

WILLIAM SAMUEL LILLY VS THOMAS HENRY HUXLEY

William Samuel Lilly, 'Materialism and Morality', *Fortnightly Review* (November 1886), pp. 575–7, 578, 581–3, 589–90.

Thomas Henry Huxley 'Science and Morals', *Fortnightly Review* (December 1886), pp. 789–92, 796, 798, 800–2.

William Samuel Lilly, 'The Province of Physics', *Fortnightly Review* (February 1887), pp. 278–9, 281–2, 283–5, 287–8, 292–3.

These three extracts form an exchange between the young Catholic writer and barrister William Samuel Lilly (1840–1919) and the ageing 'Bulldog' Thomas Huxley (1825–95) that took place in the pages of *Fortnightly Review* between 1886 and 1887. Even though it was some twenty-five years since Huxley had first ventured into the cut and thrust of defending physical science from theological attack, he relished the opportunity to have one more outing as the champion of reason over superstition. The fact that Lilly was a supporter of the Catholic theologian John Henry Newman made this all the more appealing to Huxley. At stake was not only the advance of scientific naturalism and the materialism that Lilly thought was attendant upon it, but, and on a more personal level, Lilly was not the first man with theological commitments to cast aspersions on the underpinnings of Huxley's own personal morality.

In 'Materialism and Morality' Lilly identifies the main source of the modern materialist doctrine that he wishes to expose. Indeed, the reason he felt such finger-pointing was necessary is because the worst of the perpetrators denied that they were materialists at all: William Kingdon Clifford repudiated it directly, while Huxley and Herbert Spencer deliberately carved out a great expanse for the agnostic 'unknown'. Lilly was not fooled by what he clearly saw as little more than apologetics. 'Positivism, Determinism, and much that passes current as Agnosticism are mere varieties of Materialism; sublimated expressions of it, perhaps, but true expressions' (below, p. 217). Huxley, he points out, had declared that 'consciousness is a function of nervous matter' (below, p. 218), and what

was this but a confession that scientific materialism was engaged in the gradual banishment of spirit from the universe? Even Spencer, who was well known for his exaltation of the 'Unknown and Unknowable', made 'the persistence of force his one formula' (below, p. 219). Between them they had made of the universe naught but a 'senseless mechanism' (below, p. 219).

Even the soul of man, by light of materialist philosophy, had become in the words of the physicist John Tyndall merely 'a poetical rendering' of phenomena that had as yet resisted explanation.¹ Lilly was concerned not only because he saw the influence of materialism pervading throughout the sciences, but because it was spreading through all aspects of Western culture, from the fiction of Émile Zola, to politics, as well as the fine arts: 'All that the artist now usually aims at', he laments, 'is to copy exactly, to reproduce' (below, p. 220). Materialism quenches the light of the intellect. What hope was there for morals or for man in such a world? True enough, he concludes, Huxley was determined that morality had no necessary base in the religion that he was complicit in undermining, but, Lilly points out, Huxley's own moral commitments had grown out of a theistic soil. What hope might there be for future generations? 'Morality, in Professor Huxley, I can well believe, is strong enough to hold its own', he wrote, 'But will it be strong enough in Professor Huxley's great-grandchildren?' (below, p. 221)

Huxley's 'Science and Morals' appeared in the subsequent volume in response. Although he could not answer for Clifford, who had died at a tragically young age, nor would he answer for Spencer, who was never short of words when it came to describing his own philosophy, Huxley could not accept what he took to be the core of Lilly's argument. Indeed, not only did he think the argument erroneous, but that its premises were entirely ill-founded. He took Lilly's argument to be built upon three major related claims: that Clifford, Spencer and himself put aside '(1) ... as unverifiable, everything which the senses cannot verify; (2) everything beyond the bounds of physical science; (3) everything which cannot be brought into a laboratory and dealt with chemically' (below, p. 223). On each of these points he gives the thundering response 'I say No'. Huxley refutes the first of these, suggesting in the process that Lilly is simply ignorant of the methods and aims of scientific enquiry, not to mention guilty of illogical thinking. Illustrating his point with his characteristically caustic wit, he points out that he could quite easily entertain the idea that Lilly was victim of 'a patent and enormous misunderstanding' without being able to verify the same through any of his five senses (below, p. 223). In a more serious vein he points out that while he is a firm believer – as, he claims, are all men of science, in the universal validity of the law of causation, this universality is equally beyond the reach of the senses to prove. The second of Lilly's charges, Huxley rejects as similarly absurd, and lists a number of examples to illustrate that it is improbable for anyone to hold the views that Lilly had ascribed to him and his fellows. The state of rapture or awe that Huxley himself confesses to having felt

when he first encountered ‘the dim religious gloom ... of the tropical forest’ (below, p. 225) would still persist, no matter what physical science might reveal about the place. To Huxley’s mind, aesthetics, beauty and wonder are ‘beyond the bounds of physical science’ (below, p. 225). Regarding Lilly’s third point, Huxley demands whether Lilly thought that he gave no credence, nor sought no understanding from history, from mathematics, from philology? None of these fields could be subject to chemical analysis, and yet were clearly yielding to enquiry – and, indeed, had been central to the liberal arts educational programme that Huxley had been advancing both in person and in print for years.

Huxley goes on in this extract to defend his agnostic position – rather than arrogance, or a thin shield for atheism, he argues instead that his views on the matter are but a humble testament to the recognition that there are some questions upon which it is not possible to speak with any measure of certainty – simply because they are beyond the ken of inductive inquiry. These questions, he suggests, are the battle ground of theology and philosophy. Far from immoral actions stemming from the spread of inductive science, it is to the history of these two ‘sinful sisters’ (below, p. 227) – theology and philosophy – that one should look to see a diatribe of immorality. Rather, there is a more widespread sense of social duty and a greater sense of justice, social obligation and mutual help ‘in this England of ours’ than in any former period of civilization (below, p. 228). While, according to Huxley, philosophy and theology had spawned irresolvable dispute and conflict, the ‘Cinderella’ of physical science had at least proven quite successful in putting dinner on the table. And, while not presuming to speak on the great unknowables to which they devoted their energies,

She sees the order which pervades the seeming disorder of the world; the great drama of evolution, with its full share of pity and terror, but also abundant with goodness and beauty ... and she learns, in her heart of hearts, the lesson, that the foundation of morality is to have done, once and for all, with lying; to give up pretending to believe that for which there is no evidence, and repeating unintelligible propositions about things beyond the possibilities of knowledge. (below, p. 228)

Of course, Huxley’s motivation was also to fend off the odour of lower-class political radicalism that was associated with materialist views – good science and reputation required respectability.

‘The Province of Physics’ gave Lilly the final word in this exchange, and in it he repeats his charge that Huxley was indeed one of the foremost teachers of the materialist creed, and that what he had stated in ‘Science and Morals’ only underlined this fact rather than being adequate refutation. He rejoins that while Huxley might decry the charge of materialism on the basis that there were phenomena such as aesthetics and wonder that could not be explained within the frame of sense experience, this was to miss the point (Huxley never seems

fully to have appreciated the implications of Charles Darwin's 1871 *Descent of Man*). Huxley was certainly committed to the idea that consciousness was no more than a product of the brain which, as Lilly was quick to point out, he had previously committed himself to in print. If this was the case, then it must follow that just such qualities as aesthetics and wonder were no more than products of the brain – and nothing more. What was this line of reasoning if not materialism? If this was not Huxley's intention he was certainly guilty, Lilly continues, of having led a great many of his students into the 'materialistic slough' of despond, 'never to emerge from it' (below, p. 230). In response Lilly defends his belief that there is a significant difference between living muscle and flesh and the muscle and flesh of the dead. What was this difference if not beyond the ken of science to describe – the existence of an 'immaterial vital principle – in short, of "spirit"' (below, p. 232). He concludes that 'I certainly cannot allow that animal life, constituting certain states of consciousness, is due to a material organism in which nothing immaterial resides. Is this "immaterial" to be called "spirit"? Why not?' (below, p. 232).

Notes

1. In his 'Presidential Address delivered before the Birmingham and Midland Institute, October 1 1877', Tyndall had stated 'If you are content to make your soul a poetic rendering of a phenomenon which refuses the yoke of ordinary physical laws, I, for one, would not object to this exercise of ideality'. *Fortnightly Review* (1 November 1877), p. 607.

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'WORDS are grown so false that I am loth to prove reason with them,' says Viola in *Twelfth Night*.¹ The saying constantly comes to my mind in dealing with the philosophical controversies of the present day. Rigorous definition, careful analysis, precise classification, are no longer in favour. It is an age of loose thinking, and of looser writing; of 'idle words, servants to shallow fools.'² Never, perhaps, was there an age in which the trade of the sophist, whose business it is 'to make the worse reason appear the better,'³ was carried on so successfully. Never was there an age in which a writer who feels that he is 'a teacher, or nothing,'⁴ had greater need of well-considered and accurate language. Hence it is that in the papers which I have from time to time contributed to this *Review* I have sought, before entering upon my argument, to state clearly the sense in which I employ my principal terms. Most necessary is it that I should do this in respect of such a word as Materialism. There are those who would restrict it to a doctrine which is now discredited for higher minds. What we know of living forces, of the real properties of bodies, has made an end of the old notion of matter reduced merely to solidity and extension. Our better acquaintance with the physiology of the sense organs has been fatal to the sensism which Professor Clifford⁵ contemptuously calls 'the crass Materialism of the savage.'⁶ It lingers, indeed, in the lower intellectual regions. Nay, more, it is still widely held there. 'Il y a des morts qu'il faut tuer encore.'⁷ And this is one of them. My present point, however, is that this coarse and vulgar theory is by no means the only form of Materialism. Nor is it the form under which Materialism is most potently working in the world just now. The more subtle doctrines which have arisen upon the ruins of the old materialistic hypothesis are, in all essentials, identical with it. Positivism,⁸ Determinism, and much that passes current as Agnosticism,⁹ are mere varieties of Materialism; sublimated expressions of it, perhaps, but true expressions, having in them the root of the matter. Now here I am conscious of a difficulty. Is it fair, one may be asked, to impose the name of Materialist upon those who, more or

less energetically, repudiate it? I think it is fair, and, more, that it is a duty, if the name truly describes them. Take, for example, the late Mr. Clifford. As we have just seen, he rejects emphatically 'the crude Materialism of the savage,' but only to substitute a Materialism which is, indeed, more refined, but which is also, as it seems to me, more irrational. His / biographer, Mr. Frederick Pollock,¹⁰ claims that his view is, in truth, 'idealistic monism, a very subtle form of idealism,'¹¹ and points out that his conception of the ultimate reality is 'mind, not mind as we know it in the complex form of thought and feeling, but those simpler elements of which thought and feeling are built up.'¹² Well, of course, Materialism affects to be monistic,¹³ for it seeks to explain the whole universe in terms of matter. But how is Mr. Clifford's monism idealistic? The element of which 'even the simplest feeling is a complex' he calls 'mind-stuff.'¹⁴ 'Matter,' he tells us, 'is the mental picture of which mind is the thing represented. Reason, intelligence, and volition are properties of a complex, which is made up of elements, themselves not rational, not intelligent, not conscious.'¹⁵ Is it possible, Mr. Pollock himself being judge, to call this doctrine idealism? This 'mind-stuff,' which, we are told, is the thing-in-itself, of which 'a moving molecule of organic matter possesses a small piece,' and which, 'when matter takes the complex form of a living human brain, takes the form of a human consciousness, having intelligence and volition'¹⁶ – how is it possible to account for this 'mind-stuff' as anything but matter? Again, consider the teaching of Professor Huxley. With whatever rhetorical ornaments he may gild it, what is its practical outcome but Materialism? I am well aware of his opinion that the question 'whether there is really anything anthropomorphic, even in man's nature,'¹⁷ will ever remain an open one. I do not lose sight of his recognition of 'the necessity of cherishing the noblest and most human of man's emotions by worship, for the most part of the silent sort, at the altar of the Unknown and Unknowable.'¹⁸ But, on the other hand, I remember his positive declaration that 'consciousness is a function of nervous matter, when that nervous matter has attained a certain degree of organisation.'¹⁹ I remember, too, his confident anticipation that 'we shall sooner or later arrive at a mechanical equivalent of consciousness, just as we have arrived at a mechanical equivalent of heat.'²⁰ And I do not forget that singularly powerful passage in his *Lay Sermons*²¹ – who that has once read it can forget it? – in which he enforces what he deems 'the great truth,' that 'the progress of science has in all ages meant, and now more than ever means, the extension of the province of what we call matter and causation, and the concomitant gradual banishment, from all regions of human thought, of what we call spirit and spontaneity;' that 'as surely as every future grows out of the past and present, so will the physiology of the future gradually extend the realm of matter and law until it is coextensive with knowledge, with feeling, with action.'²² Once more. Let us turn to a teacher more widely influential, perhaps, than even Mr. Huxley. I mean Mr. Herbert Spencer.²³ He, too,

recognises 'an unknown and unknowable power without beginning or / end in time.'²⁴ He tells us expressly in his *Psychology*²⁵ that consciousness cannot be a mode of movement, and that if we must choose between these two modes of being, as the generative and primitive mode, it would be the first, and not the last, which he would choose. These sayings certainly do not sound like Materialism. I think, however, that if we closely examine his writings, we shall find the persistence of force his one formula. With that he will bring for you life out of the non-living; morality out of the unethical; the spiritual out of the physical. The persistence of force! I trust it will not seem to exhibit an unappreciativeness, which I am far from feeling, of the high gifts and unwearied self-devotion of this eminent man, if I say that he has always appeared to me to belong to a class of thinkers aptly described in one of Voltaire's letters: 'des gens qui se mettent, sans facon, dans la place de Dieu: qui veulent créer le monde avec la parole.'²⁶ But this autotheism is really Materialism in disguise. If all beings, all modes and forms of existence, are but transformations of force, obeying only mechanical laws, the laws of movement – and that is what Mr. Spencer's doctrine amounts to, if there is any meaning in words – what is the universe but a senseless mechanism?



But my present inquiry is not if the teaching, whether of the late Mr. Clifford, of Mr. Huxley, of Mr. Herbert Spencer, is true, but what that teaching really is. And my contention is that all these three gifted men, whom I select as types of a host of less famous writers widely influential on English thought, must in strictness be reckoned as Materialists. All three do, in effect, express the entire man by matter, his intellectual and moral being as well as his corporal frame. All three do, in effect, restrict our knowledge to the phenomenal universe, of which consciousness and will are, for them, fortuitous or necessary products.



I consider, then, that if we survey the higher thought of Europe, as a whole, we must find it largely given over to Materialism. And if we turn to the more popular literature, in which is the truest expression of society, the same tale is unfolded. What a portent is that large and ever-growing school of 'naturalistic' fiction of which M. Zola²⁷ is the honoured and prosperous chief, and which is so eagerly read, and so largely imitated, throughout the civilised world! 'Toute métaphysique m'épouvante'²⁸ that master tells us. His works, he claims, are conceived in the true 'scientific' spirit. Matter is for him the only reality, and in its honour he raises pæans 'like the shrieks of a hyæna at discovering that the universe is all actually carrion.'²⁹ But it is not merely in the literature of the erotic passion, and

of the genetic impulse, that the mark of the beast is plainly visible. How many a grave writer of our day has acquired a reputation for originality simply upon the strength of a fantastic physical terminology! Instead of intellect, he speaks of nervous centres; instead of life, of the play of cellular activities; instead of mental energy, of cerebral erethism. And his readers, piquing themselves on their distrust of everything outside the sphere of what they call facts, / will 'wonder with a foolish face of praise.'³⁰ In truth every branch of intellectual activity bears witness to the advance of Materialism in the popular mind; to the dying out of the old spiritual and ideal types. Thus, in politics, we see the domination of the brute force of numbers, of majorities told by head, becoming almost everywhere an accomplished fact. The instincts and passions of the masses, who are little more than matter in motion, are accepted as the supreme law, in the place of justice and virtue, of reason and religion. Art, too, has bowed her sacred head to the Materialistic yoke. It has been well remarked that in the pictures of the old masters you have not merely a natural scene, but the soul of the painter who looked upon it. That attribute of soul is precisely what has been steadily dying out from modern art, as the physical sciences have more and more imposed their sway upon our ways of thinking and our habits of life. The true function of the artist, as of the metaphysician, is to seek the reason and essence of things. But while to the philosopher this reason and essence are revealed in a principle, in a general conception, to the artist they are revealed in a concrete form, as individual beauty. Both are seekers after truth; but the beautiful is the splendour of the true, and the sense of beauty is the light of the intellect. Materialism quenches that light. All that the artist now usually aims at, is to copy exactly, to reproduce phenomena. And here, indeed, he attains some measure of success, especially if the phenomena be of the lupanarian³¹ order. Well has Mr. Ruskin pronounced the art of our own time to be 'a poor toy, petty or vile.'³² Perhaps its portraits are its most valuable achievement. But their value is rather historical than artistic; they tell their own tale about the men and women of the age. What that tale is, a distinguished French painter³³ not long ago pointed out. They are the abstract and brief chronicle, he observed, in which is written the spiritual history of our century. During the first half of it, the neck is thrown back, the head is upturned towards heaven, as if in quest of some ideal vision. As we draw towards our own days the neck contracts, the head sinks nearer the shoulders, as though by the instinctive movement of a bull gathering himself up for the combat. It is because the battle of life has become more intense, because the mind is concentrated upon the material interests of the world. The habit of thought – curious verification of a law of Darwin's³⁴ – has transformed the physical habit. A most delicate and sensitive intellect – to whom British Philistinism, with its 'certitude de mauvais goût,'³⁵ has largely paid the homage of its contumely and scorn – notes the same fact in his own way. The substitution of the laws of dead matter for the laws of the moral nature, the subjection of the soul to things, 'écraser l'homme

spirituel, dépersonnaliser l'homme³⁶ is, as Amiel³⁷ discerned, the dominant tendency of the times. It appears to me that if you survey the civilised world you / find everywhere the same tokens. Everywhere I note the practical triumph of that earth-to-earth philosophy which will see nothing beyond experience, which shuts off the approach of science to all that cannot be weighed and measured. Everywhere literature and art are losing themselves in the most vulgar sensuousness. Look throughout Europe, and what, in every country, are the great majority of the educated classes, who give the tone to the rest? Sceptics in religion, doubters in ethics, given over to industrialism, and to the exact sciences which minister to it, respecting nothing but accomplished fact and palpable force, with nerves more sensitive than their hearts, seeking to season the platitude of existence by a more or less voluptuous æstheticism, a more or less prurient hedonism. Such are the men of this new age. The intellectual atmosphere is charged with Materialism: and breathe that atmosphere we must, whether we will or no.

Now the question which I would invite my readers to ponder is, What, in such an age, is the prospect before us as regards those ethical conceptions upon which society has as yet existed? Can they live in this blighted air? And, without them, what will become of the moral life of mankind?

There are eminent persons. I am well aware, to whom these conclusions will be extremely distasteful. Writers, whose names alone suffice to establish a claim upon our respectful attention, discourse to us of 'independent morality.' Professor Huxley, as I remember, somewhere protests with characteristic vehemence, 'I will not for a moment admit that morality is not strong enough to hold its own.'³⁸ After all, however, the vital question is not what this accomplished physicist will admit, but what, from the nature of the case, is likely to happen. No doubt Professor Huxley, emancipated from belief in angel or spirit, still guides himself by the same ethical rules as before. I do not myself know anything of the early history of this illustrious man. But I suppose that, like the rest of us, he was brought up upon the Catechism. At all events, I am quite sure that he is the product of many generations of Christian progenitors. What M. Renan happily calls the moral sap of the old belief – 'la sève morale de la vieille croyance'³⁹ – still courses through his spiritual being. His Materialism takes credit for virtues springing from quite another source: 'Miraturque novas frondes et non sua poma.'⁴⁰ He knows, far better than I do, the influence of heredity and of environment upon character. / He is well aware how deeply rooted in the past are those ethical principles whereby human life is still largely governed, even among materialists. The question is, can you uproot those principles, and expect them to flourish upon a quite different soil? Morality, in Professor Huxley, I can well believe, is strong enough to hold its own. But will it be strong enough in Professor Huxley's great-grandchildren?

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After the manner of a mediæval disputant, Mr. Lilly posts up three theses, which, as he conceives, embody the chief heresies propagated by the late Professor Clifford,¹ Mr. Herbert Spencer,² and myself. He says that we agree ‘(1) in putting aside, as unverifiable, everything which the senses cannot verify; (2) everything beyond the bounds of physical science; (3) everything which cannot be brought into a laboratory and dealt with chemically’ (p. 578).³

My lamented young friend Clifford, sweetest of natures though keenest of disputants, is out of reach of our little controversies, but his works speak for him, and those who run may read a refutation of Mr. Lilly’s assertions in them. Mr. Herbert Spencer, hitherto, has shown no lack either of ability or of inclination to speak for himself; and it would be a superfluity, not to say an impertinence, on my part to take up the cudgels for him. But, for myself, if my knowledge of my own consciousness may be assumed to be adequate (and I make not the least pretension to acquaintance with what goes on in my ‘Unbewusstsein’),⁴ I may be permitted to observe that the first proposition appears to me to be not true; that the second is in the same case; and that, if there be gradations in untruthness, the third is so monstrously untrue that it hovers on the verge of absurdity, even if it does not actually flounder in that logical limbo. Thus, to all three theses, I reply in appropriate fashion, *Nego* – I say No; and I proceed to state the grounds of that negation, which the proprieties do not permit me to make quite so emphatic as I could desire.

Let me begin with the first assertion, that I ‘put aside, as unverifiable, everything which the senses cannot verify.’ Can such a statement as this be seriously made in respect of any human being? But I am not appointed apologist for mankind in general; and confining my observations to myself, I beg leave to point out that, at this present moment, I entertain an unshakable conviction that Mr. Lilly is the victim of a patent and enormous misunderstanding, and that I have not the slightest intention of putting that conviction aside because I cannot ‘verify’

it either by touch, or taste, or smell, or hearing, or sight, which (in the absence of any trace of telepathic faculty) make up the totality of my senses.

Again, I may venture to admire the clear and vigorous English in which Mr. Lilly embodies his views; but the source of that admiration does not lie in anything which my five senses enable me to discover in the pages of his article, and of which an orang-outang might be just as acutely sensible. No, it lies in an appreciation of literary form and logical structure by æsthetic and intellectual / faculties which are not senses, and which are not unfrequently sadly wanting where the senses are in full vigour. My poor relation may beat me in the matter of sensation; but I am quite confident that, when style and syllogisms are to be dealt with, he is nowhere.

If there is anything in the world which I do firmly believe in, it is the universal validity of the law of causation; but that universality cannot be proved by any amount of experience, let alone that which comes to us through the senses. And, when an effort of volition changes the current of my thoughts, or when an idea calls up another associated idea, I have not the slightest doubt that the process to which the first of the phenomena, in each case, is due stands in the relation of cause to the second. Yet the attempt to verify this belief by sensation would be sheer lunacy. Now I am quite sure that Mr. Lilly does not doubt my sanity; and the only alternative seems to be the admission that his first proposition is erroneous.

The second thesis charges me with putting aside 'as unverifiable' 'everything beyond the bounds of physical science.' Again, I say No. Nobody, I imagine, will credit me with a desire to limit the empire of physical science, but I really feel bound to confess that a great many very familiar and, at the same time, extremely important phenomena lie quite beyond its legitimate limits. I cannot conceive, for example, how the phenomena of consciousness, as such and apart from the physical process by which they are called into existence, are to be brought within the bounds of physical science. Take the simplest possible example, the feeling of redness. Physical science tells us that it commonly arises as a consequence of molecular changes propagated from the eye to a certain part of the substance of the brain, when vibrations of the luminiferous ether⁵ of a certain character fall upon the retina. Let us suppose the process of physical analysis pushed so far that one could view the last link of this chain of molecules, watch their movements as if they were billiard balls, weigh them, measure them, and know all that is physically knowable about them. Well, even in that case, we should be just as far from being able to include the resulting phenomenon of consciousness, the feeling of redness, within the bounds of physical science, as we are at present. It would remain as unlike the phenomena we know under the names of matter and motion as it is now. If there is any plain truth upon which I have made it my business to insist over and over again it is this – and whether it is a truth or not, my insistence upon it leaves not a shadow of justification for Mr. Lilly's assertion.

But I ask in this case also, how is it conceivable that any man, in possession of all his natural faculties, should hold such an opinion? I do not suppose that I am exceptionally endowed because I have all / my life enjoyed a keen perception of the beauty offered us by nature and by art. Now physical science may and probably will, some day, enable our posterity to set forth the exact physical concomitants and conditions of the strange rapture of beauty. But, if ever that day arrives, the rapture will remain, just as it is now, outside and beyond the physical world; and, even in the mental world, something super-added to mere sensation. I do not wish to crow unduly over my humble cousin the orang, but in the æsthetic province, as in that of the intellect, I am afraid he is nowhere. I doubt not he would detect a fruit amidst a wilderness of leaves where I could see nothing; but I am tolerably confident that he has never been awestruck, as I have been, by the dim religious gloom, as of a temple devoted to the earthgods, of the tropical forest which he inhabits. Yet I doubt not that our poor long-armed and short-legged friend, as he sits meditatively munching his durian fruit, has something behind that sad Socratic face of his, which is utterly 'beyond the bounds of physical science.' Physical science may know all about his clutching the fruit and munching it and digesting it, and how the physical titillation of his palate is transmitted to some microscopic cells of the grey matter of his brain. But the feelings of sweetness and of satisfaction which, for a moment, hang out their signal lights in his melancholy eyes, are as utterly outside the bounds of physics as is the 'fine frenzy' of a human rhapsodist.

Does Mr. Lilly really believe that, putting me aside, there is any man with the feeling of music in him who disbelieves in the reality of the delight which he derives from it, because that delight lies outside the bounds of physical science, not less than outside the region of the mere sense of hearing? But, it may be, that he includes music, painting, and sculpture under the head of physical science, and in that case I can only regret I am unable to follow him in his ennoblement of my favourite pursuits.

The third thesis runs that I put aside as 'unverifiable' 'everything which cannot be brought into a laboratory and dealt with chemically;' and, once more, I say No. This wondrous allegation is no novelty; it has not unfrequently reached me from that region where gentle (or ungentle) dulness so often holds unchecked sway – the pulpit. But I marvel to find that a writer of Mr. Lilly's intelligence and good faith is willing to father such a wastrel. If I am to deal with the thing seriously, I find myself met by one of the two horns of a dilemma. Either some meaning, as unknown to usage as to the dictionaries, attaches to 'laboratory' and 'chemical;' or the proposition is (what am I to say in my sore need for a gentle and yet appropriate word?) – well – unhistorical.

Does Mr. Lilly suppose that I put aside as 'unverifiable' all the truths of mathematics, of philology, of history? And, if I do not, / will he have the great goodness to say how the binomial theorem is to be dealt with 'chemically,' even in

the best appointed 'laboratory;' or where the balances and crucibles are kept by which the various theories of the nature of the Basque language may be tested; or what reagents will extract the truth from any given History of Rome, and leave the errors behind as a residual calx?⁶

I really cannot answer these questions, and unless Mr. Lilly can, I think he would do well hereafter to think more than twice before attributing such preposterous notions to his fellow-men, who, after all, as a learned counsel said, are vertebrated animals.

The whole thing perplexes me much; and I am sure there must be an explanation which will leave Mr. Lilly's reputation for common sense and fair dealing untouched. Can it be – I put this forward quite tentatively – that Mr. Lilly is the victim of a confusion, common enough among thoughtless people, and into which he has fallen unawares? Obviously, it is one thing to say that the logical methods of physical science are of universal applicability, and quite another to affirm that all subjects of thought lie within the province of physical science. I have often declared my conviction that there is only one method by which intellectual truth can be reached, whether the subject-matter of investigation belongs to the world of physics or to the world of consciousness; and one of the arguments in favour of the use of physical science as an instrument of education which I have oftenest used is that, in my opinion, it exercises young minds in the appreciation of inductive evidence better than any other study. But while I repeat my conviction that the physical sciences probably furnish the best and most easily appreciable illustrations of the one and indivisible mode of ascertaining truth by the use of reason, I beg leave to add that I have never thought of suggesting that other branches of knowledge may not afford the same discipline; and assuredly I have never given the slightest ground for the attribution to me of the ridiculous contention that there is nothing true outside the bounds of physical science.



Tolerably early in life, I discovered that one of the unpardonable sins, in the eyes of most people, is for a man to presume to go about unlabelled. The world regards such a person as the police do an unmuzzled dog, not under proper control. I could find no label that would suit me, so, in my desire to range myself and be respectable, I invented one; and, as the chief thing I was sure of was that I did not know a great many things that the —ists and the —ites about me professed to be familiar with, I called myself an Agnostic. Surely no denomination could be more modest or more appropriate; and I cannot imagine why I should be every now and then haled out of my refuge and declared sometimes to be a Materialist, sometimes an Atheist, sometimes a Positivist;⁷ and sometimes, alas and alack, a cowardly or reactionary Obscurantist.



The growth of science, not merely of physical science, but of all science, means the demonstration of order and natural causation among phenomena which had not previously been brought under those conceptions. Nobody who is acquainted with the progress of scientific thinking in every department of human knowledge, in the course of the last two centuries, will be disposed to deny that immense provinces have been added to the realm of science; or to doubt, that the next two centuries will be witnesses of a vastly greater annexation. More particularly in the region of the physiology of the nervous system, is it justifiable to conclude from the progress that has been made in analysing the relations between material and psychical phenomena, that vast further advances will be made; and that, sooner or later, all the so-called spontaneous operations of the mind will have, not only their relations to one another, but their relations to physical phenomena, connected in natural series of causes and effects, strictly defined. In other words, while, at present, we know only the nearer moiety of the chain of causes and effects, by which the phenomena we call material give rise to those which we call mental; hereafter, we shall get to the further end of the series.



Thus, to come, at last, to the really important part of all this discussion, if the belief in a God is essential to morality, physical science offers no obstacle thereto; if the belief in immortality is essential to morality, physical science has no more to say against the probability of that doctrine than the most ordinary experience has, and it effectually closes the mouths of those who pretend to refute it / by objections deduced from merely physical data. Finally, if the belief in the uncausedness of volition is essential to morality, the student of physical science has no more to say against that absurdity than the logical philosopher or theologian. Physical science, I repeat, did not invent determinism, and the deterministic doctrine would stand on just as firm a foundation as it does if there were no physical science. Let any one who doubts this read Jonathan Edwards,⁸ whose demonstrations are derived wholly from philosophy and theology.

Thus, when Mr. Lilly, like another Solomon Eagle, goes about proclaiming 'Woe to this wicked city,'⁹ and denouncing physical science as the evil genius of modern days – mother of materialism, and fatalism, and all sorts of other condemnable isms – I venture to beg him to lay the blame on the right shoulders; or, at least, to put in the dock, along with Science, those sinful sisters of hers, Philosophy and Theology, who, being so much older, should have known better than the poor Cinderella of the schools and universities over which they have so long dominated. No doubt modern society is diseased enough; but then it does not differ from older civilisations in that respect. Societies of men are fermenting masses, and as beer has what the Germans call 'Oberhefe' and 'Unterhefe,'¹⁰ so every society that has existed has had its scum at the top and its dregs at the

bottom; and I doubt if any of the 'ages of faith' had less scum or less dregs, or even showed a proportionally greater quantity of sound wholesome stuff in the vat. I think it would puzzle Mr. Lilly, or any one else, to adduce convincing evidence that, at any period of the world's history, there was a more widespread sense of social duty, or a greater sense of justice, or of the obligation of mutual help, than in this England of ours. Ah! but, says Mr. Lilly, these are all products of our Christian inheritance; when Christian dogmas vanish virtue will disappear too, and the ancestral ape and tiger will have full play. But there are a good many people who think it obvious that Christianity also inherited a good deal from Paganism and from Judaism, and that, if the Stoics and the Jews revoked their bequest, the moral property of Christianity would realise very little. And, if morality has survived the stripping off of several sets of clothes which have been found to fit badly, why should it not be able to get on very well in the light and handy garments which Science is ready to provide?

But this by the way. If the diseases of society consist in the weakness of its faith in the existence of the God of the theologians, in a future state, and in uncaused volitions, the indication, as the doctors say, is to suppress Theology and Philosophy, whose bickerings about things of which they know nothing have been the prime cause and continual sustenance of that evil scepticism which is the Nemesis of meddling with the unknowable. /

Cinderella is modestly conscious of her ignorance of these high matters. She lights the fire, sweeps the house, and provides the dinner; and is rewarded by being told that she is a base creature, devoted to low and material interests. But, in her garret, she has fairy visions out of the ken of the pair of shrews who are quarrelling downstairs. She sees the order which pervades the seeming disorder of the world; the great drama of evolution, with its full share of pity and terror, but also with abundant goodness and beauty, unrolls itself before her eyes; and she learns, in her heart of hearts, the lesson, that the foundation of morality is to have done, once and for all, with lying; to give up pretending to believe that for which there is no evidence, and repeating unintelligible propositions about things beyond the possibilities of knowledge.

She knows that the safety of morality lies neither in the adoption of this or that philosophical speculation, or this or that theological creed, but in a real and living belief in that fixed order of nature which sends social disorganisation upon the track of immorality, as surely as it sends physical disease after physical trespasses. And of that firm and lively faith it is her high mission to be the priestess.

**William Samuel Lilly, 'The Province of Physics,'
Fortnightly Review (February 1887), pp. 278–9,
281–2, 283–5, 287–8, 292–3.**

Now the main point at issue between Professor Huxley and myself is, whether I am right in reckoning him among teachers of Materialism. He protests that if he 'may trust his own knowledge of his own thoughts,' this is 'an error of the first magnitude.* But surely the question is not about Professor Huxley's own knowledge / of his own thoughts. It is as to the obvious meaning and practical consequences of the words to which he has committed himself in print, and which he is **not** in the least disposed to retract. If, as I believed when I wrote my paper *Materialism and Morality*, and as I still believe after the most careful study of Professor Huxley's criticism upon it, there are among those words many statements which commit him to the doctrine, that is enough for my vindication, enough for the explanation which Professor Huxley seeks from me. Should it appear that the Professor, in other and perhaps contiguous statements, has committed himself to Idealism, the question might then arise whether he held both doctrines simultaneously or in succession. But I submit it would be no argument against his having, by force of terms, surrendered to Materialism, that he had never, in his own mind, intended to do so, or that he had before or afterwards preached Idealism. Rather it would illustrate what has been well pointed out by a recent very clear-headed writer, who, like myself, greatly admires Professor Huxley's high gifts:— 'It is just because science has private opinions of its own, just because of its convictions of the relativity of knowledge, just because of the irresistible arguments of Idealism, that it gets into a muddle. It has officially to profess Realism, and covertly to recognise Idealism. It then sets about solving the problem of their reconciliation, by stating it in terms which are applicable to the first only.† Professor Huxley, in his *Lay Sermon* on the Physical Basis of Life, proposed to lead his hearers 'through the territory of vital phenomena to the materialistic slough,' and then 'to point out the path of extrication.‡ My con-

* P. 788.

† Coke. *Creeeds of the Day*, vol. ii., p. 200.

‡ *Lay Sermons*, p. 139 (fifth edition).

tention is that a large number of his students – I believe the vast majority – and their name is legion, are led by him into the materialistic slough never to emerge from it. Some delicacy of discrimination, not commonly found in the average reader of to-day, is required in order to realise that Professor Huxley's materialistic language is really meant to be not more than metaphorical; that it implies only working hypotheses, which need not in the least be truths of fact.



And now as to Professor Huxley's 'Materialism.' In the first place I observe that I cannot quite accept his definition of the term. It suits his argument, unquestionably; but it is too narrow. He says Materialism amounts to this: 'That there is nothing in this universe but matter and force; and *that all the phenomena of nature are explicable by deduction from the properties assignable to these two factors.*'* I reject the second half of this definition – the words which I have put in italics – as unnecessary and as incorrect. A Materialist may say, 'I cannot explain the process by which certain products of matter and force come about, but I maintain that they are products of these two factors only, and not of a third different from them.' Many – perhaps most – Materialists would grant that they cannot understand how molecular action produces thought; but all the same, they contend that there is no cause of thought except matter. Professor Huxley knows that just as well as I do, and probably much better. Of course the virtue of the saving clause in his definition is plain enough. He agrees with the Materialists as to the *fact* of origin. 'Material changes are the causes of psychological phenomena.'† But if you say, 'Dear me; that sounds uncommonly like Materialism,' he turns round indignantly and exclaims, '*Nego* – I say No: the proprieties do not permit me to make the negation quite so emphatic as I could desire; I never said I could explain how they are the causes: I cannot conceive how the phenomena of consciousness are to be brought within the bounds of physical science,'‡ and so forth. He grants that states of consciousness are brought into existence by molecular changes. Yet, for all that, you must not say that he teaches Materialism, because he cannot explain the process. Why, who *can* explain the process by which light becomes heat, or heat becomes electricity? And who is thereby hindered from asserting that heat, light, and electricity are in their nature physical, not psychological? It is a question of the nature of things, not of explaining the process by which one produces another. If, in fact, molecular changes do produce states of consciousness, be the process what it may – so long as it does not bring in a new non-physical cause – we are necessarily landed in Materialism. Now with all pos-

* P. 793.

† P. 797.

‡ P. 789–90.

sible deference for Professor Huxley's knowledge of his states of consciousness, I must stick to my text that this very Materialism is contained in, and follows by strictest deduction from, his printed / statements.



Once more, Professor Huxley maintains that 'consciousness, in certain forms at any rate, is a cerebral function.'^{*} The statement is more guarded than one which was put forward by him some years ago in quelling Mr. Darwin's critics.¹ He then contended that as / electric force and light waves are expressions of molecular changes, 'so consciousness is, in the same sense, an expression of the molecular changes which take place in that nervous matter which is the organ of consciousness.'[†] So in writing in this Review in November, 1874, he laid it down that 'the consciousness of brutes would appear to be related to the mechanism of their bodies, simply as a collateral product of its working.'² And it is quite clear from the whole of the paper in which these words occur that he does not allow of any difference in this matter between men and the brutes, as to which I quite agree with him. I do not know the precise object or value of the limiting words which he now uses: 'in certain forms, at any rate.' I take it that we may fairly credit him with the proposition, which, indeed, he appears to grant, that 'consciousness is a function of the brain.'[‡] And what does he mean by function? He replies, 'We call function that effect, or series of effects, which results from the activity of an organ.'[§] Very well. We will take that definition. And now let us go a step farther.

To Professor Huxley the whole of man, except his body, consists of 'states of consciousness.'[¶] So much is clear. To talk of a personality which underlies those states, or exists in them, appears to him a return to an 'effete mythology.'^{**} Consciousness is the man, so far forth as he is man and not mere dead matter. Therefore it is no exaggeration to say that on this theory the brain makes the man – that man is the result of brain, or a cerebral function. And what is the brain except a little grey matter in a certain degree of complexity? Shall we be told that consciousness is simply the product of the activity of a material organ, and at the same time be forbidden, under pain of the strongest anathema which 'the proprieties permit,' to call this doctrine Materialism? What is Materialism if this is not? Nay, nay, says Professor Huxley, not so fast; in that sense, we are all Materialists. 'We are all agreed that consciousness is a function of matter, and

* P. 796.

† *Contemporary Review*, vol. xviii. p. 465.

‡ *Science and Morals*, p. 796.

§ P. 797.

¶ *Lay Sermons*, p. 327.

** *Science and Morals*, p. 796.

that particular tenet must be given up as a mark of Materialism.* And he imagines me to meet his parallel, drawn from the production of muscular motion, by conceding that 'no physiologist, however spiritual his leanings, dreams of supposing that simple sensations require a 'spirit' for their production.'† Professor Huxley must pardon me. That would not at all be my way of rejoicing. What physiologists hold I am not just now concerned to ascertain. But psychologists also deal with simple sensations, and I am quite sure that I am not the sole survivor of the school which perceives a difference between dead and living muscle, which attributes the state of consciousness called pain to living and / not to dead muscle, and which, therefore, affirms in living muscle the existence of an immaterial vital principle – in short, of 'spirit,' the absence of which it is that makes dead muscle, and renders pain impossible in such. Sensation, however simple, appears to me to be not a physical fact, not a nerve fact, but a mental fact. *Pace* Professor Huxley, we have not yet quite 'done with that wholly superfluous fiction.' Still less have psychologists conceded that a fiction it is. I certainly cannot allow that animal life, constituting certain states of consciousness, is due to a material organism in which nothing immaterial resides. Is this 'immaterial' to be called 'spirit'? Why not?

Moreover it must not be forgotten that Professor Huxley, who distinguishes for the moment between 'physical science' and 'all science,' has written elsewhere, 'If there is one thing clear about the progress of modern science, it is the tendency to reduce all scientific problems, except those which are purely mathematical, to questions of molecular physics – that is to say, to the attractions, repulsions, motions, and coordination of the ultimate particles of matter.'‡ Let him bear with me if I ask him whether mental problems – problems of consciousness – are scientific or not? If they are, then the clear tendency of modern science – approved, as is manifest, by Professor Huxley – is to reduce them to problems of molecular physics, which, truly, if it could be done, would make the empire of matter and force universal. Nor is there any other way of banishing 'spirit and spontaneity' from human thought. But to take the other alternative, will Professor Huxley say that problems of consciousness are not scientific? In various parts of his paper in the December *Fortnightly* he insists, with indignant emphasis, that he does not pretend to bring 'the phenomena of consciousness within the bounds of physical science.' Therefore, it would seem they are not scientific at

* P. 797.

† P. 797.

‡ *Lay Sermons*, p. 166.

all; for as he has told us, in words just now quoted, it is the tendency of modern science to bring 'all scientific problems' within those bounds. Grant them not to be 'scientific,' and how will the province of matter and force be made to include them? In no way; and then there will be a limit to the extension of that province: it will never become conterminous with all regions of human thought. It would be like the lifting of a fog if Professor Huxley would tell us which of the foregoing alternatives he proposes to defend. Is psychology a science? Is it reducible to molecular physics? Is not such a reduction tantamount to Materialism? Is every problem, transcendental and other, to be solved by the methods of physical science? Or are there regions of human thought where physics cannot find an entrance? For if there be, in such we may find room for spirit – nay, perhaps, even for 'spontaneity.' At any rate, universal / 'causation,' reducible to the pullings and pushings of the final particles of matter, will have to be given up, or Materialism, of which this doctrine is the expression, must be accepted.

Professor Huxley, however, identifies the growth of science with the extension of 'natural causation,' and he fully acquiesces in the tendency to reduce 'all scientific problems' to those of molecular physics. Is it misrepresenting him, then – the writer, I mean, not the inner consciousness of the individual man – to assert that he 'puts aside as unverifiable everything which cannot, by some process or other, be verified by the senses?' Again, it is his opinion that 'as surely as every future grows out of past and present, so will the physiology of the future gradually extend the realm of matter and law, until it is coextensive with knowledge, with feeling, with action.*' It appears, then, that to extend the realm of matter and of law is one and the same thing. Matter, law, order, universal causation – to say one is to imply the rest. But it is the senses which deal with matter. If there is nothing beyond matter, there is nothing 'which the senses cannot verify,' nothing 'beyond the bounds of physical science,' nothing 'which cannot be brought into a laboratory and dealt with chemically.' If the problems of consciousness lie under the jurisdiction of physical science, *ipso facto* they are subject to the laws and tests of molecular physics. How is it misrepresenting Professor Huxley to debit him with the conclusions of his own premises?



'The Creed of Science.' 'The relation of science to morals.' Employing the term physics, as less open to ambiguity, I am here brought back to what I said at the beginning, that physics, as such, is not conversant with morals, neither affirms nor denies religion, and can therefore have no creed in regard to either. We do not talk of the religion of the sense of hearing, nor of its irreligion; such

* *Lay Sermons*, p. 142.

an expression would be absurd. In like manner physics, which is wholly the science of the senses, abstracts from religion, from morality, and from every kind of knowledge so far as the latter is independent of sense. I say 'abstracts from,' I do not say 'rejects,' or 'repudiates,' or 'denies.' Physical science merely attends to its own business, and it is no part of its business to deal with what the late Mr. Lewes³ denominated the 'metempirical.' It is not Agnostic, for Agnosticism implies a knowledge of one's own ignorance; and physical science does not know that it is ignorant, any more than a mollusc knows that it is not moral. It is wonderful how much has been made out to the prejudice of religion as of morality, from the obvious canon of logic that, every science having its proper object, the proper object of physics does not include God or the moral order. Science, all science, has on the strength of this been described as hostile to metaphysical principles, to belief in a Personal Deity, and to an *à priori* standard of ethics. Hostile, physical science is not; indifferent, it is and ought to be. Professor Huxley asks, in what laboratory questions of æsthetics and historical truth can be tested? In none, as we both agree. But it is curious that he should think of safeguarding morality by means of that science which cannot even attain to the laws of historical criticism. He will, perhaps, assure me that I mistake him again. Well, I do not mistake in asserting that he considers physical science 'a better guardian of morality' than 'the pair of shrews,' philosophy and theology. I will say what strikes me on that point, and so conclude this paper, which has extended far beyond what I proposed to myself when I began to write it. But whether one agrees with Professor Huxley or disagrees, his pages are so fascinating that it is difficult to tear oneself away from them.

The morality of an act, we must all surely admit, is not a physical quality; it resides in the motive, and again in the nature of the act; whether, namely, the latter is conformable to a standard of perfection which the mind alone apprehends. The outward effects of two actions may be precisely similar, as when an assassin slays his victim and an executioner / hangs a convicted criminal. But one of these acts will be foul murder; the other a righteous ministration of retributive justice. Will Professor Huxley point out any science which is not a part of philosophy or theology, and is yet competent to discriminate between these two acts? What can 'science' affirm about them unless it becomes philosophy or theology? Nothing whatever. Physical science perceives only that which the senses grasp; and the senses know nothing of justice or injustice. Is it by physics that we know when social disorganization is the consequence of immorality? I trow not. To physics the deeds of a Wellington⁴ and of a Genghiz Khan⁵ are 'molecular changes,' and no more. Physical science may predict that if certain physical actions take place, certain physical structures will be injured or broken up. But it can never tell what is the moral quality of those physical actions. The taint of leprosy may be contracted by vicious habits, or in the exercise of sublimest self-sacrifice. But can

'science' inform us whether Père Damian,⁶ in his fearful prison at Molokai, has contracted it because he is good or because he is evil? Therefore, I must affirm, that while physical science may be, and ought to be, the servant of morality, it can never, in any proper sense, be its guardian. The only effective guardian of morality is religion, which affords it a sanction and a reward, which incarnates it in august symbolism and utters it in divine command for all those – they are, and ever must be, the overwhelming majority – who cannot lay hold of an abstruse philosophy, but need to be taught as children. Physical science may indeed mark the difference, which in time becomes outward and visible, between those who cultivate morality and those who trample it under foot. But there its competency stops; its powers of interpretation are exhausted. What lies at the root of the difference it can never tell. It has no means of discerning virtue or vice, and to intrust the age to its guidance would be like asking one's way of a blind giant. That he was a giant would be no compensation for his want of sight; and, if he thought himself all the more at liberty because he perceived no hindrance to his action, so much the worse would it be for those whom he dragged along with him. I have applied the parable in the paper which Professor Huxley has criticised. Physical science, apart from philosophy and religion, is indeed a giant, but it is blind. And when it proceeds unscientifically to formulate its ignorance into a creed, it is doing its best not to subserve morality, but to ruin it.

Copyright

Lilly, 'Materialism and Morality'

1. *WORDS are grown ... Viola in Twelfth Night*: William Shakespeare, *Twelfth Night*, III.i.24–5, although the words are spoken by the Clown.
2. 'idle words, servants to shallow fools': from William Shakespeare's 1594 narrative poem *The Rape of Lucrece*, l. 1016.
3. 'to make the worse reason appear the better': the aim of sophistry, much criticized by Plato.
4. 'a teacher, or nothing': 'Every great poet is a teacher. I wish to be considered as a teacher or as nothing'; Wordsworth (see note 3 to 'On the Application of the Terms', above, p. 251), as quoted by John Morley (1838–1923) in his introduction to *The Complete Poetical Works of William Wordsworth* (London: Macmillan & Co., 1889), p. lix.
5. *Professor Clifford*: William Kingdon Clifford (1845–79) was an English mathematician and philosopher, noted here for his work on metaphysics, he was also one of the most outspoken of the evolutionary naturalists. Most of his written work was published posthumously.
6. 'the crass Materialism of the savage': a reference to Clifford's 1877 article for the *Contemporary Review*, 'The Ethics of Belief', which was later republished in *Lectures and Essays of the Late William Kingdon Clifford, FRS*, ed. L. Stephen and F. Pollock, 2 vols (London: Macmillan, 1879), quotation vol. 1, p. 33.
7. 'Il y a des morts qu'il faut tuer encore': 'there are dead that we must kill again.'
8. *Positivism*: Positivism is the epistemological belief that the methods of science are those best suited to discerning the processes by which not only physical events but also historical and human events occur. In the nineteenth century it was closely associated with the French sociologist Auguste Comte (see the Lewes text on Comte above, pp. 37–46), and was particularly influential among the small community of 'Philosophical Radicals' who associated themselves with John Chapman's *Westminster Review*.
9. *Agnosticism*: Thomas Huxley (1825–95) had coined the term in 1869 to describe his belief that there was insufficient evidence to ascertain the existence of a God, but also an acknowledgement that an absence of evidence was not evidence of absence.
10. *Mr. Frederick Pollock*: Frederick A. Pollock (1845–1937), professor of jurisprudence at Oxford, was one of Clifford's closest friends. Between them, he and Leslie Stephen edited Clifford's papers after his death and wrote the introduction to his 1879 *Lectures and Essays*.
11. 'idealistic monism, a very subtle form of idealism': see Pollock's introduction to Clifford's *Lectures and Essays*, vol. 1, p. 39.
12. 'mind, not mind ... are built up': *ibid.*, vol. 1, p. 50.
13. *monistic*: monism is the belief that all things, mind as well as matter, are formed from, or can be explained in, like terms.
14. 'even the simplest ... mind-stuff': Pollock's introduction to Clifford, *Lectures and Essays*, vol. 1, p. 50.
15. 'Matter ... not conscious': from Clifford's *Lectures and Essays*, vol. 2, p. 87.
16. 'a moving molecule ... intelligence and volition': the quotation is by Clifford from Pollock's introduction to his *Lectures and Essays*, vol. 1, p. 50.
17. 'whether there is ... in man's nature': from Huxley's 'On the Advisableness of Improving Natural Knowledge, A Lay Sermon delivered in Martin's Hall on Sunday January 7th, 1866, subsequently published in the *Fortnightly Review*, Volume III, November 15th 1865–February 1st 1866 (London: Chapman & Hall), pp. 626–37.
18. 'the necessity of... Unknown and Unknowable': *ibid.*, p. 636.

19. *'consciousness is a function ... of organization'*: from Huxley's 'Mr. Darwin's Critics', *Contemporary Review*, 18 (1871), pp. 443–76, on p. 464.
20. *'we shall sooner ... of heat'*: from Huxley's 'On Descartes' "Discourse Touching the Method of Using One's Reason Rightly, and of Seeking Scientific Truth", *MacMillan's Magazine*, 22 (1870), pp. 69–80, later republished in his *Lay Sermons, Addresses, and Reviews* (London: MacMillan & Co., 1870), pp. 320–44, quotation on p. 339.
21. Lay Sermons: see note above.
22. *'the great truth ... with action'*: from Huxley's 'On the Physical Basis of Life A Lay Sermon delivered in Edinburgh, on Sunday 8th November, 1868, at the request of the late Rev. James Cranbrook', subsequently published in the *Fortnightly Review*, n.s. 5 (1868), pp. 129–45, later republished in *Lay Sermons*, pp. 130–65, quotation on p. 159.
23. *Mr. Herbert Spencer*: Herbert Spencer (1820–1903) was an English sociologist and classical liberal who became one of the most influential philosophers of the nineteenth century. Over a forty-year period he published a multi-volume *Synthetic Philosophy* in which he sought to bring all aspects of science, nature and society under a common rubric. Although he grew up a radical in politics and a dissenter in religion, he grew increasingly agnostic, referring only to an 'unknowable' that lay beyond human comprehension. An ardent advocate of natural progressive development, he coined the phrase 'the survival of the fittest' in 1864, which Darwin later incorporated into the *Origin of Species* from the 1869 fifth edition at the suggestion of Alfred Russel Wallace.
24. *'an unknown ... end in time'*: Herbert Spencer, not further identified.
25. Psychology: refers to Spencer's *Principles of Psychology*, published in two volumes in 1855.
26. *Voltaire's letters ... avec la parole*: Voltaire (1694–1778) was the pen name of François Marie Arouet, a French Enlightenment thinker, and most prolific writer. As well as writing some 2,000 books and pamphlets in his life, he also wrote some 20,000 letters, many to some of the most significant men and women of his time. He was a staunch advocate of civil liberties and political reform, and was a noted intellectual influence upon both the French and the American revolutions. The French text translates thus: 'people who are not in God's place, who want to create the world with words'.
27. *M. Zola*: Émile François Zola (1840–1902) was a prominent French author. He founded the school of literary naturalism that he saw as an experiment in psychology in the same way that his contemporary in physiology Claude Bernard's (1813–78) work was. Bernard he titled his most famous work, *An Introduction to Experimental Medicine* (1865).
28. *'Toute métaphysique m'épouvante'*: 'metaphysics terrifies me'.
29. *'like the shrieks... actually carrion'*: attributed to Zola, although not further identified.
30. *'wonder with a foolish face of praise'*: from Alexander Pope, 'An Epistle to Dr. Arbuthnot' (1735), l. 212.
31. *lupanarian*: lascivious.
32. *Mr. Ruskin ... petty or vile*: Although Ruskin (see note 13 to Dallas, *The Gay Science*, above, p. 265) advocated throughout his career for the congruency of art and science, he became an outspoken critic of the scientific naturalism of Darwin, Huxley and Tyndall from the 1860s on, and railed against the degrading influence of philosophical and economic materialism on the art of his day. The quotation is from Ruskin's *The Relationship between Michael Angelo and Tintoret. The Seventh of the Course of Lectures on Sculpture Delivered at Oxford, 1870–1871* (London: Smith, Elder & Co., 1872), pp. 44–5. The full sentence reads: 'But remember, at least, that I have borne witness to you today of the

treasures that we forget, while we amuse ourselves with the poor toys, and the petty, or vile, arts, of our own time.’

33. *a distinguished French painter*: not identified.
34. *Darwin's*: see note 3 to Miller, *Popular Geology*, above, p. 261.
35. *certitude de mauvais goût*: ‘certainly of bad taste’.
36. *écraser l'homme spirituel, dépersonnaliser l'homme*: ‘crush the spiritual life of man, dehumanize the man’.
37. *Amiel*: Henri Frédéric Amiel (1821–81) was a Swiss moral philosopher.
38. *I will not ... hold its own*: from Huxley’s ‘Influence upon Morality of a Decline in Religious Belief’, published in *Nineteenth Century*, 1:1 (May 1877), pp. 536–9, on p. 539.
39. *M. Renan ... vieille croyance*: Ernest Renan (1823–92) was a French philosopher who was widely influential during his time. Thought by some to be the very incarnation of modern ideas, he advocated a progressive politics and philosophy. The quotation translates: ‘sap the morals of the old belief’.
40. *Miraturque novas ... sua poma*: ‘and marvels at new leaves and fruits not its own’.

Huxley, ‘Science and Morals’

1. *Professor Clifford*: see note 5 to Lilly, ‘Materialism and Morality’, above, p. 283.
2. *Mr. Herbert Spencer*: see note 23 to Lilly, ‘Materialism and Morality’, above, p. 284.
3. *(1) in putting aside ... (p. 578)*: Lilly, ‘Materialism and Morality’, p. 578 (not reproduced here).
4. *Unbewusstsein*: ‘unconscious’.
5. *luminiferous ether*: see note 17 to Tyndall, ‘Scientific Use of the Imagination’, above, p. 274.
6. *residual calx*: calx is the residue of metal or mineral combustion.
7. *Positivist*: see note 8 to Lilly, ‘Materialism and Morality’, above, p. 283.
8. *Jonathan Edwards*: Jonathan Edwards (1703–58) was a prominent and influential American intellectual and theologian who wrote extensively on the metaphysics of theological determinism.
9. *Solomon Eagle ... ‘Woe to this wicked city’*: Solomon Eccles (1613–83) was a Quaker who was prosecuted a number of times in the Reformation for acts of civil disobedience relating to worship. He was also celebrated and caricatured in Daniel Defoe’s semi-fictional account of the plague of 1665, *A Journal of the Plague Year*. Defoe wrote: ‘I suppose the world has heard of the famous Solomon Eagle, an enthusiast. He, though not infected at all but in his head, went about denouncing of judgement upon the city in a frightful manner, sometimes quite naked, and with a pan of burning charcoal on his head. What he said, or pretended, indeed I could not learn’ (D. Defoe, *A Journal of the Plague Year* (1722), ed. L. Landa (Oxford: Oxford University Press, 2010), p. 89, see also p. 200). The quote ‘Woe to this wicked city’ is attributed to Eccles.
10. *‘Oberhefe’ and ‘Unterhefe’*: top-fermenting yeast and bottom-fermenting yeast. The former is an ale yeast, used to brew ales, porters and stout; it ferments at a higher temperature than the bottom-fermenting yeast that will produce a lager or pilsner style of beverage.

Lilly, ‘The Province of Physics’

1. *Mr. Darwin's critics*: a reference to Huxley’s ‘Mr. Darwin’s Critics’ which appeared in the *Contemporary Review*, 18 (1871), pp. 443–76. Lilly quotes from p. 465 in this passage.

2. *'the consciousness ... of its working'*: from Huxley's 'On the Hypothesis that Animals are Automata and its History', *Fortnightly Review*, 16:95 (November 1874), pp. 555–80, on p. 575.
3. *Mr. Lewes*: see note 35 to Dallas, *The Gay Science*, above, p. 267.
4. *Wellington*: see note 19 to [Whewell], 'Spedding's *Complete Edition of the Works of Bacon*', above, p. 256.
5. *Genghiz Khan*: Genghis Khan (1162–1227) was founding ruler of the Mongolian Empire. By his death he had expanded the empire through conquest to include most of Eurasia.
6. *Père Damian*: Father Damian or Saint Damian (1840–89) was born Jozef De Veuste in Belgium. He dedicated his life and his religious mission to helping those with leprosy, moving to live with those afflicted with the disease who had been quarantined on the island of Molokai, Hawaii. He eventually contracted the disease, and died in 1889. He was beatified in 1995.

Balfour, *The Foundations of Belief*

1. *Mr. Spencer's suggestion ... modulation in speech*: Spencer (see note 23 to Lilly, 'Materialism and Morality', above, p. 284) proposed this theory in his essay 'The Origin and Function of Music', *Fraser's*, 56 (1857), pp. 396–408. It was reprinted in his *Essays: Scientific, Political and Speculative* the following year.
2. *sexual selection*: Charles Darwin briefly described his theory of sexual selection in chapter 4 of *On the Origin of Species* (1859), but explained it at length in *The Descent of Man, and Selection in Relation to Sex* (1871). Darwin argued in chapter 19 of that work that vocal music had probably originated among the progenitors of human beings in the creation of sounds to attract a mate. Darwin made similar arguments about the origins of instrumental music and dance.
3. *sibilation*: a hissing sound.
4. *Rousseau's theory*: Swiss philosopher Jean-Jacques Rousseau (1712–78) offered his theory of the origins of music, which also drew on human physiology, emotional expression and social context, in his *Essai sur l'origine des langues* (*Essay on the Origin of Languages*, 1781).
5. *Ninth Symphony*: the final symphony, completed in 1824, of the German composer Ludwig van Beethoven (1770–1827).
6. *Weismann*: The German cell biologist August Weismann (1834–1914) presented his theory of music in 'Thoughts upon the Musical Sense in Animals and Man' (1889), published in English in *Essays upon Heredity*, 2 vols (Oxford: Clarendon Press, 1892), vol. 2, pp. 33–70.
7. *Helmholtz's classic investigations*: German mathematical physicist Hermann von Helmholtz (1821–94), whose wide-ranging work was well known in Britain, published *Die Lehre von den Tonempfindungen als physiologische Grundlage für die Theorie der Musik* (*On the Sensations of Tone as a Physiological Basis for the Theory of Music*) in 1863; it was translated into English in 1875.
8. *Voltaire's opinion of Shakespeare*: Voltaire (see note 26 to Lilly, 'Materialism and Morality', above, p. 284) wrote frequently over the course of his career on Shakespeare and, though an early admirer of the English playwright, later condemned him for his departures from the classical unities of time, place and action; the bawdiness of his plays; the weakness of his poetry and the lack of originality in his plots.