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James McCosh
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CHAPTER I.

THE STATE OF THE QUESTION.

I.

EVOLUTION AND CAUSATION.—Evolution, the drawing of one thing out of another, is deep in nature. It proceeds from causation, which is universal. In the world things are so connected that every one thing proceeds from some other, and all things from God. This arises from the universal action of causation. A cause (in physical nature) develops into an effect, and an effect is an evolution from a cause. The All-Mighty God, in all his works, might have acted immediately—that is, without any creature instrumentality. He might have produced crops and cattle, heaved up mountains and lowered plains, determined birth and death without the use of means of any kind. But in this case I do not see how mankind, with their present faculties, could have anticipated any of these occurrences, as it is only by the preparations for them that we

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know that they are coming. God has been pleased to arrange instead that every physical event has a physical cause,—the only exception being the miracles of the Old and New Testaments, which serve their purpose because they are exceptions. Causation is universal in physical nature, and causation develops all we see, or, to express it otherwise, all that we see is evolved from causes. We shall see that the evolution of plants and animals is produced by organized causes.

II.

NATURE OF CAUSATION.—I do not mean to enter into the deep discussions on this subject. We know a little more of causation in these later years. All natural causation is produced by two or more bodies acting on each other, the effect being that both are changed. A ball in motion strikes a ball at rest; this constitutes the cause, and the effect is that the ball in motion is stayed, and the ball at rest moves, the two constituting the effect. It has to be added that heat is produced by the impact, being part of the effect. A stone strikes a board; this is the cause, and the effect is the stone arrested in its course and the board broken. Cold air blows on a

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living plant ; this is the cause, and the effect is the temperature of the air insensibly affected and the plant killed. Causes always consist of two or more agents called con-causes ; effects consist of the same agents changed. The effects, which are also dual or plural, are ready with other agents to act as causes. Nature thus becomes reticulated and flexible. The evolution of living beings is an organized causation.

III.

DEVELOPMENT IN NATURE. —Suppose that nature, as created by God at the beginning, consists of a hundred or a thousand agents. These act upon each other according to their properties, and new products are ever appearing. There can be no impropriety in saying that they are evolved from their antecedents, which have the power of developing them. A complex effect is the evolution of a complexity of causes—say the downfall of the Roman empire, or the Renaissance of the fifteenth century. Such is God's method of distributing causes throughout the cosmos. It is our business not to rebel against the plan, but to fall in with it and profit by it. We can so far see its beneficial tendency. Looking to the

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causes operating, we can from the present so far find out the past and forecast the future. We can take advantage of these causes and combinations of causes to develop the results, general and special, which we wish to accomplish. Limited though our view be, we can see that the method is worthy of God, and suited to the intelligence of man. We sow in spring because we know that the seed will produce fruit in harvest.

We are all familiar with organic development, though we may not have been giving it this formidable name. We are privileged to be descended from parents. Of mature age, I know that I am developed from the boy of six as I remember him going to school. Our horses, our cattle, and dogs are of a breed which can be determined. The bread we eat sprang from seed. We do not complain of these evolutions; we do not denounce them as atheistic. We are grateful for some of them; as, for example, that we have been nursed by a mother's love and watched over by a father's care. The new evolutions of plants and animal races which we are now called to consider, may only be a farther evolution of the old ones. Possibly the one set

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may be no more atheistic than the others. Both may be illustrations of Divine method, of which we can so far see the wisdom.

IV.

THE QUESTION BETWEEN EVOLUTIONISTS AND NON-EVOLUTIONISTS.—“No man can find out the work that God maketh from the beginning to the end.” But though human science cannot go back to the beginning nor go on to the end, and while there is much in the middle that is concealed, there are whole provinces which we can inquire into and come to know. “We know in part.” We now know not a little about the generation of our earth, and of the plants and animals upon its surface. And we can tell much about the order in which animated beings appeared. But there is a keen dispute as to how they were produced.

All admit that there is system in the production of the organic world. Those who have no faith in a power above nature, ascribe it to physical forces. Religious people, so far from denying this, should at once admit and proclaim it; and seek to find out what the forces are and the laws they follow. We cannot allow God to be separated from his works, and so we must resolutely hold that God is in the

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forces arranged into an order—that is, laws, which we find it so interesting to observe.

But this is not just the burning question of the day. There is a perplexing confusion in the statement of the question. It has been misunderstood by religious, it has been perverted by irreligious, people. The former often speak of it as being: Whether all things are to be ascribed to God, or a portion to God, while the rest is handed over to material agency? In maintaining this latter view they furnish an excuse or pretext to those who would ascribe the descent of plants and animals to mechanical agency. The great body of naturalists, all younger than forty, certainly all younger than thirty, are sure that they see evolution in nature; but they are assured by their teachers or the religious press that, if evolution does every thing, there is nothing left for God to do, and they see no proof of his existence. Many a youth is brought to a crisis in his belief and life by such a representation. He feels that he must give up either his science or his faith, and his head is distracted, and his heart is tortured till feelings more bitter than tears are wrung from it.

The question is said to be, Whether the

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origin of species and descent of living creatures are by supernatural power or natural law, by Creator or creative action, by design or by mechanism, by contrivance or by chance, by purpose or without purpose.

Mr. Darwin, followed by Dr. Romanes, and many others, is constantly drawing the distinction in this form: between "natural selection" and "supernatural design," between "natural law" and "special creation." Now the difference between the two opposing theories as thus put is misleading, and this whether put by disbelief or by belief. The supernatural power is to be recognized in the natural law. The Creator's power is executed by creature action. The design is seen in the mechanism. Chance is obliged to vanish because we see contrivance. There is purpose when we see a beneficent end accomplished. Supernatural design produces natural selection. Special creation is included in universal creation.

A question is often settled by being properly stated. The *status quæstionis*, as the scholastics expressed it, is here not between God and not-God, but between God working without means and by means, the means being created by God and working for him. There may be

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evidence of design, of contrivance, and purpose in the very means employed. If an optician brings me a microscope I have only to examine it to discover design in it, but I may have as clear proof of purpose when I visit his shop and see him manufacturing the instrument. There is nothing atheistic in the creed that God proceeds by instruments, which we may find to be for the good of his creatures. There may be a want of reverence toward God and truth when there is evidence laid before us in its favor and we refuse to look at it. I should discover God in the human frame, on the supposition that he created it at once, but I have quite as satisfactory evidence on the supposition that he produced it by a father and mother, and provided that it should grow to maturity by a natural process. In the geological development I am privileged as it were to enter God's workshop and see his modes of operation, and the result reached so full of provisions in bones, muscles, joints, for the good of the creature.

V.

TENDENCY OF A SET OF CAUSES TO DIFFERENTIATE AND INTEGRATE.—Our cosmic system consists of a number of elements, supposed at

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present to be seventy, and of the properties possessed by them, such as gravitating, mechanical, and chemical power; these with an order or collocation imposed on them by God at the beginning. As they begin to act, which they do by their very nature as imparted to them by God, they differentiate. Things conjoined separate, complexities being dissolved by some of the composites having greater affinities to other things. There commence at the same time integrations; and new combinations are formed by gravitation, by chemical affinity, and other powers. These two processes are continually going on. At last, however, many integrations become fixed, so that they never change. Some have supposed that carbon is not an element, but a compound which cannot be dissolved in ordinary circumstances. Thus sea and land are distributed, mountains and rocks are formed, lakes and rivers are spread out. If organisms are ruled, as they undoubtedly are, by the law of cause and effect, there must be a like variation and conservation in their actions.

VI.

UNIFORMITY WITH VARIATIONS IN ORGANISMS.—Plants and animals are the result of

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combinations, being composed of oxygen, hydrogen, carbon, and nitrogen, the elements which form the most stable combinations, with a few others not so universally present. These are made, always by the power of God, to differentiate and combine into divisions, which are appropriately called Kinds. There are classes which are entitled to be called Natural; such, for example, is the division into fishes, amphibians, reptiles, birds, and mammals. The resemblance in the objects in the Kind is produced by their being of the same composition, but mainly from their being descended from a seed or germ which is a concentrated combination of powers. While there is a sameness there is also a variation. This may be produced by the mutual action of the elements within the organism itself. It is thus, for example, that old age and death are brought upon living beings. But the most conspicuous agent is what is called Environment. Every object has surroundings which act upon it. A fertile soil makes a plant grow and expand, while a barren soil dwarfs it.

VII.

CLASSIFICATION BY RAMIFICATION.—The classification of organisms is not now made as it