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THE IDEA OF NECESSITY, ITS BASIS AND ITS SCOPE.

THE idea of necessity, although a fundamental concept in philosophy and science, has not as yet been so clearly defined that all thinkers would agree as to its meaning and significance. Necessity is frequently identified with compulsion, and thus it is supposed to be incompatible with freedom of will. It is also identified with fate, as if it were a destiny that existed above the will of man and the powers of nature, similar to the Moira of the ancients. It is said to exclude chance in every possible conception of the term and to cause the evolution of the world to proceed by a predetermined arrangement, like the mechanism of a clock.

We cannot endorse Mr. Charles S. Peirce's objection to the doctrine of necessity, but we side with him when he denounces the mechanical philosophy for considering minds as "part of the physical world in such a sense that the laws of mechanics determine everything that happens." Mr. Peirce is right when he rebukes the mechanical philosopher for "entering consciousness under the head of sundries as a forgotten trifle." In some sense minds are parts of the physical, i. e. the natural, world, but they are not parts of that province of nature which constitutes the special domain of physics and mechanics. Ideas are not motions and cannot be explained by mechanical laws.

Having criticised in a former article of ours Mr. Peirce's position, and having rejected the indeterminism proposed by him, we shall discuss in the following pages the basis and scope of the idea of necessity.

The idea of necessity is based upon the conception of sameness, and we find that the existence of samenesses is a feature of the world in which we live. The existence of samenesses is a fact of experience, and upon the presence of this fact depends the possibility of the origin, the being, and the development of the thinking mind itself.

Necessity, as we understand it, must be carefully distinguished from the idea of fate. Although we accept without reserve the doctrine of determinism, we do not mean to deny the important part that chance plays in the world—not absolute chance, which according to Mr. Peirce is exempt from law, but that same chance of which the throw of a die is a typical instance. And bearing in mind that necessity is not a power outside of nature and above the will of man, but that it resides in them as the quality of sameness, we abandon the view that identifies necessity with compulsion; recognising thus, that freedom of the will is not incompatible with our view of necessitarianism.

I. THE BASIS OF NECESSITY.

The standpoint from which we shall treat this subject is that of monistic positivism,—the method which accepts no doctrine, theory, or law unless it be a formulation of facts. Facts are the bottom-rock to which we can and must dig down. At the same time, wherever facts appear contradictory to one another, we should not be satisfied, but continue to investigate until they are systematised so as to form a unitary entirety.

Before we begin our inquiry into the existence or non-existence of necessity, it is advisable to define the meaning of the term.

The Latin word *neccesse* is most probably a compound of the negative *ne* and the supine *cessum* from *cedere* to yield, to move. "Necessary," according to this etymology, would mean that which does not yield but abides. Thus it is the inevitable; it is that which is or will be.

It is in this sense that the word is still used, or at least ought to be used, and in this sense we shall also use it.

Every word naturally acquires by a more or less appropriate application a series of meanings. So "necessary" means also that which is needful, that which is essential, that which is indispensable and requisite; it also means that which is done under compulsion. It is understood that we exclude all the other meanings of necessary except the original one, which is its properly philosophical meaning.

The idea of necessity is closely allied to the idea of sameness. In order to understand the former we must be clear concerning the meaning of the latter.

THE IDEA OF SAMENESS.

There exist a number of synonyms often used indiscriminately; they are: identity, sameness, equality, congruity, similarity, and likeness. By "identity" we generally understand a sameness in every respect, absolute sameness; by "equality", a sameness that can be expressed in figures. Equality is always a measurable sameness, and refers to quantity, mass, size, length, height, age, etc. Likeness and similitude are samenesses of form or of proportion, albeit not of size. It is often used as a partial sameness of impressions, not so much as they are in themselves, but as they appear to the mind. Congruity is a synonym of sameness in the province of geometry, denoting the coincidence of figures when laid upon one another.*

The logical principle of identity, so-called, it appears to me, ought to be named the principle of sameness, for it has not reference to the absolute sameness of a thing with itself.† The statement $A = A$ does not mean that this particular thing A is itself and that therefore the one A is one and the same thing. It is a general statement and means that all A , in so far as they are A , are the same. The statement $A = A$, as I take it, presupposes the exist-

* The adjective "like" is an abbreviation of "alike"; and "a-like" (M.E. *alyke*, A.S. *gelic*, O.H.G. *gali*, M.H.G. *gelich*, M.G. *gleich*) is a compound of the prefix *a* with *lic* body, shape, figure.

† I am satisfied that logical identity is intended to mean sameness. I suppose that the word identity, being Latin and a kind of international term, appeared to logicians preferable to the Saxon word "sameness" or the German "Gleichheit." We need not look for any deeper reason for the adoption of the term.

ence of a number of A 's; otherwise it would have no sense, and it would not only be empty, (as we know from Kant that all formal statements are,) but meaningless and useless. It would be of no avail either in logic or in science.

In consideration of the fact that the idea of sameness is a fundamental concept in our scientific, logical, and philosophical reasoning, it is astonishing that no satisfactory definition of it is to be found. To define "same" as "one in substance; not other, . . . of one nature or general character, of one kind, degree, or amount," as is done in the "Century Dictionary," is no improvement upon "Webster," who defines it as "not different or other; identical. Of like kind, species, sort, dimensions or the like; not different in character or in the quality or qualities compared; . . . like." However, dictionaries are not encyclopedias; and they have perhaps a right to define same as identical, and identical as same.

Mr. James Ward, in the "Encyclopædia Britannica," (XVI, 81, in his excellent article on "Psychology,") incidentally complains about the ambiguity of the word "same"; he proposes a distinction between "material identity" and "individual identity," but this does not solve the difficulty. Flemming's "Vocabulary of Philosophy" (4th ed. edited by Calderwood) contains several articles on "identical" and on "identity" without discussing in any one of them the meaning of "same" or of "identical."

What then is the meaning of same?

Let us first consider the etymology of the word. The root of "same" is found in almost all Indo-European languages; it is preserved in the first syllable of the Latin "similis" and "simul," in the second syllable of the German "Zusammen"; in the Greek "ἄμω" and "ὁμοιος," and the Sanskrit "sama," all of which denote a togetherness. Thus the etymological meaning seems to signify what is classed in one category. Accordingly, the present meaning as defined by the dictionaries, as being that which is of one nature or not different in character, has not changed; at any rate if there is any change, it is slight. Yet it is desirable to bring out and set in a clear light the purport of the word and its essence.

What, then, is the economic service and function of the idea of "sameness" in the household of thought?

"Sameness" is that feature in two things or states of things, in two processes or modes of action, which brings it to pass that the one may be replaced by the other without altering for a certain purpose the state of things or affecting the result of the entire process. Popularly expressed, sameness is the capability of one thing's being substituted for another.

There is no need of discussing or proving the truism, that, properly speaking, there is no absolute sameness, no identity in the strict sense of the term. This was the meaning of Heraclitus's idea of the perpetual flux of things, expressed in his *πάντα ῥεῖ*. There are no two moments in time, no two points in space, no two atoms of matter actually identical, and we cannot enter into the identical river twice.

Cratylus tried to outdo Heraclitus, by saying that we cannot even enter once into the identical river, for while entering, not only the river changes but also we ourselves; and Cratylus is perfectly right.

We have purposely substituted in Heraclitus's proposition "identical" for "same," because this change is needed to bring out the truth of the idea. Heraclitus and Cratylus cease to be right if we use the word same as above defined. We enter indeed the same river twice. The river of to-day is, for a certain purpose, quite the same as the river of yesterday, in so far namely as the river of to-day and the river of yesterday serve a certain and the same purpose: for other purposes this same river will perhaps not be the same. The geographer and historian speak of the Rhine as that stream of water which since time immemorial has flowed down from the St. Gotthardt to the North Sea. Accordingly, if we stand on the bank of the Rhine, it is quite correct to say that this is the same river that was crossed by Cæsar. Let the purpose of our thoughts be changed, and we shall no longer be permitted to speak of sameness. Suppose we had seen the Rhine for the first time in its beautiful emerald coloring, and had come again after a rainy day to admire its beauty, should we not be justified in exclaiming: This is not the same river!

Sameness, accordingly, depends upon a special purpose. If in a chemical combination a metal is wanted, it may be all the same whether we use iron, zinc, lead, or gold. That is to say, it is all the same for bringing about a special result; yet it is not all the same in other respects. The weight and certain other qualities of the metals are different, and also the cost.

SAMENESS AND MIND.

Sameness depending upon a special purpose, the question arises, Is there any objective sameness in the world, or is sameness a mere subjective addition to things? Is sameness something "real" or is it purely mental?

This is the old quarrel between the Nominalists and Realists among the Schoolmen. It lies at the bottom of the problem of universals and particulars, and we should say, it is only a special form of the question, "Are relations objective qualities of existence or are they products of the mind?" which was discussed in a former number (*The Monist*, II, 2, pp. 240-42). The idea of sameness represents the most important relation that exists; and if any relation is real, the relation of sameness must be real also.

If sameness depends upon a special purpose, it appears that there can be no sameness without that purpose; and the purpose being purely mental, the sameness also would seem to be purely mental. But this is not so. Sameness is an idea, and it is no exception to other ideas. All ideas are mental symbols formed for a special purpose; but, being symbols of something, ideas are representative of some reality, or of some feature of a reality, or of some relation between two or several things. Every idea stands for something; and this quality of the significance of ideas is called their meaning or their import.

The question now is, How does the idea of sameness originate in the world where, as we stated above, there is no absolute sameness, no identity? Our answer is that sameness, not identity, is a general feature of this world of reality, which impresses itself upon every mind from the very beginning of the mind's origin.

We can go farther in our statement and make it more emphatic:

Mind originates and grows only on the ground of the fact that sameness is a feature of the world, and is recognised as such by feeling substance.

Two points or two congruent geometrical figures being in different places are not identical. But they are of such a nature that, so far as regards the purposes of geometry, one serves the purposes in question just as well as the other, or one can be replaced by the other; and this quality is called their sameness.

Now as a matter of fact there are no two concrete things in the world in which there cannot be found some sameness. Both somehow affect sentiency: we say they consist of matter. Both can be measured in size, breadth, and height: we say, they are extended. Both are at any given moment in a certain relation to other things: we say, they are in space. Both have a definite form and consist of one or several special structures (i. e., so to say, inside-forms). All things can in some way or other be classed together under one heading. These samenesses of things go along with differences, and the degree of sameness in the different things varies greatly. Whether there is any sameness and difference at all in the world, cannot be decided *a priori*, but is a problem which can be solved only on the ground of, first, an *a posteriori* statement of the facts, second, a systematical arrangement of the facts. If this is accomplished we can venture into a methodical investigation as to the nature of the samenesses as well as the differences that obtain in the universe, and having arranged them in a system, we can apply *a priori* this system to facts with which we are not as yet acquainted.

The many samenesses which are experienced are not purely mental additions: they are not mere subjective imputations transferred upon objective existence. They are real; i. e. there are in the objective things actual features which allow of certain substitutions. A ray of light awakens in some feeling substance the traces left by former rays of light; and this reawakening is called memory. The perception of sameness is the beginning of mind, and it involves the perception of difference as a natural consequence.

Suppose that the stuff of which the world consists were capable of acquiring feeling, but there were no samenesses whatever;

which would mean that every smallest piece of the world-stuff were a particular thing by itself and in every respect unlike every other piece, of a different material or of no material at all, of different size or of no size at all, and also possessed of a different number of space dimensions. In such a world all the impacts made upon a sentient being would be different: not one would be like the other, and all feelings would present a chaos without uniformities, worse than the most complex crazy-quilt. Under such circumstances mind would be impossible: it would neither originate nor could it develop.

On the other hand suppose again that the stuff of which the world consists were capable of acquiring feeling in some certain formation, and that there were samenesses in the world and in the events of the world. Would not mind necessarily originate in such a world? Given feeling substance in a world of samenesses and differences, these samenesses will produce analogous samenesses of impression upon the feeling substance, which will be perceived as samenesses of feeling. The preservation of the traces left in the feeling substance (supposing this substance to live on indefinitely) will in the long run result in the formation of special sense-organs. It will later on, with the aid of word-symbolism, lead to the formation of universals, for universals are nothing but samenesses perceived. It will then create with the assistance of abstraction the realm of scientific thought, representing the uniformities of the events of the world in exact formulas.

THE EXISTENCE OF SAMENESSES A FACT.

The question whether there are samenesses at all in the world, is in our opinion settled. It is a fact that there are samenesses. The uniformities of the world are an indubitable experience — indubitable because our very existence as thinking beings, as minds, is conditioned by this fact. We see the mind of every child develop out of his perception of samenesses. Our scientists teach us that the race-soul, like a great immortal individual, is the product of the accumulated experience of samenesses; and all future progress, in science as well as in civilisation, in mechanical invention,

as well as in ethics, depends upon the trustworthiness of the samenesses stated to exist in the objective world.

The question of the ultimate *raison d'être* of the samenesses and differences, is another question; and it would lead us too far here to discuss it. In several details the problem is not as yet ripe for solution. A full solution of the problem would be tantamount to the exposition of a complete knowledge of the world. Suffice it here to say that we have reasons to think of the world-stuff as being of the same nature throughout. The chemical elements seem to be different configurations of one and the same substance. In this way all difference would have to be explained as a difference of form.

The form of reality possesses sameness and difference in all its parts. Space in its sameness is by experience found to be tri-dimensional, which means, it is determinable throughout by three coördinates; while its differences are due to the position of the points considered. For the purpose of the geometrician space is uniform, but for the purpose, say of the architect, it is not uniform. To the geometrician two congruent triangles, whether they are in the cellar or in the garret, are the same. However, to the architect the position of two congruent triangles in his design of a house is by no means the same. Every single point of space has its special and individual qualities.

The whole business of science is to systematise the samenesses of experience, and to present them in such convenient formulas that they can be used for guidance in our actions.

The most comprehensive formulation of the sameness of the universe as a whole has found its expression in the law of the conservation of matter and energy. This law rests upon the experience, corroborated by experiments, that causation is transformation. It states that the total amount of matter and the total amount of energy remain constant. There is no creation out of nothing and no conversion of something into nothing.

EINDEUTIG BESTIMMT.

After this sketch of the importance of sameness, (a subject which we have by no means exhausted,) we return to the idea of necessity.

The ideas of sameness and necessity are closely related. A world of sameness is a world in which necessity-rules, and necessity means regularity and order.

German scientists have a very good expression to denote the formulation of events in a manner which describes them in their necessary course. If they have succeeded in finding the sameness in the instances of a certain class of events, they say that it is *eindeutig bestimmt*, which means, the sameness is determined in a way that admits of no equivocation; it is complete, representing solely and purely that feature upon the presence of which the result depends. Whatever is thus *eindeutig bestimmt*, is recognised in its necessity. The presence of that feature which makes it *eindeutig bestimmt*, determines the event to take place; and this being determined, its inevitableness, the *it will be* of the process, is all there is to necessity.

All natural phenomena that can be *eindeutig bestimmt* are necessary in their happening. A world which with regard to the total amount of its matter and energy is the same to-day and yesterday and will be the same to-morrow, a world whose laws of form possess a sameness throughout, so that it allows of formulating and applying them in their rigidity to all facts present, past, and future, a world in which all the changes are transformations determinable with the assistance of formal laws, can be relied upon and the course of its events can be computed.

Such is the world in which we live; and taking this ground I say, the world is a cosmos, it is no chaos; and noticing that being possessed of sameness is an intrinsic and inalienable feature of the world, I am inclined to add the world never was and never will be a chaos. And this, if it be true at all, is true not only in general and as it were wholesale, but in its minutest details. If there were deficiencies of this order in the unobservable details, they would not be diminished by being summed up in large and ever larger amounts; on the contrary, they would increase; they would grow in proportion. This not being the case, we have not the slightest reason to doubt that in those realms of minutest existence into which, from the grossness and the lack of precision of our organs and instru-

ments of observation, we cannot penetrate, the same order and regularity obtains as in those regions which lie open to our investigation. In other words: From this standpoint, existence is, so to say, permeated by law throughout; every event is determined and any kind of absolute chance is excluded.

Following Kant's etymology we understand by *a posteriori* the sensory elements, and by *a priori* the formal elements of our experience. The queer expression "*a priori*" is in so far justified as formal truths (such as geometrical, arithmetical, logical rules) are formulas expressing the universal samenesses of the form of existence. They contain the laws of form in a shape that is *eindeutig bestimmt*, so that an experimenter will know them *a priori* to be so. *A priori* means beforehand. An experimenter knows certain things even before he makes his experiments. The *a priori* elements of experience are by no means innate truths; nor are they the historical beginning of experience. On the contrary. In their abstract purity they appear as a very late product of man's mental evolution.

The *a priori* systems of thought are not arbitrary constructions; they are constructions raised out of the recognition of the formal, i. e. the relational, samenesses that appear in experience. All possibilities of a certain class of relations can be exhausted and formulated in theorems. As such they can be used as references to assist in the explanation and determination of new experiences. We know some part of any new experience with which we are confronted even before we have investigated it. We know certain laws of its form, and by reference to these known laws we are enabled to reduce the unknown to the known, to analyse the process and set forth that feature of it which makes it *eindeutig bestimmt*.

II. THE SCOPE OF NECESSITY.

Mr. Peirce objects to necessitarianism, and classes it together with materialism and the mechanical philosophy, speaking of the latter as the most logical form of necessitarianism. In consonance with the dictionary-definitions of these words, he contrasts them to the doctrine of the freedom of the will and also to miracles--the

latter, we must confess, being a dangerous concession to certain theological conceptions.

The "Century Dictionary" defines "necessitarianism" as

"The theory that the will is subject to the general mechanical law of cause and effect."

And "necessitarian" as

"One who maintains the doctrine of philosophical necessity, in opposition to that of the freedom of the will; opposed to libertarian."

The word "determinism" is regarded as a synonym of necessitarianism. Its first definition in the "Century Dictionary" reads as follows:

"A term invented by Sir William Hamilton to denote the doctrine of the necessitarian philosophers, who hold that man's actions are uniformly determined by motives acting upon his character, and that he has not the power to choose to act in one way so long as he prefers on the whole to act in another way."

Hamilton's definition as here presented is puzzling. If the words "choose" and "prefer on the whole" are *not* meant to be tautological, there is no sense in it: for no determinist denies that a man might "upon the whole" prefer to act this way, while he has the power to choose, and for special considerations perhaps does choose, to act in another way. However, if the words "choose" and "prefer on the whole" are meant to be tautological, the self-contradictoriness of the statement is too palpable for a Hamilton. Is there anybody who would maintain that a man who chooses to act in one way can at the same time, under the very same circumstances, and he remaining the very same man of the same character and intentions, choose to act in another way?

While we accept determinism and also necessitarianism in the sense that all events (the actions of willing beings included) are determined, we cannot accept either the mechanical philosophy or materialism as the terms are commonly understood.

We find materialism defined as

"The metaphysical doctrine that matter is the only substance, and that matter and its motions constitute the universe." ("Century Dictionary," 2d sense.)

The mechanical philosophy is explained *sub voce* "atomic" as

"[The view that] from the diverse combination and motions of . . . atoms all things, including the soul, were supposed to arise." *Ibid.*

Determinism is simply the negation of absolute chance. It does not exclude chance in the original sense of the word as an unexpected event, as something that befalls one without his seeking it or making the event—chance being derived from *ML. cadentia*, i. e. the falling, as in a throw of dice.

The "Century Dictionary" defines "chance" in sense 9, as

"Fortuity; especially the absence of a cause necessitating an event."

This is absolute chance, the existence of which we deny. The "Century Dictionary" adds the following little note:

"Absolute chance, the (supposed) spontaneous occurrence of events undetermined by any general law or by any free volition. According to Aristotle, events may come about in three ways: first, by necessity or an external compulsion; second, by nature or the development of an inward germinal tendency; and third, by chance, without any determining cause or principle whatever, by lawless, sporadic originality."*

We understand chance as being, from certain premisses, an incalculable coincidence, either not intended to be calculated, or, for certain reasons, from a given standpoint with a limited and definite amount of knowledge, not capable of calculation. Determinism, as we understand the term, does not imply as the "Century Dictionary" has it in its definition of necessitarianism, that "the law of cause and effect" is "mechanical." It simply asserts that the law of cause and effect holds good universally, and that there is no effect, that is not definitely determined, according to the nature of the things in action, by causes and all their circumstances.

* Knowing that Mr. Peirce is one of the most prominent contributors to the *Century Dictionary*, I may be pardoned for surmising that, perhaps with the exception of the parenthesised word "(supposed)" he is the author of this passage and very likely of most of the other quotations of philosophical terms we have adduced from the same source.

NECESSITY AND CHANCE.

Mr. Peirce says:

"All the diversity and specificfalsness of events is attributable to chance—diversification, specificfalsness, and irregularity of things, I suppose is chance—and this diversity cannot be due to laws that are immutable." (P. 332.)

Our world-view leads us to other conclusions; we say:

Every specificfalsness or particularity is such by possessing a certain form and standing in a definite relation (in time as well as space) to all other things of the universe. Of every concrete thing we can say it is now and here, or it was then and there. It is or was made up in this special way, and it stands or it stood in these special relations to its surroundings. Proportions, relations, forms—these are what account for the diversification and specificfalsness of all things in the universe; they are what explain the irregularities of individual cases and of all those events which appear as chance to him who, although he may be well informed about the nature of a thing, does not know the relation of its complex surroundings, exercising according to law their disturbing influence upon its actions which otherwise would be uniform.

And since no two spots of space and no two instances of time are the same, since the relations of every atom are different in every position and at every moment of its existence, we need not be astonished to find diversity and specificfalsness in this world of samenesses.

We do not believe in absolute chance, but we believe in chance.

What is chance?

Chance is any event not especially intended, either, not calculated, or, with a given and limited stock of knowledge, incalculable.

Gunpowder was, according to the legend, invented by chance. Berthold Schwartz intended to make gold, yet when the mixture was ignited, he began to understand that it was an explosive. When I say that I met a friend by chance, I mean that the meeting was unintentional. I had not foreseen it and perhaps could not foresee it. When we call a throw of dice pure chance, we mean that the incidents which condition the turning up of these or those

special faces of the dice have not been or cannot be calculated. We do not mean that the law of cause and effect is suspended; we mean that we are unable to determine the effect. That which would make this or that throw *cindutig bestimmt* is either not known to us, or, if it were known, is of such a nature that we cannot produce the desired effect with any certainty. Matters are so arranged in the game of dice that the slightest incident changes the result, and these incidents are either not within our ken or not within the range of our power. Chance, accordingly, as we understand it, is no exception to necessity; it does not happen contrary to law, and is in each case the strict result of a definite cause under definite circumstances.

Absolute chance is something quite different. Absolute chance is that which is incalculable because of the absence of law. Mr. Peirce says:

"Another argument, or convenient commonplace, is that absolute chance is *inconceivable*. This word has eight current significations. The 'Century Dictionary' enumerates six. Those who talk like this will hardly be persuaded to say in what sense they mean that chance is inconceivable."

Absolute chance is "inconceivable" as the word is defined by the "Century Dictionary" in the second sense: It is

"unacceptable to the mind because involving a violation of laws believed to be well established by positive evidence."

Absolute chance is not unthinkable in the sense of unimaginable. We can very well depict a case of absolute chance in our imagination, just as we can tell and describe in minutest details the fairy tale of Aladdin's lamp; just as we can in our imagination depict a creation out of nothing. But he who accepts that the world is in its innermost nature a cosmos, that its events are strictly and throughout regulated by law, cannot at the same time think that there are nooks and crevices in which the law does not operate. Absolute chance actually involves the idea of a creation out of nothing; and thus it stands in contradiction to the law of the preservation of matter and energy. Absolute chance which means that the very same thing under the very same conditions can act in this or in some other way, that it need not act in exactly the same way, involves a

belief in either the creation of a not existing quality out of nothing, or the disappearance of existing qualities into nothing.

Mr. Peirce says:

"It seems to me that every throw of sixes with a pair of dice is a manifest instance of chance."

Yes, of chance; but not of that chance the existence of which Mr. Peirce maintains—not of absolute chance. Every throw of dice, every toss of head or tail, are exactly determined by circumstances. We call it chance only in so far as we cannot calculate and predetermine the result.

Suppose you take two large silver coins between your thumb and the first two fingers, one coin parallel to and a little above the other. Suppose tails are up in both. Drop the lower coin without an effort just as it would fall, about twenty inches, and you may be sure that, in spite of yourself, it will turn up head. Then drop the upper one and it will not turn, but plump right down showing tail. There are certain mechanical reasons for the one case as well as for the other. As soon as we know the law and can apply it, the case ceases to be an instance of chance.

Dice, the roulette, and other games of chance are so arranged, that the determining circumstances are too numerous and also too complex, one interfering with and being disturbed by the others, to admit of any adequate calculation or predetermination. An arrangement of conditions which in this way eludes the calculation of a definite set of possibilities, is called by Professor Kries *gleiche Spielräume* or equal chances. And the province of equal chances is and will remain the proper sphere of the calculus of probabilities.

Professor Nitsche objects to Kries's proposition, saying that absolutely equal chances are impossible and an equal chance (*ein gleicher Spielraum*) is nothing but the objectification of a judgment of equal value.* We find no fault with Nitsche's objection; there are no absolutely equal chances; and what is called "equal chance"

* *Die Principien der Wahrscheinlichkeitsrechnung* by Johannes von Kries. See also Meinong's review of the book (in *Gött. gel. Anz.*, No. 2, p. 56 et seqq.) and Ad. Nitsche's article on the subject (in *Vierteljahrsschrift für wiss. Phil.* of 1892. XVI, 1, p. 26).

means that the strength of two or several anticipations is of the same degree; that our belief and doubt as to the turning up of one, two, three, four, five, or six spots of a die are equally justified. The objective conditions which justify such equality of several expectations is what Kries (if we understand him correctly) calls *gleiche Spielräume*. But *gleiche Spielräume* do not imply absolute chance. We might as well expect that all the six faces of a die should turn up simultaneously in one throw, as that any one of them should turn up by absolute chance.

While absolute chance cannot be admitted, partly because we are not in need of it, (since the irregularities of nature can be sufficiently explained otherwise,) and partly because the idea of absolute chance if it were needed, is incompatible with our world-conception, we shall, nevertheless, have to concede to chance, as we understand the term, a very important rôle in the evolution of life. The formation of worlds and the history of mankind depend to a great extent upon chances similar to the throws of dice. There are many possibilities, and now this, now that, will, according to the circumstances, be realised—of course in each case with strict necessity.

Let us illustrate this idea by an example.

The formation of about seventy elements out of the original world-substance, which may be supposed to be homogeneous, does not appear to depend upon chance. Their universal appearance in all parts of the universe suggests the hypothesis that their formation is the inevitable result of a gradual condensation of nebular substances. We find everywhere, according to the stage of condensation, a gradual appearance, first of the lighter, then of the heavier elements. There seems to be no possibility of the formation of other elements than those known to us (including here the hypothetical elements which are still missing in the Mendeljeff series and at the same time, at least, not excluding a further continuance of the series). These elements or none, it appears, must be formed out of the original substance of our world. Let us here assume, for argument's sake, that it were so beyond question, and that we knew the nature of the world-substance to be such as to condense, if it condenses at all, into no other but these forms, which we call chemical elements.

This would be a limitation of possibilities. Exactly so the throws of dice are limited. With the dice commonly in use we cannot throw fractions; nor can we throw either zero, or seven, or any other higher number. We can throw only whole numbers, integrals from one up to six. But while we thus assume that the formation of the elements is limited to those actually existing, the proportion in which the elements may be distributed in the different nebulae and solar systems, is apparently very different. Suppose we had a full knowledge of the intrinsic nature of the world-substance and were standing outside the universe observing the process of world-formations; we could not from this knowledge alone predict all that would happen. We should on our assumption be able to predict *a priori* that such elements would be formed. But whether the different elements would be generated in these or in other proportions appears to depend upon the presence of certain conditions; perhaps the rapidity of motion, the heat produced by friction, the temperature of the surrounding cosmic space, any knowledge of which is not included in our knowledge of the nature of the world-substance. These conditions may vary, nay, so far as we can judge they actually do vary; and any apparently slight variation of them, or even one of them, will result in different effects of great consequence. Without a detailed knowledge of all these special conditions, simply from a supposed *a priori* knowledge of the world-substance, the idiosyncrasy of this or that particular solar system could not be *a priori* determined. Here it will be such, and there, under perhaps slightly different circumstances, it will be entirely other. Here the centre of gravity may be in one great mass, there again it may be divided in two, so that the planets circle around two suns.

From this point of view we have to call these results products of chance.

To a being who not only might be supposed to know the intrinsic nature of existence, but could have present before his mind every event of the great interacting cosmos in its entire complexity, this kind of chance would, of course, also disappear. To him all states of things would appear throughout as *eindeutig bestimmt*. Yet, although in this way necessity permeates all events that take place, we do not

intend to deny the irregularity of detail,* the specificness of the particulars, the diversity of individual incidents and existences. According to our conception of nature they must remain, and we need not attribute them to absolute chance. To attribute irregularities to absolute chance (as Mr. Peirce does) is actually an abandonment of explaining them. The specificness and particularity of nature can be said to be due to chance in so far only as they do not depend upon and are not determinable by the nature of the things under consideration, but result (with strict necessity of course) from the ever-changing conformations of surrounding circumstances.

Thus the fate of a man depends mainly upon his character,—the proverb says, "Every man is the architect of his own fortune"—but not entirely. There are sometimes coincidences determining the fates of men, and through them the fates of whole nations. And these coincidences do not result from their character.

Let everybody think of his own fate. Part of his life has been what it was because he is such a man as he is; and we can, within certain limits, predict the fate of a youth with whose character we are familiar. But how much of our lives depends upon circumstances which could be foreseen only by an omniscient being, and which, as we might properly say, if we do not misunderstand the term, is due to chance!

FREE WILL.

Compulsion is generally considered as a synonym of necessity. But the usage of the term necessity in the sense of compulsion is, in our opinion, very inappropriate, because misleading. Necessity and compulsion should not be confounded; for compulsion excludes free will and "necessity" does not.

A government compels its citizens to obey certain unpopular laws; the victorious army compels the enemy to surrender. The obedience of the citizens and the surrender of the enemy are acts

* By irregularity of detail we understand simply a lack of uniformity, but not exceptions to law. If irregularity be defined as exception to law, we should say, There is no irregularity in the world, while at the same time nothing is uniform: for every particle of the world is in its time and space relations and otherwise different from every other particle.

done under compulsion; they are not acts of free will. But a man of a certain character wills, under given circumstances and in the absence of compulsion, *necessarily* in the way in which he does. The determination of a free will is not a matter of chance but of necessity. Yet the determining factors are not outside but inside; they are not due to compulsion, not to the pressure of a foreign power, but to the nature of the willing being himself.

This, then, is the definition of "free": A being is free if it is unrestrained, so that it acts according to its own nature. As is its nature, so it wills; as it wills, so it acts. If we know the character of a man and the situation in which he is placed, we can predict his choice as the necessary result of his nature. His decision, although it is free and not under compulsion, is not an outcome of chance which might under the same conditions be different, but is the inevitable result of necessity.

If by free will we had to understand that the decisions of the will are the result either of chance or of absolute chance, the foremost duty of the educator would be to make man unfree, to insert certain dominant ideas into his mind, destined to determine his will. The free man according to this definition of free will as being due to chance, would be a person whose actions are more whimsical than the fancies of lunatics. We reject this conception of the freedom of the will.

In our opinion a will is free if it is unrestrained so that it can act according to its nature. Our conception of free will does not stand in contradiction to the doctrine of "determinism" as defined by the "Century Dictionary" in its second sense:

"In general, the doctrine that whatever is or happens is entirely determined by antecedent causes."

THE MECHANICAL PHILOSOPHY.

We distinguish between (1) mechanical, (2) physical, (3) chemical, (4) physiological, and (5) psychical events.

A mechanical phenomenon is a change of place which does not involve a change of the constitution of the parts moved. E. g., a stone is pushed; its position is altered, but the stone remains the same.

A physical phenomenon is an event in which the molecular state of the bodies in action is altered. Water heated becomes steam, frozen it becomes ice. The three states have different molecular configurations.

Chemical phenomena are such in which the constitution of the atoms is altered. The characteristic qualities of hydrogen, for example, are different when combined with different elements or when isolated. Each combination is a peculiar substance with peculiar qualities and not a mixture or combination of the qualities of the isolated elements.

Physiological processes are all those changes that take place in the living irritable substance of plants and animals, such as nutrition, growth, and propagation. Its characteristic features are (1) hunger or thirst, i. e. the want of certain materials (food), (2) the reception of the wanted materials by suction or other means, which in some cases are a quite mechanical or physical process, not unlike the afflux of oxygen caused by a burning candle or the suction of water by a sponge; and (3) the assimilation of food. The materials received are distributed in the places wanted, thus adding to the building up of the living substance according to the nature of its structure. This produces as a natural result (4) the phenomenon of growth with a preservation of form. (5) Propagation is a special kind of growth: it is the growth of a part that at some stage of its development becomes an independent individual.

Psychical phenomena are such in which feelings and the meanings of feelings are the determinant factors.

It is apparent that all these terms, mechanical, physical, chemical, physiological, and psychical, are mere abstracts. In describing a mechanical phenomenon, we limit our attention to the mechanical change. We do not mean to say that the body moved does not possess chemical, physical, perhaps physiological, or even psychical qualities. The calculation of the curve of a jump is a mechanical problem, although the jumping body may be a human being. However, the question why did the man jump, is a psychical question. The motive of the jump is an idea in that class of mental activity characterised as purpose. The man had an end in view. And this

idea of an end to be realised is the combined result of special conditions and of the character of the man.

The different spheres of mechanical, physical, chemical, physiological, and psychical actions being abstractions, it is obvious that science when dealing with so-called purely mechanical phenomena, has to do with a fiction. There are no purely mechanical phenomena. There are features of reality which are purely mechanical: and these we call motions. But the world does not consist of motions only. It also possesses other qualities.

The mechanical philosopher assumes that the world consists of matter and motion only, and so he feels warranted in the hope that every event that takes place, the actions of man included, can be explained by the laws of motion. Yet the premiss is wrong, and we may anticipate that the conclusion also will prove erroneous. And so it is.

The laws of motion are applicable to and will explain all motions: but they are not applicable to that which is not motion.

It is inconceivable how we can hope to explain a feeling by the laws of motion: and so the fond hope of explaining the problems of the nature of the soul by mechanics is preposterous. No objection can be made to the possibility of explaining the delicate motions in the nervous substance of the brain by the laws of molar or molecular mechanics. But these explanations would throw no light upon the causation that takes place in the mind. The properly psychical phenomena, the properly intelligent action of thought, could not be explained in this way. For the world of mentality introduces quite a new factor into the sphere of being.

What is this new factor?

The nature of mental activity consists in the symbolism of feelings. Feelings, being different under different conditions and the same under same conditions, become representative of their corresponding causes, and thus the objects of experience are depicted in feeling symbols.

Representativeness, accordingly, is the nature of mind.

The question, How certain brain-structures operate, is a question of the mechanics of nervous substance, and further, the

question, How thought-operations take place, is a question, so to say, of logical mechanics. But the question, Why a certain idea responds to certain stimuli and not to others, does not admit of a mechanical explanation or formulation. The answer to this question will be a description of the nature of the idea: and the nature of the idea is not a motion: it is the meaning of which the idea is possessed.

The action of a mind depends upon the meaning of certain symbols. A written or spoken word has a special meaning, and this meaning becomes the determinant factor of mind action. The meaning of a word is not a piece of matter, neither is it a motion. It is something *sui generis*. I do not say that there is any inexplicable mystery connected with it. On the contrary, wonderful as the fact is, it is not mysterious: it does not stand in contradiction to any other fact of nature. Symbols stand for something: they indicate, denote, or signify something. This significance is called their meaning: and mind is a system of symbols in states of awareness.

Now, neither states of awareness are mechanical, nor is the meaning of words anything mechanical. How can we hope for a mechanical explanation either of the soul or the mind or of any mental action?

Suppose, for instance, a general receives a message containing a few words. He opens the paper, he reads it, and all on a sudden, his mind is in a tumult of excitement. What is it that produces the excitement? Is it any motion? Yes! In a certain sense, it is a motion: it is the reading of the paper. This is the cause. Yet not the reading as such excites his consternation. He might read other messages all the day long without any such an effect. Plainly, the causative element of the cause is not the reading, not the motions of which the reading consists, not the shape of the written characters and their combinations in groups, called words. It is something more subtle even than that. It is the significance of the writing. It is the meaning of the written characters. It is the purport that is attached to the word-symbols.

The origin of mind accordingly introduces a factor which has nothing to do with mechanics: and the simplest psychical reflexes,

including those physiological reflexes which we must suppose to have originated by conscious adaptation and then been submerged into unconsciousness, cannot be explained from mechanical or physical laws alone.

SPONTANEITY.

While we thus reject the conception of the mechanical philosophy and also of materialism, we do not say that there are motions either in the brain or anywhere else which form exceptions to the laws of mechanics. The laws of mechanics hold good for all motions. The laws of mechanics are formal laws: they do not explain why bodies gravitate; but they describe how they gravitate, and the latter is much more useful to know than the former. There is (as we conceive it) no deep secret in the problem why bodies gravitate; they gravitate because they possess a quality which attracts them to each other with a force directly as their masses and inversely as the squares of their distances. In a word, gravity is the intrinsic nature of masses, it is an inalienable part of their existence. Thus whenever bodies gravitate, we are confronted with an act of spontaneity.

Attempts have been made to explain gravitation without the assumption of spontaneity, by the pressure of an atom-surrounding ether. But that only defers the question: for the spontaneity, in that case, would have to be placed in the ether. Whatever be the merits of the explanations of gravitation by a *vis a tergo*, we must recognise the fact that no motion can take place in the world, no pressure can be exercised, without there being somewhere some spontaneous something that moves or presses. Spontaneity is a universal feature of nature.

Mr. Peirce uses the term "spontaneity" in a different sense from ours. He identifies spontaneity with absolute chance. He means by it the irregularities that arise without cause, thus producing departures from law. We call that action spontaneous which is not due to external influence but springs from the nature of the things in action.

Spontaneous is derived from the Latin *sponte*, "will," which as a noun was obsolete at the classical period of Roman literature and

occurred only in such forms as *sponte*, "of one's own will, of one's own accord." If a man acts of his own will, free from and not biassed by the influence of other men, his action is spontaneous. A free man's action is not arbitrary, unless arbitrariness* be the character of the man: it is not an exception to law: it is, if the character of the man is known, calculable in advance, for every free action is spontaneous: it springs immediately from the character of the man: it is the direct expression of his will: it reveals the nature of his very being, thus showing the man himself, and not something beyond or outside of him.

Taking the word spontaneity in this sense, we say: Masses gravitate spontaneously: they are self-moving: their motion is due to their gravity, and gravity is their intrinsic nature.

Exactly as the laws of mechanics explain the "how" of motions, but not why there is motion at all, the "why" depending upon the nature of each moving body, so the "how" of the brain-motions is explicable by mechanical laws, but the "why" depends upon the nature of the moving material. The brain-atoms are possessed of the same spontaneity as the atoms of a gravitating stone. Yet there is present an additional feature: there are present states of awareness, and these states of awareness possess meaning, both of which are items which the chemist cannot find by chemical analysis. Neither states of awareness nor their meanings can be weighed on any scales, be they ever so delicate, nor are they determinable in foot-pounds.

Yet while mechanics is not applicable to mental facts, the realm of mentality is by no means to be surrendered to indeterminism. Mr. Peirce describes the domain of mind as the absence of law and the prevalence of absolute chance, of an indetermined and indeterminable sporting. This is not so. While the fact must be recognised that the nature of the mind is not something mechanical, its action is nevertheless determined by laws—not by mechanical laws.

* Arbitrary, as used here, means capricious, uncertain, unreasonable. A man's action is capricious if he is biassed by the present motive alone, without considering other motives which he would have under other circumstances. A deliberate man equalises, as it were, his actions by forming rules of conduct. An arbitrary man does not recognise rules or laws, made either by himself or by others.

but by psychical and mental laws. These psychical and mental laws are in one respect of exactly the same nature as mechanical laws: they describe the samenesses of certain facts of reality. And the facts of the ideal domain of thought, the facts of subjectivity, are no less real than the grosser facts of mechanical motion, which are the facts of objectivity.

The term mechanical is often used in the sense of "lacking life or spirit" ("Century Dictionary," p. 3679). This is justifiable in so far only as when we speak of mechanical phenomena we do not mean psychical or any other phenomena. It is true that that which makes this or that idea respond to a certain stimulus is not a mechanical but a mental quality, but the action itself, in so far as it is a motion, is and remains mechanical. Thus it happens that the laws of mechanics, far from being anti-spiritual, are the means by which we learn to understand and objectively to represent the action of mental phenomena.

In this connection attention may be called to the efforts of modern logicians to construct thinking machines which will perform the work of mental operations in a purely mechanical way. You propose the problem by adjusting certain indicators: then you turn the crank, and the machine does the rest. The results will come out with unfailling exactness.

The attempt made to construct thinking machines cannot as yet be called successful. Nevertheless they are not impossibilities. Calculating machines of various constructions are in practical use and doing satisfactory work, not only in addition and subtraction but also in multiplication and division, and even in extracting roots and in raising numbers to higher powers. Calculations are undoubtedly one kind of thought, and if calculations can be performed by machines, there is no theoretical reason why we should not be able to construct logical machines, which shall perform the operations of deductive and even of inductive thought with perfect accuracy.

CONCLUSION.

Determinism does not make freedom impossible and natural laws do not suppress the spontaneity of nature.

Natural laws are not a power forcing a certain mode of action upon things: they are not an oppression of nature. Natural laws are simply a description of nature as nature is. There is no "must" in nature in the sense of compulsion, as if there were two things, (1) a master (i. e. the law) giving a command, and (2) a slave (i. e. the single facts) obeying the command. The situation is not dualistic, but monistic. There is an "is" in nature, and this "is" is constant. There is a certain sameness in nature. In spite of all changes it remains the same: and thus even the apparent irregularities preserve throughout an unvarying consistency. The facts of nature express the character of nature: they are nature herself. Briefly, the "is" of nature (if we are permitted to personify her) does not describe that which nature must do, but that which nature wills to do: it describes how she acts spontaneously, of her own free will, in conformity with her innermost being and consistently with her permanent character.

The main difference that obtains between the actions of inanimate nature—so-called—and rational beings is not the absence and presence of spontaneity, (for spontaneity is in both,) but the absence and presence of mind: and mind is not only the subjectivity of existence: mind is not merely sentiency, i. e. the awareness of feelings; mind is the representative symbolism of subjectivity.

There are sufficient reasons to assume that all objective existence, which appears to us as matter in motion, possesses a subjectivity, the nature of which depends upon the mode of the interaction of its elements. This subjectivity appears in organised substance as feeling and develops naturally into mind.

The essence of nature, accordingly, is not materiality, but spirituality. Materiality is the character of nature as it affects sentient beings; but its innermost self, as it were, its subjectivity, its psychical aspect is revealed in the appearance of the spirit-life of rational beings—of minds.

While we fully recognise the spirituality of nature as nature's innermost essence and as an ineradicable feature of reality, we cannot with Mr. Peirce place mind at the beginning of the world. There is a great difference between spirituality and mind. One is the source and condition of the other. One is permanent, the other is transient. One is the abstract view of a universal quality of the world, eternal and everlasting, as much indestructible as matter and energy; the other is an individual formation that originates, grows, and develops: that can be broken and built again: that dies with the body and rises again in new generations; that decays, as the foliage of the trees falls in winter, yet reappears, as the verdure reappears in spring; for the life of nature is immortal.

Mr. Peirce, regarding determinism as that view which does not recognise the freedom of will, has an original and in our conception a wrong view on the one hand of natural laws, which are to him mere habits acquired by the world, and on the other hand of chance, or arbitrary sportiveness, (i. e. that which is not determinable by law,) which he identifies with mind and with the spontaneity of freedom. Mind is to him the beginning of all. Mind remains mind, according to his view, so long as it is irregular, producing out of its own undetermined being sporadic effects without order or consistency. As soon as mind takes to habits, it grows mechanical: by creating regularity it disappears: and the result is matter in motion according to mechanical laws. Matter, accordingly, is said to be "effete mind." Law in our view is the divinity of nature; according to Mr. Peirce it is the termination of nature's irregularities: it comes to suppress her freedom and to supplant her mentality by mechanicalism. An element of pure chance, however, survives, which appears in the free will of man, in miracles, and in nature's irregularities, and this element of pure chance will remain until in the infinitely distant future, mind becomes crystallised into an absolutely perfect, rational, and symmetrical system. Such is in brief Mr. Peirce's view of the rôle played by mind in the world-process.

Mr. Peirce's views of chance and law seem to come to the rescue of certain theological dogmas, which represent the world-order as the product of a divine mind. We doubt very much whether

Mr. Peirce's position be tenable even from the standpoint of the scientific theologian. For the order of the world, as it appears in natural laws, must be, and is recognised even by the theist, as part and parcel of God's eternal being. The scientist who formulates *sub specie aeternitatis* certain facts of nature, say the "how" of gravitating bodies, describes a certain quality of God himself; he describes something that is immutable, eternal, everlasting; it is not the whole of God, but it is certainly one feature of Jahveh, of that which is, was, and will be as it is.

In contradistinction to Mr. Peirce, we recognise, that the regularity of the whole is preserved in the specificallness of its individual particulars, that there are samenesses in this world of changes and diversities, and that if all reality is regarded as being essentially the same throughout, all the diversities and apparent irregularities can very well be explained as resulting from peculiar forms, combinations, and relations. Furthermore, we recognise that natural laws are compatible with the spontaneity of nature and that the necessity with which a free man acts according to his character, does not reverse his freedom of will.

Nature is self-acting throughout: nature is free: even inanimate nature is spontaneous. But a higher freedom rises with the appearance of mind. And there are degrees of this higher freedom which can be determined with great exactness, for they correspond to the range of the mentality of each creature. Mentality develops by the observation of samenesses, and it reaches rationality by the recognition of natural laws. The recognition of natural laws is a view of some natural phenomena in their eternal aspect, and we call them truths. So much is natural law and freedom interconnected that the recognition of natural laws widens the range of freedom; and obedience to them raises man out of his dependence upon his surroundings to a state of dominion over the creation in which he becomes the master of natural forces.

What a deep significance lies in the saying of the apostle: "The truth shall make you free!"

EDITOR.

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