

pieces is that Radcliffe-Brown was one of the founders of that school which replaced the historical and evolutionist schools of anthropology (discussed in Unit 12 of the course) and which has dominated the discipline, at least in Britain, during the past half century.

The extract from *The Elementary Forms of Religious Life* (1912) by the sociologist Emile Durkheim (1858–1917) exemplifies attempts to account for religions in terms of sociology and anthropology. It is noteworthy that Durkheim aimed not so much to refute religious doctrines but rather to explain religion as a useful social phenomenon which revealed the nature of the society it served. For Durkheim, therefore, what was really interesting was not any rivalry between religion and science in their claims to approach truth, but rather their complementarity and use to society. Nonetheless, he severely circumscribed religion's role. In words reminiscent of Spencer (see items 2a and 2b) he asserted that religion would never disappear but would be transformed by science.

#### 6a. A. R. Wallace, 'Darwinism applied to Man'

##### *The Origin of the Moral and Intellectual Nature of Man*

[ . . . ] I fully accept Mr Darwin's conclusion as to the essential identity of man's bodily structure with that of the higher mammalia, and his descent from some ancestral form common to man and the anthropoid apes. The evidence of such descent appears to me to be overwhelming and conclusive. Again, as to the cause and method of such descent and modification, we may admit, at all events provisionally, that the laws of variation and natural selection, acting through the struggle for existence and the continual need of more perfect adaptation to the physical and biological environments, may have brought about, first that perfection of bodily structure in which he is so far above all other animals, and in co-ordination with it the larger and more developed brain, by means of which he has been able to utilise that structure in the more and more complete subjection of the whole animal and vegetable kingdoms to his service.

But this is only the beginning of Mr Darwin's work, since he goes on to discuss the moral nature and mental faculties of man, and derives these too by gradual modification and development from the lower animals. Although, perhaps, nowhere distinctly formulated, his whole argument tends to the conclusion that man's entire nature and all his faculties, whether moral, intellectual, or spiritual, have been derived from their rudiments in the lower animals, in the same manner and by the action of the same general laws as his physical structure has been derived. As this conclusion appears to me not to be supported by adequate evidence, and to be directly opposed to many well-ascertained facts, I propose to devote a brief space to its discussion.

*The Argument from Continuity*

Mr Darwin's mode of argument consists in showing that the rudiments of most, if not of all, the mental and moral faculties of man can be detected in some animals. The manifestations of intelligence, amounting in some cases to distinct acts of reasoning, in many animals, are adduced as exhibiting in a much less degree the intelligence and reason of man. Instances of curiosity, imitation, attention, wonder, and memory are given; while examples are also adduced which may be interpreted as proving that animals exhibit kindness to their fellows, or manifest pride, contempt, and shame. Some are said to have the rudiments of language, because they utter several different sounds, each of which has a definite meaning to their fellows or to their young; others the rudiments of arithmetic, because they seem to count and remember up to three, four, or even five. A sense of beauty is imputed to them on account of their own bright colours or the use of coloured objects in their nests; while dogs, cats, and horses are said to have imagination, because they appear to be disturbed by dreams. Even some distant approach to the rudiments of religion is said to be found in the deep love and complete submission of a dog to his master.<sup>1</sup>

Turning from animals to man, it is shown that in the lowest savages many of these faculties are very little advanced from the condition in which they appear in the higher animals; while others, although fairly well exhibited, are yet greatly inferior to the point of development they have reached in civilised races. In particular, the moral sense is said to have been developed from the social instincts of savages, and to depend mainly on the enduring discomfort produced by any action which excites the general disapproval of the tribe. Thus, every act of an individual which is believed to be contrary to the interests of the tribe, excites its unvarying disapprobation and is held to be immoral; while every act, on the other hand, which is, as a rule, beneficial to the tribe, is warmly and constantly approved, and is thus considered to be right or moral. From the mental struggle, when an act that would benefit self is injurious to the tribe, there arises conscience; and thus the social instincts are the foundation of the moral sense and of the fundamental principles of morality.<sup>2</sup>

The question of the origin and nature of the moral sense and of conscience is far too vast and complex to be discussed here, and a reference to it has been introduced only to complete the sketch of Mr Darwin's view of the continuity and gradual development of all human faculties from the lower animals up to savages, and from savage up to civilised man. The point to which I wish specially to call attention is, that to prove continuity and the progressive development of the intellectual and moral faculties from animals to man, is not the same as proving that these faculties have been developed by natural selection; and this last is what Mr Darwin has hardly attempted, although to support his theory it was absolutely essential to prove it. Because man's physical structure has been developed from an animal form by natural selection, it does not

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necessarily follow that his mental nature, even though developed *pari passu* with it, has been developed by the same causes only.

To illustrate by a physical analogy. Upheaval and depression of land, combined with sub-aerial denudation by wind and frost, rain and rivers, and marine denudation on coastlines, were long thought to account for all the modelling of the earth's surface not directly due to volcanic action; and in the early editions of Lyell's *Principles of Geology* these are the sole causes appealed to. But when the action of glaciers was studied and the recent occurrence of a glacial epoch demonstrated as a fact, many phenomena – such as moraines and other gravel deposits, boulder clay, erratic boulders, grooved and rounded rocks, and Alpine lake basins – were seen to be due to this altogether distinct cause. There was no breach of continuity, no sudden catastrophe; the cold period came on and passed away in the most gradual manner, and its effects often passed insensibly into those produced by denudation or upheaval; yet none the less a new agency appeared at a definite time, and new effects were produced which, though continuous with preceding effects, were not due to the same causes. It is not, therefore, to be assumed, without proof or against independent evidence, that the later stages of an apparently continuous development are necessarily due to the same causes only as the earlier stages. Applying this argument to the case of man's intellectual and moral nature, I propose to show that certain definite portions of it could not have been developed by variation and natural selection alone, and that, therefore, some other influence, law, or agency is required to account for them. If this can be clearly shown for any one or more of the special faculties of intellectual man, we shall be justified in assuming that the same unknown cause or power may have had a much wider influence, and may have profoundly influenced the whole course of his development.

*The origin of the mathematical faculty*

We have ample evidence that, in all the lower races of man, what may be termed the mathematical faculty is either absent, or, if present, quite unexercised. The Bushmen and the Brazilian Wood-Indians are said not to count beyond two. Many Australian tribes only have words for one and two, which are combined to make three, four, five, or six, beyond which they do not count [ . . . ].

When we turn to the more civilised races, we find the use of numbers and the art of counting greatly extended. Even the Tongas of the South Sea islands are said to have been able to count as high as 100,000. But mere counting does not imply either the possession or the use of anything that can be really called the mathematical faculty, the exercise of which in any broad sense has only been possible since the introduction of the decimal notation. The Greeks, the Romans, the Egyptians, the Jews, and the Chinese had all such cumbrous systems, that anything like a science of arithmetic, beyond very simple operations, was impossible; and the Roman system, by which the year

1888 would be written MDCCCLXXXVIII, was that in common use in Europe down to the fourteenth or fifteenth centuries, and even much later in some places. [ . . . ]

It is, however, during the last three centuries only that the civilised world appears to have become conscious of the possession of a marvellous faculty which, when supplied with the necessary tools in the decimal notation, the elements of algebra and geometry, and the power of rapidly communicating discoveries and ideas by the art of printing, has developed to an extent, the full grandeur of which can be appreciated only by those who have devoted some time (even if unsuccessfully) to the study.

The facts now set forth as to the almost total absence of mathematical faculty in savages and its wonderful development in quite recent times, are exceedingly suggestive, and in regard to them we are limited to two possible theories. Either prehistoric and savage man did not possess this faculty at all (or only in its merest rudiments); or they did possess it, but had neither the means nor the incitements for its exercise. In the former case we have to ask by what means has this faculty been so rapidly developed in all civilised races, many of which a few centuries back were, in this respect, almost savages themselves; while in the latter case the difficulty is still greater, for we have to assume the existence of a faculty which had never been used either by the supposed possessors of it or by their ancestors.

Let us take, then, the least difficult supposition – that savages possessed only the mere rudiments of the faculty, such as their ability to count, sometimes up to ten, but with an utter inability to perform the very simplest processes of arithmetic or of geometry – and inquire how this rudimentary faculty became rapidly developed into that of a Newton, a La Place, a Gauss, or a Cayley. We will admit that there is every possible gradation between these extremes, and that there has been perfect continuity in the development of the faculty; but we ask, What motive power caused its development?

It must be remembered we are here dealing solely with the capability of the Darwinian theory to account for the origin of the *mind*, as well as it accounts for the origin of the *body* of man, and we must, therefore, recall the essential features of that theory. These are, the preservation of useful variations in the struggle for life; that no creature can be improved beyond its necessities for the time being; that the law acts by life and death, and by the survival of the fittest. We have to ask, therefore, what relation the successive stages of improvement of the mathematical faculty had to the life or death of its possessors; to the struggles of tribe with tribe, or nation with nation; or to the ultimate survival of one race and the extinction of another. If it cannot possibly have had any such effects, then it cannot have been produced by natural selection.

It is evident that in the struggles of savage man with the elements and with wild beasts, or of tribe with tribe, this faculty can have had no

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influence. It had nothing to do with the early migrations of man, or with the conquest and extermination of weaker by more powerful peoples. The Greeks did not successfully resist the Persian invaders by any aid from their few mathematicians, but by military training, patriotism, and self-sacrifice. The barbarous conquerors of the East, Timurlane and Genghis Khan, did not owe their success to any superiority of intellect or of mathematical faculty in themselves or their followers. Even if the great conquests of the Romans were, in part, due to their systematic military organisation, and to their skill in making roads and encampments, which may, perhaps, be imputed to some exercise of the mathematical faculty, that did not prevent them from being conquered in turn by barbarians, in whom it was almost entirely absent. And if we take the most civilised peoples of the ancient world – the Hindoos, the Arabs, the Greeks, and the Romans, all of whom had some amount of mathematical talent – we find that it is not these, but the descendants of the barbarians of those days – the Celts, the Teutons, and the Slavs – who have proved themselves the fittest to survive in the great struggle of races, although we cannot trace their steadily growing success during past centuries either to the possession of any exceptional mathematical faculty or to its exercise. They had indeed proved themselves, to-day, to be possessed of a marvellous endowment of the mathematical faculty; but their success at home and abroad, as colonists or as conquerors, as individuals or as nations, can in no way be traced to this faculty, since they were almost the last who devoted themselves to its exercise. We conclude, then, that the present gigantic development of the mathematical faculty is wholly unexplained by the theory of natural selection, and must be due to some altogether distinct cause.

*The origin of the musical and artistic faculties*

These distinctively human faculties follow very closely the lines of the mathematical faculty in their progressive development, and serve to enforce the same argument. Among the lower savages music, as we understand it, hardly exists, though they all delight in rude musical sounds, as of drums, tom-toms, or gongs; and they also sing in monotonous chants. Almost exactly as they advance in general intellect, and in the arts of social life, their appreciation of music appears to rise in proportion; and we find among them rude stringed instruments and whistles, till, in Java, we have regular bands of skilled performers, probably the successors of Hindoo musicians of the age before the Mahometan conquest. The Egyptians are believed to have been the earliest musicians, and from them the Jews and the Greeks, no doubt, derived their knowledge of the art; but it seems to be admitted that neither the latter nor the Romans knew anything of harmony or of the essential features of modern music. Till the fifteenth century little progress appears to have been made in the science or the practice of music; but since that era it has advanced with marvellous rapidity, its progress being curiously parallel with that of mathematics, inasmuch as

great musical geniuses appeared suddenly among different nations, equal in their possession of this special faculty to any that have since arisen.

As with the mathematical, so with the musical faculty, it is impossible to trace any connection between its possession and survival in the struggle for existence. It seems to have arisen as a *result* of social and intellectual advancement, not as a *cause*; and there is some evidence that it is latent in the lower races, since under European training native military bands have been formed in many parts of the world, which have been able to perform creditably the best modern music.

The artistic faculty has run a somewhat different course, though analogous to that of the faculties already discussed. Most savages exhibit some rudiments of it, either in drawing or carving human or animal figures; but, almost without exception, these figures are rude and such as would be executed by the ordinary inartistic child. In fact, modern savages are, in this respect hardly equal to those prehistoric men who represented the mammoth and the reindeer on pieces of horn or bone. With any advance in the arts of social life, we have a corresponding advance in artistic skill and taste, rising very high in the art of Japan and India, but culminating in the marvellous sculpture of the best period of Grecian history. In the Middle Ages art was chiefly manifested in ecclesiastical architecture and the illumination of manuscripts, but from the thirteenth to the fifteenth centuries pictorial art revived in Italy and attained to a degree of perfection which has never been surpassed. This revival was followed closely by the schools of Germany, the Netherlands, Spain, France, and England, showing that the true artistic faculty belonged to no one nation, but was fairly distributed among the various European races.

These several developments of the artistic faculty, whether manifested in sculpture, painting, or architecture, are evidently outgrowths of the human intellect which have no immediate influence on the survival of individuals or of tribes, or on the success of nations in their struggles for supremacy or for existence. The glorious art of Greece did not prevent the nation from falling under the sway of the less advanced Roman; while we ourselves, among whom art was the latest to arise, have taken the lead in the colonisation of the world, thus proving our mixed race to be the fittest to survive.

[Wallace here develops another line of argument. His argument is this. Natural selection cannot work on extreme variations that crop up in only a tiny proportion of the population. The basic material of natural selection is the range of variations in characteristics shared by the whole population. Wallace elsewhere observes that truly gifted mathematicians, musicians and artists comprise a very small proportion of the population – he hazards a guess of one in a hundred – and that their gifts mark them off by a huge margin from the rest of the population; with such a low incidence, of such large variations, natural selection could not build mathematics, music and art into an evolving population.]

We have thus seen that the faculties are developed in different degrees, and that the characters and the conditions brought to the struggle for existence. And there are other faculties, of a metaphysical kind the most of which have no ultimate cause and force, of speculation. Speculations of savages, who are essentially ideas of civilisation, and philosophers, who take an active part in the spring sudden referred to, in the population.

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The special existence in nature

We have thus shown, by two distinct lines of argument, that faculties are developed in civilised man which, both in their mode of origin, their function, and their variations, are altogether distinct from those other characters and faculties which are essential to him, and which have been brought to their actual state of efficiency by the necessities of his existence. And besides the three which have been specially referred to, there are others which evidently belong to the same class. Such is the metaphysical faculty, which enables us to form abstract conceptions of a kind the most remote from all practical applications, to discuss the ultimate causes of things, the nature and qualities of matter, motion, and force, of space and time, of cause and effect, of will and conscience. Speculations on these abstract and difficult questions are impossible to savages, who seem to have no mental faculty enabling them to grasp the essential ideas or conceptions; yet whenever any race attains to civilisation, and comprises a body of people who, whether as priests or philosophers, are relieved from the necessity of labour or of taking an active part in war or government, the metaphysical faculty appears to spring suddenly into existence, although, like the other faculties we have referred to, it is always confined to a very limited proportion of the population.

In the same class we may place the peculiar faculty of wit and humour, an altogether natural gift whose development appears to be parallel with that of the other exceptional faculties. Like them, it is almost unknown among savages, but appears more or less frequently as civilisation advances and the interests of life become more numerous and more complex. Like them, too, it is altogether removed from utility in the struggle for life, and appears sporadically in a very small percentage of the population; the majority being, as is well known, totally unable to say a witty thing or make a pun even to save their lives.

*The interpretation of the facts*

The facts now set forth prove the existence of a number of mental faculties which either do not exist at all or exist in a very rudimentary condition in savages, but appear almost suddenly and in perfect development in the higher civilised races. These same faculties are further characterised by their sporadic character, being well developed only in a very small proportion of the community; and by the enormous amount of variation in their development, the higher manifestations of them being many times - perhaps a hundred or a thousand times - stronger than the lower. Each of these characteristics is totally inconsistent with any action of the law of natural selection in the production of the faculties referred to; and the facts, taken in their entirety, compel us to recognise some origin for them wholly distinct from that which has served to account for the animal characteristics - whether bodily or mental - of man.

The special faculties we have been discussing clearly point to the existence in man of something which he has not derived from his animal

progenitors – something which we may best refer to as being of a spiritual essence or nature, capable of progressive development under favourable conditions. On the hypothesis of his spiritual nature, superadded to the animal nature of man, we are able to understand much that is otherwise mysterious or unintelligible in regard to him, especially the enormous influence of ideas, principles, and beliefs over his whole life and actions. Thus alone we can understand the constancy of the martyr, the unselfishness of the philanthropist, the devotion of the patriot, the enthusiasm of the artist, and the resolute and persevering search of the scientific worker after nature's secrets. Thus we may perceive that the love of truth, the delight in beauty, the passion for justice, and the thrill of exultation with which we hear of any act of courageous self-sacrifice, are the workings within us of a higher nature which has not been developed by means of the struggle for material existence.

It will, no doubt, be urged that the admitted continuity of man's progress from the brute does not admit of the introduction of new causes, and that we have no evidence of the sudden change of nature which such introduction would bring about. The fallacy as to new causes involving any breach of continuity, or any sudden or abrupt change, in the effects, has already been shown; but we will further point out that there are at least three stages in the development of the organic world when some new cause or power must necessarily have come into action.

The first stage is the change from inorganic to organic, when the earliest vegetable cell, or the living protoplasm out of which it arose, first appeared. This is often imputed to a mere increase of complexity of chemical compounds; but increase of complexity, with consequent instability, even if we admit that it may have produced protoplasm as a chemical compound, could certainly not have produced *living* protoplasm – protoplasm which has the power of growth and of reproduction, and of that continuous process of development which has resulted in the marvellous variety and complex organisation of the whole vegetable kingdom. There is in all this something quite beyond and apart from chemical changes, however complex; and it has been well said that the first vegetable cell was a new thing in the world, possessing altogether new powers – that of extracting and fixing carbon from the carbon-dioxide of the atmosphere, that of indefinite reproduction, and, still more marvellous, the power of variation and of reproducing those variations till endless complications of structure and varieties of form have been the result. Here, then, we have indications of a new power at work, which we may term *vitality*, since it gives to certain forms of matter all those characters and properties which constitute Life.

The next stage is still more marvellous, still more completely beyond all possibility of explanation by matter, its laws and forces. It is the introduction of sensation or consciousness, constituting the fundamental distinction between the animal and vegetable kingdoms. Here all idea of mere complication of structure producing the result is out of the

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question. We feel it to be altogether preposterous to assume that at a certain stage of complexity of atomic constitution, and as a necessary result of that complexity alone, an *ego* should start into existence, a thing that *feels*, that is *conscious* of its own existence. Here we have the certainty that something new has arisen, a being whose nascent consciousness has gone on increasing in power and definiteness till it has culminated in the higher animals. No verbal explanation or attempt at explanation – such as the statement that life is the result of the molecular forces of the protoplasm, or that the whole existing organic universe from the amoeba up to man was latent in the fire-mist from which the solar system was developed – can afford any mental satisfaction, or help us in any way to a solution of the mystery.

The third stage is, as we have seen, the existence in man of a number of his most characteristic and noblest faculties, those which raise him furthest above the brutes and open up possibilities of almost indefinite advancement. These faculties could not possibly have been developed by means of the same laws which have determined the progressive development of the organic world in general, and also of man's physical organism.

These three distinct stages of progress from the inorganic world of matter and motion up to man, point clearly to an unseen universe – to a world of spirit, to which the world of matter is altogether subordinate. To this spiritual world we may refer the marvellously complex forces which we know as gravitation, cohesion, chemical force, radiant force, and electricity, without which the material universe could not exist for a moment in its present form, and perhaps not at all, since without these forces, and perhaps others which may be termed atomic, it is doubtful whether matter itself could have any existence. And still more surely can we refer to it those progressive manifestations of Life in the vegetable, the animal, and man – which we may classify as unconscious, conscious, and intellectual life – and which probably depend upon different degrees of spiritual influx. I have already shown that this involves no necessary infraction of the law of continuity in physical or mental evolution; whence it follows that any difficulty we may find in discriminating the inorganic from the organic, the lower vegetable from the lower animal organisms, or the higher animals from the lowest types of man, has no bearing at all upon the question. This is to be decided by showing that a change in essential nature (due, probably, to causes of a higher order than those of the material universe) took place at the several stages of progress which I have indicated; a change which may be none the less real because absolutely imperceptible at its point of origin, as is the change that takes place in the curve in which a body is moving when the application of some new force causes the curve to be slightly altered.

#### *Concluding remarks*

Those who admit my interpretation of the evidence now adduced – strictly scientific evidence in its appeal to facts which are clearly what

ought *not* to be on the materialistic theory – will be able to accept the spiritual nature of man, as not in any way inconsistent with the theory of evolution, but as dependent on those fundamental laws and causes which furnish the very materials for evolution to work with. They will also be relieved from the crushing mental burthen imposed upon those who – maintaining that we, in common with the rest of nature, are but products of the blind eternal forces of the universe, and believing also that the time must come when the sun will lose his heat and all life on the earth necessarily cease – have to contemplate a not very distant future in which all this glorious earth – which for untold millions of years has been slowly developing forms of life and beauty to culminate at last in man – shall be as if it had never existed; who are compelled to suppose that all the slow growths of our race struggling towards a higher life, all the agony of martyrs, all the groans of victims, all the evil and misery and undeserved suffering of the ages, all the struggles for freedom, all the efforts towards justice, all the aspirations for virtue and the wellbeing of humanity, shall absolutely vanish, and, 'like the baseless fabric of a vision, leave not a wrack behind'.

As contrasted with this hopeless and soul-deadening belief, we, who accept the existence of a spiritual world, can look upon the universe as a grand consistent whole adapted in all its parts to the development of spiritual beings capable of indefinite life and perfectibility. To us, the whole purpose, the only *raison d'être* of the world – with all its complexities of physical structure, with its grand geological progress, the slow evolution of the vegetable and animal kingdoms, and the ultimate appearance of man – was the development of the human spirit in association with the human body. From the fact that the spirit of man – the man himself – *is* so developed, we may well believe that this is the only, or at least the best, way for its development; and we may even see in what is usually termed 'evil' on the earth, one of the most efficient means of its growth. For we know that the noblest faculties of man are strengthened and perfected by struggle and effort; it is by unceasing warfare against physical evils and in the midst of difficulty and danger that energy, courage, self-reliance, and industry have become the common qualities of the northern races; it is by the battle with moral evil in all its hydra-headed forms, that the still nobler qualities of justice and mercy and humanity and self-sacrifice have been steadily increasing in the world. Beings thus trained and strengthened by their surroundings, and possessing latent faculties capable of such noble development, are surely destined for a higher and more permanent existence; and we may confidently believe with our greatest living poet:

That life is not as idle ore,  
But iron dug from central gloom,  
And heated hot with burning fears,  
And dipt in baths of hissing tears,  
And batter'd with the shocks of doom  
To shape and use.

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Source: A. I.  
Ch. XV, 'De'

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We thus find that the Darwinian theory, even when carried out to its extreme logical conclusion, not only does not oppose, but lends a decided support to, a belief in the spiritual nature of man. It shows us how man's body may have been developed from that of a lower animal form under the law of natural selection; but it also teaches us that we possess intellectual and moral faculties which could not have been so developed, but must have had another origin; and for this origin we can only find an adequate cause in the unseen universe of Spirit.

Source: A. R. Wallace, *Darwinism*. London, Macmillan, 1889. Excerpt from Ch. XV, 'Darwinism applied to Man', pp. 461-78.

Notes

1. For a full discussion of all these points, see *Descent of Man*, Ch. iii.
2. *Descent of Man*, Ch. iv.

6b. E. B. Tylor, 'The Science of Culture'

Culture or Civilization, taken in its wide ethnographic sense, is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society. The condition of culture among the various societies of mankind, in so far as it is capable of being investigated on general principles, is a subject apt for the study of laws of human thought and action. On the one hand, the uniformity which so largely pervades civilization may be ascribed, in great measure, to the uniform action of uniform causes; while on the other hand its various grades may be regarded as stages of development or evolution, each the outcome of previous history, and about to do its proper part in shaping the history of the future. To the investigation of these two great principles in several departments of ethnography, with especial consideration of the civilization of the lower tribes as related to the civilization of the higher nations, the present volumes are devoted.

Our modern investigators in the sciences of inorganic nature are foremost to recognise, both within and without their special fields of work, the unity of nature, the fixity of its laws, the definite sequence of cause and effect through which every fact depends on what has gone before it, and acts upon what is to come after it. They grasp firmly the Pythagorean doctrine of pervading order in the universal Kosmos. They affirm, with Aristotle, that nature is not full of incoherent episodes, like a bad tragedy. They agree with Leibnitz in what he calls 'my axiom, that nature never acts by leaps (la nature n'agit jamais par saut)', as well as in his 'great principle, commonly little employed, that nothing happens without its sufficient reason'. Nor, again, in studying the structure and habits of plants and animals, or in investigating the lower functions even of man, are these leading ideas unacknowledged. But when we come to