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T. H. HUXLEY AS A
MAN OF LETTERS

BY
ALDOUS HUXLEY

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Thomas Henry Huxley, who was born on 4th May, 1825, was Professor of Biology from 1854, and Dean of the Royal College (then Normal School) of Science and Royal School of Mines from 1881 to the date of his death in 1895.

The Memorial Lecture was founded by the Governing Body of the Imperial College of Science and Technology in 1925, following the celebration of the Centenary of Huxley's birth. The members of the Lecture Committee are representative of the various activities of Huxley during his lifetime, viz:—

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T. H. HUXLEY AS A MAN OF LETTERS

By ALDOUS HUXLEY

Mr. G. K. Chesterton has a genius for saying new and surprising things about old subjects. We are grateful to him for his originality. But there is such a thing as being too original by half; and it sometimes happens that what Mr. Chesterton says is so new and so surprising that it has very little perceptible relevance to the subject under discussion. For example, in that stimulating little book, *The Victorian Age in Literature*, he says of Lord Macaulay and T. H. Huxley that "they were both much more under the influence of their own admirable rhetoric than they knew. Huxley, especially, was much more a literary than a scientific man."

Well, this is new and surprising enough—new and surprising, indeed, to the point of being quite untrue. The records of Huxley's scientific achievements are there to prove the contrary. He was a man of science first of all—a man of science who also had, what quite a number of men of science before and after his day have had, a literary gift.

Being myself of the literary profession, I think I can guess how a fellow man of letters would arrive at the conclusion so boldly enunciated in Mr. Chesterton's book. The process is simplicity itself. All that is required is a little systematic and selective ignorance. Ostrich-like, one shuts one's eyes to the scientific achievements of one's subject. One refrains from reading any of his technical papers (and, incidentally, even if one did read them, one would not understand them); and one concentrates exclusively on his more accessible, his more

specifically literary productions. The result is that one comes, logically and inevitably, to the conclusion that "Huxley, especially, was much more a literary than a scientific man." Q.E.D. It is as evident as a proposition of Euclid.

It would be easy to apply the same process to other men of science and to arrive at exactly similar conclusions. Thus, if you choose to forget the "Experimental Researches" and remember only the Calvinistic sermons, you can say of Faraday that he was much less a man of science than a nonconformist preacher. Concentrate on Clerk Maxwell's beautiful letters, and you will be able to conclude that the author of the electromagnetic theory of light was not so much the successor of Newton as of Mme. de Sévigné and Horace Walpole. And if you listen to the musical improvisations rather than to the lectures on relativity, you will have every reason for saying that Einstein is more significant as a violinist than as a mathematical physicist.

Such conclusions are based, as I have said, on systematic and selective ignorance. Now, systematic ignorance of past science is doubtless deplorable. But, however deplorable, it is not, except with a special effort, to be avoided. Those who have not had a scientific education are incapable of understanding the technicalities of any scientific paper. Those who have been educated in one branch of science are hardly better off than laymen, when it comes to understanding a paper in some other branch. And those who have been educated in the particular science under consideration have no need to refer to the original papers of their predecessors. Every generation of scientific men starts where the previous generation left off; and the most advanced discoveries of one age constitute the elementary axioms of the next. We are not in the habit of inspecting the foundations of the houses in which we live; and, similarly, men of science are not in the habit of referring to the original paper of their predecessors. "I am toiling over my chapter

about Owen," writes Huxley towards the end of his life, in 1894. "The thing that strikes me most is, how he and I and all the things we fought about belong to antiquity." It was, to a large extent, thanks to Huxley's own labours that they belonged to antiquity. A prolific discoverer is continuously superannuating his earlier self.

Except, then, for the historians of science, nobody studies at first hand those contributions to knowledge to which the great discoverers of the past owe their scientific reputations. By what seems a strange paradox, the older scientists survive mainly as artists. A work of art can never be taken for granted, and so forgotten; neither can it ever be disproved and therefore thrown aside. Science is soon out of date, art is not.

Of this fact Huxley himself was well aware. In one of his letters he comments upon it with characteristic humour. "At the Christmas dinner," we are told in his biography, "he invariably delighted the children by carving wonderful beasts, generally pigs, out of orange peel. When the marriage of his eldest daughter had taken her away from this important function, she was sent the best specimen as a reminder. 'I call it,' he writes in the accompanying letter, 'Piggyurne, or Harmony in Orange and White.'" [This was written in 1878, the year of Whistler's action against Ruskin; nocturnes and colour harmonies were very much 'in the news.'] 'Preserve it, my dear child,' he goes on, 'as evidence of the paternal genius, when those light and fugitive productions which are buried in the *Philosophical Transactions* and elsewhere are forgotten.'"

The jesting words express a truth. Productions published in the *Philosophical Transactions* of the Royal Society may not be light; but they are in a very real sense fugitive. The substance of a scientific paper is incorporated into the general stock of knowledge; but the paper itself is doomed to oblivion. Not so the pig made of orange peel. If sufficiently well carved, it may

continue to give pleasure and to excite admiration for an indefinite period—or at any rate so long as the peel holds together. What is true of orange peel pigs is true, *a fortiori*, of those monuments more lasting than brass, well-written books.

As a scientific man, Huxley, like all his great contemporaries and predecessors, is now a mere historical figure. Most of us are content to accept his scientific reputation on authority, without ever having consulted the original evidence on which it was based. As a literary man, however, he is still a living force. His non-technical writings have the persistent contemporariness that is a quality of all good art. People go on reading his books and enjoying them. Mr. Chesterton affirms, as a matter of historical fact, that Huxley “was much more of a literary than a scientific man.” In which Mr. Chesterton is wrong. But if he had said that Huxley “*is* much more of a literary than a scientific man,” he would have been quite right. In so far as Huxley is still alive, influential and contemporary, it is as the man of letters. Such is the privilege of art. Orange-peel pigs are less transient than scientific papers.

There are several ways in which I might deal with Huxley's career as a man of letters. There is, for example, the biographical approach. But the biographical ground has been so thoroughly covered in the *Life and Letters* that I could do nothing in this line but summarize what has been said before. I prefer, therefore, to approach the subject as a purely literary critic. Now, much has been written in rather vague and general terms of Huxley's style. I shall, accordingly, try to do something more definite and precise. Taking characteristic specimens of Huxley's writings, I shall analyse them with a view to showing what exactly were the technical means he employed to produce his effects. Critics, it seems to me, content themselves too often with the mere application of epithets. Majestic, flat, sublime, passionate—criticism is in many cases just a calling of laudatory

or disparaging names. But this is not enough. Critics should take pains to show why such and such a piece of writing provokes us to call it by such and such a name. The observable facts of literature are words arranged in certain patterns. The words have a meaning independent of the pattern in which they are arranged; but it is the pattern that gives to this meaning its peculiar quality and intensity; that can make a statement seem somehow truer or somehow less true than the truth. Moreover, a word-pattern of one kind will cause us to say of its inventor: "This man is (for example) sincere;" of another kind: "This man is affected and false." It is the business of the literary artist to make word-patterns in such a way that his readers shall be compelled to draw certain inferences from them. It is the business of the critic to show how our judgments are affected by variations in word-patterns. This is what I shall try to do in the present case.

But before beginning my analysis of Huxley's achievements as a literary artist, I think it would be advisable to say a few words by way of general introduction about the relations between literature and science.

The function of language is twofold: to communicate emotion and to give information. The rudimentary language of the lower animals seems to be purely emotive. Beasts make noises to express desire, fear, anger and the like; to let off their superfluous energy; and to make their presence known to their fellow-creatures. Never do they express a concept. When a startled blackbird flies off at our approach with his characteristic cry, he is not saying, "There is a man;" he is saying, "I am afraid"—or rather, he is simply screaming with terror. And at the sound of the scream, other blackbirds are terrified. Communication is by emotional infection, never, apparently, by conceptual statement.

Man has invented concepts. He does not merely scream with terror: he also says why and of what he is afraid. The noises he makes stand for classes of objects.

He can do what the animal can never do : he can make an exact statement untinged by passion. In other words, he can write scientifically.

But because he *can* do this, it does not follow that he very often wants to do it. In most of the circumstances of life, he wants not only to inform, but also to move—above all, to be moved as well as to be informed. Literature is the art of making statements movingly.

Now, the emotions which a literary statement may cause us to feel are of two distinct types. They may be what I will call the “biological emotions”—emotions, that is to say, with a survival value, such as fear, anger, delight, or disgust, all of which we share with the lower animals. Or they may be more specifically human emotions—luxury feelings, which we might lose without seriously imperilling our chances of survival.

Literature, in common with the other arts, arouses in us, over and above any kind of biological emotion, a certain luxury feeling, to which we give the name of the æsthetic emotion. We describe as beautiful anything which makes us experience this feeling.

Let us now consider the case of a writer who is trying to make a statement which shall cause his readers to have a certain biological feeling—say, a feeling of anger. By using words with suitable significances and associations, by expressing himself in terms of metaphors that call up the right kind of images, he can make it clear to his readers that he feels angry himself (or, vicariously, in the person of a fictional character) and that he wants them to feel angry too. Whether they respond or remain unmoved depends, to a very considerable extent, on his powers as an artist—on his powers, that is to say, as a giver of æsthetic emotions. If he can arrange his words and phrases in a pattern which his readers will consider beautiful, then he is likely to succeed. If not, he is likely to fail. Biological feelings can be well and promptly communicated only by words arranged so as to give us æsthetic feelings. And the same thing is

true even of the most abstract ideas. We are more likely to take in an idea which is expressed with art, beautifully, than if it is expressed in language that gives us no æsthetic satisfaction.

True, facts and theories *can* be communicated in terms that give the reader no æsthetic satisfaction. So can the passions. But neither passion nor facts and theories can be communicated rapidly and persuasively in such terms. Whatever is expressed with art—whether it be a lover's despair or a metaphysical theory—pierces the mind and compels assent and acceptance. Against that which is expressed without art, our understandings are naturally armoured. We have a certain difficulty in taking in anything that is not intrinsically elegant; a certain eagerness to accept anything that moves us æsthetically. Handsome faces are sometimes associated with ugly characters; and in the same way, alas! literary art may be associated with untruth. The natural human tendency to believe what is beautiful has been the source of innumerable errors. If only Plato had written as badly as Immanuel Kant! But his voice was, unfortunately, the voice of an angel, even when it was uttering demonstrable nonsense. And if Darwin's style had been as excellent as Samuel Butler's, Mr. Bernard Shaw would not at present be a preacher of Lamarckism—"a doctrine," as Professor J. B. S. Haldane has remarked, "supported by far less positive evidence than exists for the reality of witchcraft."

Science is investigation. But if it were only investigation, it would be without fruit, and useless. Henry Cavendish investigated for the mere fun of the thing, and left the world in ignorance of his most important discoveries. Our admiration for his genius is tempered by a certain disapproval; we feel that such a man is selfish and anti-social. Science is investigation; yes. But it is also, and no less essentially, communication. But all communication is literature. In one of its aspects, then, science is a branch of literature.

It may be objected that I apply the term "literature" too indiscriminately—that, instead of using the word to cover all verbal communications whatsoever, I should limit its connotation to a certain class of communications. To this objection, I reply interrogatively: Which particular class of verbal communications constitutes literature? The answers to this question are generally very vague. For example, literature has been defined as "the interpretation of life through the medium of words"; while a distinction is often drawn between "words used to record observations of fact, either as an end in themselves, or as a basis for generalizations, and words used as a means for transferring experience." But, frankly, this sort of thing won't do; it is too hazy. Not much better is the distinction between literature and science implied by Wordsworth in his preface to the *Lyrical Ballads*. "The remotest discoveries of the chemist, the botanist, or the mineralogist will be as proper objects of the poet's art as any upon which he is now employed, if the time should ever come, when these things shall be familiar to us, and the relations under which they are contemplated shall be manifestly and palpably material to us as enjoying and suffering beings." But who, we may inquire, are the people whom Wordsworth calls "us"? Is it not obvious that the more intelligent a man is, and the more highly cultivated, the wider will be the range of things which are "material to him as an enjoying and suffering being"? Moreover, as every verbal communication can be made well or badly, every verbal communication is susceptible of affecting some men, at any rate, as æsthetic enjoyers and sufferers. It goes without saying, of course, that only those who understand the terms in which the communication is made will have any æsthetic feelings about it. Englishmen are clearly not the best judges of Chinese poetry, and those who have not had a scientific education will be unable to understand, much less to appreciate and enjoy, works written in a highly

technical language. But for anyone who knows what they are talking about, the very mathematicians are men of letters—men of algebraical letters, no doubt; but even α and *sigma* and *psi* can be æsthetically good or bad, *litteræ humaniores* or inhuman letters. I have heard mathematicians groaning over the demonstrations of Kelvin. Ponderous and clumsy, they bludgeon the mind into a reluctant assent. Whereas to be convinced by Clerk Maxwell's elegant equations is a pleasure; and reading Niels Abel on hyperelliptic functions is almost, it seems, like listening to Mozart's chamber music. For the mathematically illiterate, like myself, these things are, of course, mere scribblings, without significance and without form. For those whom Nature has endowed with suitable talents and who have had the right education, they are works of art, some exquisite, some atrociously bad. What is true of a mathematical argument is equally true of arguments couched in words. Even plain records of observed fact may be, in their own way, beautiful or ugly. From all which we must conclude that all verbal communications whatsoever are literature.

Some kinds of literature, however, are more widely accessible than others. Also, certain classes of experience give more artistic scope to those who communicate them than do certain other classes of experience. For example, a man who writes about his experiences of love or pain has more scope for arranging words in an æsthetically satisfying way than one who sets out to give an account of his observations on, say, deep-sea fish. All communications are literature; but their potentialities for beauty are unequal. A good account of deep-sea fish can never be as richly, variously and subtly beautiful as a good poem about love. But, on the other hand, a bad account of fish can probably never be so monstrous as a bad love poem.

To make clearer what I have been saying, let me give two specific examples. The following is an extract from an article in the *Encyclopædia Britannica* on the furnishing

of Anglican churches after the Reformation. "When tables were substituted for altars in the English churches, these were not merely movable, but, at the administration of the Lord's Supper, were actually moved into the body of the church, and placed *table-wise*—that is, with the long sides turned to the north and south, and the narrow ends to the east and west. In the time of Archbishop Laud, however, the present practice of the Church of England was introduced. The communion table, though still of wood and movable, is, in fact, never moved; it is placed *altar-wise*—that is, with the longer axis running north and south. Often there is a reredos behind it; it is also fenced in by rails to preserve it from profanation of various kinds."

This is a simple and, as it happens, not a very good specimen of scientific literature. We read it without feeling any emotion, whether biological or æsthetic. The words are neither exciting nor beautiful; they are merely informative—and informative in what is, on the whole, rather an inelegant way.

Let us now listen to what Milton had to say on the same subject. "The table of communion, now become a table of separation, stands like an exalted platform on the brow of the quire, fortified with bulwark and barricado to keep off the profane touch of the laics, whilst the obscene and surfeited priest scruples not to paw and mammock the sacramental bread as familiarly as his tavern biscuit."

This is a statement about church furnishing; but not, as I think you may have noticed, a scientific statement—that is to say, a merely informative and unimpassioned statement. Milton, it is clear, designed to communicate, along with the facts about altars, certain biological feelings of his own—as hatred of priests and sympathy for an exploited laity. Thanks to the skilful use of a number of technical literary devices—devices which, unfortunately, I have no time to describe and analyse—the passage also gives us a lively feeling of æsthetic

satisfaction. Milton communicates what he has to say with art; that is to say, he communicates it successfully. He really makes us feel, at any rate while we are reading him, some of his own indignation.

Huxley, as I shall show in due course, was an artist in both these kinds of literature—an artist in pure scientific statement, and also, on occasion, an artist in the communication of what I have called the biological feelings. Both his pure scientific and his emotive statements arouse æsthetic feelings; in other words, each kind of statement is, in its own way, beautiful.

Huxley realized very well the importance of being an artist. Of the Germans he writes: "As men of research in positive science they are magnificently laborious and accurate. But most of them have no notion of style, and seem to compose their books with a pitchfork." Determined that his own books should not justify a similar reproach, he cultivated his literary gifts with conscientious industry. "It constantly becomes more and more difficult for me to *finish* things satisfactorily," he writes to Hooker in 1860. The reason for this was that his standard of literary excellence was constantly becoming higher. Let me quote in this context a letter to his French translator, de Varigny. "I am quite conscious that the condensed and idiomatic English into which I always try to put my thoughts must present many difficulties to a translator. . . . The fact is that I have a great love and respect for my native tongue, and take great pains to use it properly. Sometimes I write essays half a dozen times before I can get them into the proper shape; and I believe I become more fastidious as I grow older." It was an effective fastidiousness; Huxley undoubtedly wrote better as he grew older.

What were his artistic principles and ideals? The following passage from a letter to the *Pall Mall Gazette* in 1886 is illuminating:

"That a young Englishman may be turned out of one

of our universities, 'eoppt and perfect,' as far as their system takes him, and yet ignorant of the noble literature which has grown up in these islands during the last three centuries, no less than of the philosophical and political ideas which have most profoundly influenced modern civilization, is a fact in the history of the nineteenth century which the twentieth will find hard to believe; though perhaps it is not more incredible than our current superstition that whoso wishes to write and speak English well should mould his style after the models furnished by classical antiquity. For my part, I venture to doubt the wisdom of attempting to mould one's style by any other process than that of striving after the clear and forcible expression of definite conceptions; in which process the Glassian precept, 'first catch your definite conceptions,' is probably the most difficult to obey. But still I mark among distinguished contemporary speakers and writers of English, saturated with antiquity, not a few to whom, it seems to me, the study of Hobbes might have taught dignity, of Swift, concision and clearness, of Goldsmith and Defoe, simplicity.

"Well, among a hundred young men whose university career is finished, is there one whose attention has ever been directed by his literary instructors to a page of Hobbes, or Swift, or Goldsmith, or Defoe? In my boyhood we were familiar with *Robinson Crusoe*, *The Vicar of Wakefield* and *Gulliver's Travels*; and though the treasures of 'Middle English' were hidden from us, my impression is that we ran less chance of learning to write and speak the 'middling English' of popular orators and head masters than if we had been perfect in such mysteries and ignorant of those three masterpieces. It has been the fashion to decry the eighteenth century, as young fops laugh at their fathers. But we were there in germ; and a 'Professor of Eighteenth-Century History and Literature' who knew his business might tell young Englishmen more of that which it is pro-

foundly important that they should know, but which at present remains hidden from them, than any other instructor: and, incidentally, they would learn to know good English when they see or hear it—perhaps even to distinguish between slipshod copiousness and true eloquence, and that alone would be a great gain.”

To literary beginners, Huxley's advice was: “Say that which has to be said in such language that you can stand cross-examination on each word.” And again: “Be clear, though you may be convicted of error. If you are clearly wrong, you will run up against a fact sometime and get set right. If you shuffle with your subject and study chiefly to use language which will give you a loophole of escape either way, there is no hope for you.” “Veracity,” he said on another occasion, “is the heart of morality.” It was also the heart of his literary style. For all those rhetorical devices by means of which the sophist and the politician seek to make the worse appear the better cause Huxley felt an almost passionate disapproval. “When some chieftain,” he wrote, “famous in political warfare, ventures into the region of letters or of science, in full confidence that the methods which have brought fame and honour in his own province will answer there, he is apt to forget that he will be judged by those people on whom rhetorical artifices have long since ceased to take effect; and to whom mere dexterity in putting together cleverly ambiguous phrases, and even the great art of offensive misrepresentation, are unspeakably wearisome.”

The chieftain in question was Mr. Gladstone, with whom, in 1891, Huxley was having the Gadarene swine controversy. Four years later, in the last year of his life, Huxley was to remark, in a conversation recorded by Mr. Wilfrid Ward, on the philosophical methods of another eminent politician, Mr. Arthur Balfour. “No human being holds the opinion he (Balfour) speaks of as Naturalism. He is a good debater. He knows the

value of a word. The word 'Naturalism' has a bad sound and unpleasant associations. It would tell against us in the House of Commons, and so it will with his readers." Huxley was also a good debater; he also knew the value of a word. But his passion for veracity always kept him from taking any unfair rhetorical advantages of an opponent. The candour with which he acknowledged a weakness in his own case was always complete, and though he made full use of a rich variety of literary devices to bring home what he wanted to say, he never abused his great rhetorical powers. Truth was more important to him than personal triumph, and he relied more on a forceful clarity to convince his readers than on the brilliant and exciting ambiguities of propagandist eloquence.

For the purposes of literary analysis, Huxley's writings may be divided into three classes: first, the purely descriptive; secondly, the philosophical and sociological; and thirdly, the controversial and (to use once more a repellant, but irreplaceable, word) the emotive. To the first of these classes belong the technical scientific papers; to the second, the studies of Hume and Berkeley and a number of essays on metaphysical, ethical and educational subjects; and to the third, certain of the essays on Christian and Hebrew tradition and the essays containing criticisms of other people's ideas or a defence of his own. It is hardly necessary to say that, in reality, the three classes overlap. The descriptive papers contain philosophical matter in the form of generalizations and scientific hypotheses. The philosophical and sociological essays have their controversial and their emotionally moving passages; and as most of the controversies are on philosophical subjects, the controversial essays are to a considerable extent purely philosophical. Still, imperfect as it is, the classification is none the less useful. The writings of the first two classes are strictly scientific writings; that is to say, they are meant to communicate facts and ideas, not passions. They are

of the same kind as the passage from the *Encyclopædia* quoted at an earlier stage in this lecture. The writings of the third class belong to the same genus as my quotation from Milton. They are intended to communicate feelings as well as information—and biological feeling as well as pure æsthetic feeling. I propose now to deal with these three classes of Huxley's writings in order.

To describe with precision even the simplest object is extremely difficult. Just how difficult only those who have attempted the task professionally can realize. Let me ask you to imagine yourselves suddenly called upon to explain to some Martian visitor the exact form, function and mode of operation of, say, a corkscrew. The thing seems simple enough; and yet I suspect that, after a few minutes of stammering hesitations, most of us would find ourselves reduced to making spiral gestures with a forefinger and going through a pantomime of bottle-opening. The difficulties of describing in a clear and intelligible way such an incomparably more elaborate piece of machinery as a living organism, for example, are proportionately greater.

Not only is exact description difficult; it is also, of all kinds of writing, that which has in it the least potentialities of beauty. The object to be described stares the author uncompromisingly in the face. His business is to render its likeness in words, point by point, in such a way that someone who had never seen it would be able to reconstruct it from his description, as from a blue print. He must therefore call every spade consistently and exclusively a spade—never anything else. But the higher forms of literature depend for many of their most delicate effects on spades being called on occasion by other names. Non-scientific writers are free to use a variety of synonyms to express the same idea in subtly different ways; are free to employ words with variously coloured overtones of association; are free to express themselves, in terms now of one metaphor, now of another. Not so the maker of verbal blue prints. The

only beauties he can hope, or, indeed, has any right to create are beauties of orderly composition and, in detail, of verbal clarity. Huxley's scientific papers prove him to have had a remarkable talent for this austere and ungrateful kind of writing. His descriptions of the most complicated organic structures are astonishingly lucid. We are reminded, as we read, that their author was an accomplished draughtsman. "I should make it absolutely necessary," he writes in one of his essays on education, "for everybody to learn to draw. . . . You will find it," he goes on, "an implement of learning of extreme value. It gives you the means of training the young in attention and accuracy, which are two things in which all mankind are more deficient than in any other mental quality whatever. The whole of my life has been spent in trying to give my proper attention to things and to be accurate, and I have not succeeded as well as I could wish; and other people, I am afraid, are not much more fortunate." No artist, I suppose, has ever succeeded as well as he could wish; but many have succeeded as well as other, less talented people could wish. In its own kind, such a book as Huxley's *Treatise on the Crayfish* is a model of excellence. Quotation cannot do justice to the composition of the book as a whole, and the unavoidable use of technical terms makes the citing even of short extracts unsuitable on such an occasion as the present. The following passage may serve, however, to give some idea of the lucidity of Huxley's descriptive style :

"In the dorsal wall of the heart two small oval apertures are visible, provided with valvular lips, which open inwards, or towards the internal cavity of the heart. There is a similar aperture in each of the two lateral faces of the heart, and two others in its inferior face, making six in all. These apertures readily admit fluid into the heart, but oppose its exit. On the other hand, at the origins of the arteries there are small valvular

folds directed in such a manner as to permit the exit of fluid from the heart, while they prevent its entrance."

This is nakedly plain and unadorned; but it does what it was intended to do—it gives the reader a satisfyingly accurate picture of what is being described. Some modern popularizers of science have sought to "humanize" their writing. The following is an example of the late Dr. Dorsey's humanized—his all-too-humanized—scientific style.

"If we find that the thing we trust to pick the mother of our children is simply a double-barrelled pump, knowledge of our heart or the liquid refreshment it pumps to our brains will not grow more nerve cells, but it should make us less nervous and more respectful of the pump and the refreshment it delivers; when it stops, the brain starves to death."

Obscure almost to meaninglessness, vulgar, vague—this is the humanization of science with a vengeance! Deplorably but, I suppose, naturally enough, this kind of popular science is thoroughly popular in the other, the box-office sense of the term. Wordsworth's generalization, that we needs must love the highest when we see it, has but the slenderest justification in observable fact.

So much for the writings of the first class. Those of the second are more interesting, both to the general reader and to the literary critic. Philosophical writings have much higher potentialities of beauty than purely descriptive writings. The descriptive writer is confined within the narrow prison of the material objects whose likeness he is trying to render. The philosopher is the inhabitant of a much more spacious, because a purely mental, universe. There is, if I may so express myself, more room in the theory of knowledge than in a crayfish's heart. No doubt, if we could feel as certain about epistemology as we do about the shape and function of

crustacean viscera, the philosopher's universe would be as narrow as the descriptive naturalist's. But we do not feel as certain. Ignorance has many advantages. Man's uncertainties in regard to all the major issues of life allow the philosopher much enviable freedom—freedom, among other things, to employ all kinds of artistic devices, from the use of which the descriptive naturalist is quite debarred.

The passages from Huxley's philosophical writings which I now propose to quote and analyse have been chosen mainly, of course, because they exhibit characteristic excellences of style, but partly, also, for the sake of their content. Huxley's philosophical doctrines are outside my province, and I shall not discuss them. What I have done, however, is to choose as my literary examples passages which illustrate his views on a number of important questions. They show how cautious and profound a thinker he was—how very far from being that arrogant and cocksure materialist at whom, as at a convenient Aunt Sally, certain contemporary publicists are wont to discharge their dialectical brickbats.

Huxley's use of purely rhythmical effects was always masterly, and my first three examples are intended to illustrate his practice in this branch of literary art. Here is a paragraph on scientific hypotheses.

“All science starts with hypotheses—in other words, with assumptions that are unproved, while they may be, and often are, erroneous, but which are better than nothing to the searcher after order in the maze of phenomena. And the historical progress of every science depends on the criticism of hypotheses—on the gradual stripping off, that is, of their untrue or superfluous parts—until there remains only that exact verbal expression of as much as we know of the facts, and no more, which constitutes a perfect scientific theory.”

The substance of this paragraph happens to be intrinsically correct. But we are the more willing to believe

its truth because of the way in which that truth is expressed. Huxley's utterance has something peculiarly judicious and persuasive about it. The secret is to be found in his rhythm. If we analyse the crucial first sentence, we shall find that it consists of three more or less equal long phrases, followed by three more or less equal short ones. Thus :

“ All science starts with hypotheses—
in other words, with assumptions that are unproved,
while they may be, and often are, erroneous ;
but which are better than nothing
to the searcher after order
in the maze of phenomena.”

The long opening phrases state all that can be said against hypotheses—state it with a firm and heavy emphasis. Then, suddenly, in the second half of the sentence, the movement quickens, and the brisk and lively rhythm of the three last phrases brings home the value of hypotheses with an appeal to the æsthetic sensibilities as well as to the intellect.

My second example is from a passage dealing with “ those who oppose the doctrine of necessity ” :

“ They rest (writes Huxley) on the absurd presumption that the proposition, ‘ I can do as I like ’ is contradictory to the doctrine of necessity. The answer is : nobody doubts that, at any rate within certain limits, you can do as you like. But what determines your likings and dislikings ? Did you make your own constitution ? Is it your contrivance that one thing is pleasant and another is painful ? And even if it were, why did you prefer to make it after the one fashion rather than the other ? The passionate assertion of the consciousness of their freedom, which is the favourite refuge of the opponents of the doctrine of necessity, is mere futility, for nobody denies it. What they really have to do, if they would

upset the necessarian argument, is to prove that they are free to associate any emotion whatever with any idea whatever; to like pain as much as pleasure, vice as much as virtue; in short, to prove that, whatever may be the fixity of order of the universe of things, that of thought is given over to chance."

Again, this is a very sound argument; but its penetrative force and immediate persuasiveness are unquestionably increased by the manner of its expression. The anti-necessarian case is attacked in a series of short, sharp phrases, each carrying a simple question demanding a simple and, for the arguer's opponents, a most damaging answer:

"But what determine as your likings and dislikings?
Did you make your own constitution?
Is it your contrivance that one thing is pleasant and another is unpleasant?"

The phrases lengthen as the argument deals with subtler points of detail; then, in the last sentence, where Huxley convicts his opponents of upholding an absurdity, they contract to the emphatically alliterative brevity of

"to like pain as much as pleasure,
vice as much as virtue."

After which the absurdity of the anti-necessarian case is generalized; there is a long preparatory phrase, followed by a brief, simple and, we are made to feel, definitive conclusion:

"To prove that, whatever may be the fixity of order of the universe of things,
that of thought is given over to chance."

The persuasive effectiveness of these last phrases is enhanced by the use of alliteration. "Things" and

"thought" are key words. Their alliterative resemblance serves to emphasize the unjustifiable distinction which the anti-necessarians draw between the two worlds. And the insistent recurrence in both phrases of the v-sound of *prove*, *whatever*, *universe* and of *given* and *over* enhances the same effect.

The passage I am now about to quote is remarkable both for what it says and for the particularly solemn and noble manner of the saying:

"In whichever way we look at the matter, morality is based on feeling, not on reason; though reason alone is competent to trace out the effects of our actions and thereby dictate conduct. Justice is founded on the love of one's neighbour; and goodness is a kind of beauty. The moral law, like the laws of physical nature, rests in the long run upon instinctive intuitions, and is neither more nor less 'innate' and 'necessary' than they are. Some people cannot by any means be got to understand the first book of Euclid; but the truths of mathematics are no less necessary and binding on the great mass of mankind. Some there are who cannot feel the difference between the 'Sonata Appassionata' and 'Cherry Ripe,' or between a gravestone-cutter's cherub and the Apollo Belvedere; but the canons of art are none the less acknowledged. While some there may be who, devoid of sympathy, are incapable of a sense of duty; but neither does their existence affect the foundations of morality. Such pathological deviations from true manhood are merely the halt, the lame and the blind of the world of consciousness; and the anatomist of the mind leaves them aside, as the anatomist of the body would ignore abnormal specimens.

"And as there are Pascals and Mozarts, Newtons and Raphaels, in whom the innate faculty for science or art needs but a touch to spring into full vigour, and through whom the human race obtains new possibilities of knowledge and new conceptions of beauty; so there have been

men of moral genius, to whom we owe ideals of duty and visions of moral perfection, which ordinary mankind could never have attained; though, happily for them, they can feel the beauty of a vision which lay beyond the reach of their dull imaginations, and count life well spent in shaping some faint image of it in the actual world."

As a piece of reflective writing, this is quite admirable; and it will be worth while, I think, to take some trouble to analyse out the technical devices which make it so effective. The secret of the peculiar beauty of this grave and noble passage is to be found, I believe, in the author's use of what, for lack of a better term, I will call "cæsura-sentences." Hebrew literature provides the classical type of the cæsura-sentence. Open any of the poetical books of the Bible at random, and you will find all the examples you want. "His soul shall dwell at ease; and his seed shall inherit the earth." Or, "Then shall the dust return to the earth as it was; and the spirit shall return unto God who gave it." The whole system of Hebrew poetry was based on the division of each sentence by a cæsura into two distinct, but related clauses. Anglo-Saxon verse was written on a somewhat similar principle. The cæsura-sentence is common in the work of some of the greatest English prose-writers. One of them, Sir Thomas Browne, used it constantly. Here, for example, is a characteristic passage from the "Urn Burial": "Darkness and light divide the course of time, and oblivion shares with memory a great part even of our living beings. We slightly remember our felicities, and the smartest strokes of affliction leave but short smart upon us. Sense endureth no extremities, and sorrows destroy us or themselves." It was Browne, I think, who first demonstrated the peculiar suitability of the cæsura-sentence for the expression of grave meditations on the nature of things, for the utterance of profound and rather melan-

choly aphorisms. The clauses into which he divides his sentence are generally short. Sometimes the two clauses are more or less evenly balanced. Sometimes a longer clause is succeeded by a shorter, and the effect is one of finality, of the last word having been spoken. Sometimes the shorter comes first, and the long clause after the *cæsura* seems to open up wide prospects of contemplation and speculative argument.

I could give other examples of the use of *cæsura*-sentences by writers as far apart as Dr. Johnson and De Quincey. But time presses; and besides, these examples would be superfluous. For, as it so happens, Huxley's use of the *cæsura*-sentence is very similar to Browne's. He employs it, in the great majority of cases, when he wants to express himself in meditative aphorisms about the nature of life in general. Thus: "Ignorance is visited as sharply as wilful disobedience—incapacity meets with the same punishment as crime." Again, "Pain and sorrow knock at our doors more loudly than pleasure and happiness; and the prints of their heavy footsteps are less easily effaced." Here is another example, where the clauses are much shorter: "There is but one right, and the possibilities of wrong are infinite." Here yet one more, in which, as the statement made is more complicated, the clauses have to be longer than usual: "It is one of the last lessons one learns from experience, but not the least important, that a heavy tax is levied upon all forms of success; and that failure is one of the commonest disguises assumed by blessings."

In the long passage quoted just now much of that effect of noble and meditative gravity is obtained by the judicious use of *cæsura*-sentences. The tone is set by a sentence that might almost have been penned by Sir Thomas Browne himself: "Justice is founded on the love of one's neighbour; and goodness is a kind of beauty." All the rest of the first paragraph is built up of fundamentally similar *cæsura*-sentences, some almost as brief and simple as the foregoing, some long and

complicated, but preserving through their length and complication the peculiar quality (as of a sad and deeply reflective soliloquy, an argument of the mind with its inmost self), the musically pensive essence of the Brownian formula.

Before leaving the subject of Huxley's philosophical writings, I must say something about his use of images and his choice of words. Since accuracy and veracity were the qualities at which he consistently aimed, Huxley was sparing in the use of images. Ideas can be very vividly expressed in terms of metaphor and simile; but, since analogies are rarely complete, this vividness is too often achieved at the cost of precision. Seldom, and only with the greatest caution, does Huxley attempt anything like a full-blown simile. The most striking one I can remember is that in which he compares living beings to the whirlpool below Niagara.

“However changeful is the contour of its crest, this wave has been visible, approximately in the same place, and with the same general form, for centuries past. Seen from a mile off, it would seem to be a stationary hillock of water. Viewed closely, it is a typical expression of the conflicting impulses generated by a swift rush of material particles. Now, with all our appliances, we cannot get within a good many miles, so to speak, of the crayfish. If we could, we should see that it was nothing but the constant form of a similar turmoil of material molecules, which are constantly flowing into the animal on one side, and streaming out on the other.”

Only where analogies were as close as this one between the living body and the vortex, would Huxley venture to make use of similes. He was never prepared to enliven the manner of his books at the expense of their matter.

Huxley's vocabulary is probably the weakest point in all his literary equipment. True, it was perfectly adequate

to the clear and forceful statement of his ideas. But the sensitive reader cannot help feeling that the choice of words might, without any impairment of scientific efficiency, have been more exquisite. For example, we miss in his writings that studied alternation of words of Greek and Latin with words of Teutonic origin—an alternation so rich, when skilfully handled, as by Milton, in powerful and startling literary effects. To illustrate the defects in Huxley's vocabulary would be a lengthy and laborious process, which I cannot undertake in the time at my disposal. It must be enough to say that, good as his choice of words generally is, it might unquestionably have been better.

Let us turn now to the third division of Huxley's writings, the controversial and emotive. As a controversialist, Huxley was severe, but always courteous. We must not expect to find in his polemical writings those thunderous comminations, that jeering and abuse which make Milton's prose such lively reading. Still, he could be sarcastic enough when he wanted, and his wit was pointed and barbed by the elegance with which he expressed himself. Here is a passage from a brief biography of Descartes, which shows what was the nature of his talents in this direction:

“Trained by the best educators of the seventeenth century, the Jesuits; naturally endowed with a dialectic grasp and subtlety which even they could hardly improve; and with a passion for getting at the truth which even they could hardly impair, Descartes possessed in addition a rare mastery of literary expression.”

One could quote many similar passages. From the neat antithesis to the odd and laughter-provoking word—Huxley used every device for the expression of sarcasm and irony.

In the passages in which his aim was to convey, along with ideas, a certain quality of passion, Huxley resorted

very often to literary allusion—particularly to biblical allusion. Here is a characteristic example :

“The politician tells us, ‘You must educate the masses because they are going to be masters.’ The clergy join in the cry for education, for they affirm that the people are drifting away from church and chapel into the broadest infidelity. The manufacturers and the capitalists swell the chorus lustily. They declare that ignorance makes bad workmen; that England will soon be unable to turn out cotton goods, or steam engines, cheaper than other people; and then, Ichabod ! Ichabod ! the glory will be departed from us. And a few voices are lifted up in favour of the doctrine that the masses should be educated because they are men and women with unlimited capacities of being, doing, and suffering, and that it is as true now as ever it was, that the people perish for lack of knowledge.”

Here the two, or rather the three, biblical references produce a variety of powerful emotional effects—produce them, let us note in passing, only upon those who know their Bible. Those who do not know their Bible will fail to appreciate the chief beauties of this passage almost as completely as those who do not know their Functions of Complex Variables must fail to appreciate the beauties of Niels Abel’s mathematical literature. Every writer assumes in his readers a knowledge of the work of certain other writers. His assumptions, I may add, are frequently quite unjustified.

Let us now consider the emotional effects which Huxley aimed at producing and which, upon those who know the sacred writings as well as he, he did and still does produce. Ichabod, it will be remembered, was so named, “because the glory is departed from Israel, for the ark of God is taken.” To mention Ichabod in this context is to imply a richly sarcastic disquisition on the nature of the capitalists’ god. The tone changes, in the last sentence, from ironical to

earnest and pathetic; and those final words, "the people perish for lack of knowledge," put us in mind of two noble biblical passages: one from the book of the prophet Hosea, who affirms that "the Lord hath a controversy with the inhabitants of the land" and that "the people are destroyed for lack of knowledge"; the other from the book of Proverbs, to the effect that "where there is not vision the people perish." The double reference produces the effect Huxley desired. The true reason for universal education could not be stated more concisely or more movingly.

Occasionally, Huxley's biblical references take the form, not of direct citation, but of the use of little tags of obsolescent language borrowed from the Authorized Version. After a long passage of lucid and essentially modern exposition, he will sometimes announce the oncoming of his peroration by a phrase or two of sixteenth-century prayer-book or Bible English. Our modern taste has veered away from this practice; but among writers of the early and middle nineteenth century it was very common. Lamb and his contemporaries were constantly dropping into Wardour Street Elizabethan; Carlyle's writings are a warehouse of every kind of fancy-dress language; Herman Melville made a habit of breaking out, whenever he was excited, into bogus Shakespeare; the very love-letters of the Brownings are peppered with learned archaisms. Indeed, one of the major defects of nineteenth-century literature, at any rate in our eyes, was its inordinate literariness, its habit of verbal dressing up and playing stylistic charades. That Huxley should have made brief and occasional use of the literary devices so freely exploited by his contemporaries is not surprising. Fortunately, his passion for veracity prevented him from overdoing the literariness.

I have constantly spoken, in the course of these analyses, of "literary devices." The phrase is a rather unfortunate one; for it is liable to call up in the hearer's mind a picture of someone laboriously practising a

mixture of card-sharpping and cookery. The words make us visualize the man of letters turning over the pages of some literary Mrs. Beeton in quest of the best recipe for an epigram or a dirge; or else as a trickster preparing for his game with the reader by carefully marking the cards. But in point of fact the man of letters does most of his work not by calculation, not by the application of formulas, but by æsthetic intuition. He has something to say, and he sets it down in the words which he finds most satisfying æsthetically. After the event comes the critic, who discovers that he was using a certain kind of literary device, which can be classified in its proper chapter of the cookery-book. The process is largely irreversible. Lacking talent, you cannot, out of the cookery-book, concoct a good work of art. The best you can hope to do is to produce an imitation, which may, for a short time, deceive the unwary into thinking it the genuine article.

Huxley's was unquestionably the genuine article. In this necessarily perfunctory discussion of a few characteristic examples of his writing, I have tried to show why he was a great man of letters, and how he produced those artistic effects, which cause us to make this critical judgment. The analysis might be carried much further, but not by a lecturer and not within the lecturer's allotted hour. "Had we but world enough and time . . ." Alas! we never have.



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