

DARWIN AND HIS WORKS:

A BIOLOGICAL & METAPHYSICAL STUDY.

Audi Alteram Partem!

By H. A. S.

Synopsis:—Origin of Species (a)—Natural (b)—Sexual and (c) Artificial Selection—The Problem stated—Variation—Heredity—Survival—"Struggle"—Adaptation—Descent of Man—Pedigree—Missing Links—Progress—Degeneration—Geological Support—Genesis of Life—Whence—When—Man's Future! "Beagle Log," etc.—The Mystery of Consciousness—Animal and Brute Intelligence—Evolution of Language—Society—Morals—Religion—Darwin's Faith—Morals—Genius—Position in Science—What Science, Literature, Poetry, Reason, Dogma, "The World," say of the Man! of his Works!—Detractors—Summary.

"Before man made us citizens, great Nature made us men."

—Lowell.

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PREFACE.

The following sketch of "Darwin and his Works" would never have been written but for a spirit of misrepresentation and injustice, that has been evinced towards the author of the theory of "Natural Selection" by even an enlightened community. (EALING.)

It is not intended to cover more than a passing memoir and an enquiry into Darwin's most popular works ; but since the "Genesis of Life, Evolution of Morals, Society and Religion," are inseparably linked with this theme, and "Human and Brute Intelligence" suggest themselves as branches of the subject, it is thought pertinent to devote a chapter to them.

On the principle that "the world knows nothing of its greatest men," I repeat, this sketch is written, to justify the claims of a genius on our wider study of his work, and to interest, and if possible, enlighten, the curious reader on the man and his theory.

H. A. S.

London, March, 1888.

INTRODUCTORY.

"It is only our natural prejudice, and that arrogance which made our forefathers declare that they were descended from demigods which lead us to demur to this conclusion (descent of man from a common type). But the time will come when it will be thought wonderful that naturalists who were well acquainted with the comparative structure and development of man and other mammals, should have believed that each was the work of a separate act of creation."—"Descent of Man," p. 28.

"As good almost kill a man as kill a good book; who kills a man kills a reasonable creature—God's image: but he who destroys a good book kills reason itself, for a good book is the precious life blood of a master spirit embalmed and treasured up on purpose to a life beyond life."—Milton's "Arcopagitica."

"Truth, it is supposed, may bear all lights, and one of those principal lights or natural mediums by which things are to be viewed in order to a thorough recognition is ridicule itself."—SHAFTESBURY.

"A subject which will not bear raillery is suspicious."—LEONTINUS.

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CHAPTER I.

*" Watch my life,
Glide down the stream of knowledge and behold
Its waters with a musing stillness glass
The thousand hues of nature and of Heaven."*—Lytton.

*" Now o'er the one half world
Nature seems dead."*—Shakespeare.

DARWIN AND HIS WORKS.

A Biological and Metaphysical Study.

CHAPTER I.

"AUDI ALTERAM PARTEM!"

Synopsis:—Ridicule of the World—The Test of Truth—Crude Idea of Life Fifty Years Ago—Natural Selection—The Problem Stated Under IX. Laws—Darwin's Religion—His Morality—Geological Support of Theory—Examples in Fossil Life—"Missing Links"—Variation—Adaptation—Early Man—Advance—Retrogression—Atavism—Disuse—Abuse of Parts—Gains of Species from Change—Natural Selection—Types therefrom—Sexual Selection—Struggle—Decimation—Gain from Sexual Selection in Vegetable and Animal Life—Endorsed by Science and Poetry—Artificial Selection—Examples of Type—Summary of Natural Selection—Period gone through.

LINKED as the subject of Darwinism is with the subtle mysteries of Nature's laws, and intimately

blended as it must be with the higher and deeper interests of natural history, it is hoped that the student may find in the following study of his work some interest, and that the general reader may be enabled to profitably beguile the passing hour. But should the curiosity and thirst on the part of the latter for knowledge anent his ancestors be limited, and his confidence in conventional canons be complete, let him lay aside the sketch at once, and rest contented with his little Brewer. Darwin's reputation is often trailed in the dust, in spite of a gentle nature and mind that contributed so largely to a knowledge of men and things. It is matter of regret that the works of this genius are not better known. Whence comes it? Is it that orthodoxy is afraid of burning its pinions in the presence of a great luminary? or that truth, when taken at the flood, is repugnant to inelastic minds? It behoves us, in travelling from the "China of enlightenment to the Peru of ignorance," that we endeavour to find out whether he is worthy of a seat on the platform of true genius, or whether he is guilty of the crimes laid to his charge: whether he is guilty, I say, of spreading doctrines beneficial to man, as evincing an intelligent perception of nature's laws, or injurious to man by virtue of a conflict with "the knowledge once delivered to the saints." The *Life and Letters* are abroad, and Bettany's *Sketch* has gone forth, and yet even in the

silence of death Darwin is not free from detraction. It is true that a superficial study of Darwin will lead the enquirer to regard his theory as the "baseless fabric of a vision"—will lead him to think as did Browning—

"That mass man sprang from was a jelly lump
Once on a time ; he kept an after course,
Thro' fish and insect, reptile, bird, and beast,
Till he attained to be an ape at last,
Or last but one."

So much for a surface knowledge and poetical license—he will be landed in a "slough of Despond," he who inquires little and infers much ; but should he *drink deeply he will comprehend* "what has been" and "what is"—that Darwin's work is a living testimony of man's descent. In spite of all I said he had his foes. Well ! a little healthy opposition is good, if only to sober down so vast a success, for we yet have to solace us a legacy of ideas which will broaden and brighten like the light of the sun—I refer to a literature in Natural History full of imagination, research, and practical philosophy. As on its appearance the origin was treated with ridicule, so now the theory—accepted by the intellectual world—is as readily confuted. It is those who know little, and not much about it, who decry the gospel of truth. Darwin's theory was first presented to the writer under the guise of raillery. Apropos of ridicule,

a story is told in the Diogenes Laertius (Lib. vi., cii.) of the exception Diogenes took to Plato's definition of man "as a two-legged animal without feathers," for on hearing it he lost no time in plucking a fowl, and presenting it at the school said, "Here is Plato's man;" thereupon, there was added to the definition, "with broad flat nails." Ridicule becomes the "test of truth," and works which have already made a conquest of ridicule demand acceptance.

"After life's fitful fever he sleeps well." The Rev. J. Byles opened—and that with a manliness and courage that did him credit, as a lover of truth—the subject of Darwinism in a sermon of reconciliation. He felt, I have no doubt, that when theories based on truth pass into history and fact, that peaceful acceptance should follow and rancour cease. Someone said (I think "Nemo") that Darwin opposed the Christian faith and disbelieved in immortality! I think it due to him to say that had his want of faith or morality been admitted he would never have been buried in the sanctuary of the "able and good"—Westminster Abbey—where admiration and reverence attended his obsequies. No! he did not pretend to explain the primeval and ever sacred mysteries of life—the vital force, the elixir of life, the soul—let alone the source of love and song; his motto was the poet's behest, "Man, know thyself!" and he has made, by

giving us the "Origin of Species" and "Descent," the dry bones of a crude biology live, and extended a reverence to the position every humble form of life obtains in creation. As an instance, 100 years ago every germ was thought to be not only perfect in itself, but contained one within another—like a nest of Chinese boxes—the perfect germ of all its descendants. Now we know the truth: before, animals were as mummies, now they are living beings; and again, thirty years ago it was held that the innumerable species of animals and vegetables, as geology and nature revealed them, were separately created. Custom palmed off the view with dogmatic sanction, and such a view ministered to the pride of the race; it was agreeable—it was orthodox; while that strange mystery of likeness and unlikeness of species, their variety and immutability, were glibly disposed of under such phrases as "plan of creation" and "unity of design." It was Darwin who read the secrets of the great mother of nature, and far more marvellous and obviously subtle must his theory seem to bestow upon the matter of life physical and mental gifts, which will develop from low and little beginnings countless visible forms of beauty, use, and power, than to invent this or that creature of fixed shape and character. Till his time in the animal and vegetable worlds there was darkness in the land:—

"Nature and nature's laws lay hid in night,
God said, Let *Darwin* be, and all was light."—*Pope*.

What are his doctrines?

Summary of Data of Darwin's Theory.

I.—Every species varies in a greater or lesser extent from a given type.

II.—Variations are hereditary—hence artificial selection by man in improving character and type.

III.—More life is produced than can live—hence "struggle."

IV.—The world is continually changing, hence variation (climatic).

V.—Struggle for existence follows—the weak go to the wall and allow the "fittest" (most deserving) "to survive."

VI.—Improvement is inherited by survivors.

VII.—Varieties obtain and get "fixed;" "races" are formed; these beget new "species."

VIII.—The past is infinite, and existent species are evolved through natural selection acting through time.

IX.—Sexual selection is the outcome of natural—the strong males capture the females by struggle, and transmit their types. (*b.*) The selection of the best males is by female choice (birds, animals), hence improvement of racial features and animal types.

Darwin's religion is foreshadowed in an extract from

the "Descent" (p. 613). "The birth, both of the species and of the individual, are equally parts of that grand sequence of events which our minds refuse to accept as the result of blind chance. . . . The understanding revolts at such a conclusion." What does this mean? "*Deus est anima brutorumque hominum.*" (Bolingbroke.)

His *morality* was embraced in the text: "As ye would that men should do to you, do ye to them likewise" ("Descent," p. 126). I have no doubt his private views on "Non omnis moriar" were as clear as ours. In studying man he did not presume on the unknown; as Tyndall said, "He merely followed the flying shuttle of nature in its process of weaving the living garment of God," and in the repose and well-merited fame he now enjoys we can safely say:—

"He has outsoared the shadow of our night;
 Envy and calumny, and hate and pain,
 And that unrest which men miscall delight,
 Can touch him not, and torture not again.
 From the contagion of the world's slow stain
 He is secure."—*Shelley*.

His love of life was work, and its reward was great. In the classic "Origin" we can solve problems in life which nothing else touches; we understand the disagreement between old and new fossils, and the divergence of different groups.

For admitting to the full the great gaps which

exist in continuity of the rock formations—"blank periods"—we still possess data of sufficient accuracy to determine the general order in which life is developed. The further back we go in rock history the fewer likenesses we detect in animals and plants; occasionally forms offer which seem to have existed from very early times, and without change even until now, such for example as the brachiopods and foraminifera. The more simple the forms the more persistent the type; probably, as in disease, low forms as the bacteria and cancer cell have always existed and multiplied their kind with the same disaster to other life as have polycystinæ and globigerinæ been continued in their innocence to life existing. Even going back to the Silurian or Palæozoic period there has been a gradual production of life from forms unlike those of to-day towards the existing life of the globe in forms higher than the simple; as time has gone on, the oldest rocks show fossils only of low or primitive life—those of the newest rocks traces only of higher life. There is no similarity, there is progress in fossil history as time advanced, which shuts out the theory of "special creation." It is not till we get to the newer coal measures that we find the succeeding and higher class, that of the frogs or amphibians (I refer to a later Palæozoic age), then above this the reptile fossils first occur. Birds make their appearance in the mesozoic or middle age which next

follows, and later on the oldest mammals come to the front. All this shows that the progression of life in the past has been that which the development of animals to-day demonstrates. In other words, as the stages in development we see to-day repeat the ancestry of the developing animal, so the embryonic fossil forms represent the early and lower phases in the progress of the species (Wilson), so that animals as now seen represent the cumulative qualities, as man represents the sum total of the inherited points in the advance of the race. The tree of life is of luxuriant growth, and the twigs, as we see them, are but offshoots of stems and branches of an old parent—here we see scars and lopped branches, and there evidences of degeneration and falling off, but improvement and advance in the collateral offshoots of sturdiest growth. Of course, the relics of birds and insects are *incapable of a fossil state, and so geology is here at sea*; so the inquiry into extinct life suffers and becomes fruitless, for the student has to look to marine or aquatic forms, which become entombed in the soft deposits which form future rock fossils, for only the hard parts of animals and plants are capable of preservation. Bones, teeth, scales, shells and corals are the structures which commonly form fossils, although here and there the footprints of animals (see Wilson's "Evolution for Birds," p. 157), the tracks of sea worms, the foliage of ferns (as in

coal deposits), and even the impress of the jelly fish are discovered (see the impression of a giant ichthyosaurus in the British Museum fossilised). Evidence in reference to the past clearly points to progression and modification of living beings as the only acceptable hypothesis of the history of the cosmos, and he who runs may read with pleasure and profit the story of life which is written in the record of the rocks—a story, I say, of evolution with modification as an evidence of divergence, *e.g.*, “In the fossiliferous foot of the horse we trace the transition of the five-toed Eocene horse into the one-toed horse of to-day” (Winchell); we bridge over the gulf of past and present; we see the links between birds and reptiles filled up by finding birds with teeth and reptiles with wings; we note the rudiments of a tail in man (*os coccyx*); we know the import of men and monkeys having tails of equal length in embryonic life, of higher apes without appendages—as alike the relics of ancestral structures still found in man and other animals, originally of great use but now of none; we understand why embryonic frogs have tails, and whales of like date teeth that are absent in adults, and then why some and not other salamanders had gills; we know why the young whale shows its descent from land mammals which had short fore and hind legs, scant hair, beaver-like tails, and keen scent; their ancestors living in marshes and becoming modi-

fied into dolphins lived in fresh water and then found their way into the ocean ; adaptive changes of structure continued their development, and modification was subservient to natural selection. While advances thus went on, to return to our monkeys, they, by reason of their arboreal habits, thumbs that opposed the fingers and grasping toes, rendered change slow. Whatever variation followed was handed down to their young, and slow progress probably proceeded till brain power, represented by sharpened wits and keener senses in the struggle to live, conquered brute force and outwitted strength. Arboreal habits later were dropped by virtue of environment, and, getting to walk on hind legs, prehension was given up by limb and tail to higher endowments—to the shambling gait or the stooping walk of the man-like ape. Tree life was given up for life on the ground. If we look for a type of early man improved in caste, but evincing traces of low descent, we should have to go to Terra del Fuego, where are met men whose very signs and expressions are less intelligible to us than those of animals—men of less instinct and oblivious of reason, at all events whose arts are not apparent, and men who are nearer the ape than to the European. “ The remote ancestor may be thus described : a strong cunning biped with keen sense organ (always sharper for exercise in savage man), strong instincts, uncontrolled emotions, small faculty of wonder, and little reasoning power, unable

to forecast to-morrow or understand to-day, living from hand to mouth, clothed in skin, daubed with clay and living in a cave." Such men would obey the words of Lucretius: "During the revolution of many lustres of the sun they led a life after the roving fashion of wild beasts, none knowing how to guide the plough or to labour in the fields with iron. What the sun and rain gave, what the earth produced, was guerdon enough to content their hearts." But the causes of arrest and advance remain complex, because "man is the creature of circumstances," and many influences have effected his destiny; "extremes of climate have sometimes checked his advance, temperate zones have oftenest led to his progress, but natural selection only directs, it does not vary organisms once formed, it only preserves them under favourable conditions" (Darwin). It adjusts Nature's balance, and becomes the genius of adaptation that presides over her destinies. It is not that everything has an *intrinsic* tendency to evolve, for in the case of the living types of a species, if the surrounding actions are constant, the types are constant; if the conditions change there is adaptation or acclimatisation with progress or reversion. Degeneration is seen in the instance of the lancelets, the rotifers, and the sea squirts; and with races, in Bushmen and Fuegians, whose arts, preceding their decay, we can feebly imitate, whose manliness we cannot excel. Type remains constant, but only in

the unaltered condition of simple life. Simplicity often means salvation ; but the simple cell of a neoplasm from its low type oft increases with such speed as to effect its own degeneration, and by virtue of its pressure to choke out the life of its host, possibly to bring down a rising monarch tottering to the ground. The more highly complex a healthy structure the more easily it gets out of gear ; the lower the type of an unhealthy structure (say cancer) the sooner it degenerates after rapidly attaining its ends—complete growth. What man wants is a highly complex brain and a very simple stomach intolerant of injury. To return to our apes, we must not forget, as Huxley says, that "there is less difference between man and the higher apes than there is between these and the lower." But how do we account for the former losing their tails ? Physiology teaches that an animal with an organ for which it has no use, or abuses such use, soon loses movement in the organ and then the part itself, *e.g.*, the hermit crab. And so with our monkeys : disuse led to their loss of an organ originally of great use. The law of use and disuse similarly explains the modification of plant life—it asserts that organs become degraded when no longer useful to the economy of nature ; it shows that degradation is subservient to the welfare of the animal or plant as a whole, and is related to the law of adaptation in nature which ordains that "whatever is, is right." Habits

modify structures and time brings variation. For Darwin says, "I find in the domestic duck that the bones of the wing weigh less, and those of the leg more, than do the same bones in the wild duck, because the former flies much less and walks much more than its wild ancestors." Wasting again of parts is constantly seen from disuse, and hypertrophy from excessive use, in, for instance, the limb of paralysis, and the blacksmith's arm. Again in the parasite of the hermit crab, a notable example is seen of a creature losing its limbs, for the Nauplius (the young of the Sacculina), directly it fixes on to its host (itself a semi-parasite), loses the limbs for which it now has no swimming use, although Nature is generous enough to provide for so mean a type of life six short feet at an early stage. Degradation follows disuse—so much for degeneration as a type of Darwinism. If we look for evidence from the limbs of animals, "what can be more curious than the hand of a man formed for grasping, that of a mole for digging, the leg of the horse, the paddle of the porpoise and the wing of the bat; should all be constructed on the same pattern, and should all include similar bones in like positions?" The patterns are similar and yet the parts are used for widely different ends; "we may call it conformity to type" without getting nearer to an explanation, but is it not powerfully suggestive of true relationship of "inheritance from a common ancestor" (Flower). To

say that things were created so suddenly may be a confession of dogma, but it is in no sense scientific, let alone true. Perhaps some will ask, How do you account for the variations seen in limbs of vertebrates? Given that they are modifications of a common type derived from ancestors, to what process do they owe their modification to the different wants and ways of life of their predecessors? The fundamental structure being the same—inherited—to what law of life do we owe the varied function? I reply—Adaptation! or modification of an early type to new duty. Alteration and modification of a structure take place according to duty, and as required by the kind of life. Secondly, the variations that are profitable will be preserved, such modifications as fit a limb for swimming, as occurred in extinct whales first inhabiting land and then water, or for flight, as in some pigeons. Yet the type of the skeleton remains as before. Such illustrates the theory of natural selection. What is its gain? It preserves the variations and alterations in structures favourable to the preservation of the animal and its race-condition favouring it in the "struggle for existence." The presence of the varied scheme of vertebrate life of to-day—the active bird, the crawling serpent, the lithe fish, the fleet steed, the aërial bat, and even man, appear as a testimony of the operation of a great law of Nature, which decrees that the newer and stronger shall possess the earth, while the weak and

deformed are at the same time prevented, perhaps wisely, from cumbering the ground. I refer to natural selection in general terms. There is a constant reversion in nature to extinct types of life in organs transmitted. Of course there are many so-called "missing links," but investigation and travel (museums) will produce most, if geology does not illustrate all. Although Lyell says: "The record is never complete, it is Nature's duty to unite everything, for even portions of her annals have to be ground down to furnish materials for new strata; and again, we can never hope to complete a consecutive history (on breaks in sequence of rock formation) by gathering together monuments already detached and scattered to the four winds of heaven," no more than we can fill up a blank in the political annals of England by a scrap of Chinese history." Just as Professor Owen builds up a skeleton from a single bone, will geology complete its task, like finding a work of 100 volumes, many may be lost and pages gone, yet we know the "missing links" are to be found and have been (Judd). The countless series of animals have undoubtedly a common descent through infinite modification from germs of apparently no structure, and life may be said to be illimitable. Progress was originally very slow, oft interrupted, but sure, and the life forms ascended *pari passu*. Such a lingering advance brought variation and modification as surroundings changed—at

times development, at other epochs a decline, in species and in structure, according to use, disuse, and habit. Yet the scripture of events in geology can never be broken. Similar agents and laws are still going on. "The earth itself speeds through space heedless of the freight of life that throbs and struggles on its surface, and that at last is laid to sleep in its bosom, careens and brings the seasons in sureness, spins and gives unfailing the sunrise and sunset, and in periodic changes in its orbit crowns, at one epoch its northern pole with vines and oaks and water lilies, and at another epoch covers it with impassable ice." (Clodd.)

With the gigantic task the investigator has before him it is natural to find in the earth's history great divergence and gaps, for the nearer the strata, the more do the fossils approach existing types; and the newer such, the more highly organised the life forms become. In the Palæozoic strata not a fossil species now existing is found, and the types are degraded. Lapse of ages improves the forms; complexity increases the "struggle," and time brings the "links," and forms are transmitted and become stable—the parent gives to the offspring its peculiarities. We find that no two animals are alike, for the shepherd can recognise each sheep in the flock, and the Laplander each reindeer on the hill-side, not to mention the gardener who knows one bulb from a thousand. *Natural selection* accounts

for variations, and explains, aided by "sexual choice," the beauty and form of birds and beasts, but Nature destroys the rickety and feeble in the "struggle" involved. Did it not obtain, a pair of elephants (slowest breeders) would in 750 years produce nineteen millions and over-run the earth; from a roe are produced eight millions of eggs, and if they all lived the sea would be solid; a fly in a single season produces twenty-one millions, and some fungi even more, by billions, in a few hours—there is continually a great slaughter going on. Nature is ever careless of the single life, so decimation balances supply. By sexual selection, female kine and birds, &c., show a choice of the victorious males in battle, and so we have the rich song of birds, the antlers of the stag, and the mane of the lion in beauty; and, by virtue of rivalry and struggle, we have the gold-finch, the pea hen and the Argus pheasant. Man takes advantage of transmitted likeness; by selection he seeks to bring about strength in the cart horse from a given species, as alike speed in the race horse; he develops special qualities in the blood-hound, the terrier and the spaniel, so the struggle for food and place is ever severe—the race is to the swift and the battle to the strong. Amongst men who follow the same calling, this applies forcibly, even now. With plants, those that have the longest hair have the largest absorbing power; the sweetest and gayest

flowers are most robbed, yet their kind is perpetuated, less favoured specimens perish in the struggle to live. Among birds of flight the "longest on the wing" survive and emigrate or return home, while the weak fall by the way. The lions of the forest of best sight and most elastic spring, as alike the wolves of keenest scent, secure their prey. The prowess amongst other animals holds good, and "choice," after battle, rages at home and abroad; sea lions fight for the mastery, stags and deer engage oft in mortal combat for "the favourite."

"Meanwhile until Philosophy
Sustains the structure of the world,
Her working will be carried on
By hunger and by love."—*Schiller*.

Beauty of colour, form, odour, or voice constitutes the bone of contention, and natural selection in the place of its derivative maintains the balance between life and environment, where, if adaptation does not obtain, life ceases. By *artificial* selection new features and varieties are produced, thereby the Otter sheep and the Fantail pigeon. Such theories bring their reward in natural selection, for in the struggle to live the lion gives speed and agility to the antelope he pursues, and the bee scent and colour to the flower he robs.

Let us now condense into a summary the doctrine of natural selection.

(a) No two things are alike—variation proceeds with surroundings.

(b) Heredity transmits qualities—the higher this the better the flora or fauna, to maintain the struggle.

(c) A ceaseless, "struggle" ensues to live amongst myriads of living things, and—

(d) The majority succumb.

(e) Variations produce new species, and all that we can ask is, has sufficient time advanced to effect all this? This is not decided, and does not affect the evidence in support of the theory of descent. The estimate of geology is, that present changes being the measure of past changes, there has been a lapse of not less than—allowing for the possibility of great and sudden revolution—*one hundred million years*.

CHAPTER II.

*"He found the Temple of Science to be made of brick and
he left it marble."*—After Dr. Johnson.

*"Things seem to die, but die not; the spring showers
Die on the bosom of the motherly earth,
But rise again in fruits and flowers and leaves,
And every death is but another birth."*—Mallock.

CHAPTER II.

Synopsis:—First Cause—Origin of Life—Man's Brain Compared—Lower States of Consciousness—Examples in Vegetable and Animal Life—Language—Difference between Men and Animals—Primitive and Savage Races—Intellect—Will—Abstract Ideas—Social Instinct—Mystery of Consciousness—Memory—Consciousness as the Attribute of Life—Examples—Common-sense!—Memory in Insect, Animal, and Savage Life—That of Civilised Man—Relation to Nerve Matter—Clifford's Views on Consciousness—Metaphysics of Mind and Body—John Milton's Views!—Those of Lucretius.

REVIEWING with admiration and wonder the progress of descent in such a doctrine—that injures not but elevates design—all must admit it is not a chance one, for matter can only be organised by will, and life alone proceed through matter; but nothing sprang suddenly into being. As Clodd says :—"The 'whence' of the nebula, the beginning of the crystal, the origin of the cell, are beyond discovery ; we can trace thought

to change in matter; but we cannot pass from chemistry to consciousness, or transform nerve motion into love, reverence, and hate."

And this brings to our notice the human brain, which may be looked upon as the paragon of development; but there are two things about it:—Firstly, that its faculties are derived from previous brains. Secondly, if it is compared with the brains of apes and other mammals, with the cephalic organs of birds, reptiles, and fishes; with the curious ganglia of insects; nay, further, with that strange structureless little point of jelly, the "amœba" (endowed with an attribute of nerve matter, "reflex action"), which somehow, though it has no brain, nerve, or stomach, or other organ, yet apparently can feel and select its proper food—if this long detailed comparison is made, there is something in common besides that mystery we call life. So the naturalist shows that the most complex structure is built up from the simplest, and that the work of the new natural history is to trace this building up during the hundred odd billions of years in which it is stated Nature has been at work.

Lower States of Consciousness.—A consideration of the conditions of consciousness is not out of place here. What is its nature and whence its origin? Conscious states are dependent on the properties and activities of nerve tissues, as magnetic shocks and influences are due to the properties and action

of iron. We can no more explain the relation of cause and effect in the one than we can in the other. Analysed, it is the elementary principle of mind, because inseparable from sensation and emotion, and it is distinct from the higher states, intelligence or instinct. It is generally supposed that the brain is alone the seat of consciousness, but the irritation and response of nerve discs in insect and other life conclusively disproves it. Consciousness is, then, generally an attribute of nerve matter, although a centre of consciousness is well represented in the brain, which is the chief office. There are hosts of messengers (nerves) and many branches outside the brain. Nerve then is a medium (not a mode) of consciousness, for we cannot have consciousness except through a something which acts, and so consciousness is a result of something which moves. The higher the nervous system the greater the consciousness; very low must we go in life to trace its lowest type, and even then we find that many plants, notably Venus' flytrap (*Drosera*), *Dionæa*, an American plant, and *Pinguicula* and *Utricularia*, aquatic plants, are responsive to irritation, and possess an apparent consciousness or sensation in their glandular and vascular systems, for with neither stomach nor nervous system they devour insects wholesale, and are very sensitive. There is no break in the chain of nervous development—in

the two kingdoms disparities exist and apparent gaps, but only as we get very high in vertebrate life. The higher condition of consciousness I shall dismiss, and travel to the highest development of a conscious state in intellect. Language constitutes the main distinction between brute and human intelligence, and this acts in concert with social influences in forming society, but there are many other differences. Each have alike organs and feelings in common, but animals, while being intelligent, have no intellect; sympathetic, have no ethics; emotive, have no conscience. Although judgment is shown in animal action, and intelligence in their moving about and adapting means to ends, they lack conception, the power of grasping abstract ideas, but they are essentially social, know duty to their kind, and exhibit a dawn of consciousness in remorse of wrong-doing.

Intellect—Will.—Intellect comes only with the human stage, because man alone discriminates symbols. Commerce is the outcome of complex social states, and so European differs from primitive races, as man differs from animal types. The bridge between human and animal intelligence is the language of symbols, and this is the cause and effect of civilisation—the gap between man and monkeys. An animal possesses the logic of feeling to guide him; the man has the logic of signs; a knowledge of par-

ticular facts in the one exists—that of general facts in the other. But how does man obtain a superiority over animals to achieve his ends? Well, by his faculty of concentration he is enabled to count or group things. Fingers and toes were probably first used for symbols, and are even now used by savage races. In 1878, while coaling at Zanzibar port, I was interested in seeing a native count the sacks by cutting notches on a piece of wood. From counting man passes to numerical relations, viz., algebra, and thence to its higher relation—calculus; it is thus then sentience begets science, and facts become laws. But although an ape cannot construct a scientific theory, analyse a fact, or frame to himself a picture of the life led by his ancestors—facts which lead orthodoxy to reject with scorn the theory which seeks for an explanation of human intelligence in the functions of animal organisms generally, plus spiritual agency—it must not be forgotten that a savage, from whence man was certainly derived, cannot understand a philosophic conception, that the peasant is little better than the ape in the problems of abstract knowledge, for neither can weigh the stars or understand equations; the language of both is without terms for justice, sin, and crime. As G. H. Lewes says, he has not the ideas; he understands generosity, pity, and love little better than the dog does; his aims are all immediate—practical. So images and symbols explain

intellect, and language becomes a social product for a social need—that of abstraction—and the barrier is past.

Moral life serves a social medium, and this responds to a law of order—the Cosmos; but social conditions abound in animal life, and social instincts are similar to those of the individual, although they keep in check selfish desires and subordinate the person to the general good. Man's intellect hereby emerges from animal intelligence (see Lubbock's "Prehistoric Man"), which develops a vast independent creation. From this springs a moral intelligence. "Both intellect and conscience are products of the animal impulses acting and reacting; the intellect surveys the relation of the Cosmos and its history, and regulates them—the conscience making itself adaptive to the relation of humanity" (Bastian).

The subject of consciousness, an attribute of so much life, deserves further study. We find that consciousness of animals is largely organic, for their needs are continually carried on without their knowledge. Any sensation of which the brain is conscious entails fatigue, and many duties being unconscious, automatic (walking, playing, writing), are necessarily done with ease; the call on the bank of registered impressions is met by a ready response. Some prodigies, as Zerah Colbourne, the great calculator, and

J. K. Clifford, always had answers ready made to abstruse subjects; they seemed to come into their heads. Shakespeare had an unconscious brain, "for there was more in it than he even was aware of" (Carlyle), and Goëthe it seems was afraid of the essence of mind—"he did not wish to know what it was." The art of mental life and progress is to store up a large fund of this apparent or reflex condition, for it is the veritable essence of life and nerve development. I go farther, and say its best expression is soul—that cherisher of pleasing hopes and fond desires to live for aye by æsthetes here below.

There is an objective—what we are immediately concerned with—and a subjective, consciousness or memory, and for most of our life our absolute consciousness is asleep till aroused. Now it is the faculty of waking this stored-up consciousness that we speak of as memory, which is an attribute of so much life—for even a puppy on burning its nose stores up the fact more permanently than does man, who so often perpetuates by its repetition-error. So we have the proverb: "Don't keep a hair of the dog which bit you." It is not generally known that each link in the chain of nerve discs that form an animal's nervous system is a centre of consciousness, and that the latter extends to the toes. What we call memory, then, is stored up, or apparent consciousness (as a lower state), and the art of mental life is as before

stated. Thought is the vehicle or agent of memory, and may be defined as the active expression of a latent or dormant consciousness, and to constitute in its activity a call on a bank of registered impressions.

The kinship between the consciousness and the manifestation of the personal spirit would seem to be identical, for without either the "Ego" enjoys little more than a name, like a log of wood. Destroy the consciousness of the "Ego" and you destroy, *ex parte*, the life—the psyche. Witness the life blank of paralysis and the effects of brain compression; relieve either, and the personal "Ego" asserts itself. A story is told of an officer, who was wounded in the head at Sebastopol, and was taken to the "Dreadnought Hospital," where he remained unconscious for twenty-three years. He suffered from compression of the brain—a bullet struck him when giving the word of command. Directly his consciousness returned he finished the word of command. His "Ego"—his mind—in the interval was a complete blank; there was no spiritual remembrance. Consciousness appears, then, to be essentially an attribute of matter—for its dawn, its highest expression, as alike its history, are alone coeval with the integrity of a nervous organisation. It is the cause of all our joy and all our sorrow, and did perfect harmony exist between us and the world, the "Ego," and the "Non Ego," there would be no

consciousness. The greater the consciousness the greater the common sense, for all this is but the unconscious blending together of small experiences registered in the past, and inferences derived therefrom, and so "He most lives who thinks most, feels the noblest"—more deeply in this life; and our duty becomes, increase and multiply your stores of impressions and live to the full. "He had such an undercurrent of wit," is a trite remark often heard, and what a pleasure it is to see this in play!

But it must not be inferred that memory, the faculty of drawing on registered impressions, is alone man's distinguishing prerogative. It is well represented in insect, animal and savage life. An ant can remember for four months a mate taken from its beat, and Darwin tells a story of a savage dog, who was put away for five years, and on his return recognised his master's voice. Elephants remember acts of kindness or abuse for many years, and have the bump of "locality" well represented. They will remember the kindness of visitors repeatedly in a town parade. They also reason, for if placed in swampy quarters they will batten down the ground to resist pressure or utilise straw if near them. They will also remember their keepers, if absent, for many years, although their sagacity does not approach that of a pigtailed baboon, who, when he loses his teeth, will, after breaking open a nut with a stone, hide it for future use;

or again, that of an orang who will make tea, use his table napkin, and "touch glasses," when invited, and all this with respect. (See Romanes' "Animal Intelligence.") We have marked intelligence exhibited by other animals, as the nut-hatch of Japan, and the carnivorous mongoose of Central Africa. Professor Newton, speaking of the former, says :—" Instead of the more yielding fruit of the yew, I once substituted hazel-nuts ; as the bird was unable to crack them he placed them in his water glass." (" Travels of a Naturalist," 1870, p. 278.) Given an egg, the writer has seen the mongoose—unable to break it with his paws—place it between his four legs, and with a backward propelling movement jerk it forcibly against a wall. Esquimaux dogs, when travelling in numbers over thin ice, exhibit reason in spreading themselves out and going full tilt. These examples of sagacity and cunning surely equal proud man, and are not surpassed by the artifice of the priest, who had to do penance in discharging the sacred duties of his office, by tolerating peas in his shoes. He complied with the terms of his punishment *by having the peas boiled*. Other evidences in insect and animal life abound. Placing an ant in a treacle pot suspended from the ceiling, Romanes observed that the sole tenant of the treasure house conveyed the news to a distant camp, and that a file of ants were soon on the track. A monkey once stung by a wasp in a

paper bag holding food, a fortnight after on the same trick being repeated, *listened for the buzzing*.

Compared with these intelligent feats, what approach can the savage make? Well, in memory, he will occasionally surpass his vertebrate inferior. Dr. Moffatt, the missionary, knew a half-witted savage who would, after hearing him preach a sermon, hold forth and repeat, with precision and solemnity, its substance, in a gesture and manner approaching well-nigh the original: and a dement was known to the writer who could repeat the whole of the New Testament verbatim. But all this only proves that memory is an attribute (it is true, also, an acquisition) of inferior brain power, and is ever very subordinate to the higher attribute—judgment.

Then consciousness is the attribute of nerve matter, generally from insect to man; it remains the expression of sensation and nerve motion; and the gentle or excessive vibration of nerve as its medium is felt either as pleasure or pain. Clifford says that "the energy or spiritual body is replete with power when the brain decays and starts off through the unseen universe, taking consciousness with it but leaving matter behind." Consciousness is then a complex condition—a stream of feelings—the action of the brain—a stream of nerve message. He also says: "that the relation of feeling to nerve message is not that feeling is part of consciousness, because the ner-

vous system of animals grows simpler as we descend in life." We cannot say where it begins or ends, and many thousand nerve messages go on without our knowing, without animals either being aware of them by feeling, so much are we automata. So nerve message may exist with or without feeling, and consciousness even extending to our toes remains complex—feeling being an expression of nerve message or not:—but destroy these nerve messages and you destroy the feelings—consciousness will go.

It is then *the* attribute of life—the link between body and soul, and the question that arises is, if that consciousness dies with the body, does it continue to live on with its purer half? Careful enquiry leads one to think that, like a tiny tributary, the soul with a consciousness non-corporeal is gathered to the ocean of divine energy that presides over creation—like the

"Weariest river that winds somewhere out to sea."

When this happens the water is not lost, but the stream is dead.

Since "the passage from the physics of the brain to the corresponding facts of consciousness is unthinkable," so our imagination halts at the idea of a man without a head; as well think of a horse without a body—there must be something to govern it. And we can no more understand a body without a mind

than we can of the immaterial state of the soul. It was the opinion of John Milton (see "Masson's Essays"), that the soul died with the body till the divine source of its habitat again claimed it. And Lucretius says that "the mind cannot come into being alone without a body, nor exist far away from sinews and blood." Surely the voice of the poet and the dictum of the great philosopher are worthy of our respect. The disunion of either body or soul in association with life is without terms of expression. Whatever the subtle element is, it is the same essence in kind that characterises brute life. Their life energy, their conscious entity is labelled "Corporeal, material;" we snuff out the last iota of respect to the mystery of their life, and yet their complex organisms evince the like principle in kind that we lay claim to under soul; whereas the same touch of nature makes the whole world kin.

CHAPTER III.

*" All forms that perish other forms supply ;
By turns we catch the vital breath, then die."*—Pope.

" Thus dead matter, animated by vital force, passes through a countless series of races, and perchance enshrines in the very substance in which of old a miserable worm enjoyed its brief existence, the divine spirit of Pythagoras."—Humboldt.

CHAPTER III.

SOCIAL DEVELOPMENT.

Synopsis:—Social Development—Birth of Mind—Dawn of Instinct—Shape and Capacity of Brain—"Reflex Action"—Birth of Society—Natural Selection Relenting spares Types of Genius Aided by Sympathy, &c.—Examples—Struggles of Society—Cost thereof—Gain—Examples of Instinct in Social Types of Life—Language Dormant—Its Centre—Bees—Birth of Language—Of Morals—History of Each—Evolution of Religion—Soul—Views of Lubbock, Beattie, Coleridge—Natural Selection still at Work—Existence of a Creator.

Birth of Mind—Instinct.—Man may be looked upon as but one in ultimate beginnings, and in the stuff of which he is formed with the meanest flower that blows, since that in manner of development from the embryo there is exact likeness between him and other mammals. As is remarked by Professor Huxley,—"English Men of Letters," Hume—"Structure for structure, to the minutest microscopic details—the

eye, ear, organs of smell, nerves, spinal cord, brain of ape or dog, correspond with the same organs in the human subject; cut a nerve, there is paralysis or insensibility alike in either case; apply pressure to the brain, or give a narcotic, signs of intelligence disappear." The changes that give rise in brain motion to consciousness take place equally in man and brute. The dawn of sense is seen in that of touch, "the mother tongue of every sense." It is from the necessity of putting in action new parts and fresh functions, to meet given ends, that senses are elaborated and nerve tracks are permanently laid down. Practice makes perfect in new use, and by repetition being incessant, the lowest and simplest nerve actions, known as "reflex," take place automatically in plants and animals. Such are the contractions of an amœba, or of the leaves of the mimosa; the shutting up of an oyster when the shell is touched, winking, the action of the heart, and other actions performed unconsciously—the need of their discharge becomes innate. Besides these there are artificial reflex actions, as reading, playing.

b. Instinct is a higher form of reflex action, for the bird makes its nest, the bee builds its six-sided cell, the spider spins its web, the chick emerges from the shell, in virtue of like acts on the part of their ancestors (registered and oft-repeated actions). These acts do not vary from age to age, and the tendency to

repeat them is transmitted within the germ from which life proceeds in fish, insect, bird and beast. A story is told of a St. Bernard puppy that was taken into the country, when a sharp fall of snow fell; the dog, who had never seen it before, rolled in the snow, bit it, and endeavoured to recover lost treasure or a buried traveller. The instinct to retrieve, to succour, was innate. The main difference between instinct and reason is that while the one is done because the animal cannot help it, and knows not the relation between ends and means, the other is the conscious adjustment of means to ends; in the one there is no pause, in the other an interval.

"There is not a faculty in the human brain which is not possessed, in lesser or greater degree, by animals, oftenest in lesser degree, sometimes in greater degree, as in the showing forth of affection and devotion that oft puts man's selfishness to shame." The nearest faculty (very near) is seen in embryonic life (see Foster's "Embryology") and infancy (also see Andrew Wilson's "Evolution"). The capacity of receiving instruction and profiting by experience only comes with growth of nerve matter (maturity of the fabric of life, if you will). Knowledge of things acquired, and habits that arise, make character—and it becomes of the utmost import to know what is true and cultivate what is good.

"But vast as are the differences between the

highest and lowest mental acts, there is no break in the series which, starting with the reflex movements of the amœba (protoplasm) or a carnivorous plant, advances along the line of animal instinct and intelligence, and ends with the complex movements of the brain of civilised man" (Clodd). Some examples of instinct and social life in ants will be discussed hereafter.

Birth of Society.—The mortality of the human race is enormous, in response to the struggle for existence, and the weeding out of the weakest is a law of natural selection. Seven hundred million human beings every century are minced down into nothingness, unknowing that they lived, to say nothing of mortality from early life and war. Where the weak and diseased live and baffle the stern laws of their environment, it is by the play of mercy and sympathy, and alteration of natural states. This is a beneficent power, and thanks to civilisation, although hosts of deformities encumber the ground, we gain weaklings, at times, of genius—we are enabled to boast of a poet like Keats, a philosopher like Newton, and a hunchback like Pope. Humanity is enriched by the spirit of tolerance, and adds to its history monuments of genius that in a barbarous age would be stifled at their dawn. Man's normal state is one of conflict; long ago it impelled the defenceless bipeds from whom he sprang to unity. The range of this continued long after he had obtained

mastery over the brute. Need for combination gave way to struggle to gain the ends of life, and still holds good in most communities; the tactics of society may change and war be superseded, "but be it war of camps or markets (in commerce), the last appeal is to force of brain or muscle; but brain always first."

The strength of man's emotions, his craving for excitement, have undoubtedly increased the struggle that has exceeded that of brutes who fight for food and mates; but no brute ever tortured its kind as man has tortured in fiendish glee the victims of his revenge, intolerance and hate; and what is the gain of this admission? Well, peace is wrung from pain, war builds a nation, slavery and superstition give way to progress; curiosity, the mother of knowledge, is awakened, patriotism, morals, and hardy virtues are produced. As to our cost for these advantages—small content follows "unless we believe that the tardy years are bringing us nearer to the goal where might shall be subdued by right, and injustice and selfishness swallowed up by goodness" (Clodd). *Man's social instincts are inherited from his pre-human ancestors*, but they are well represented in brutes. The duty of rendering services to their kind becomes so innate that they oft become impelled by sympathy and love to minister to the welfare of their own kind. Social instincts are well seen in ants, bees and wasps, and higher in dogs.

Community of interest is a binding force, then, in the establishment of social states. Instinct is spoken of generally as a term that names all the mental qualities of animals, but there is no doubt that the mind of an animal is constructed on the same principles as the mind of a man, the difference between the two consisting merely in the difference of relative degree in which instructive faculties predominate in the animal, and the rational faculties in man; the one is inborn, spontaneous, the other is reflective; the one adaptive, antecedent to experience, and the other adaptive after this is gained. It is found that the most extraordinary examples of instinct are seen in ants. All the ants of every nest know each other personally, and this in an ant town of 2,000 nests. This is proved by taking to a nest a foreign ant, who is immediately slain. (*b*) Again, if you take away the crysalcs or eggs out of an ant nest, and hatch them at a distance, and then return them to the nest, the young ants are at once known as friends (sense of smell). (*c*) If you take away the queen ant before she lays her eggs, and she lays them in any other place, and the young returned to the original nest, all the ants recognise the progeny of the queen—blood relationship is distinguished. Communication is conspicuous, and this is done by rubbing their antennæ together; thereby locality of food is given, "this way home," and "this way out," "follow me!"

&c. (*d'*) Then again they keep other insects for the purpose of furnishing them with a sweet secretion. The aphides are larger than ants and act as cows: the ants build a mud wall or stable around them with a door just large enough for the ants to go out, but not for the aphides. They go in quest of eggs in October which they find on daisies; these they store and hatch in March; directly they are born the ants take them to pasture on daisies, and then escort them home. (*e*) The keeping of slaves as beasts of burden is well known. (*f*) Another remarkable habit about them is, that they keep pets, in the shape of beetles, which they play with—so creatures for work and play serve apart in the republic of ants. They are very clean; this is a social instinct, and each acts as the other's valet, for "one good turn deserves another," and a brush up of its fellow discharges the common obligation. Romanes says, that they play "hide and seek," have wrestling matches, and behave just like athletes. It is certain that they conduct funerals, and make bridges of themselves when they want to cross a stream.

Bees have strong instincts; by that of mutual pressure (Buffon) they excavate their wax and form cells; the wonder is that they appreciate the distance of each other in so doing, but adaptation is so often seen in nature—like blowing soap bubbles in a cup, one bubble disports itself with due regard to the rest.

The sense of direction is dependent on land marks, the recognition of which is instinctive, for if ants are taken out of their beat they do not return to the hive (Lubbock). To give one more example of instinct, the sphex, a kind of wasp, lays up for its young a store of insects for food when they are hatched, but it always stings the insect in order to paralyse it, and this is done on the seat of nerves; if not stung the insect (say spider) might be too much for the young sphex if killed, and the food by decay would be sacrificed.

Birth of Language.—This, the most distinguishing feature between man and brute, had a simple beginning. It probably began in signs and gestures, and then progressed by an inexact and crude gamut of sounds as with animals. Captain Cook compared the voice of the Fuegians to a man clearing his throat, but the obstruction abides that language is the plastic symbol of ideas of unlimited range, and marks the gulf between man and brute. Its origin lies in man's need to speak to his fellows, and but for it all attempts after social ends would have been like weaving a rope of sand. Various tongue sounds struck out the names of things, and simple root sounds gave way to compound words. Gesture language still exists, and many American Indians can only talk in the dark. The scanty and shifting speech of lower races has come from mimetic sounds, and so has proceeded the rich

and copious language of civilisation. "Language has followed a law of evolution in advance, from simple to complex, from noun and verb, to the elaboration of families of words and parts of speech (Whitney "On Language").

For countless eons, though primitive man possessed the complex machinery of speech, he made no use of the function. Language had not arrived at an articulate stage, and was probably only represented by gesture. The need in social life (such as it was) for anything more than the necessities of life had not arrived. From investigation, Arabic seems to have been the oldest recognised language (see Whitney), and it was not until 1861 that science found the chief office or "centre" from which, through the call of will, the message is transmitted from this speech-centre (by a volition current) to the instruments of language, viz., the mouth, &c. Brocà found it to be situated in *the hinder part of the third lobe of the left half of man's brain*, and not to exceed the size of a pea (disease of this disc abolishes or impairs speech).

Birth of Morals.—Man is by birth un-moral; he knows nothing of ethics, and right and wrong become terms of distinction only on instruction. Were there no society, there would be no sin. There must be offence against somebody, and with offence the conditions of right and wrong. From combination springs praise or blame, pleasure and pain to others, and this

constitutes the moral code. Society has a struggle, and morals constitute its conscience. With the preservation of the best interests of a tribe came sympathy, and this is the basis of morals, for restraint, limitation and self-interest come into play, and these are observed as men get property. Whatever is helpful to a tribe or society is good and right, and *vice versa*.

A man must be true to his fellow, for sympathy begets approval and actions become obedient to wishes, although, of course, these may be selfish; man's higher instincts crave for society and sympathy. Regret is inborn in following lower desires, and resolutions to be better are acquired by experience—knowing what is due to others. Heredity and acquired experience dictate to the following of high impulses, and obedience to social (tribal) states constitutes the birth of morals. Remorse becomes the offspring of reflection, and the dawn of conscience and the following of the higher impulses confers the stamp of nobility on man as the paragon of animals. Morals are, then, relative not absolute—the standard of right and wrong is not fixed for all time, except with fluctuations in Western countries—for the moral code advances with the race's progress, and conscience becomes a growth (see Lubbock's "Pre-historic Man").

What society approves at one time it condemns at

another—such is the power of custom and authority ; and so deep is its interest against change, that acts are often grafted on a question apart from character—hence the laws to keep certain days sacred with different races, hence the tyranny of caste among Indians. With some Mahommedans it is a greater sin to dine at an hotel than to commit murder ; among savage races it is worse to marry a girl of the same tribe than to slay one of another tribe ; among ourselves, society forgives an offence against etiquette less readily than an act of dishonour. Alterations in criminal laws witness to progress in morals and humanity. It is not long since people were burned for stealing money or coining what was false, or hanged for stealing a sheep. The humane raised no protest, and Christianity did not question its justice. The elevated tone was in the main due to the march of science, and a juster appreciation of human life. The social good is the element of consideration. Man's capacity can never exceed his loftiest ideals, and to conceive them is to follow them. What is often called sin, is more often due to an imperfect sense of the nature of things, and "evil is wrought for want of thought, as well as want of heart." Morals then are due to the social instinct—the good of all—"for the mass of evil can only be lessened by suppression of selfishness, by keeping the balance between such care of ourselves as shall best fit us for

man's service, and such thought for others as shall inflict on them no suffering " (Morrison). We do not adequately value the signification of descent—what our ancestors made us, plus the play of circumstances around us, and self-conquest lies in obedience, which follows on knowledge. The law and commandments become the rule for conduct in life (see Emerson), "for if man be true to himself, he cannot be false to his fellows, and what he sows he will undoubtedly reap sooner or later."

Evolution of Religion.—Ample evidence from men who have existed with savages is forthcoming, "that numerous races have existed, who had no idea of one or more gods, and who have no words to express such ideas in their language" (Darwin); and this is confirmed by Canon Farrar (*Anthropological Review*, 1864), and by Sir J. Lubbock in "Prehistoric Times," but belief in unseen spirits seems universal with less civilised races. Probably the powers of imagination, wonder, and curiosity, with some reasoning, led man to speculate what was his beginning, and about the future. Dreams seemed to have played a part, for "man was probably led to look at himself as double through dreams, shadows and other causes" (Spencer), and the belief in the spirit of an early progenitor; then again the belief in animated objects. These severally passed into beliefs of the existence of one or more gods, spirits of good and evil (especially the

last after wrong-doing). The Fuegians, we are told, believed in no god, and practised no rites. Religion is a highly complex devotion, and is a "reflex" of an ideational or emotive sense, and hence is largely exhibited by those strong in emotion; it embraces hope, fear, gratitude, dependence, and submission, and for these very reasons could not have advanced till the intellectual and moral (emotive) faculties reached a high level. Some distant approach to reverence and dependence is seen even now in the love of a dog for his master. Such gratitude led to a belief in spiritualism, fetishism, and the belief of one or more gods; and in the development of true religion rank superstition has held its sway, with sacrifices of bloodshed and the stake to record its rise, and with a crimson blot of shame and disgrace to stain its history. "Even now the horrible dread of an unknown evil hangs like a thick cloud over savage life, and embitters every pleasure" (Lubbock). Ignorance, the mother of mystery, made early man the slave of his fears; an empty mind foreshadowed demons of panic, and terror ascribed in his mind a life to everything that moves, from the sun in heaven to the stones at his feet, and the fear of vengeance from unseen spirits embittered his life. Like the lunatic of Shakespeare, the savage man "apprehends more than cool reason ever comprehends; he sees "more devils than vast hell can hold." The imagination of the emotional creature

is ever conjuring up "some shaping phantasy," some airy nothing, some form impalpable and unperceived. The belief in a soul did not always exist then, although Beattie says "it existed for all time, but not with all people," and this is borne out by Lubbock. Virtually the creed belongs to the old-world philosophy, from whence it crept into Christian theology, although its early teachers (Justin-Martin and Athanasius) believed the soul only to be *capable* of immortality. Some of the most influential of the early Christian writers (says Coleridge) "held that the soul was the result of bodily organisation—material, corporeal—and the vulgar believed the soul to be incorporeal (with Plato's views), but the orthodox Christian divines looked on this as impious." Probably as reason, science and the love for truth advanced, theology slowly reached its present vigorous growth, and with its growth came its traditions, its hopes and fears, its rewards and punishments. What a debt of gratitude we owe to the improvement of our reason, to science, and to knowledge!

The existence of a Creator and Ruler of the universe has long ago been answered by the highest intellects that have ever existed. The grave is still the cradle of beliefs about the departed with many races, and the tomb becomes the temple. The writer has seen the Mussulman by the hour together at the tomb of his defunct sire. A belief in life, where

power or movement is seen, led to theologies without end, and personality to unseen powers is still a fancy. Many of the beliefs of the past are now myths, which were in ages gone a consolation to many generations of men. In the readjustment, then, in the present and to come, of theology to science—since the latter has no facts to interpret save those which man gains from experience—may the utmost harmony prevail, for though creeds may die and rites possess but an archæological interest, human needs must still endure; and though consolation and comfort come with the one, her ministry of peace and blessing must ever be discharged in presence of suffering and anguish, and ever need the gentle aid of her beneficent sister—science.

CHAPTER IV.

*" His life was gentle,
And the very elements so mixed in Him,
That Nature might stand up, and say to all the world
This was a man."—Shakespeare.*

*" When I am dead and turned to dust, let man say what they
will,
I care not ought." . . . —Lewis-Morris.*

CHAPTER IV.

Synopsis:—Science—Its Benefits to Man—Compared to Game of Chess—Mystery of Life—Huxley's Views—Matter and its Attributes—Man's Duty—Browning thereon—Is Darwinism Science?—The World's Estimate of his Works—"Beagle Log"—"Expression of the Emotions"—Retrospect of Natural Selection—Tennyson on—Sir J. Lubbock on—Bonnet on Natural Selection—A. R. Wallace arrives at same view independently—Future of Hope—Continued Progress—What the "Descent of Man" Teaches—Social Progress under Laws of Natural Selection—Darwin's Sense of Duty—Clifford's Judgment on Man's Consciousness and his Duty—Resumé of Darwin's Doctrine—What our Attitude should be concerning it.

SCIENCE can justly claim a large share of our respect, if only from the fact that through her pioneers we have learned more during the Victorian era than through all time before. She quickens and cultivates the faculty of observation which in many lies dormant

through life, she teaches the sequence of cause and effect, she registers the observations of the special senses on the throne of intelligence, and thereby lays down laws for future conduct and happiness in life. She is the means, when our hearts begin to fail, of transplanting us to pleasant scenes, away from the foibles of our "little world," out of the dark waters of our distracted minds. Speaking as a utilitarian, H. Spencer says : "That science is the most profitable study we mortals have below." Following science is not unlike a man playing a game of chess, for he finds the board to be the world ; he sees in the pieces the events of the universe, and in the rules of the game the laws of nature. The opponent is always hidden away, but we know that his play is fair, just and patient, while, like Mephisto, he never overlooks a mistake. Science has been the means of sweeping away the dark superstitions and degrading beliefs in sorcery and witchcraft, and the cruel intolerance which embittered the world, even from the times of the apostles, and in such a crusade she has surely performed no mean service to the faith of Christendom. May we not say she has proved herself a minister to religion. Under law iii. of Natural Selection, in that more life is produced than can live, she has stimulated man's inventive faculty, and thereby developed the arts and sciences. Misery and destitution or struggle in 20,000 artisans only in one and a

very modern invention, namely, electricity, have been prevented by the labour involved in a single branch of usefulness. The steamships of modern times, through science, have handed over a starving people at home to a distant and fruitful colony. In other directions she has shown not only beneficence and power, but beauty and wonder ; infinite space crowded with worlds unnumbered ; infinite time peopled by countless lives and infinite organisms (bacteriæ, micrococci, monads and protistæ), full of subtle power and of delicate structure ; her mission, in fine, has been to bring about " the greatest happiness of the greatest number ; to economise effort and to extinguish human pain. Through her (a) men have been enabled to face the glowing fire of ironworks through media and under conditions hitherto unknown ; (b) the sunbeam now casts for us with absolute fidelity the faces of those we love ; (c) the poor miner can work with safety even in presence of choke damp ; (d) suffering humanity, through the labours of Simpson, is rendered hushed and unconscious while the operator is exercising his skill ; (e) sight is given to the blind, a fact that in the days of Milton might have enriched the world by an epic equalling " Paradise Lost"—to say nothing of improvements in connection with other branches of the surgeon's craft, the antiseptic system of Sir Joseph Lister, the improved procedures of Sir Spencer Wells, the consummate skill of Sir Henry

Thompson ; as alike vast strides in engineering in connection with light-houses, railroads and cable-laying—all conducing to the length or happiness of life, the reduction of labour, and the trampling on disease. Then let us not refuse the gentle summons of science when she kindly welcomes us—

“ To nature's testing room, sanctum of wonder,
Whose rigid test all living things supply,
Whose scope is rocks and seas, whose voice is thunder,
Whose dome's the sky.”—H. A. S.

After all enquiry, life remains a great mystery. Animalculæ of the lowest type have only yet been seen to proceed from living matter, and, in spite of Dr. Bastian's careful experiments, their origin from inorganic matter is yet unproven and likely to be (see a paper by Dr. Wilson, “Leisure-time Studies”; or Dr. Dallinger's records on “monads and the fireproof nature of their spores at 250° (Fahr.) in conducting experiments on Spontaneous Generation;” Challenger). The evidence of life is universal, and yet, proceeding from substance and energy, it seems unlike either.

If we ask when life was formed, we can only answer that it is enormously older than any record thereof. As to the place, we can but take the statement of Buffon “that it was probably in the North Pole where a change in temperature progressed. In northern latitude (60°) fossil life is found, and later than the

Silurian age, life was maintained of a tropical kind to the Tertiary period. In carboniferous times an equable temperature prevailed further south." And Thyselton Dyer reverts to a like period in tracing the assemblage of plants. As to the mode of Life's dawn, the transition from the inorganic to the organic world; only a play of force between chemistry and protoplasmic development can span the gulf, only fancy based on scientific speculation dare to intrepert. We may have to look to the properties of electricity on account of its influence on life, its resemblance to nerve force, and its contraction on protoplasm or jelly, and this may be akin to the energy of the plant and animal already borrowed from the sun, which again passes on disintegration into space," for the dust returns to the earth as it was. We may have to look to a psychic force of which we are only pensioners in the occult world.

Professor Huxley says of this mystery—the origin of life :—

"Looking back through the prodigious vista of the past, *I find no record of the commencement of life*. I cannot form a definite opinion as to the conditions of its appearance"; he has no belief as to the mode of origin, and further, "but expectation is permissible where belief is not : if it were given me to look beyond the abyss of geologically recorded time to the still more remote period when the earth was passing through physical and chemical conditions, I should

expect to be a witness of the evolution of protoplasm from non living matters. To see it appear under forms of great simplicity, endowed like existing fungi with the power of forming new protoplasm* from chemical compounds abounding in nature." Such is the opinion from analogy and reason of the greatest biologist of modern times; but remember, he does not call his opinion anything but "an act of philosophical faith."

There are four cardinal powers in nature, Matter, Force, Thought and Will, and believers in one or many constitute theists of different kinds. Tyndall "sees in matter the promise and potency of life because it is associated with matter;" and Huxley says:—"considered fundamentally it is by the operation of an inscrutable mystery that life is evolved and mind unfolded from prepotential elements in the past." Is this statement injurious to the cause of orthodoxy? I answer, No! Huxley clearly sees in the factor Will the governor of power. In the beginning was matter, force and thought! and the whole subject may be dismissed by saying that "Will" (first cause) formed the universe, and still continues by the establishment of fixed natural laws to govern it; the brake has been turned on, and the complex machinery of nature continues in motion.

To serve the ends of the universe it is man's capacity

* Critiques and Addresses, p. 238.

to do good in this life that must count—that is the test of immortality—a creditable discharge of a given stewardship—for the adaptation of the life's energy to the world's good *must* speak for itself in another life. As with "Paracelsus," the great question is not of a future life, but of the true idea of this in the service of man; although no man evinces so keen a knowledge of man's inward sense, the soul, our psychological poet, Browning, believes it to be an entity akin to the conservation of force—that works on through all eternity—as part of that divine energy from which it was received and into which it is finally gathered, for neither physics, philosophy nor biology has yet arrived at its fountain and origin, and it remains with all a vexed question; its essence (the soul's) is, in fact, unthinkable. As Descartes said on this matter in 1650, "We know nothing, No! not even that we know nothing."

Unenlightened, biassed and so unrecognised authority says:—Darwinism is not science, &c. Here a conflict with faith is thrown on a great man's work. Darwin was fifty-one years at hard scientific work in the service of man. His writings survey animated creation; they have been translated into most European and several Oriental languages, and ranking—as the classics of the world—with Newton's "Principia," and Kant's "Critique" furnish proof enough of accepted science. To the question, why does not history repeat itself in

man's descent from apes, and when did the process stop? I will quote the "Descent," p. 164. "We must not fall into the error of supposing that the early progenitor of the whole ape-like stock was identical with any existing ape." We have to look back along the files of time to a point whence, from a common origin, the human and ape branches diverged each towards its own peculiar line of growth on the tree of life.

The medium of conversion is extinct; we cannot put back time countless ages; as well expect the tragedy of man's fall to be re-enacted—since extinct forms are but intermediate between past and present. Man owes his birth to a long line of early progenitors ("Descent," p. 165). Obeying the law of natural selection, the lovely floral world reaches its perfection—a law which links plant life with that of insect and insect with bird. Darwin's work illustrates the unbroken chain of vital activity, and balances the faculties and attributes of all life.

The "Naturalist's Voyage round the World," or "Beagle Log," is a mine of lore, and had Darwin not been selected as the naturalist by the government to accompany the "Beagle," we may possibly never have had the "Origin of Species." Had his graphic pen ceased at the "Log" to delineate nature, his fame would, however, have been secure in the discovery of no less than three important

places—Port Darwin, Darwin Sound, and Mount Darwin. Here the keen study of primitive man was made, the dawn of man's descent divined. Here were found men with signs and expressions less intelligent than those of domestic animals; the most intelligent even imagined England to be in London; men who stood aghast at the European fashion of washing the face (p. 41), and whom to study was like watching the tiger tearing his prey or the hippopotamus wallowing in the mud of an African river. Here (Australasia, Galapagos, &c.), Darwin learned habits of collecting, recording and thinking, for in ever questioning much, he learnt much, "and the occasional ray of light he came across was an ample reward." His field of investigation was wide, and he made use of exceptional opportunities of testing the resources of Volcanic Islands, North and South America, the Falkland Islands, &c.; of tracing the distribution of erratic boulders; of noting the play of dust (teeming with life) on vessels at sea; of investigating coral reefs; of unearthing untold geological wealth. His labours here alone stamp him as a man of genius, and when it is remembered that the government in 1837 gave £1,000 to the publication of it, surely the book to which Darwin contributed so much is worthy of our study. In it we are carried to scenes where it snows butterflies, where beetles swarm the rivers in islands,

and clouds of gossamer spiders fill the air (Cape de Verde). The interest never flags—mysteries and beauties of life so abound. Tyrant fly-catchers (birds) distinguish one place, owls of peculiar plumage flit o'er the scene in another, giant tortoises are peculiar to a third, and then we meet with lizards that "go a-fishing." Travel is for ever opening up new vistas of interest. Beetles are found to live in the sea, catacombs of extinct monsters become unearthed at a level little above it. Here are met with skunks that defile the air, and there typical forms of shells that transport the fancy. Here, again, rattlesnakes, that by their hideous and ominous pose appal the senses, and sharks that secrete carmine, and in another place (p. 82) animals that surpass in size the largest elephant; leviathan beasts of the prairie with prehensile organs, that pulled down or pulled up the luxuriant trees of a long-forgotten past.

"The Expression of the Emotions," based on native life, points to the influence of natural selection in forming instinct: on the latter subject even Tennyson, speaking of nature, says:—

"Considering everywhere
Her secret meaning in her deeds,
And finding that of fifty seeds
She often brings but one to bear."

Sir John Lubbock, the eminent biologist, a keen and close observer of all the complex processes going

on in the laboratory of the vegetable world, says of the theory, "I am satisfied that natural selection is a true cause, and whatever may be the final result of our enquiries—whether animated nature be derived from one ancestral source or from many, the publication of the "Origin of Species" will none the less have constituted an epoch in history," . . . although the action of it may have been modified and checked by such laws as "peristence of type and reversion" (Atavism) "Lubbock's origin of Insects," p. 83.

What Aristotle predicted, Goëthe hinted, Bonnet, 1762, affirmed, and A. R. Wallace, 1859, confirmed ("Contributions to Theory of Natural Selection") still holds good. "Animals were not created as seen, but produced by development and modification from progenitors." But it was the Socratic mind of Darwin that elaborated and classified the "vast chain of being which from God began," that converted life chaos into Cosmos. To his observation and study is due the accepted history of animals and plants; and in an age of peace and progress the triumphs of science should count as brilliant as the success of a Wolseley, or the fame of a Senator. Will sectarian prejudice presume to oppose the march of truth (for shame!) Darwin's doctrine teaches hope, and foreshadows a reasoned faith in man's ascent; for, if a monkey has become a man, what may not a man become? such a viaduct is perfectly consistent with anatomical progress and

compatible with the design of creative wisdom. Such a doctrine shows that we are marching steadily on to a newer and fuller life—possibly of more varied and exquisite sense—where spiritual progress may be under like laws—a life that yet may see eternal day in a happier clime, and in the life-picture Darwin, by his works, has left us, we find that—

“ Nothing is foreign, parts relate to whole,
One all extending, all preserving soul,
Connects each being, greatest with the least.”

* * * * * *

We see—

“ All served, all serving, nothing stands alone,
The chain holds on, and where it ends—unknown.”

In the descent of man we learn that the mental powers of animals are capable of further development, and that it is the moral faculties (see their evolution) based on social instincts that distinguish largely men from brutes; so much so that they are more valued than intellectual powers, although the latter have effected their advance. Habit, instruction and reflection doubtless came to man's rescue, and a play of sympathy brought on his social instincts; and habits, convictions, and reason, his conscience, and these together developed a now firm rooted faith; and “surely it is not more irreligious to explain man's origin by descent through laws of variation and selec-

tion, than it is to follow blindly the erratic laws of ordinary reproduction."

Darwin saw that human life is as much the sum total of little beginnings, as that human history is a development of customs and institutions stretching back to the dawn of experience and forward through phases none can foresee. He felt, I have little doubt, that beliefs of men are largely fashioned by environment, race, culture, and personal attributes. Belief with him was a vital, far more than a logical problem—for man's soul is ever under lock and key! Variation and development—so far endless and practically infinite—by selection of the fittest among ideas as among organisms, was probably the formula of his creed, although he may have privately held an idea of spiritual (certainly of mental) ascent, and eternal progress as a conception of "Life to come—of an infinite series of better states!"

Whatever may have been his creed, his sense of duty to himself, to his countrymen, to the world—as alike to the cause of true progress—was sacred and supreme, for human knowledge is as much a guide to human conduct as the faith of Christendom; since poverty, disease, and crime as often follow the path of ignorance and superstition; nor is the motive for goodness and virtue in any way injured by a knowledge of nature's laws.

The hero of this essay kept ever within his domain

—that of science—and a high sense of duty alone characterised the prosecution of a gentle and noble calling. Then let us sink any native prejudice we may have against this genius on the side of pronounced orthodoxy; let us set no bounds to the purifying and organising work of science—"for without mercy and without resentment she ploughs up weed and briar; from her footsteps behind her grow up corn and healing flowers, and no corner is far enough to escape her furrow"—provided only we take as our own motto and our rule of action—"Man speed the plough." (Clifford.)

"So stands the statue that enchants the world,
And thereby hangs a *tail*."

London, March, 1888.

FINIS.

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