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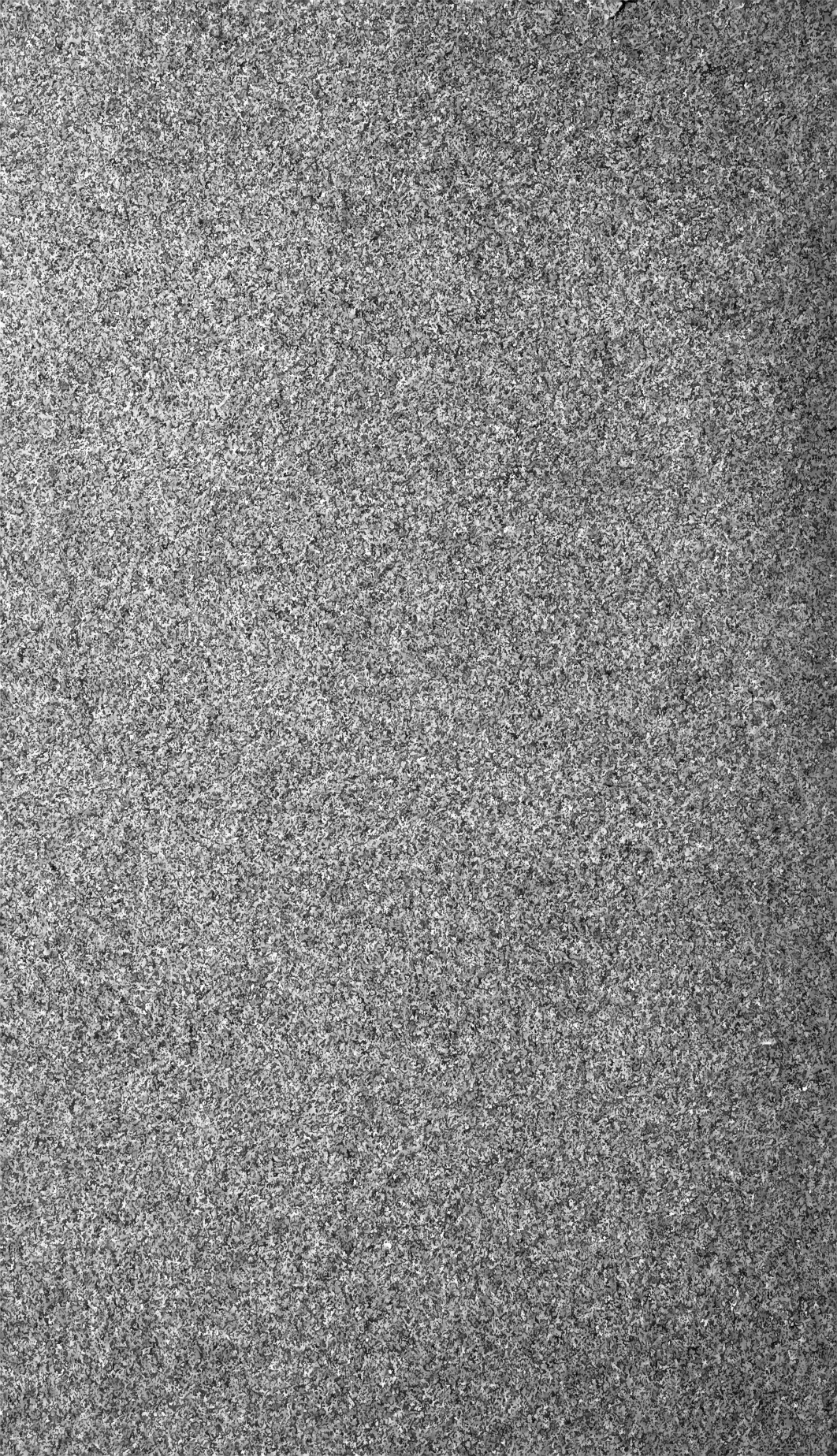
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The Freedom
of the Will...



A Study in Materialism

By ALEXANDER PETRUNKEVICH, Ph. D.



.....THE.....
FREEDOM OF THE WILL.

A STUDY IN MATERIALISM.

By ALEXANDER PETRUNKEVICH, Ph. D.

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TO MY FATHER-IN-LAW, MR. E. F. HARTSHORN,
WHOSE WHOLE LIFE IS AN EXAMPLE OF
FREE WILL, I DEDICATE
THIS STUDY.

THE FREEDOM OF THE WILL.

A STUDY IN MATERIALISM

BY

ALEXANDER PETRUNKEVITCH, Ph. D.

Materialism has come into discredit. Theology has always led a strong fight against it, declaring the first cause to be the Divine Power; Philosophy has repeatedly and vigorously attacked it and has finally inflicted a deadly blow in the discovery of its weakest point—the heel of Achilles of materialism—*Consciousness* and *Free Will*. The general public, too, looks with abhorrence on materialism, dreading and combating it like an ulcer; although not sufficiently acquainted either with the facts upon which materialism is based or with its philosophic merits and errors, it feels darkly the presence of a danger to society in the principle of inexorable, pre-established *Necessity*.

Indeed, the life of materialism as taught by *Laplace*, *Lagrange* and the authors of the "System of Nature"¹ is doomed. It has given way before new monistic constructions and dualistic principles. Among the former, *Parallelism*, especially, which offers a more plausible explanation of many psychic phenomena, is now gaining ground rapidly in philosophy and science.

It is not my purpose to criticize either of these philosophic systems; the history of materialism, also, has been made the subject of much study and is sufficiently well known.² What I desire to attempt is to *save* Materialism as a philosophic doctrine; to give it a new form; to show that *Necessity* is not essential to Materialism; to do away with the error contained in the law of causality, an error which, strange to say, originated in the minds of mathematicians and physicists; and finally to introduce a *new principle* into the explanation of physical and psychical phenomena.

¹ "Systeme de la Nature ou des lois du monde physique et du monde moral par feu M. Mirabaud." 1770. This book is supposed to have been written by Baron von Holbach, Grimm, and others, probably Diderot, Larrange and Naigeau.

² To those especially interested in the history and criticism of materialism I would recommend F. A. Lange's "Geschichte des Materialismus," 1902.

To fulfill all this, it will be necessary (1) to substitute for the law of causality a new law and (2) to show that free will really exists, being not the mere self-deception of a mind unaware of the hidden, causally necessitated *Desire*. I am sensible of the difficulties that confront me in such an attempt. Yet if science does not wish to confine itself to a mere gathering of facts, it must seek for an understanding of the surrounding world which would otherwise become for it as dry and lifeless as a museum collection! In studying the laws which govern the origin and development of living beings, I am necessarily confronted with questions of a more general character, and the mind going from one phenomenon to another and from one cause to another, seeks a general principle.

This is the way Theology has gone since time immemorial in deriving the causal evidence of the existence of God from the law of causality. In reasoning that each effect has its cause which is in turn the effect of another cause having again a cause of its own and so on, the theologians declared the First Cause, the Cause of all causes, to be the One who is alone His own cause. But besides the fallacy involved in the conception of anything as being its own cause, they failed to consider that all the infinite effects which take place at a given moment in the world, have infinite causes which produced them and which are themselves, in turn, the effects of infinite causes and so on to eternity, thus leaving no room for the idea of a beginning in *one* cause. But we start with the proposition that innumerable causes have existed in infinito and that these causes were always of a material nature, and have to consider what influence this may have upon the effects.

It was this law of causality which brought the greatest among the materialists to their doctrine of the necessity of all that occurs in the world. The best expression of this idea is to be found in the essay by *Laplace* upon the probabilities.³ Although frequently quoted, the words of Laplace seem to me so important, that I cannot refrain from reproducing them here.

“All events, even those which by reason of their trivality “may not seem to be subject to the great laws of nature, are a consequence of these as inevitable as the revolutions of the sun. In “our ignorance of the bonds that unite them to the whole system “of the universe, we have made them dependent either upon final “causes or upon chance, according as they occur and succeed one

³ P. S. de Laplace, *Essai philosophique sur les probabilités*.

“another with regularity or without apparent order; but these “imaginary causes have continuously receded with the bounds “of our knowledge and have completely disappeared before that “same philosophy which sees in them but an expression of our “ignorance of the real causes. The occurrences of the present “have a connection with those that preceded them based upon the “manifest principle that a thing cannot commence to exist with- “out a cause which produced it. This axiom, known under the “name of the ‘principle of the sufficient reason,’ applies even to “the most insignificant acts. To these the freest possible will “could not give birth without a determining motive, for if, all “the circumstances in two situations being identical, it should “in the one act and in the other abstain from acting, its choice “would be an effect without a cause. . . . The contrary opinion is “an illusion of the mind which loses from view among indifferent “things, the fugitive reasons for the choice of the will and be- “lieves this choice to be self-determining and without motives.

“We have, therefore, to consider the present state of the uni- “verse as the effect of a preceding state and as the cause of that “which is to follow. An intelligence which would for a given “moment know all the forces animating nature and the respec- “tive states of the beings of which it is composed, if, furthermore, “it should be great enough to subject these given conditions to “analysis, would embrace in a single formula the movements of “the greatest of the world-bodies and those of the smallest atom. “To it nothing would be uncertain and the future as the past “would be present before its eyes.”

This is indeed a logical, a binding conclusion for one who assumes that every effect has a necessary cause and itself is the cause of another, necessary effect. But is this in reality so? If we admit—and this I do not dispute—that every effect has its cause, does it follow that we may reverse this affirmation and say that this effect is the *necessary* effect of its cause? that it is the *only possible* effect of this cause? But this is the general belief; this is the axiom upon which everything is based, mathematics and physics, biology as well as psychology. It was this principle which brought the materialists to their doctrine of the necessity of all being and which has given to materialism the “teinte” of fatalism. Strange as this question may seem, which to the best of my belief I am the first to bring forward, it should be considered with all possible attention. The answer, as we shall see, will differ from the common conception.

Does in truth every cause, so to say, resolve itself into a single effect, the one possible effect of this cause or are under certain circumstances or perhaps even normally, other effects possible, too? How does it happen that the greater the phenomena or the more complicated they are, the more room we have to leave for error in our calculations? Why does the answer to stimuli, so definite in lower organisms, become gradually more and more indefinite with the complication of the body in higher animals, until it finally begins to produce on us the impression of what is commonly understood under free will?

In studying the questions of heredity, in subjecting to critical analysis the phenomena of growth and development, I came to the conclusion that all of these phenomena are governed by a general law which I called: "The principle of the limits of possible oscillations."⁴ I tried to show that each stage of an organism, from its beginning as an egg and to its last moment as a perceptibly living being has a structure definite for each separate stage, but subject to oscillations within certain limits which cannot be transgressed without a change or destruction of the stage in question, leading to a consequent change of its future fate. I showed that these limits are largest for the egg and also

⁴ A Petrunkevitch, Gedanken über Vererbung. Freiburg i-B. 1904. Verlag von Speyer & Kaerner.

For the benefit of those unacquainted with this book I give here a brief summary of the results to which I came.

1. There is no standstill in the life of an organism, as there is none in the whole universe, the structure, *i. e.*, both body and "Psyche" of an organism changing continuously.
2. There are therefore no real individuals, but only mechanical "Systems" more or less stable and producing on us the impression of real "Individuals" whenever this stability attains its highest point, as for example in man.
3. Development consists of the changes which start in the egg and which lead to an approximate repetition of the parental life cycle.
4. Heredity cannot always be differentiated with sufficient ground from the changes caused by the influence of the environment, and must therefore be restricted to the so-called "Keimbahn". Heredity is then to be defined as the process which leads to the production of germcells in the offspring similar to those in the parents. (Of germcells only, not of the whole organism as is generally accepted).
5. Every cell has a structure which varies within definite limits only. Size and form are functions of the structure and obey *co ipso* the same law. The structure and number of cell organs, the distances between them and their relations to each other obey also the same law.
6. The space for possible oscillations within the limits I call the amplitude. It is largest for the egg and diminishes with the increasing number of cells which help mutually to decrease their respective amplitudes.
7. Transgression of an amplitude leads to the formation of a new system with new amplitudes, as is always the case in each new stage of development, in the formation of monstrosities and in the changes leading to destruction of the organism.
8. All eggs of a species have the same amplitude, but each individual egg differs within the possible limits from another egg of the same species. These possible oscillations give rise to *endogenous* variations.
9. Environment may produce changes during development thus giving origin to *exogenous* variations.
10. When the structure of the eggs produced by an offspring has an amplitude differing from that of the eggs produced by the parent, and when the eggs with such new amplitudes are moreover capable of development, this development will result in a "mutation." The difference between the variations and the mutations is that the variations have the same amplitude common to them all, while the mutations have differing amplitudes, within which other variations are possible.

how they are gradually more and more restricted with the development of the organism, thus avoiding the danger of premature destruction which would inevitably result if the limits should grow.

According to this conception then, the presence of oscillations within an amplitude, *i. e.*, within the space between the possible limits, might be considered to be a special characteristic of living beings. I thought really to have found here a difference between the living organisms and inorganic matter.

But after a long weighing of the facts I have now come to the conclusion that this principle of the limits of possible oscillations extends much further than I originally supposed and together with another still broader principle which I shall call the "*Principle of plural effects*" governs equally the whole of nature, organic as well as inorganic. The two principles may be formulated as follows:

(a) *Every cause is potentially capable of producing several effects.*

PRINCIPLE OF PLURAL EFFECTS.

(b) *The number and the nature of the effects which actually take place may vary within definite limits only, or in applying the once chosen terminology, within the specific amplitude of the cause.*

PRINCIPLE OF THE LIMITS OF POSSIBLE OSCILLATIONS.

Should anyone doubt the truth of these principles and ask for an indisputable proof, I would refer him to mathematics, where an inexhaustible supply of such examples ought to persuade the most critical mind. Thus a 2 may be an effect of $\sqrt{-4}$, having in this case the $\sqrt{-4}$ for a necessary cause. But this proposition may not be reversed, *i. e.*, the 2 is not the only possible effect of $\sqrt{-4}$; we know, indeed, that there is another solution possible, another effect, and this is -2 (minus two). We therefore have here two possible effects of one and the same cause, effects which can take place either separately as single effects, or together. The following root $\sqrt{\sqrt{4}}$ has four possible solutions or effects, of which two are rational $+ \sqrt{2}$ and $-\sqrt{2}$ and two irrational $+ \sqrt{-2}$ and

$\sqrt{-2}$.⁵ Many equations have several possible solutions; in others the number of possible solutions is reduced by the improbability or irrationality of some of them. Thus the common equation of the parabola $y^2 = 2px$ gives one curve, the negative quantities for the x being impossible because of the resulting irrational quantities for the y -axis. Such an exclusion of solutions happens whenever the final formula gives an answer broader than the question demanded. I do not want to give more examples, as everyone may find an abundance of them in any book on mathematical questions. This however may be added, that some equations with several unknown quantities have an unlimited or at any rate a very great number of solutions, giving growing values to one of the unknown quantities, each satisfying the equation. A nice example of a formula that satisfies many solutions of which each again gives many possibilities, is that comprising ellipsis, parabola and hyperbola $r = \frac{ep}{1 - e \cos \Delta}$, where r and Δ are polar co-ordinates.

What is true of mathematics must also be true of physics and the other sciences, but things being limited, the number of possibilities or possible effects must likewise be limited, indeed even more limited than in pure mathematics. If we do not perceive the various effects of the same cause, it is because we do not see the connection between them and attribute to the various effects separate causes, deceived by our prejudice; or it is also possible that the several possibilities were annulled in favor of a single effect, one into which the cause appears then fully to resolve itself. If a moving ball strikes a ball which is in a state of rest, the latter will acquire a certain velocity, this motion being an effect of the impact. Yet the same impact will produce a certain heat in both balls. Thus the energy will be partly transferred to the ball and partly transformed, both phenomena being the results or effects of the same cause. This is why one kind of energy cannot practically be *fully* transformed into another kind of energy, say light into electricity or heat, and why all experiments in this line show a greater or smaller error. The cause of this lies in the fact that each kind of energy can be transformed into every other kind of energy, the result being that it will be transformed into all other kinds in certain quantities simultaneously; the quantity of each kind, that is

⁵ We see why the common conception that $\sqrt[n]{\frac{m}{V_a}} = \sqrt[nm]{V_a}$ is inadequate since it corresponds only to one-half of the possible solutions.

each separate effect will depend upon the given circumstances.

In physics as in mathematics one and the same effect may be produced by different causes; but it is evident that the other possible effects of these causes will be different. A 4 may be the result of addition of $1 + 3$, or of subtraction of $5 - 1$, or of extracting the square root of 16; a certain amount of electric current may have as its cause light or chemical changes etc. It follows that a certain state of things, a system, could be obtained in different ways, and that the present state of the whole world might have had a combination of causes differing from that which in reality took place.

We therefore should make a great mistake in saying that every effect has a necessary cause, since several effects could have been produced by the same cause, or the same effect by a different cause. We may only say that every effect *necessarily* has a cause. The principle of sufficient reason is true only when thus formulated.

In the same manner we may not reverse the sentence and say that every cause has a necessary effect, since it might have had another or several other effects. On the contrary we must say that each cause *necessarily* resolves itself into several effects, some of which may be imperceptible for our senses or instruments, or obscured by interfering phenomena. The relation between the effects will in each case be different and will depend upon circumstances.

Logically the conception that a cause has many possible effects is broader than the common conception that a cause has a single effect only. The *latter* is therefore only a particular case under a broader law. The content of the *former* being broader, it naturally governs a larger number of phenomena. Every good experimenter tries to eliminate in his experiments not only unnecessary forces, *i. e.* causes, but also possible effects which might take place and obscure the results of the experiment. Yet no one has thought of formulating a general law induced from such experience.

The same fact that we can eliminate certain causes or effects, as we do it in our experiments, ought to show sufficiently the existence of at least relative free will. Indeed, it would be strange to suppose that each time an experiment is repeated, the necessary state of the *whole* universe is such as to allow the experiment to succeed. We ought rather to expect that in the majority of cases such experiments must fail owing to new dis-

positions of the causes. Still although experiments in physics and chemistry invariably succeed when the experimenter takes all necessary precautions, and although scientists daily make many experiments in which they dispose the forces as their aims require, yet just among scientists the belief prevails that free will does not exist and that what we consider to be such, is only a false interpretation of actions which depend upon causes beyond our control. I have mentioned already the words of *Laplace*. *Herbert Spencer*, too, expresses the same idea: "That every one is at liberty to do what he desires to do (supposing there are no external hindrances), all admit; though people of confused ideas commonly suppose this to be the thing denied. But that every one is at liberty to desire or not to desire, which is the real proposition involved in the dogma of free will, is negatived as much by the analysis of consciousness as by the contents of the preceding chapter." (*Origin of feelings and of reason*).⁶

Now in order to show that free will really exists and is not a fallacy due to confused ideas, we may choose one of the two following ways: either to show that the desire can be controlled at liberty, or that there may even be free action following a desire which is necessitated in us by causes independent of our control. If it is possible to give one indisputable example in either of these two cases, the question of the existence of *free will* will be solved.

I choose the second case as the one especially denied by *Spencer*. Suppose that I have before me two balls of equal size, color and structure, placed near to each other in such a way that their surroundings are practically identical, say on a bare table in an empty room. This is essential in order that my action may be influenced as little as possible by external differences. Now I desire to choose one of the two balls merely for the purpose of demonstrating that I can freely choose either of them. No matter whether the desire to choose was free or necessitated, the choice itself will evidently be free. It will be free because my desire is not to choose *this* ball or *that* ball, but to choose either of them; this choice will be free because I choose one of the balls not because it is larger or better or because I prefer it to the other, but because I am moved by the desire of choice for the mere purpose of showing the free will

⁶ *Herbert Spencer, Principles of Psychology, Vol. I., §219, p. 500. New York edition, 1902.*

in the choice. This purpose is not the cause of the choice. It is the cause of my desire to choose. The choice itself has for its cause a conscious decision preceded by reasoning.

In this case then the popular belief that "one can do what one desires," or better to say, can choose according to one's free will, is beyond doubt. The question of the desire itself is of course much more complicated and difficult of answer. In the great majority of cases the desire will originate in feelings which lie beyond the power of any control. But we must not forget that the sphere of free will is a very restricted one, limited to the cases of conscious choice. It is always preceded by reasoning as indeed a choice without previous reasoning is impossible. Yet reasoning will lead sometimes to a choice directly contrary to the strongest immediate desire which without this reasoning would undoubtedly prevail. The dominant desire of some men is that of supreme power, *i. e.* that of acting according to their own wishes. Yet in practical life a person, dominated by such a desire but having no such power by birth, will often suppress his strongest immediate wishes and freely subject his will to the will of another in order to further the success of his ultimate object, *i. e.* supreme power. He will on every such occasion suffer much, but will act nevertheless according to the dictates of reason. It is to satisfy the reasoning which has its origin in the collision between the desire of power and circumstances, and not to satisfy the desire of power itself, that the man will choose an action contrary to his momentary desire. Should any one object that in this case the choice is a necessary effect of the dominant desire (that, of obtaining finally the supreme power), he would make several errors; first, that of separating the choice too far from its cause without being able to show the whole chain of intermediary effects in a way to preclude all doubt; then, that of basing his conclusion upon a contradiction, because the immediate desire to act in accordance with this desire is only a particular instance of the dominant desire for supreme power, which I have defined as the desire for acting always according to one's own wishes. Besides, the person in question confronted by the necessity of choosing has to consider what to choose. If the cause for the choice were not this reasoning, then it is inexplicable, how he could avoid choosing what he most desires at the moment.

Having thus shown that free choice and in consequence

free will really exists, we must see, how its origin is to be explained from the materialistic point of view.

We must not forget that free will can manifest itself only where a choice is possible. If there is no choice, if the action is a necessary effect of a previous cause, there *eo ipso* can be no question of the freedom of the will. But more than that: if an action may be or really is a necessary effect of a cause, it will take place without our will, so to say passively, if I may use this word here. My actions would be necessary effects of my desires which were, in turn, necessary effects of other causes. There is no room for WILL here. The expression "freedom of the will" is in reality a useless tautology, because will without freedom of choice is an absurdity. It is like the case of a man, who having lost both of his legs in an accident is asked whether he will dance or take a walk!

Another phase of the question is that an act of will can be only a conscious act preceded by reasoning. This is evident from all that has been said. If an act of will were not brought to our consciousness, choice which, in accordance with the Principle of plural effects, would still be sometimes possible, would be degraded to the level of mere *CHANCE*. But the *conscious* choice is nothing but a consequence of reasoning, and the question of the free will is thus brought back to the question of the origin of reasoning. This is clear from the fact that every action is nothing but a transformation of potential energy into kinetic, into motion, and reasonable action following conscious choice can have no cause other than reasoning.

Some people may still think that this conclusion is false. Is it not generally known that men with the greatest power of reasoning are apt to possess a weak will? Is it not an every day experience that *will* and *reason* are often antagonistic? But such objections are of a quite illusory nature. To come to a decision in the act of choice may require a longer or shorter time, and the quicker the process of reasoning, the deeper the insight and the broader the knowledge of causes and of possible effects—the quicker also the decision. In those cases where one acts seemingly instantaneously, his action is due either to an exceedingly quick reasoning or represents a necessary effect without the interference of the will, in which case the action is compulsory. Where the final action of a person contradicts his reasoning, there we doubtless have also a case of compulsory action.

Every action is in a sense a reaction, inasmuch as every action is an effect of a cause. Already in the lowest organisms each action possesses, according to my conception, an amplitude of possible oscillations. Only in experiments, where the forces are limited to those arbitrarily chosen by the experimenter, the action, the effect is always a necessary one. But where the forces are not limited or better to say not chosen by an experimenter, there the same action shows oscillations within the possible limits owing to the amplitude of its own cause and of the causes of the surrounding world. Since these have been always infinite in number, this seems to afford a mechanical explanation of *CHANCE*. The more complicated an organism is, the larger the number of phenomena that take place in it simultaneously in consequence of stimulation and the larger we should expect the number of possible effects or reactions to be. This is only approximately so. There is no summation of all the amplitudes of the separate causes. The many phenomena standing in relation to each other determine each other and thus limit an excess in the growth of possibilities. In the end the choice in each case is limited to several possibilities only. If *THOUGHT* is a form of energy into which other forms of energy known to physics are converted in our brain, then we have in the two principles an adequate explanation of the fact, that choice is sometimes possible. It is a mechanical, materialistic explanation of the freedom of the will.

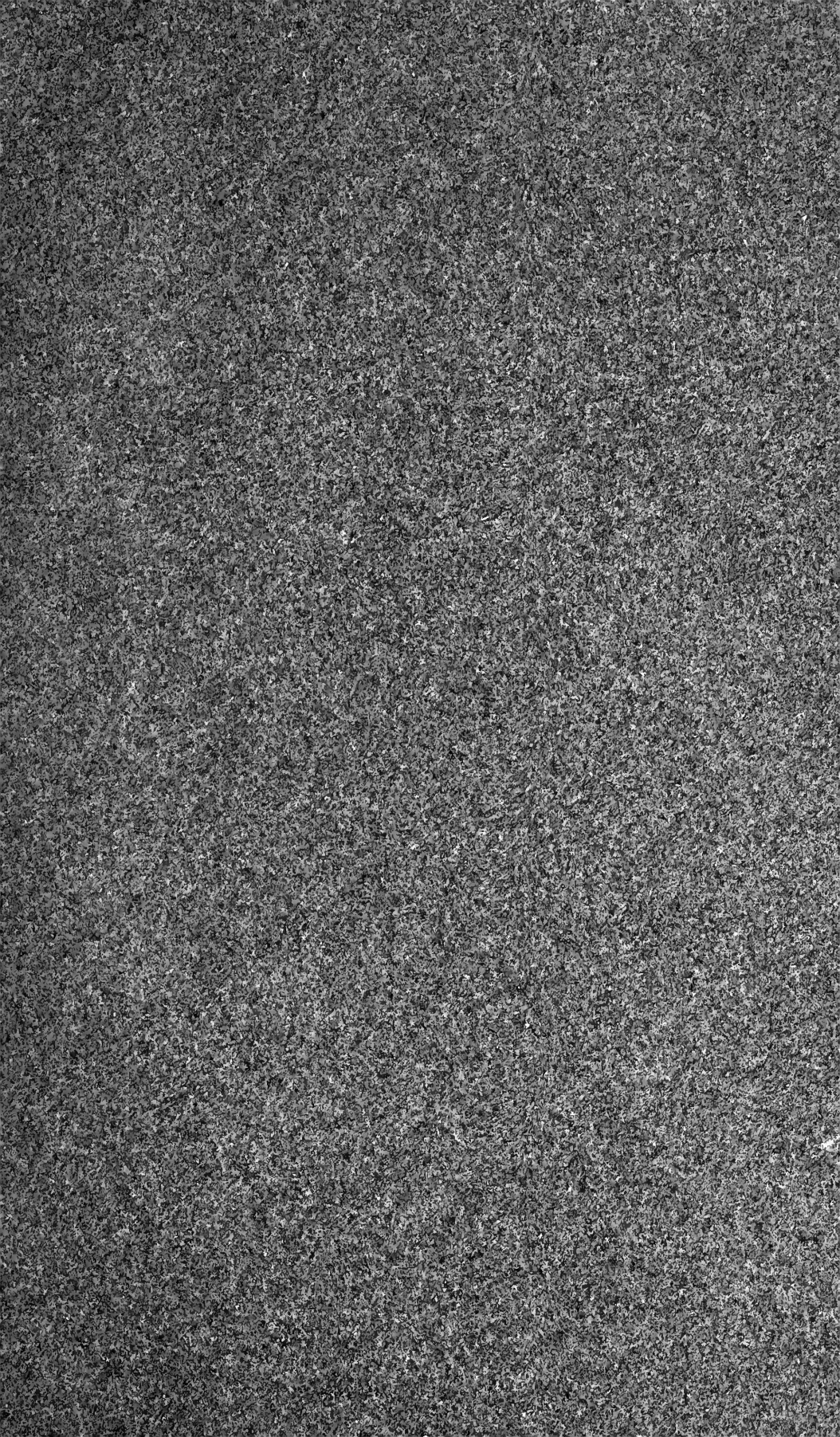
I reserve for another occasion the application of the two principles to such questions as those of social, intellectual and moral life of individuals and societies. Many of these phenomena may readily be explained as necessary effects of the structure of the human body and of its relation to the environment, even should we hold to the law of causality; but there always remains a large number of actions for which only the freedom of the will may be accounted the real cause; not the great elementary movements, such as revolutions of oppressed peoples driven to their action by the growth of irresistible feelings, but the occurrences of every day life, the reasonable acquisition of knowledge and choice as factor in the struggle for existence.

What an enormous difference makes the comprehension of these principles as the dominating principles of all that occurs in the world, when compared with the old materialistic idea of Necessity! Instead of a calculated machine, the millions

of wheels of which move necessarily in a mathematically defined way, we have before us a living being with ever growing possibilities. And if an intelligence, such as Laplace speaks of, would at a given moment comprehend and know all the causes of the phenomena that take place, it would not be able to predict the future as the necessary effects of the given causes, but would see in amazement and admiration, how many are the possibilities that may take place. Well could it isolate a certain group of causes actuated by enormous, irresistible forces and predict such effects as the revolutions of celestial bodies. But it would be at a loss to predict the actions of one even of all the millions of intellects moved by millions of causes to reasoning, because here begins the reign of *Freedom*.

13 December, 1905.

Short Hills, New Jersey



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