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John W. Judd

Excerpt

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## CHAPTER I

## INTRODUCTORY

WHEN the history of the Nineteenth Century—‘the Wonderful Century,’ as it has, not inaptly, been called—comes to be written, a foremost place must be assigned to that great movement by which evolution has become the dominant factor in scientific progress, while its influence has been felt in every sphere of human speculation and effort. At the beginning of the Century, the few who ventured to entertain evolutionary ideas were regarded by their scientific contemporaries, as wild visionaries or harmless ‘cranks’—by the world at large, as ignorant ‘quacks’ or ‘designing atheists.’ At the end of the Century, evolution had not only become the guiding principle of naturalists, but had profoundly influenced every branch of physical science; at the same time, suggesting new trains of thought and permeating the language of philologists, historians, sociologists, politicians—and even of theologians.

How has this revolution in thought—the greatest which has occurred in modern times—been brought

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about? What manner of men were they who were the leaders in this great movement? What the influences that led them to discard the old views and adopt new ones? And, under what circumstances were they able to produce the works which so profoundly affected the opinions of the day? These are the questions with which I propose to deal in the following pages.

It has been my own rare good fortune to have enjoyed the friendship of all the great leaders in this important movement—of Huxley, Hooker, Scrope, Wallace, Lyell and Darwin—and, with some of them, I was long on terms of affectionate intimacy. From their own lips I have learned of incidents, and listened to anecdotes, bearing on the events of a memorable past. Would that I could hope to bring before my readers, in all their nobility, a vivid picture of the characteristics of the men to whom science and the world owe so much!

For it is not only by their intellectual greatness that we are impressed. Every man of science is proud, and justly proud, of the grandeur of character, the unexampled generosity, the modesty and simplicity which distinguished these pioneers in a great cause. It is unfortunately true, that the votaries of science—like the cultivators of art and literature—have sometimes so far forgotten their high vocation, as to have been more careful about the priority

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of their personal claims than of the purity of their own motives—they have sometimes, it must be sadly admitted, allowed self-interest to obscure the interests of science. But in the story we have to relate there are no ‘regrettable incidents’ to be deplored ; never has there occurred any event that marred the harmony in this band of fellow-workers, striving towards a great ideal. So noble, indeed, was the great central figure—Charles Darwin—that his senior Lyell and all his juniors were bound to him by the strongest ties of admiration, respect and affection ; while he, in his graceful modesty, thought more of them than of himself, of the results of their labours rather than of his own great achievement.

It is not, as sometimes suggested, the striking out of new ideas which is of the greatest importance in the history of science, but rather the accumulation of observations and experiments, the reasonings based upon these, and the writings in which facts and reasonings are presented to the world—by which a merely suggestive hypothesis becomes a vivifying theory—that really count in making history.

Talking with Matthew Arnold in 1871, he laughingly remarked to me ‘I cannot understand why you scientific people make such a fuss about Darwin. Why it’s all in Lucretius !’ On my replying, ‘Yes ! Lucretius guessed what Darwin proved,’ he mischievously rejoined ‘Ah ! that only shows how much

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greater Lucretius really was,—for he divined a truth, which Darwin spent a life of labour in groping for.’

Mr Alfred Russel Wallace has so well and clearly set forth the essential difference between the points of view of the cultivators of literature and science in this matter, that I cannot do better than to quote his words. They are as follows :—

‘I have long since come to see that no one deserves either praise or blame for the *ideas* that come to him, but only for the *actions* resulting therefrom. Ideas and beliefs are certainly not voluntary acts. They come to us—we hardly know *how* or *whence*, and once they have got possession of us we cannot reject them or change them at will. It is for the common good that the promulgation of ideas should be free—uninfluenced by either praise or blame, reward or punishment.’

‘But the *actions* which result from our ideas may properly be so treated, because it is only by patient thought and work that new ideas, if good and true, become adopted and utilized; while, if untrue or if not adequately presented to the world, they are rejected or forgotten<sup>1</sup>.’\*

*Ideas* of Evolution, both in the Organic and the Inorganic world, existed but remained barren for thousands of years. Yet by the labours of a band of workers in last century, these ideas, which were but the dreams of poets and the guesses of philosophers, came to be the accepted creed of working naturalists, while they have profoundly affected thought and language in every branch of human enterprise.

\* For References see the end of the volume.

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## CHAPTER II

### ORIGIN OF THE IDEA OF EVOLUTION

IN all ages, and in all parts of the world, we find that primitive man has delighted in speculating on the birth of the world in which he lives, on the origin of the living things that surround him, and especially on the beginnings of the race of beings to which he himself belongs. In a recent very interesting essay<sup>2</sup>, the author of *The Golden Bough* has collected, from the records of tradition, history and travel, a valuable mass of evidence concerning the legends which have grown out of these speculations. Myths of this kind would appear to fall into two categories, each of which may not improbably be associated with the different pursuits followed by the uncivilised races of mankind.

Tillers of the soil, impressed as they must have been by the great annual miracle of the outburst of vegetable life as spring returns, naturally adopted one of these lines of speculation. From the dead,

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bare ground they witnessed the upspringing of all the wondrous beauty of the plant-world, and, in their ignorance of the chemistry of vegetable life, they imagined that the herbs, shrubs and trees are all alike built up out of the materials contained in the soil from which they grow. The recognition of the fact that animals feed on plants, or on one another, led to the obvious conclusion that the *ultimate* materials of animal, as well as of vegetable, structures were to be sought for in the soil. And this view was confirmed by the fact that, when life ceases in plants or animals, all alike are reduced to 'dust' and again become a part of the soil—returning 'earth to earth.' In groping therefore for an explanation of the origin of living things, what could be more natural than the supposition that the first plants and animals—like those now surrounding us—were made and fashioned from the soil, dust or earth—all had been 'clay in the hands of a potter.' The widely diffused notion that man himself must have been moulded out of *red* clay is probably accounted for by the colour of our internal organs.

Thus originated a large class of legendary stories, many of them of a very grotesque character. Even in many mediaeval sculptures, in this country and on the continent, the Deity is represented as moulding with his hands the semblance of a human figure out of a shapeless lump of clay.

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But among the primitive hunters and herdsmen a very different line of speculation appears to have originated, for by their occupations they were continually brought into contact with an entirely different class of phenomena. They could not but notice that the creatures which they hunted or tended, and slew, presented marked resemblances to themselves—in their structures, their functions, their diseases, their dispositions, and their habits. When dogs and horses became the servants and companions of men, and when various beasts and birds came to be kept as pets, the mental and even the moral processes characterising the intelligence of these animals must have been seen by their masters to be identical in kind with those of their own minds. Do we not even at the present day compare human characteristics with those of animals, the courage of the lion, the cunning of the fox, the fidelity of the dog, and the parental affection of the bird? And the men, who depended for their very existence on studying the ways of various animals, could not have been less impressed by these qualities than are we.

Mr Frazer has shown how, from such considerations, the legends concerning the relations of certain tribes of men with particular species of animals have arisen, and thus the cults of 'sacred animals' and of 'totemism' have been gradually developed. From comparisons of human courage, sagacity, swiftness,

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strength or perseverance, with similar qualities displayed by certain animals, it was an easy transition to the idea that such characteristics were derived by inheritance.

In the absence of any exact knowledge of anatomy and physiology, the resemblances of animals to themselves would quite outbulk the differences in the eyes of primitive men, and the idea of close relationship in blood does not appear to have been regarded with distaste. In their origin and in their destiny, no distinction was drawn between man and what we now designate as the 'lower' animals. Primitive man not only feels no repugnance to such kinship :—

‘But thinks, admitted to that equal sky,  
His faithful dog shall bear him company<sup>3</sup>.’

It should perhaps be remembered, too, that, in the breeding of domestic animals, the great facts of heredity and variation could not fail to have been noticed, and must have given rise to reflection and speculation. The selection of the best animals for breeding purposes, and the consequent improvement of their stock, may well have suggested the transmutation of one kind of animal into a different kind, just as the crossing of different kinds of animals seems to have suggested the possible existence of centaurs, griffins and other monstrous forms.



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How early the principles of variation and heredity, and even the possibility of improving breeds by selection, must have been appreciated by early men is illustrated by the old story of the way in which the wily Jacob made an attempt—however futile were the means he adopted—to cheat his employer Laban<sup>4</sup>.

Yet, in spite of observed tendencies to variation among animals and plants, early man must have been convinced of the existence of distinct kinds ('species') in both the vegetable and animal worlds; he recognised that plants of definite kinds yielded particular fruits, and that different kinds of animals did not breed promiscuously with one another, but that, pairing each with its own kind, all gave rise to like offspring, and thus arose the idea of distinct 'species' of plants and animals.

It must be remembered, however, that for a long time 'the world' was believed to be limited to a few districts surrounding the Eastern Mediterranean, and the kinds or 'species' of animals and plants were supposed to number a few scores or at most hundreds. This being the case, the sudden stocking of 'the world' with its complement of animals and plants would be thought a comparatively simple operation, and the violent destruction of the whole a scarcely serious result. Even the possibility of the preservation of pairs of all the different species, in a ship of moderate dimensions, was one that was easily enter-

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tained and was not calculated to awaken either surprise or incredulity.

But how different is the problem as it now presents itself to us! In the year 1900 Professor S. H. Vines of Oxford estimated that the number of 'species' of plants that have been described could be little short of 200,000, and that future studies, especially of the lower microscopic forms, would probably bring that number up to 300,000<sup>5</sup>. Last year, Mr A. E. Shipley of Cambridge, basing his estimate on the earlier one of Dr Günther, came to the conclusion that the number of described animals must also exceed 300,000<sup>6</sup>. On the lowest estimate then we must place the number of known species of plants and animals, living on the globe, as 600,000! And if we consider the numbers of new forms of plants and animals that every year are being described by naturalists—about 1500 plants and 1200 animals—if we take into account the inaccessible or as yet unvisited portions of the earth's surface, the very imperfectly known depths of the sea, and, in addition to these, the almost infinite varieties of minute and microscopic forms, I think every competent judge would consider *a million* as being probably an estimate below, rather than above, the number of 'species' now existing on the earth!

While some of these species are very widely distributed over the earth's surface, or in the waters of the oceans, seas, lakes and rivers, there are others