By Joseph John Murphy, Esq.

JOHN STUART MILL has quoted from some unnamed writer that "on all great subjects much remains to be said." Perhaps, however, he would have made an exception of those subjects which are contemptuously called metaphysical by that Positivist school whereof he was the ablest English exponent; perhaps he would have said that they are partly solved and partly proved to be insoluble, and that on this question of Freedom and Necessity the last word which has been or can be spoken is, not that freedom is proved impossible,—Mill was too cautious a reasoner to commit himself to such an assertion,—but that no valid reason can be given for admitting any exception or limitation to the absolute uniformity of the order of Nature, including not only unconscious Nature, but conscious Mind. And this appears to be the general belief of that philosophical, or scientific, school, which is dominant among us, and has Mr. Herbert Spencer as its chief living exponent. Some, indeed, speak as if they thought this absolute uniformity of the course of things was of the nature of a logical truth, which cannot

be denied without affirming a contradiction. But the more general and plausible opinion is that this uniformity follows by mathematical necessity from the laws of physical nature.

We think, on the contrary, that this question of Freedom *versus* Necessity is not, and perhaps may never be, a closed question. We think it one of those "great questions on which much remains to be said"; and we propose to give an account of some views on the subject, which have been published by French writers during the last few years.

We must begin by stating the question in dispute; for we believe there are many who really affirm this doctrine of absolute uniformity in the order of things—philosophical necessity as it was formerly called, or determinism as it is called now—and yet say that in some transcendental sense they are believers in moral freedom. If we do not misunderstand them, this is the position of Dr. Chalmers and the Duke of Argyll. We cannot state the question in more suitable words than those of Professor Delbœuf, of Liège,* which we translate:

"The fundamental proposition of determinism is the following:—The present state of the Universe, and consequently the movement of the least of its atoms, is the necessary and the only possible consequence of its immediately preceding state, and the sufficient cause of its immediately following state, so that a sufficiently powerful intelligence would be able from a single glance (at the present state of the Universe) to infer its entire past and its entire future.

"The partial denial of this proposition will evidently give the definition (of freedom) which we seek:—Freedom is a faculty or power, which produces movements which are not implied (*renfermés*) in the immediately preceding movements, and consequently cannot be predicted" (by any intelligence, however powerful, which acts under the same conditions as ours).

We have added the concluding words to Delbœuf's, because we believe that the Divine Intelligence does not exist under the same conditions as that of Man, but transcends time, and comprehends all things, past, present, and future.

We do not purpose to go back on the metaphysical aspect of the controversy, but to treat it only in its relations to physical science.

The physical or mechanical, as distinguished from the

* *Bulletin de l'Académie Royale de Belgique.* 3me série, tome 1, No. 4, 1881.—3me série, No. 2, 1882. The quotation in the text is from the latter of these two memoirs.

metaphysical, difficulty in recognising Will as an agency capable of acting on matter was, we believe, first seen by Descartes. He taught that matter and spirit, though in union, are absolutely distinct; that matter acts and is acted on according to rigidly mechanical laws; and that the total quantity of motion in the universe is invariable. From these premises it is an obvious consequence that Will cannot be a source of motive power in the universe of matter; but Descartes solved the difficulty by adding that Will, though unable to produce motion, is able to direct it. We believe this to be in substance the true solution; and it is substantially that of at least two of the three writers of whose views we have undertaken to give an account; but it needs to be translated into not only the language, but the ideas of modern science. "Quantity of motion" is an ambiguous expression; but the truth after which Descartes was groping is what is now known as the doctrine of the Conservation of Energy; that the energy of the universe, though perpetually undergoing transformation, is a constant quantity; that a given quantity of energy, when it undergoes transformation, does an exactly equivalent quantity of work, which work re-appears in some other form of energy. Muscular action, as such, is no exception to this law of Conservation; for it is disputed by none that the energy put forth in muscular action is not created by an effort of the will, but has previously existed in the animal organism, stored up in some form which can be drawn on when needed for use.

Expressed in modern language, the mechanical argument against the possibility of Freedom is that Freedom would be inconsistent with the law of the Conservation of Energy. Freedom, as Delbœuf has defined it in the passage quoted above, implies that it would have been possible for certain events to have befallen differently from what actually has befallen; and it is asserted that, if this had been the case, the sum total of energy in the universe would have been changed either by increase or by decrease;—which is impossible. A possible reply to this is that energy may be transformed, without either gain or loss of quantity, under the influence of a force which remains unchanged, and does not itself pass into energy. Thus, in a "dynamo," or generator of electricity for illuminating or other purposes, the energy due to the motion of the machinery is transformed into electricity, under the influence of magnets which themselves undergo neither increase nor diminution of magnetic power; and it may be argued that the function of the will, in determining the transformation of nervous and mus-

cular energy, is analogous to that of the magnets of the dynamo; being unable to produce energy in the smallest quantity, but able to direct its transformation in one way rather than in another.* This, however, appears a very unsatisfactory analogy. The static force of the magnets belongs to the same order of being with the current of electricity, being related to it somewhat as pressure to motion; while Will is not a physical force, but is of another order of being from matter and its forces.

Another possible reply is, that the Will may determine the time and manner of the transformation of energy, somewhat in the same way that, in mechanism, a very small force is able to guide the action of a very great one. For instance, the steam-engines which propel a large ship, though they work up to several thousand horse-power, can be started or stopped by the will of the engineer moving a lever with the exertion of an amount of muscular force almost infinitesimally smaller than that of the engines which he controls. And it would be possible indefinitely to diminish the muscular power needed, until the gentlest finger-touch on an electric button was sufficient to control the most powerful engines. In such arrangements there is no relation whatever between the magnitudes of the controlling and the controlled forces;—the magnitude of the controlled force may be indefinitely increased, while that of the controlling force remains unchanged. Is not this a significant symbol of the control of Will over the muscular forces?

But in reply to this, it is urged that the analogy altogether fails unless it were possible for the will of the engineer to control the engines without the exertion of muscular power at all; and however this may be diminished by refinement of mechanism, it can never be reduced absolutely to nothing.

Sir John Herschel saw the difficulty, and appears to have concluded that the Will can and does produce energy, though in quantity so minute as to be incapable of experimental proof.† This is cutting the knot rather than untying it.

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* We think this suggestion, though quite differently expressed, is fundamentally identical with one made on the same subject in an article on Atomic Theories in the *North British Review*, March, 1868, by the late Prof. Fleeming Jenkin, and now published in the collected edition of his papers.

† We quote from Sir John Herschel's *Familiar Lectures* on *Scientific Subjects* (Strahan, 1866), page 468.

"The actual *force* necessary to be *originated* to give rise to the utmost imaginable exertion of animal power in any case, may be no greater than is required to remove a single material molecule from its place through a space inconceivably minute, no more in comparison with the dynamical force *disengaged*, directly or indirectly, by the act, than the pull of a hair trigger

A French writer of our time,—Professor Armand Sabatier, of Montpellier,—has proposed to cut the knot in another way, by denying the absolute uniformity of the order of Nature.* He admits, of course, that all motions on the largest scale, that is to say, those of the celestial bodies, and indeed of all masses which are visible to the unassisted eye, are absolutely determined; but he maintains that this is not true of those molecular motions which modern science has proved to exist everywhere; and, as he truly remarks, it is not in the greatest but in the minutest motions that the nature of matter is in any degree revealed to us. Light consists of undulations in an ethereal substance, moving, so long as the light is not polarised, in every plane at right angles to the direction of the ray; and the heat of bodies consists of vibrations of their molecules, moving, no doubt, in every direction at once. These motions are, in M. Sabatier's opinion, in some degree undetermined, and not subject to any rigid law of uniformity; and he finds traces of the same indeterminism in some motions which are on a sufficiently large scale to be visible under the microscope. One instance of this which he mentions is that of the "Brownian" motions of minute particles suspended in water or other liquids.† These movements are of very small amplitude; but incessant, of quite sensible rapidity, and in every direction at once. They are well seen in ink when it is sufficiently thick to make them visible, and it is these motions which prevent ink from losing its properties as such by the subsidence of the black particles.

We cannot think there is any truth in Sabatier's hypothesis as regards inorganic nature. To say that the minutest motions are undetermined, is to say that below a certain limit of magnitude the laws of motion cease to be absolutely true.

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in comparison with the force of the mine which it explodes. But without the power to make some material disposition, to originate *some* movement, or to change, at least temporarily, the amount of dynamical force appropriate to some one or more material molecules, the mechanical results of human or animal volition are inconceivable. It matters not that we are ignorant of the mode in which this is performed. It suffices to bring the origination of dynamical power, to however small an extent, within the domain of acknowledged personality."

* In a series of articles entitled *Evolution et Liberté*, in the *Revue Chrétienne*, of April, May, September, and October, 1885.

† So named after the eminent botanist, Robert Brown, who first called attention to their importance. Professor Jevons (*Quarterly Journal of Science*, April, 1878), offers what appears to be a satisfactory explanation of these motions as being due to minute disturbances of electric equilibrium. They are precisely analogous to the motions of pith balls in a well-known electric experiment.

Now, the laws of motion are perfectly simple; though not mathematical in the nature of their evidence,—for they are proved only by experiment, and have not that self-evidencing character which belongs to mathematical truth,—yet they are mathematical in form; though the proof that they are absolutely true is never perfectly complete, yet every increase in the accuracy and perfection of astronomical knowledge brings us nearer to such absolute proof; and it seems extremely improbable that they should be subject to any limit whatever. The Brownian motions, the motions of the molecules of gases, the undulatory motion which constitutes light,—all these, however minute, are motions, and we cannot doubt that they are rigidly subject to the laws of motion. It is uncertain how far chemical actions can be resolved into the motions of atoms, accompanied in many cases by transformations of energy, as in the case of heat produced by combustion; but the law of the absolute invariability of chemical properties and actions,—the proof of which, it is true, can never be complete, though every increase of chemical knowledge strengthens it,—makes it probable, with a probability approaching indefinitely near to certainty, that the laws of chemical action admit of no more limitation or exception than the laws of motion. We consequently hold with scientific men generally, that all inorganic actions, on whatever scale of magnitude, whether planetary or atomic, are determined by the laws of motion with a certainty which, though not mathematical in its nature, is equal to mathematical certainty.

But is absolute determinism true in mathematics? An attempt has been made by Professor Boussinesq, of Lille, to show that this is not the fact;*—that absolute determinism, though generally true in mathematics, is not always so, and therefore is not necessarily always true in mechanics. He chiefly makes use in his argument of what are called singular solutions. We must here state when and how a singular solution arises, for the term is by no means self-explaining.

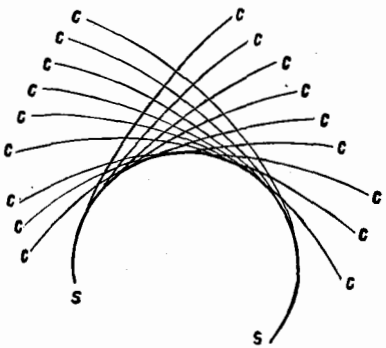
A set of curves are drawn which we shall call C, C′, C″, &c. They are not in general mathematically similar, but constitute a family, varying continuously from curve to curve according to a definite law. They are indefinite in number and indefinitely near to each other, and are so drawn that C intersects with C′, C′ with C″, and so on.

A curve S, which is generally of a totally distinct kind from the curves C, is drawn through these intersections; and the

* See Paul Janet's article in the *Contemporary Review*, June, 1878.

curves C, at the points where they intersect each other, are tangential to S; that is to say, they touch it without intersecting it; so that the relation of S to the curves C is somewhat like that of a circle to its tangents. S is called the envelope of the curves C, and it is "singular," that is to say unique, and not one of a family like the curves C.

The following diagram will give an idea of the relation of the curves C to S.



Every line, straight or curved, may be described as produced by the motion of a point P,—this is actually the case when it is drawn by a pencil,—and consequently the equation which describes the direction of a curve at any place may also be read as describing the direction of the motion of P at that place. Equations usually speak a perfectly unambiguous language, but in singular solutions an exception arises; the equation which describes the direction of motion at that point of any C where it touches S will be equally satisfied by P either continuing to move along its C, or at that point leaving the C and moving along S. So that the equation which describes the direction of the motion of P at any point of S does not absolutely determine its path, but leaves undetermined which of two paths it is to take; those paths being along curves of unlike kinds.

Where there is thus mechanical indetermination, there is, or may be, room for voluntary determination to enter. An agency like the Will, which is not properly a force inasmuch as it cannot exert energy, may nevertheless determine the motion of a point along one of these two curves rather than the other. It is no objection to this that the indetermination shown in a singular solution cannot be realised under experimental conditions. It is impossible to do this, just as it is impossible to make a cone stand on its apex. But it does not seem by any means impossible that it may be realised among

molecular or atomic actions; and the actions in those dim recesses of the brain where alone the Will acts on matter can be only an atomic scale.

This argument appears to us of much importance, as showing that absolute determinism is not a mathematical truth. But we do not think it throws any light on the actual *modus operandi* of Freedom. The processes of life are not mechanical, and its laws are not resultants from the physical and chemical properties of the substances of which the organism is composed. Even if all physiological processes could be referred to chemical laws, this would not be true of the morphological processes which build up tissues and organs; and though it might conceivably be true that the law of Habit, in virtue of which every action tends to become easier with repetition and to repeat itself, was a merely physical law like that whereby "streams their channels deeper wear;"* yet the law of heredity, whereby habits and tendencies of all kinds, both active and formative, tend to be reproduced in the offspring, cannot be merely physical and mechanical. In all life, even the merely organic life of vegetables, there is something as absolutely inscrutable as the ultimate properties of matter; and it seems to us probable, though not capable of demonstration, that Sabatier's theory of a certain limited indeterminism, though untrue of inorganic matter, is true of organic nature. As he reminds us, we do not there find, either in form or in function, the rigid mathematical uniformity of inorganic nature. Variation, though generally very slight, is universal; no two trees in a forest, no two leaves on a tree, are exactly alike; the same is true probably of the physiological processes of all organisms, and certainly of the muscular actions of animals; and even if Darwin's theory of the origin of all organic forms by natural selection among spontaneous variations is unsatisfactory and insufficient, he has at least made it obvious that it is this fact of variability,—so utterly unlike any property of any part of inorganic nature,—which makes the evolution of organic forms possible. It is asserted, no doubt, by those with whom absolute determinism is an article of scientific faith, that organic variations are absolutely determined, partly by differences and changes in the environment of the organism, and partly by the laws of its development. This may be true. It is at present, and may ever remain, impossible to prove either absolute determinism or a certain limited indeterminism in the organic world. Sabatier only insists that his opinion

* "Time but the impression stronger makes,
As streams their channels deeper wear."—*Burns.*

is as tenable as that of his opponents, and that the facts of organic variation give it support. It may be mentioned that, according to Darwin, the immediate effect of a change in the environment of an organism, whether animal or vegetable, is usually not to produce any special variation, but to promote an indefinite variability. In crystallisation, on the contrary, there is, we believe, no such thing as indefinite variability, unless a tendency to form imperfect and partly amorphous crystals can be so called; but when the environment of crystals is changed by introducing some slight change into the chemical constitution of the liquid from which they are precipitated, the change in the form of the resulting crystals, if any, is definite.

But even if we altogether reject the idea of a certain limited indetermination in vital actions generally, this will not disprove the possibility of indetermination and freedom, also limited, in a self-conscious being like Man. Sensation, consciousness, and self-consciousness are such wonderful phenomena, and so totally unlike anything that can be imagined as properties of mere matter, that it seems rather probable than otherwise that they should be accompanied by other wonderful properties, and especially by this of free self-determination.

We go on to state Delbœuf's theory of the *modus operandi* of this free self-determination. He says: "Freedom disposes of time. This, as we shall see, is sufficient. We consequently define a free being as one which possesses the power of suspending its activity until the moment chosen by itself. A free being is thus a reservoir of force (or, more correctly, energy) in a state of tension, which it can transform at pleasure into actual motive power (*forces vives*). . . . . This transformation of latent energy, or energy in the form of tension, is effected without any increase or decrease in the total energy of the system" of which the free being forms a part.

So Delbœuf. We think this is by far the most luminous suggestion yet made on the subject, and we only wonder that, with his knowledge of natural science, he has left it as a bare suggestion, and not worked it out into further detail. With the help of modern physiology, however, this is not difficult. We know that the greater part of our life goes on in unconsciousness and in total independence of the Will,—the Will only enters, as it were, occasionally to control and regulate. Thus the lungs perform their function of breathing without any action of the Will, and without exciting consciousness; and in walking our legs continue to move, though we may be

absorbed in the profoundest reverie, and cease to move only in obedience to a voluntary determination like that which at first set them moving. These facts of ordinary consciousness agree with the results of anatomy and physiology. The involuntary, or what physiologists call reflex, actions of the nervo-muscular system are found to increase in energy when, by accident, or as the result of experiment, they are withdrawn from the influence of the brain, which is the organ of the Will. A case has often been quoted where an injury to a man's spinal cord made it incapable of conducting either sensible impressions to, or motor impulses from, the brain; so that the sufferer had neither sensation in, nor control over, his lower extremities; yet when the sole of his foot was tickled, he kicked more energetically than he would have done if the nervous connections had been unimpaired. Experiments on animals yield similar results, and establish the conclusion that the relation of the voluntary and conscious forces, which have their seat in the brain, to the involuntary and unconscious forces, which have their seat chiefly in the spinal cord, is regulative, and, for the most part, inhibitory. To go back to our former illustration, it may be compared to the relation of the engineer to the steam-engine; for this also is regulative and inhibitory. The engineer controls the steam, not by impelling or ceasing to impel it, which would be impossible, but by permitting or refusing to permit it to flow into the cylinder, and by directing it on the one side or the other of the piston.

This, however, gives no idea of the way in which it is probable that the Will really acts. There appears to be conclusive evidence that the animal system has the power of storing energy, which can be afterwards liberated for the purpose of doing muscular work.* The seat of this stored energy is probably the substance of the muscles; and the Will determines muscular action by determining whether, and at what time, this stored energy shall be transformed into mechanical energy by the contraction of the muscle. It is true that the determination of the Will is conveyed to the muscle, not by any immediate action, but by a current of nervous energy sent downwards from the brain, which involves a transformation of energy, and is as truly a physical agency as the opening or closing of a steam-valve by the engineer. But the chain of physical causation cannot extend

* For the facts which prove this, see Carpenter's *Human Physiology*, and the account of the experiments of Fick and Wislicenus, on muscular work, in the *Philosophical Magazine*, June, 1866.

backwards more than a very few links, and it is at least credible that in the original determination of Will within the brain, the Will may be free, in that absolute sense in which Delbœuf in the passage first quoted defines freedom, either to effect or not to effect that transformation of energy on which depends the sending downwards of the nervous current that sets the muscle in action; for we cannot doubt that energy is stored in the brain and the entire nervous system as well as in the muscles; nor that the motion of every nerve current, as of every electric current, involves the transformation of energy from some other form into that represented by the current.

It may be objected that this is a similar case to that of the engineer, who starts or stops his engine by a turn of his hand, which is a mechanical action, involving an exertion of energy; and consequently that it brings us no nearer to understanding how the actions of the muscular system, which are mechanical, can be directed by the Will, which is not a mechanical agency, and cannot exert energy. But to this we reply, that in the case of the engineer we have seen that the proportion which the muscular force that he has to exert bears to the force of his engine, may be diminished without limit, provided only that it does not become absolutely null. We know what is the *modus operandi* of the engineer in directing his engine. We know nothing whatever of the *modus operandi* of the Will in determining the transformation of stored energy in the brain into a nerve-current, but we are safe in asserting that it bears no resemblance to that of the engineer, and does not consist in anything like turning a handle; and we see nothing improbable in the belief that the Will may exercise its direction and regulative function without the exertion of any energy whatever. When man's mechanical art can diminish the magnitude of the directing force infinitesimally, provided that it is not absolutely reduced to nothing, it seems in no way improbable that it may be absolutely reduced to nothing by the vital powers of the organism, which infinitely excel all human art in subtlety. Boussinesq's illustration from geometry, though not suggesting how this can be done, appears conclusively to show that it implies no mathematical absurdity.

The freedom of which we speak is emphatically called moral freedom; all moralists agree that moral freedom is manifested in self-control, and practically means the power of self-control. We now see the physiological ground and interpretation of this. Self-control consists, primarily, in the control by the Will of muscular actions which without such

control would have gone on in response to stimuli, as in the case of the patient who kicked when tickled on the soles of his feet, though unconscious of the tickling. Will—or, if this word is thought inapplicable, voluntary action—is developed to this extent in animals; and, in our opinion, the step in development which separates the human from the highest animal intellect consists in acquiring the power of directing thought at will.* On this depends the power of abstraction, and with it the ability to use arbitrary signs, and the faculty of language;—for, as Prof. Max Müller has shown in his recent work on the Science of Thought, every word in its origin is a result of abstraction.

These considerations throw some light on the evolution of Will and self-consciousness.† Mind has been evolved from sensation as from a germ. In its earliest development, sensation, or rather nervous action (we have no means of knowing how far down in the animal scale sensation really begins), exists only as a guide to muscular action; and all muscular actions, such as that of the mouth in closing on food, are performed in immediate response to a nervous stimulus. But when the conditions of life so change that the animal can no longer obtain food by merely closing its mouth upon it, as a sea anemone does, but has to use some of the arts of a hunter; and when at the same time the single ganglion, which alone was necessary at first, develops into a rudimentary brain; then when the nervous stimulus, coming probably from the eye or the ear, reaches the brain, and the animal has to watch its prey instead of at once closing upon it, it is probable that the impulse to close upon its prey, inherited from the ages before its brain was developed, is still transmitted, but is counteracted by an inhibitory impulse engendered in the brain itself, and throwing the nervo-muscular system into a state of strain between the two opposing impulses; while at the same time the arrest of muscular action heightens the consciousness which the sensory impression excites in the brain; for it is a well-known law that consciousness is heightened when muscular action is hindered, whether by a voluntary or an involuntary cause. This counteraction of the impulse to close on the prey is the germ of voluntary self-control; this heightening of consciousness is the germ of attention, and ultimately of the consciousness of

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* Prof. Max Müller, in a letter in *Nature*, of the 14th July, 1887, speaks of this view as being at least worthy of consideration.

† The following has been suggested by the review of Wundt's *Physiological Psychology* in *Mind*, January, 1876, by Mr. Sully.

self. In this pause, produced by the opposition between the sensory impulse to rush forward and the mental determination to hold back, is contained the germ of all the self-conscious and voluntary life which constitutes Mind.

This may appear fanciful, and we do not advance it as established truth. But, though the first germs of attention and voluntary determination are probably to be found in such creatures as ants and spiders, it is scarcely an exaggeration to say that the evolution which we have endeavoured to describe may be witnessed in that very common though most interesting sight, a dog pointing. His stillness is visibly not that of rest, but of strain, as between two evenly balanced impulses, one urging him forward and the other holding him back. Darwin suggests that this remarkable habit—which, like other acquired habits, has in some decree become hereditary—is only the exaggeration of the pause of a carnivorous animal going to rush on its prey; and he adds that probably no one would have ever thought of teaching a dog to point, unless he had noticed such a tendency.

We may be reminded that while we have offered an account of the evolution of some of the mental powers, we have taken for granted the evolution of the brain, on which the mental powers depend. This is quite true. Structure and Function have been evolved together, and the evolution of each was necessary to that of the other.

To return to the point where we began.

We do not say that we have proved the reality of indeterminism and freedom. We do not think it admits of proof; —it is as much as we can hope for, if we can show that from the scientific point of view our opinion is as defensible as the opposite one, while the moral arguments for the doctrine of freedom remain for what they are worth—and in the opinion of the present writer they are worth very much. Professor Huxley once said—we quote from memory—that the controversy about Necessity and Freedom will always be a drawn battle, and that for all practical purposes this is equivalent to the believers in Freedom gaining the victory. We can assent to this, though Huxley is a Necessarian and we believe in Freedom; all that we hope to do is to help to remove some presumptions in favour of the doctrine of absolute Necessity, and some difficulties in the way of believing in Freedom, which at first sight may appear formidable, and yet diminish and disappear when really understood. We fully admit that the entire world of mere matter is "bound fast in fate;" that Freedom exists in living beings only, perhaps in none but man, and dominates only a small portion even of man's

life. But we have seen with Boussinesq that absolute determinism is not universally true in mathematics, and therefore need not be universally true in Nature, though we do not think it probable that indeterminism and Freedom actually enter in the way indicated by Boussinesq's reasoning. We have seen with Sabatier that the variability which is so remarkable in the organic world, and, according to Darwin, makes possible the evolution of organic forms, appears to show a sensible though very minute degree of indetermination in the physiological and formative, as well as the motor actions of living beings. And we have seen with Delbœuf that the manner in which the Will most probably determines action, without being itself capable of exerting motive power, is by determining the transformation of stored-up energy in the organism into active energy.

We do not deny that all this is hypothetical. But we have to do with questions in which certainty — demonstrative certainty, at least—is at present unattainable, and may ever remain so. But the doctrine that mind is bound fast in the same chain of fate with inorganic matter is as hypothetical and as incapable of proof as the doctrine of a certain limited freedom of the Will. We are not now replying to those who deny the freedom of the Will on metaphysical grounds; our arguments are directed against those only who deny it on grounds of physical science, and we believe their argument may be refuted on purely scientific grounds.

The so-called scientific argument against the possibility of Freedom has been stated already; namely, that Freedom is inconsistent with the Conservation of Energy; and we have stated Delbœuf's reply to it, which we think sufficient and satisfactory. This, however, is not all that is to be said. If it is true, as the argument implies, that no mental determination can alter the direction in which physical causation acts, much more is involved in this than the denial of Freedom. Moral Freedom was denied on metaphysical grounds before any one had thought of bringing the laws of motion and force into the argument; but, if we deny it on purely physical grounds, we must deny the possibility of Mind being an agent at all. When we shrink from pain or seek pleasure, the older Necessarianism did not think of denying that the fear of pain and the hope of pleasure, which are mental affections, are the cause of the appropriate muscular actions. But if it is true that the law of the Conservation of Energy makes it impossible for any mental determination to change the action of physical causation, then mental determination can neither produce nor influence muscular motion, and con-

sciousness misleads us in making us believe that our mental determinations—our desires and our fears—determine our bodily actions.

To mere common sense this conclusion must appear impossible and absurd. Nevertheless it has been accepted by Professor Huxley* and many others of the same school, and is known as the theory of Automatism. It may be thus stated :—"Consciousness, though an effect of physical action, is never its cause, but only its sign. The action of the legs of the patient who kicked violently in response to tickling which he could not feel, is the type of all nervous and muscular action whatever. All such action, whether conscious or unconscious, goes on as if in unconsciousness."

This is a paradox, but many paradoxes are true. To go no further than our present subject, it is a paradox that the Will cannot produce nervous or muscular energy; yet it is quite certain that the Will cannot produce energy, and can at most only direct it. But the paradox which the theory of Automatism requires us to believe is not only great but enormous and monstrous. If Automatism is true, then consciousness is mere surplusage, and not a cause, but only a sign of physical action; and all human history might, without violation of any law of causation, have gone on in unconsciousness; the development of art, science, and faith might have appeared to go on with unconscious puppets for actors, without a throb of pain or a glow of pleasure; wars might have been waged without ambition, pictures painted and statues carved without a sense of beauty, music composed and performed without a sense of harmony, science built up without a love of truth, and prayer uttered without hope or fear,—all as the result of nervous action never translating itself into consciousness. Rather than assent to such a paradox as this, we should believe with Sir John Herschel what is scarcely a paradox at all, that the Will has the power of creating energy to an infinitesimally small amount;—though, as we have shown, we do not think this is necessary to a belief in the freedom and self-determining power of the Will.

It may be said that a *reductio ad absurdum*, however forcible, is worth little outside the domain of pure mathematics and abstract logic. We do not assent to this; but we think a conclusive direct refutation of the theory of Automatism has been given by Mr. Romanes, a writer who is, we believe, beyond any suspicion of theological or meta-

* See his address on Automatism, at the Belfast Meeting of the British Association, as published in the *Fortnightly Review*, November, 1874.

physical prejudice on such a question. It is simply this:—that if consciousness were only an effect without being a cause, and were consequently mere surplusage, it never could have been evolved at all. Whether it is true or not that "natural selection among spontaneous variations" has been the chief cause of vital evolution, it is certain that all vital evolution has been effected under the law of natural selection; and natural selection cannot perfect a useless function, which consciousness would be if Automatism were true.

If, then, the dicta of instinct and common sense are scientifically true; if consciousness can affect matter, and desire and fear can determine bodily actions, all arguments from physical science against Moral Freedom and self-determination are irrelevant and worthless, and the question of the reality of Moral Freedom is left to be decided, or to remain undecided, on the old metaphysical, moral, and, we will add, theological ground.

THE CHAIRMAN (W. N. West, Esq.).—Although the learned author of the paper just read has unfortunately not been able to come to England to attend this evening, I am sure all present will accord him a vote of thanks for this addition to our proceedings, and at the same time feel that his absence has, as far as possible, been compensated for by the clear and distinct manner in which Mr. Cadman Jones has read it. We shall now be glad to hear any observations that may be offered.

SIR J. FAYRER, K.C.S.I., F.R.S. (Vice-President).—Mr. Murphy's paper is not one which I should have felt myself able to discuss, even had it been on a matter to which I had given special attention. One could hardly be expected to take up a subject so abstruse, and containing so much matter for close thought, and discuss it at once. I am glad, however, to have had the opportunity of hearing the paper read, as I like to know that questions of this kind are brought before the Institute, and am glad to see the subject so reasonably argued and fairly considered. I think that a good deal of strong language is occasionally used in reference to great thinkers of the present day, because they do not hold the same views as others who have not had the same opportunities for studying the questions with which they deal.

The subject of to-night is one of importance and interest, and I will not offer any further opinion upon it, except to say that I think conclusions in regard to our organic nature ought not to be accepted as regards our moral nature and our will: at least, I decline so to accept them. An hour ago I did not think I should be standing here in response to a call from the chairman to say a few words. I feel satisfied that in doing this my own will is operating, and that what I am saying is not the result of any precedent cause, other than what may have been excited by the chairman's remarks. There was one point which specially interested me, and that had reference to heredity. There can be no doubt as to the great importance of that subject philosophically and physically; perhaps sufficient attention has not been given to it. The illustrations which the author has given us are those of the pointer and the setter. The peculiarity of these animals is spoken of as being to a certain extent hereditary; and no doubt it is so, for, although the pointer is trained to point and act as a hunting-dog, yet it is also true that he points the first time he goes into the field, and before any teaching can have affected his proceedings. Most sportsmen know that a good young dog will sweep the field after grouse as though it had done the same thing for years. Of course it needs the keeper to direct and teach it. There are other remarkable examples of it. The following illustration has just occurred to me. Since telegraphic wires have become so common on the grouse moors, the number of birds killed by the wires has diminished. It would seem to have become hereditary among the grouse not to fly against the wires and kill themselves, as they formerly did; for one grouse so killed now, the number some years ago was probably tenfold. It is not to be supposed that the grouse which are shot in August can have learned anything more than the birds which have preceded them: the inference is that they have acquired the habit which enables them to avoid the wires in their flight by heredity. It seems very strange that this faculty should be so transmitted. What one would like to know is, the nature of the molecular condition of brain which effects this. Such subjects are of great interest. I will not attempt to discuss them, but as I have been asked to speak, I have thought it right to make the few remarks I have offered.

Mr. St. George Lane Fox, F.G.S.—I would suggest, in the first place, that there appears to me to be a slight discrepancy between the title of the paper and the author's concluding remarks. Whilst

listening to it, I was not quite sure whether the author intended to put forward a new theory, or to destroy some theories that seem hitherto to have prevailed among scientific men. I now gather that he merely intended to show the futility of attempting to arrive at a solution of the question of moral freedom from a purely physical standpoint. One idea that has been dealt with in the course of the paper is that the operation of the human will is in the direction of suspending the manifestations, as it were, of energy, —of converting latent energy or what the physicists call "potential energy" into the kinetic form, or *vice versâ*. I think, however, the author has not quite realised that there is a very great distinction between individual action from the standpoint of consciousness, and the operation of force in the physical universe. It seems to me that this is the difficulty with which the author had to contend; that he had not grasped the distinction between the microcosm and the macrocosm, which distinction is, to my mind, the key of the great and perplexing problems we see constantly present in regard to moral action. The operation of physical matter according to recognised laws,—that is to say, laws that have been more or less determined by experiment,—is dependent upon a certain phase of material development, upon certain conditions of force and certain limitations of time and space. Now, in the case of the individual man we deal, as it were, with the universe from the microcosmic point of view. There is the will, in the individual effort, as distinct from the operation of force in the physical world, without hypothetically, at any rate, believing in the operation of the universal will. It seems to me that there lies the clue. If we can only conceive that the individual man has a potential universe in himself, and that there are certain relations between his material being, which forms a mere atom, as it were, in the outer universe of which his body is a component part, in its physical aspect, we may gain some insight as to how an interchange of energy takes place between the universal and the individual. This conception of a universal and individualised *will* may, perhaps, although not affording an explanation of the difficulty, offer a clue to the direction in which it can be found. It is, however, almost impossible to deal adequately with these questions from the nomenclature available to modern science. There is one other point to which I would like to draw attention; it is this. That the constant use of the word "proof" or "disproof" appears to be an exceedingly arbitrary mode of dealing with a difficult question. This is one of the failures of modern

thought. It is exceedingly common to hear men of science, especially when dealing with subjects of this kind, making use of the words "proof" or "demonstration," without taking into account the mind or the receptive power, to which the proof or demonstration is to be fitted. Scientific men, as a body, have developed a mind of their own. There are things which they demonstrate to themselves which do not appeal to the minds of those who have not been trained in their particular school of thought. This is a very important point, and one which I think is often lost sight of, particularly when such illustrations as those of the dynamo machine and the steam engine are made use of, as they were, in the paper just read. The whole train of thought and the whole collection of experiments associated with the use of such expressions as the dynamo machine and the steam engine, if thus wrenched from their context and applied to ideas with which they are not technically associated, seem to me to be more or less nonsensical. In conclusion, I would say that, while I think we may accept the paper as a valuable contribution to the discussion of this subject, at the same time it appears to offer a very useful illustration of the futility of attempting to deal with metaphysical subjects from a wholly material standpoint.

Professor ODELL.—I think that freedom of will may be accepted and acknowledged as a fact,—I mean freedom of will in degree, not absolute,—there is not anything absolute except God. No doubt it is hard to speak on an abstruse subject like this without entering into speculative matter. It is accepted by some thinkers that the mind is an emanation of the brain, and is dependent for its existence on the nervous system; while the nervous system is dependent on the general constitution for its health; and furthermore, the general constitution is dependent on a variety of circumstances, such as air, food, &c. If this be so, it seems to me to curtail very much individual freedom of will,—either the moral or the mental will—then, as the first speaker has mentioned, it bears on the question of inheritance which curtails also, even more than anything else, individual freedom of will, provided the will is strictly dependent upon the brain and the nervous system. But there are some who believe that this is not the case, and that the will is part and parcel of the mind, if, indeed, it is not the mind in its entirety. There are proofs it would be impossible for me to bring forward to-night, but which, although they might not be very conclusive, would yet offer fair evidence that mind may exist apart,—and here I do not speak with

absolute certainty, although to myself it is a certainty,—from the brain and the material and physical body. I can very easily conceive that the mind cannot act without a visible organ, which enables it to do so, in the physical world, surrounded by physical matter. For instance, I lift up this paper in my hand. It is not my hand that lifts the paper—my hand is only an instrument. I go further still, and believe that it is not my brain or any portion of my nervous system that acts upon the hand, or upon the paper in lifting it up, except as instruments; for I cannot imagine the brain being able to do an action of that kind. Therefore, I ask, what is the explanation? There must be something besides the brain and the nervous system: if there be nothing more than the brain and the nervous system in the discharge of this function, my reason is not satisfied. My reason induces me to expect something more, and, in accordance with that expectation, I believe that something exists besides the brain and nervous system which it is impossible for us to see and feel with our physical eyes and senses. But although we may never have seen what we call "the mind," yet we have evidence sufficient for any jury to accept, to prove the existence of the mind, when we can point to actions which we are fairly assured and persuaded could never be done by mere brain and muscle and the corporeal system. Take the case of a writer. Is it the pen that does the work, or is it the hand, except as instruments? Is it the brain by which the grand ideas of Shakespeare, or Milton, or Bacon were put upon paper? To put the matter only to the mere test of common sense and common reason, not mere faith in what people may call superstitious teaching; does it satisfy my mental reasoning powers to rest there with the pen and with the brain and nervous system, and say that all the grand thoughts of the great writers I have mentioned could have been thus evolved? There is a sentence in the paper which I cannot very well understand. On page 237 we are told, "Sensation is, of course, the germ out of which mind has been evolved." That is a very positive statement. I ask, what is meant by "sensation"? Is it physical sensation? If so, is it not a fact that when physical sensation expires, mind must expire also? The author accepts this statement, which is not a quotation, and gives us to understand that the mind is dependent on sensation. I cannot understand this. I do not think that the author is a materialist, but it is nevertheless a materialist's statement; and I cannot conceive myself living in any state of existence outside this life apart from the mind as it at present exists. I mean here by "mind" my thinking and reasoning powers,

my present consciousness. It is against reason to suppose that it would be I who would exist; but certainly if I am to exist at all in any other form, I must take with me my intelligence, my reason, and my memory wherever I go. I, therefore, ignore this statement, and say that I do not believe the mind is dependent on physical sensation, if it be physical sensation that is here meant.

The Honourable J. M. Gregory, LL.D. (Ph. Soc. of Washington):—I have been deeply interested both in the paper and in the discussion that has arisen upon it. They touch points that certainly lie at the bottom of all our experience. Any one who has thought at all must have thought more or less on these subjects. One of the happy suggestions made in the course of this discussion was as to the inaptitude and inadequacy of scientific language borrowed from physical science to express the facts of our mentality. I do not fear that the great question of the freedom of the will will ever be surrendered by the mass of mankind. That common sense, whose value as an evidence was fully recognised by Sir William Hamilton, pronounces in favour of this freedom of will. All institutions of government, our moral sense, our judgments of our life and actions, rest on a basis of belief in some form or decree of freedom of will.

It is true that modern physiological science has shown that this freedom of will is not so unlimited as this universal consensus of opinion of mankind would assume. It is agreed that there are limitations in the hereditary qualities and the physical formation we possess; but after all, although we may thus be driven partly from the ground adopted to allow these limitations, yet, I imagine that common-sense will have its way here just as in the answer to the argument of Bishop Berkeley for the spiritual or ideal, as against the material. We may make the argument as strong as we will, that there is no evidence or proof of the existence of the external objects of nature, still we turn aside if a post is in the road. It has occurred to me that the difficulty in this discussion on the freedom of the will lies in the attempt to pass in thought from one sphere of our nature to the other,—from the physical to the mental, or the reverse. When we come to reason on what we know, we find that we have always proceeded on some fundamental assumption. We have two such fundamental assumptions, on which all our knowledge is based. I know that the physicists and those who deal simply with material science profess to take all phenomena as they present themselves to their eyes; but they certainly assume the *reality* of the phenomena and their *power* to

recognise it. Even from their point of view, if we go down to the basis of our knowledge, we must accept two fundamental assumptions: must assume them because we can neither prove them nor doubt them. One of these is that there is *something which occupies space*—which I take to be the simplest definition of matter. It is assumed, with equal certainty, that there is *something which thinks*. In this simplest definition of mind I use the word "think" in its evident meaning, including all acts of intellect, sense, and will. These two general propositions we can neither prove nor deny. I cannot prove that something occupies space, nor can I demonstrate that there is anything that thinks; but, at the same time, I cannot doubt either assumption. The one is as certain as the other. I am as sure that I think as I am that I weigh so many pounds avoirdupois, or that I stand on my feet. The certainty of one is as great as that of the other. If any choice must be made between the certainty of these two fundamental assumptions, which are unproved and unprovable, but which are always assumed as the bottom of the matter, it must be given to the side of mind. On these two assumptions are built the two great departments of human knowledge or science,—the mental sciences, including the psychologic, social, moral, æsthetic, and political; all springing from the something that thinks; and the sciences of matter, or of the something that occupies and moves in space. The maxim of Descartes,—"Cogito *ergo sum*,"—has been contradicted, as assuming that the part is the whole. In place of his "I think, therefore I am," one may read, "I am, therefore I think." In other words, thinking proves my mental existence. With regard to the other assumption, that there is something which occupies space, I have said that this also is unproved but undeniable. All physical science is based upon it. Occupancy of space and motion in space, with their variations, are the data that our senses give us for our science of matter. There is at the bottom of every stage of our development of knowledge a very serious difficulty. If I am accustomed to look at questions relating to the phenomena of life from the side of my consciousness, and confine myself in my studies to the reflective side, I shall find it an exceedingly difficult thing to project myself into the realms of physical science and explain its phenomena. In so doing I must employ the language made familiar by my philosophy, and shall be laughed at by the physicists for the absurdity of any explanations: the fault lies in my phraseology. But when those whose studies have been on the

side of physical science attempt to pass out of their region into mine, I find that they experience the same difficulty. Their language lacks meaning when applied to mental facts.

The true difficulty experienced by material or physical science lies in this, that it assumes, if it does not assert, that all the phenomena which it sees and studies are certain and positive, but that those of metaphysical science are mostly unreal and illusory. When the physicists say you must begin with matter and force and motion, they put limitations upon the possibilities of thought which nature herself has never imposed. They limit the sphere of reflection, or rather they exclude themselves from that sphere, except as they may employ language which is not adapted to the facts of consciousness and reflection. It is unfortunate that in the modern investigation of social, moral, and spiritual truth, they should have so absolutely disposed of, and too often with a contemptuous sneer, all metaphysical truth and the facts of consciousness. In doing this they have disposed of one-half, and the higher half, of the whole question. It is like trying to compel us to walk on our left foot because they think the right foot is not the proper one to use or stand upon.

The whole question of the freedom of will, for example, must find its basis and argument on that side of truth which belongs to our consciousness. I remember that some ten or twenty years ago a writer in *La Revue des Deux Mondes*, criticising a work that had then just appeared, the work of M. l'Huys on the Brain, since published in the International Science Series, said :—" It is indubitably true that in France the medical faculty have concluded, almost to a man, that mental science is nothing more than a chapter of mental physiology " ; but he went on very acutely to remark that we may study mental science without appealing to the facts of physiology to interpret it. That is to say, I may study the phenomena of memory, reflection, classification, and generalisation, and all the different forms of thought, without thinking of the brain by which I do this, or the physiological functions that accompany it. But, the writer added, the man who starts to study mental physiology cannot go a step of the way without appealing to the mental side,—to consciousness, —to interpret the phenomena he has before him. It was, I think, Professor Tyndall who said that if a man had the power to observe the molecular movements of brain,—of its electrical currents and discharges,—if there be such, he would be as far from having passed the gulf which separates the phenomena of matter from those of the

mind as he is now. The study of the mental functions of the brain, without the previous consciousness of the mental facts to be explained, can not go on. This is so obvious that it strikes me it should occur to our physiological friends when they attempt to address us on physiological grounds.

The meeting was then adjourned.

REMARKS ON THE FOREGOING PAPER.

By The Rev. R. Watts, D.D., LL.D.

I am much interested in this paper, but have no time for communicating any special remarks upon it. I cannot, as a theist, accept the position that mind cannot act on matter directly. If it cannot act on it directly, it cannot act on it at all, for there can be no mediatory agency which is not either mind or matter. If mind has created matter, it is idle to allege that mind cannot act on its own offspring. To deny that mind cannot act on matter is all one, therefore, with the denial of the creation of matter. Besides, on philosophical principles, I must reject the doctrine that mind cannot put forth energy. The ultimate court of appeal on all such questions is consciousness, and the testimony of consciousness is, that our *ego*, is a fountain of energy potent to the excitation of energy in the material organism we inhabit, and, through it, in the material of our environment. I hold by the Edwardian doctrine of the will, the fundamental principle of which is that the law of causality holds sway within the realm of mind.

THE AUTHOR'S REPLY.

The Honorary Secretary has kindly sent me the report of the discussion on my paper, and Prof. Watts's observations.

Prof. Watts has altogether mistaken my meaning. I have written the paper in order to remove the difficulty which the dynamical philosophy has raised in the way of believing that mind can act on matter. I believe in such action as firmly as he does, though on different grounds. But when he maintains, as a dictum of consciousness from which there is no appeal, that the will "is a fountain of energy, potent to the excitation of energy in the

material organism," I reply that this proves no more than does the dictum of consciousness that the earth stands still. Astronomical science proves that the earth moves, and dynamical science proves that the will can only transform the energy due to the oxidation of the food. To deny this is to deny the conservation of energy. My purpose has been to show that the will may be able to direct energy, and thereby to be an agent in the universe of matter, without having any power to originate energy. If this is true, there is room in the physical universe for moral freedom; though on any theory moral freedom can exist only within narrow limits. Prof. Watts says, quoting apparently from Edwards, that "the law of causation holds sway within the realm of mind." If this only means that the relation of cause and effect exists within the realm of mind, it appears to me not only true, but the fundamental datum of all reasoning on the subject; but my purpose is to show that this does not prove the doctrines of necessarianism and automatism.

Mr. Lane-Fox, if I understand him, thinks any attempt to treat subjects belonging to the moral sciences from the physical point of view is almost necessarily "more or less nonsensical." If my reasoning is sound it must prove itself, but I will remark that the tendency of all modern science is to obliterate the supposed boundaries of the several sciences. Dynamics is now but an application of mathematics, and physics of dynamics; and we cannot tell what possibilities of knowledge would be shut out if we were to acquiesce in the dictum that the physical and the mental sciences can throw no light on each other. It would be a hopeless state of things if, on such a question as this of moral freedom, the two parties were simply to face each other, the one saying "Consciousness affirms it, and we care not what may be said against it;" and the other, "Science disproves it, and we care not what may be said in its favour." Surely it is better to seek for some way of harmonising. An able writer once contemptuously called me a harmoniser, but I am proud of the name.

Professor Odell questions my opinion, that mind has been evolved out of sensation. I think that, as a matter of fact, this is almost as certain as that the organism has been developed out of a minute mass of protoplasm; but I have written my work on *Habit and Intelligence* to prove that there is an element in all intelligence which is not due to any unintelligent materials or forces.

I agree with almost all that Dr. Gregory has said. I do not wish

to be thought insensible to the spiritual side of truth, because my immediate subject does not lead to it. I have, in this paper, only endeavoured to reply to the argument of materialism against moral freedom, with arguments of a kind to which materialists are open. My statement of the arguments of a spiritual philosophy in favour of moral freedom, is to be found in my work on *The Scientific Bases of Faith.*