

branching corals, and a profusion of *Cyathophyllia*, or cup-corals." ¹

Thus, in all the great periods of the earth's history of which we know anything, a part of the then living matter has had the form of polypes, competent to separate from the water of the sea the carbonate of lime necessary for their own skeletons. Grain by grain, and particle by particle, they have built up vast masses of rock, the thickness of which is measured by hundreds of feet, and their area by thousands of square miles. The slow oscillations of the crust of the earth, producing great changes in the distribution of land and water, have often obliged the living matter of the coral-builders to shift the locality of its operations; and, by variation and adaptation to these modifications of condition, its forms have as often changed. The work it has done in the past is, for the most part, swept away, but fragments remain, and, if there were no other evidence, suffice to prove the general constancy of the operations of Nature in this world, through periods of almost inconceivable duration.

¹ Dana, *Manual of Geology*, p. 272.

NOTES

AUTOBIOGRAPHY

PAGE 1

Autobiography: Huxley's account of this sketch, written in 1889, is as follows: "A man who is bringing out a series of portraits of celebrities, with a sketch of their career attached, has bothered me out of my life for something to go with my portrait, and to escape the abominable bad taste of some of the notices, I have done that."

pre-Boswellian epoch: the time before Boswell. James Boswell (1740-1795) wrote the famous *Life of Samuel Johnson*. Mr. Leslie Stephen declares that this book "became the first specimen of a new literary type." "It is a full-length portrait of a man's domestic life with enough picturesque detail to enable us to see him through the eyes of private friendship. . . ." A number of biographers since Boswell have imitated his method; and Leslie Stephen believes that "we owe it in some degree to his example that we have such delightful books as Lockhart's *Life of Scott* or Mr. Trevelyan's *Life of Macaulay*."

"*Bene qui latuit, bene vixit*": from Ovid. He who has kept himself well hidden, has lived well.

PAGE 4

Prince George of Cambridge: the grandson of King George III, second Duke of Cambridge, and Commander-in-chief of the British Army.

Mr. Herbert Spencer (1820-1903): a celebrated English philosopher and powerful advocate of the doctrine of evolution. Spencer is regarded as one of the most profound thinkers of modern times. He was one of Huxley's closest friends.

PAGE 5

in partibus infidelium: in the domain of the unbelievers.

PAGE 6

"*sweet south upon a bed of violets*." Cf. *Twelfth Night*, Act I, sc. 1, l. 5.

O, it came o'er my ear like the sweet sound
That breathes upon a bank of violets,
Stealing and giving odour.

For the reading "sweet south" instead of "sweet sound," see Rolfe's edition of *Twelfth Night*.

PAGE 7

"*Lehrjahre*": apprenticeship.

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Charing Cross School of Medicine : a school connected with the Charing Cross Hospital in the Strand, London.

PAGE 9

Nelson : Horatio Nelson, a celebrated English Admiral born in Norfolk, England, 1758, and died on board the *Victory* at Trafalgar, 1805. It was before the battle off Cape Trafalgar that Nelson hoisted his famous signal, "England expects every man will do his duty." Cf. Tennyson's *Ode to the Duke of Wellington*, stanza VI, for a famous tribute to Nelson.

PAGE 11

middies: abbreviated form for midshipmen.

Suites à Buffon : sequels to Buffon. Buffon (1707-1781) was a French naturalist who wrote many volumes on science.

Linnean Society : a scientific society formed in 1788 under the auspices of several fellows of the Royal Society.

Royal Society : The Royal Society for Improving Natural Knowledge; the oldest scientific society in Great Britain, and one of the oldest in Europe. It was founded by Charles II, in 1660, its nucleus being an association of learned men already in existence. It is supposed to be identical with the Invisible College which Boyle mentions in 1646. It was incorporated under the name of The Royal Society in 1661. The publications of the Royal Society are called *Philosophical Transactions*. The society has close connection with the government, and has assisted the government in various important scientific undertakings among which may be mentioned Parry's North Pole expedition. The society also distributes \$20,000 yearly for the promotion of scientific research.

PAGE 12

Rastignac : a character in *Le Père Goriot*. At the close of the story Rastignac says, "A nous deux, maintenant" :—Henceforth there is war between us.

Père Goriot : a novel of Balzac's with a plot similar to *King Lear*.

Professor Tyndall (1820-1893): a distinguished British physicist and member of the Royal Society. He explored with Huxley the glaciers of Switzerland. His work in electricity, radiant heat, light and acoustics gave him a foremost place in science.

PAGE 13

Ecclesiastical spirit : the spirit manifested by the clergy of England in Huxley's time against the truths of science. The clergy considered scientific truth to be disastrous to religious truth. Huxley's attitude toward the teaching of religious truth is illuminated by this quotation, which he uses to explain his own position : "I have the fullest confi-

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dence that in the reading and explaining of the Bible, what the children will be taught will be the great truths of Christian Life and conduct, which all of us desire they should know, and that no effort will be made to cram into their poor little minds, theological dogmas which their tender age prevents them from understanding." Huxley defines his idea of a church as a place in which, "week by week, services should be devoted, not to the iteration of abstract propositions in theology, but to the setting before men's minds of an ideal of true, just and pure living; a place in which those who are weary of the burden of daily cares should find a moment's rest in the contemplation of the higher life which is possible for all, though attained by so few; a place in which the man of strife and of business should have time to think how small, after all, are the rewards he covets compared with peace and charity."

PAGE 14

New Reformation: Huxley writes: "We are in the midst of a gigantic movement greater than that which preceded and produced the Reformation, and really only the continuation of that movement. . . . But this organization will be the work of generations of men, and those who further it most will be those who teach men to rest in no lie, and to rest in no verbal delusion."

ON THE ADVISABLENESS OF IMPROVING
NATURAL KNOWLEDGE (1866)

PAGE 15

On the Advisableness of Improving Natural Knowledge : from *Method and Results* : also published in *Lay Sermons, Addresses and Reviews*.

For the history of the times mentioned in this essay, see Green's *Short History of the English People*.

The very spot : St. Martin's Borough Hall and Public Library, on Charing Cross Road, near Trafalgar Square.

Defoe (1661-1731): an English novelist and political writer. On account of his political writings Defoe was sentenced to stand in the pillory, and to be "imprisoned during the Queen's pleasure." During this imprisonment he wrote many articles. Later in life he wrote *Robinson Crusoe*, *The Fortunes and Misfortunes of Moll Flanders*, *Journal of the Plague Year*, and other books less well known.

PAGE 17

unholy cursing and crackling wit of the Rochesters and Sedleys : John Wilmot, the second Earl of Rochester, and Sir Charles Sedley, were both friends of Charles II, and

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were noted for biting wit and profligacy. Green, in his *Short History of the English People*, thus describes them: "Lord Rochester was a fashionable poet, and the titles of some of his poems are such as no pen of our day could copy. Sir Charles Sedley was a fashionable wit, and the foulness of his words made even the porters in the Covent Garden belt him from the balcony when he ventured to address them." **Laud**: Archbishop of Canterbury. Laud was born in 1573, and beheaded at London in 1645. He was throughout the reign of Charles I a staunch supporter of the King. He was impeached by the Long Parliament in 1640 and executed on Tower Hill, in 1645.

PAGE 18

selenography: the scientific study of the moon with special reference to its physical condition.

Torriceilian experiment: a reference to the discovery of the principle of the barometer by the Italian, Torricelli, in 1643.

Sir Francis Bacon (1561-1626): Bacon endeavored to teach that civilization cannot be brought to a high point except as man applies himself to the study of the secrets of nature, and uses these discoveries for inventions which will give him power over his environment. The chief value of the work was that it called attention to the uses of induction and to the experimental study of facts. See Roger's *A Student's History of Philosophy*, page 243.

The learned Dr. Wallis (1616-1703): Dr. Wallis is regarded as the greatest of Newton's predecessors in mathematical history. His works are numerous and are on a great variety of subjects. He was one of the first members of the Royal Society.

PAGE 19

"New Philosophy": Bacon's ideas on science and philosophy as set forth in his works.

Galileo (1564-1642): a famous Italian astronomer. His most noted work was the construction of the thermometer and a telescope. He discovered the satellites of Jupiter in 1610. In 1610, also, he observed the sun's spots. His views were condemned by the Pope in 1616, and in 1633 he was forced by the Inquisition to abjure the Copernican theory.

Royal Society: see note, page 11.

Newton, Sir Isaac (1642-1721): a distinguished natural philosopher of England. Newton was elected a member of the Royal Society in 1672. His most important scientific accomplishment was the establishing of the law of universal gravitation. The story of the fall of the apple was first related by Voltaire to whom it was given by Newton's niece.

"Philosophical Transactions": the publications of the Royal Society.

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PAGE 20

Vesalius (1514-1564): a noted Belgian anatomist.

Harvey (1578-1657): an English physiologist and anatomist. He is noted especially for his discovery of the circulation of the blood.

Schoolmen: a term used to designate the followers of scholasticism, a philosophy of dogmatic religion which assumed a certain subject-matter as absolute and unquestionable. The duty of the Schoolman was to explain church doctrine; these explanations were characterized by fine distinctions and by an absence of real content. See Roger's *A Student's History of Philosophy*; also Baldwin's *Dictionary of Philosophy and Psychology*.

Subtle speculations: Selby gives examples from questions discussed by Thomas Aquinas. Whether all angels belong to the same genus, whether demons are evil by nature, or by will, whether they can change one substance into another, . . . whether an angel can move from one point to another without passing through intermediate space.

"writ in water": an allusion to Keats' request that the words "Here lies one whose name was writ in water" be his epitaph. The words are inscribed on his tomb in the Protestant Cemetery at Rome.

Lord Brouncker: The first president of the Royal Society after its incorporation in 1662 was Lord Brouncker.

revenant: ghost.

PAGE 22

Boyle: Robert Boyle (1627-1691): a British chemist and natural philosopher who was noted especially for his discovery of Boyle's law of the elasticity of air.

Evelyn (1620-1706): an English author and member of the Royal Society. His most important work is the *Diary*, valuable for the full account which it gives of the manners and customs of the time.

The Restoration: In English history the reestablishing of the English monarchy with the return of King Charles II in 1660; by extension the whole reign of Charles II: as, the dramatists of the *Restoration*. *Century Dictionary*.

PAGE 25

Aladdin's lamps: a reference to the story of the Wonderful Lamp in the *Arabian Nights*. The magic lamp brought marvelous good fortune to the poor widow's son who possessed it. Cf. also Lowell's *Aladdin*: —

When I was a beggarly boy,
And lived in a cellar damp,
I had not a friend or a toy,
But I had Aladdin's lamp;

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When I could not sleep for the cold,
I had fire enough in my brain,
And builded, with roofs of gold,
My beautiful castles in Spain!

PAGE 26

"When in heaven the stars": from Tennyson's *Specimens of a Translation of the Iliad in Blank Verse*.

PAGE 28

"increasing God's honour and bettering man's estate": Bacon's statement of his purpose in writing the *Advancement of Learning*.

For example, etc.: could the sentence beginning thus be written in better form?

PAGE 29

Rumford (1738-1814): Benjamin Thompson, Count Rumford, an eminent scientist. Rumford was born in America and educated at Harvard. Suspected of loyalty to the King at the time of the revolution, he was imprisoned. Acquitted, he went to England where he became prominent in politics and science. Invested with the title of Count by the Holy Roman Empire, he chose Rumford for his title after the name of the little New Hampshire town where he had taught. He gave a large sum of money to Harvard College to found the Rumford professorship of science.

PAGE 30

eccentric: out of the centre.

A LIBERAL EDUCATION (1868)

PAGE 35

A Liberal Education: from *Science and Education*; also published in *Lay Sermons, Addresses and Reviews*.

PAGE 36

Ichabod: cf. 1 Sam. iv, 21.

PAGE 37

senior wranglership: in Cambridge University, England, one who has attained the first class in the elementary division of the public examination for honors in pure and mixed mathematics, commonly called the *mathematical tripos*, those who compose the second rank of honors being designated *senior optimes*, and those of the third order *junior optimes*. The student taking absolutely the first place in the mathematical tripos used to be called *senior wrangler*, those following next in the same division being respectively termed second, third, fourth, etc., wranglers. *Century Dictionary*.
double-first: any candidate for the degree of Bachelor of Arts in Oxford University who takes first-class honors in both classics and mathematics is said to have won a double-first.

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PAGE 40

Retzsch (1779-1857): a well-known German painter and engraver.

PAGE 42

Test-Act: an English statute of 1673. It compelled all persons holding office under the crown to take the oaths of supremacy and of allegiance, to receive the sacrament according to the usage of the Church of England, and to subscribe to the Declaration against Transubstantiation.

Poll: an abbreviation and transliteration of *οἱ πολλοί*, "the mob"; university slang for the whole body of students taking merely the degree of Bachelor of Arts, at Cambridge.

pluck: the rejection of a student, after examinations, who does not come up to the standard.

ON A PIECE OF CHALK

PAGE 44

On a Piece of Chalk: a lecture to working-men from *Lay Sermons, Addresses and Reviews*.

Needles of the Isle of Wight: the needles are three white, pointed rocks of chalk, resting on dark-colored bases, and rising abruptly from the sea to a height of 100 feet. Baedeker's *Great Britain*.

Lulworth in Dorset, to Flamborough Head: Lulworth is on the southern coast of England, west of the Isle of Wight; Flamborough Head is on the northeastern coast of England and extends into the German Ocean.

Weald: a name given to an oval-shaped chalk area in England, beginning near the Straits of Dover, and extending into the counties of Kent, Surrey, Hants, and Sussex.

PAGE 51

Lieut. Brooke: Brooke devised an apparatus for deep-sea sounding from which the weight necessary to sink the instrument rapidly, was detached when it reached the bottom. The object was to relieve the strain on the rope caused by rapid soundings. Improved apparatuses have been invented since the time of Brooke.

Ehrenberg (1795-1876): a German naturalist noted for his studies of *Infusoria*.

Bailey of West Point (1811-1857): an American naturalist noted for his researches in microscopy.

enterprise of laying down the telegraph-cable: the first Atlantic telegraph-cable between England and America was laid in 1858 by Cyrus W. Field of New York. Messages were sent over it for a few weeks; then it ceased to act. A permanent cable was laid by Mr. Field in 1866.

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PAGE 56

Dr. Wallich (1786-1854): a Danish botanist and member of the Royal Society.

Mr. Sorby: President of the Geological Society of England, and author of many papers on subjects connected with physical geography.

PAGE 60

Sir Charles Lyell (1797-1875): a British geologist, and one of the first to uphold Darwin's *Origin of Species*.

Echinus: the sea-urchin; an animal which dwells in a spheroidal shell built up from polygonal plates, and covered with sharp spines.

PAGE 62

Somme: a river of northern France which flows into the English Channel northeast of Dieppe.

PAGE 63

the chipped flints of Hoxne and Amiens: the rude instruments which were made by primitive man were of chipped flint. Numerous discoveries of large flint implements have been made in the north of France, near Amiens, and in England. The first noted flint implements were discovered in Hoxne, Suffolk, England, 1797. Cf. Evans' *Ancient Stone Implements* and Lyell's *Antiquity of Man*.

PAGE 64

Rev. Mr. Gunn (1800-1881): an English naturalist. Mr. Gunn sent from Tasmania a large number of plants and animals now in the British Museum.

"the whirligig of time": cf. Shakespeare, *Twelfth Night*, Act V, sc. 1, l. 395.

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Euphrates and Hiddekel: cf. Genesis ii, 14.

PAGE 66

the great river, the river of Babylon: cf. Genesis xv, 18.

PAGE 72

Without haste, but without rest: from Goethe's *Zahme Xenien*. In a letter to his sister, Huxley says: "And then perhaps by the following of my favorite motto, —

"Wie das Gestirn,
Ohne Hast,
Ohne Rast" —

something may be done, and some of Sister Lizzie's fond imaginations turn out not altogether untrue." The quotation entire is as follows: —

Wie das Gestirn,
Ohne Hast,
Aber ohne Rast,
Drehe sich jeder
Um die eigne Last.

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THE PRINCIPAL SUBJECTS OF EDUCATION
(1882)

PAGE 73

The Principal Subjects of Education: an extract from the essay, *Science and Art in Relation to Education*. this discussion: "this" refers to the last sentence in the preceding paragraph, in which Huxley says that it will be impossible to determine the amount of time to be given to the principal subjects of education until it is determined "what the principal subjects of education ought to be." **Francis Bacon:** cf. note p. 18.

PAGE 74

the best chance of being happy: In connection with Huxley's work on the London School Board, his biographer says that Huxley did not regard "intellectual training only from the utilitarian point of view; he insisted, e. g., on the value of reading for amusement as one of the most valuable uses to hardworked people."

PAGE 75

"Harmony in grey": cf. with l. 34 in Browning's *Andrea del Sarto*.

PAGE 82

Hobbes (1588-1679): noted for his views of human nature and of politics. According to Minto, "The merits ascribed to his style are brevity, simplicity and precision." **Bishop Berkeley (1685-1753):** an Irish prelate noted for his philosophical writings and especially for his theory of vision which was the foundation for modern investigations of the subject. "His style has always been esteemed admirable; simple, felicitous and sweetly melodious. His dialogues are sustained with great skill." Minto's *Manual of English Prose Literature*. **We have been recently furnished with in prose:** The *Iliad of Homer* translated by Lang, Leaf and Myers, the first edition of which appeared in 1882, is probably the one to which Huxley refers. The *Odyssey*, translated by Butcher and Lang, appeared in 1879. Among the best of the more recent translations of Homer are the *Odyssey* by George Herbert Palmer; the *Iliad* by Arthur S. Way, and the *Odyssey* by the same author.

PAGE 83

Locke (1632-1704): an English philosopher of great in-

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fluence. His chief work is *An Essay Concerning Human Understanding*.

PAGE 84

Franciscus Bacon sic cogitavit: thus Francis Bacon thought.

THE METHOD OF SCIENTIFIC INVESTIGATION (1863)

PAGE 85

The Method of Scientific Investigation is an extract from the third of six lectures given to workmen on *The Causes of the Phenomena of Organic Nature in Darwiniana*.

PAGE 86

these terrible apparatus: *apparatus* is the form for both the singular and plural; *apparatuses* is another form for the plural. Incident in one of Molière's plays: the allusion is to the hero, M. Jourdain in the play, "Le Bourgeois Gentilhomme."

PAGE 90

these kind: modern writers regard *kind* as singular. Shakespeare treated it as a plural noun, as "These kind of knaves I knew."

PAGE 93

Newton: cf. page 19. Laplace (1749-1827): a celebrated French astronomer and mathematician. He is best known for his theory of the formation of the planetary systems, the so-called "nebular hypothesis." Until recently this hypothesis has generally been accepted in its main outlines. It is now being supplanted by the "Spiral Nebular Hypothesis" developed by Professors Moulton and Chamberlin of the University of Chicago. See Moulton's *Introduction to Astronomy*, p. 463.

ON THE PHYSICAL BASIS OF LIFE (1868)

PAGE 95

On the Physical Basis of Life: from *Methods and Results*; also published in *Lay Sermons, Addresses and Reviews*. "The substance of this paper was contained in a discourse which was delivered in Edinburgh on the evening of Sunday, the 8th of November, 1868 — being the first of a series of Sunday evening addresses upon non-theological topics, instituted by the Rev. J. Cranbrook. Some phrases, which could possess only a transitory and local interest, have been omitted; instead of the newspaper report of the Archbishop of York's address, his Grace's subsequently published pam-

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phlet *On the Limits of Philosophical Inquiry* is quoted; and I have, here and there, endeavoured to express my meaning more fully and clearly than I seem to have done in speaking — if I may judge by sundry criticisms upon what I am supposed to have said, which have appeared. But in substance, and, so far as my recollection serves, in form, what is here written corresponds with what was there said."—*Huxley*.

PAGE 96

Finner whale: a name given to a whale which has a dorsal fin. A Finner whale commonly measures from 60 to 90 feet in length. A fortiori: with stronger reason: still more conclusively.

PAGE 97

well-known epigram: from Goethe's *Venetianische Epigramme*. The following is a translation of the passage: Why do the people push each other and shout? They want to work for their living, bring forth children; and feed them as well as they possibly can. . . . No man can attain to more, however much he may pretend to the contrary.

PAGE 100

Maelstroms: a celebrated whirlpool or violent current in the Arctic Ocean, near the western coast of Norway, between the islands of Moskenäsö and Mosken, formerly supposed to suck in and destroy everything that approached it at any time, but now known not to be dangerous except under certain conditions. Century Dictionary. Cf. also Poe's *Descent into the Maelstrom*. Milne-Edwards (1800-1885): a French naturalist. His *Éléments de Zoologie* won him a great reputation.

PAGE 101

with such qualifications as arises: a typographical error.

PAGE 104

De Bary (1831-1888): a German botanist noted especially for his researches in cryptogamic botany. No Man's Land: Huxley probably intends no specific geographical reference. The expression is common as a designation of some remote and unfrequented locality.

PAGE 106

Kuhne (1837-1900): a German physiologist and professor of science at Amsterdam and Heidelberg. Debemur morti nos nostraque: Horace — *Ars Poetica*, line 63.

As forests change their foliage year by year,
Leaves, that come first, first fall and disappear;
So antique words die out, and in their room,

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Others spring up, of vigorous growth and bloom;
 Ourselves and all that's ours, to death are due,
 And why should words not be mortal too?
 Martin's translation.

PAGE 107

peau de chagrin: skin of a wild ass. Balzac (1799-1850): a celebrated French novelist of the realistic school of fiction.

PAGE 109

Barmecide feast: the allusion is to a story in the *Arabian Nights* in which a member of the Barmecide family places a succession of empty dishes before a beggar, pretending that they contain a rich repast.

PAGE 112

modus operandi: method of working.

PAGE 113

Martinus Scriblerus: a reference to *Memoirs of Martinus Scriblerus* written principally by John Arbuthnot, and published in 1741. The purpose of the papers is given by Warburton and Spence in the following extracts quoted from the Preface to the *Memoirs of the Extraordinary Life, Works and Discoveries of Martinus Scriblerus* in Elwin and Courthope's edition of Pope's works, vol. x, p. 273:—

"Mr. Pope, Dr. Arbuthnot, and Dr. Swift, in conjunction, formed the project of a satire on the abuses of human learning; and to make it better received, proposed to execute it in the manner of Cervantes (the original author of this species of satire) under a continued narrative of feigned adventures. They had observed that those abuses still kept their ground against all that the ablest and gravest authors could say to discredit them; they concluded, therefore, the force of ridicule was wanting to quicken their disgrace; and ridicule was here in its place, when the abuses had been already detected by sober reasoning; and truth in no danger to suffer by the premature use of so powerful an instrument."

"The design of this work, as stated by Pope himself, is to ridicule all the false tastes in learning under the character of a man of capacity enough, that had dipped into every art and science, but injudiciously in each. It was begun by a club of some of the greatest wits of the age—Lord Oxford, the Bishop of Rochester, Pope, Congreve, Swift, Arbuthnot, and others. Gay often held the pen; and Addison liked it very well, and was not disinclined to come into it." accounted for the operation of the meat-jack: from the paper "To the learned inquisitor into nature, Martinus Scriblerus: the society of free thinkers greeting." Elwin and Courthope, Pope's works, vol. ?, p. 332.

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The remainder of the essay endeavors to meet the charge of materialism. The following is the conclusion:—

"In itself it is of little moment whether we express the phenomena of matter in terms of spirit; or the phenomena of spirit in terms of matter: matter may be regarded as a form of thought, thought may be regarded as a property of matter—each statement has a certain relative truth. But with a view to the progress of science, the materialistic terminology is in every way to be preferred. For it connects thought with the other phenomena of the universe, and suggests inquiry into the nature of those physical conditions, or concomitants of thought, which are more or less accessible to us, and a knowledge of which may, in future, help us to exercise the same kind of control over the world of thought, as we already possess in respect of the material world; whereas, the alternative, or spiritualistic, terminology is utterly barren, and leads to nothing but obscurity and confusion of ideas.

"Thus there can be little doubt, that the further science advances, the more extensively and consistently will all the phenomena of Nature be represented by materialistic formulæ and symbols. But the man of science, who, forgetting the limits of philosophical inquiry, slides from these formulæ and symbols into what is commonly understood by materialism, seems to me to place himself on a level with the mathematician, who should mistake the x's and y's with which he works his problems, for real entities—and with this further disadvantage, as compared with the mathematician, that the blunders of the latter are of no practical consequence, while the errors of systematic materialism may paralyze the energies and destroy the beauty of a life."

ON CORAL AND CORAL REEFS (1870)

PAGE 115

On Coral and Coral Reefs: from *Critiques and Addresses*. The essay was published in 1870. **Sic et curialium**: Thus also the coral, as soon as it touches the air turns hard. It was a soft plant under the water. **Boccone** (1633-1704): a noted Sicilian naturalist.

PAGE 116

Marsigli (1658-1730): an Italian soldier and naturalist. He wrote *A Physical History of the Sea*. "**Traité du Corail**": "I made the coral bloom in vases full of sea-water, and I noticed that what we believe to be the flower of this so-called plant was in reality only an insect similar to a little

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nettle or polype. I had the pleasure to see the paws or feet of this nettle move, and having placed the vase full of water in which the coral was, near the fire, at a moderate heat, all the little insects expanded, the nettle stretched out its feet and formed what M. de Marsigli and I had taken for the petals of the flower. The calyx of this so-called flower is the very body of the animal issued from its cell."

PAGE 117

Réaumur (1683-1757): a French physiologist and naturalist, best known as the inventor of the Réaumur thermometer. He was a member of the French Academy of Science. **Bishop Wilson**: Thomas Wilson (1663-1755), bishop of the Isle of Man. Details of his life are given in the folio edition of his works (1782). An appreciation of his religious writings is given by Matthew Arnold in *Culture and Anarchy*. Bishop Wilson's words, "To make reason and the will of God prevail," are the theme of Arnold's essay, *Sweetness and Light*. **An eminent modern writer**: Matthew Arnold (1822-1888), eldest son of Thomas Arnold, headmaster of Rugby; a distinguished critic and poet, and professor of poetry at Oxford. The allusion is to Arnold's essay, *Sweetness and Light*. The phrase, "sweetness and light," is one which Æsop uses in Swift's *Battle of the Books* to sum up the superiority of the ancients over the moderns. "As for us, the ancients, we are content, with the bee, to pretend to nothing of our own beyond our wings and our voice, that is to say, our flights and our language; for the rest, whatever we have got has been by infinite labor and search, and ranging through every corner of nature; the difference is, that instead of dirt and poison we have rather chose to fill our hives with honey and wax, thus furnishing mankind with the two noblest things, which are sweetness and light." Arnold's purpose in the essay is to define the cultured man as one who endeavors to make beauty and intelligence prevail everywhere.

PAGE 118

Abbé Trembley (1700-1784): a Swiss naturalist. He wrote "Mémoires pour servir à l'histoire d'un genre de polypes d'eau douce, à bras en forme de cornes." **Bernard de Jussieu (1699-1776)**: a French botanist; founder of the natural classification of plants. He was superintendent of the Trianon Gardens. **Guettard (1715-1786)**: a French naturalist.

PAGE 124

Monte Nuovo within the old crater of Somma: Monte Nuovo, a mountain west of Naples; *Somma*, a mountain

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north of Vesuvius which with its lofty, semicircular cliff encircles the active cone of Vesuvius.

PAGE 126

Mauritius: an island in the Indian Ocean; Huxley visited the island when on the voyage with the *Rattlesnake*. He wrote to his mother of his visit: "This island is, you know, the scene of Saint Pierre's beautiful story of Paul and Virginia, over which I suppose most people have sentimentalized at one time or another of their lives. Until we reached here I did not know that the tale was like the lady's im-prover—a fiction founded on fact, and that Paul and Virginia were at one time flesh and blood, and that their veritable dust was buried at Pamplemousses in a spot considered as one of the lions of the place, and visited as classic ground."

PAGE 130

Mr. Darwin's coral reefs: *The Structure and Distribution of Coral Reefs*, published in 1848.

PAGE 134

Professor Jukes (1811-1869): an English geologist.

PAGE 136

Mr. Dana (1813-1895): a well-known American geologist and mineralogist; a professor at Yale from 1845. He wrote a number of books among which is *Coral and Coral Reefs*.

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Jurassic period: that part of the geological series which is older than the Cretaceous and newer than the Triassic; so called from the predominance of rocks of this age in the Jura Mountains. The three great divisions of fossiliferous rocks are called the Triassic, the Jurassic, and the Cretaceous.

REFERENCE BOOKS

The following reference books are suggested for a more complete treatment of various points in the text:—

Andrews' *History of England*.

Green's *Short History of the English People*.

Traill's *Social England*.

Roger's *A Student's History of Philosophy*.

Royce's *The Spirit of Modern Philosophy*.

Huxley's *Life and Letters*.

Smalley's *Mr. Huxley*, in *Scribner's Magazine* for October, 1905.

Darwin's *Life and Letters*.