

CHAPTER II

PHYSICAL SCIENCE AND THE HUMANITIES

THE aim and office of instruction . . . is to enable a man
to know himself and the world. MATTHEW ARNOLD.

THE study of letters is the study of the operation of
human force, of human freedom and activity; the
study of nature is the study of non-human forces, of
human limitation and passivity. *Id.*

WE are going to ask why the modern world studies
the classical literatures. But some one may raise
the previous question: Why study literature at
all? This question is often asked in letters written
to the papers by indignant fathers, who want to
know why their sons, destined for business, learn
fancy subjects instead of things serviceable to them
in after-life. They expect their sons to pick up
certain knowledge at school, and are disappointed
if they confuse Alexandria with Alexandretta, do
not know what ice-free ports Russia has, fail to

supplement the parental knowledge of history, or make fools of themselves by some obvious ignorance. They are always rather disappointed because the amount of knowledge gathered at school is small, because there is 'so little to show' for the years in the class-room, and—the standing grievance—because very few boys acquire modern languages during them. What, they ask, is the good of an education which doesn't even teach French and German properly?

There is something in these complaints; boys might be taught geography and physical science and modern languages better, though few will learn at school to talk fluent French and German. But no one would suffer more than the complainants if they were allowed to impose on us the curriculum of their dreams. I say nothing of the effects on a boy's character of training him for the business of money making, and making this from the outset the object of his efforts. Horace noted such a habit in the Roman parent, and its effect on the boy:

Our Roman boys, by puzzling days and nights,
Bring down a shilling to a hundred mites.
Come, young Albinus, tell us, if you take
A penny from a sixpence, what 'twill make.

Fivepence; good boy! you'll come to wealth some day.
Now add a penny. Sevenpence he will say.
O how this cankering rust, this greed of gain,
Has touched the soul and wrought into its grain . . .¹

But apart from the results of a deliberately cultivated materialism, the business man would soon find out that an education may impart all the knowledge in the world, that its victims may be walking dictionaries, but that it fails, or is successful by the qualities it develops in its pupils and not by the knowledge it puts into them. Lord Morley says somewhere: "An educated man is one who knows when a thing is proved and when it is not. An uneducated man does not know." This is a partial definition of education, yet the educational reformer will do well continually to remember it. It may be inconvenient to be unable to place Alexandretta, but not to know when a thing is proved—that is a real disaster. To be unable to sift the evidence, to confuse the essential facts with unimportant details, to miss the bearing of a point, to be deluded by sentiment or passion or rhetoric or humbug, whether it be in politics, education, business or private life, means failure, as its opposite means success.

¹*Ars Poetica*, 325, tr. Conington. (I have slightly altered the last line but one.)

Some of our critics speak as if a boy came into a schoolmaster's hands as steel comes into the hands of a machine-tool maker, ready, without further preparation, to be manufactured, and then let loose complete on the world. They forget that a boy of fourteen is raw material, and must undergo many processes before he is fit to take his final shape. No one would propose to make high pressure steel out of the crude ore as it leaves the mine ; if he got any resulting metal from such an attempt, it would be coarse and brittle. But an attempt to run human raw material into its final mould before it has been refined and tempered will produce something equally unserviceable. The crude ore comes to the schoolmaster wanting in bite and cutting power, unable to stand a sudden strain ; his essential business is to turn the rude metal into high pressure steel, and on the success of the endeavour will depend, other things being equal, its serviceableness and effect in after-life. The knowledge may be picked up later, but the training of the mind never. Hence so much that seems needless and annoying in education. It must impart qualities and powers essential if its product is to be useful, but of which that product has, as yet, hardly a trace. Accuracy, concentration, sym-

pathy, judgment are obvious needs, but not less necessary is the revelation of the world itself. Education, it has been said, should knock windows into the world for us. We are born into a closed and darkened room: as the windows are opened, we see, here, man, with all his character and capacities, experiments, endless achievements and possibilities; there, the material world itself, the elements that compose, and unexpected laws that govern it. The windows are unmade, or in the making, when we are fourteen; we have no notion of the landscapes and moving figures outside our prison-house, and an essential of education is to make openings in its walls, and take us to them, and give us time to view the scene beyond.

That explains why the school time-tables are not filled with colloquial French or book-keeping. Taking a wider view of what is necessary to success in life—to put the lowest motive—education remembers that the power to understand other points of view, to ‘know when a thing is proved and when it is not,’ to realise the various possibilities, material and human, of the universe, is even more necessary to the business man than a knowledge of French or commercial geography.

An open and alert mind, which understands

human nature and its possibilities, which can judge and sympathise, which because of its wide survey and outlook on the world creates new opportunities and developments, prospers in commerce or in any work ; but it is the child of a varied education, not of narrow technical training. So education, remembering this, says to the complaining parent : Your boy will get his commercial and professional knowledge ; but it is my first task to give him a general training, to open windows on the world, and thus give him a glimpse of its possibilities, and a sense of proportion. Commerce will not flourish the better if I send into it men of narrow outlook and untrained minds ; and in the end, my method will pay you, even in mere coin of the realm.

If a College tutor, with no special knowledge of commerce, were to expound his ideas on running a big business, his shots would go wide ; amateur suggestions on education are apt to be equally ill aimed. Education is a profession which requires at least as much thought and experience as any branch of commerce ; and it would be unfair to use such views as men of straw, convenient and easy to demolish. Instead, let me take the case against literature, as it might be put by a man of

science, who was extreme in his views, but prudent and capable in expressing them. He would condemn the notion of giving the first place in education to literature, history and philosophy (as do our older universities). "It is a first necessity," he would argue, "for us, as a people, to comprehend the paramount part which science must occupy in genuine education if Great Britain is to maintain her position in the world. This position actually depends not on military power, important as this may be for the defence of the country, but upon the fact that we are, after all, as Adam Smith reminded us, a nation of shopkeepers, and that the goods we have to dispose of are no longer made by rule of thumb, but by the application of physical and chemical principles to the processes employed in their production. It is therefore obviously desirable that a knowledge of those principles should be diffused throughout the community."¹ Even for boys who are not going into business the same is true. 'Do you really maintain,' we are asked, 'that the dead world should be studied before boys know the living world around them? Literature and philosophy are luxuries, but for the hard, practical business of life, a man

¹ Sir E. Schäfer, *Times Educational Supplement*, March 7, 1916.

must understand the things among which he moves every day. Is he to remain ignorant of the nature and history of the soil on which he lives and from which his wealth comes ; or of his body, of the laws which govern its health, of the methods in which its food is digested, or in which its nerves, flesh and bones are compacted ; of the principles of mechanics which not merely control the great mechanical inventions that feed, clothe and transport him, but without which he would be actually unable to move his limbs? He must spend all his life in the presence of these realities ; in his education alone shall he walk in the shadow world of literature? Science covers the greater part of life, let it cover the greater part of education also.' "What is actually wanted is that *instruction in science shall form the basis of secondary education, and shall even share with the three R's the time allotted to elementary instruction.*"¹ That, I hope, is not an unfair statement of the extreme scientific case ; some of it is taken from a letter by a well-known man of science.

Now let us examine it a little closer. It is true that without physical science our whole civilisation would collapse ; and it is a just conclusion from

¹ Sir E. Schäfer. *loc.*

this that the community must contain a sufficient number of trained men of science to meet its needs. But it is not a just conclusion that every citizen must be a trained scientist. The community would equally collapse if it had no farmers, no shipwrights, no teachers—the list may be extended indefinitely; but it is not a just conclusion from this that we must all study agriculture, naval architecture and pedagogics. Because specialists are necessary in all branches of life, it does not follow that we must all specialise in every form of specialisation. Why is physical science to be given an exceptionally favoured position?

The reply made is, because physical science covers the greater part of life. But does it? Take this present war and ask how much of it physical science explains. What does it tell about the causes of the war? Nothing; you must look for them in the past history of Germany since Frederick the Great, in German thinkers, Nietzsche, Treitschke, and a host of others, in political and moral philosophies, in theories of empire, and nationality, in Russia, Austria, the Balkan States, in the wealth of the Turkish empire and the nature of its government and inhabitants, in the character of the various peoples fighting—an

enquiry which takes us infinitely far before we find the forces which have moulded national spirit and temper, and made Germans, Frenchmen, Russians, Britons so strangely different. Physical science covers only the tiniest plot of all this ground ; all it could tell us about the war is something about coveted mineral deposits, something (very little) about industrial complications, and practically everything about the material means by which the war is being fought. This knowledge is, no doubt, indispensable, but it covers neither the whole, nor even the greater part of the war, any more than it covers the whole or the greater part of life.

The great gap in science is that it tells us hardly anything about man. This sounds paradoxical ; yet consider. Suppose that we have studied physics, chemistry, physiology, zoology and the rest, how much do we thereby know of man ? Perhaps we have mastered the history of his tissues, his nervous system, his bones and sinews ; perhaps we understand his structure and constitution, the laws which regulate his production, growth and decay. Still, we know nothing of *him* as he moves in actual life. The man who is our friend, enemy, kinsman, partner, colleague, with

whom we live and do business, who governs or is governed by us, has never once come within our view.

That is why it is impossible to 'base our education on physical science.' It omits a branch of knowledge which everyone needs. It is possible for the ordinary man to dispense with a knowledge of physical science; he can go to specialists who will do his business for him better than he can do it for himself. Considering that the world reposes on physical science, it is wonderful how well most of us can get along without any knowledge of it, provided our occupation does not demand actual scientific knowledge. (The layman, in spite of his ignorance of physiology, enjoys no worse health than a doctor.) But no one can dispense with a knowledge of man. Everyone needs it, and is using it each minute he is in relation with human beings, whether he is speaking to them, or reading what they have written, or engaged in work which at any point touches them. We need this knowledge as private individuals: and still more, we need it as citizens and voters; the political conditions of England make it absolutely indispensable for us. Our need of science may be great, but our need of political

and moral wisdom is greater, and we are far more likely to shipwreck from the former than from the latter. We may require more chemists, and need to appreciate and employ them more than we do, but the storms that loom above us and threaten to break in most disastrous ruin are political ; they are the dangers of a self-willed, impetuous and ignorant democracy (and by democracy we do not only mean the labouring classes). This democracy is called to vote on problems of government at home and abroad, to decide between the policies presented to it, to discern whether truth resides in the glib tongues of its leaders and the facile pens of its daily papers. Without some knowledge of itself, and its neighbours in the world, of the ideals that sway or have swayed its own and other countries, of the judgments that history records on the experiments, crimes and blunders of past ages, the steps of humanity will be more blind and blundering than ever. Metallurgical or chemical analysis needs highly trained skill and knowledge ; but the analysis of political and moral problems is at least as complicated and urgent, and it is work which cannot be handed over entirely to experts ; if we do not all take some share in it, we are all, as voters, called to pronounce a decision upon it. If

a voter knows nothing of trinitrotoluene, England will not be much the worse for his ignorance ; but she is in a bad case, if her citizens, however primed with physical science, cannot appreciate and judge the political issues at stake. The attitude of some sections of our population at the beginning of this war should have convinced the most sceptical that the ignorance of a democracy is a real danger. Now this knowledge cannot be acquired merely by living in the world. It is in books. Physical science cannot give it ; for it is the knowledge of man recorded in history, and, more vaguely, in literature.

What, more precisely, do we get from the studies on which our higher education is at present based, the studies which some critics wish to replace by more 'paying subjects,' and which Sir E. Schäfer wishes to replace by physical science? There is no good English word to describe them ; but for convenience' sake we will call them the humanities, a term coined at the Renaissance. How do we justify their prominence in education?

First, as science reveals to us the physical constitution of ourselves and of the world round us,

so the humanities reveal to us man. There is no science of man ; anatomy and biology, while they have much to say about his body, throw little light upon his behaviour, nor explain why he makes a French Revolution or a European war, why he is a miser or a spendthrift, a Machiavelli or a Frederick the Great. Physical science does not deal with this kind of thing. Yet the "science" which everyone needs, and statesmen above all, is such a knowledge of man.

Now there is, if not a science, yet a record and account of man ; we call it, according to its various aspects, by the various names of literature, history, philosophy. And this is the justification of the literary-philosophic-historical education which prevails in our secondary schools and universities. Generally speaking, the subject of that education is man ; man viewed in himself and his proper nature, viewed as literature views him, as a being with feelings and prejudices, virtues and vices, ruled by intellect, or perverted by passion, inspired by ideals, torn by desires, acting on plan and calculation, or carried away by unreflecting emotion, sacrificing his life, now for gold, now for an ideal—an adulterer, a patriot, a glutton, a dreamer, Aegisthus, Oedipus, Hamlet,

Macbeth, Faust—; or man, viewed as a being governed by the laws of a universe outside him, viewed as philosophy views him, subject to limitations of time and space, of his own origin, nature and destiny, related to beings and forces outside him, adapting himself to those relations and modifying his action according to his conception of them, a creature with moral capacities or the descendant of an ape, determining his future according to his wishes, or merely one wheel among many blindly revolving in a great machine : or thirdly, man, viewed as a political and social being, as history views him, creating states and overthrowing them, making laws and refusing to be bound by them, opposing religion to politics, and freedom to law, binding art and politics, empire and freedom, public and private life into a harmonious whole, or crowning one to the exclusion of the rest, fighting, colonising, making money and spending it, treating his neighbour as a fellow-being, or using him as a tool for the production of wealth, monarchist, parliamentarian, socialist, anarchist, Pericles or Augustus, Cromwell or Robespierre. Before the student of literature, philosophy and history are displayed all the forces and ideas that have governed man, personal,

religious or political ; to see why he has rejected this and espoused that, why this failed and that was successful, what are liberty and religion, family affection and personal greed, and in a word, to study Man. As he reviews them, and compares them with the present, he can see, as far as a man can see, what ideas have come down to his own day, and what new elements are combining with them, can forecast in some degree the future, and by virtue of his knowledge guide the streaming forces, and shape the molten mass, serve his country and use to the best advantage his own powers.¹

If anyone thinks this pedantic, and believes that the knowledge of man is only got from life, let him read *Anna Karenina* or *The Ordeal of Richard Feverel*, and say if he learns nothing from them about marriage, education and human nature in general ; and let him remember the opinion of a man who knew the world and was not a pedant. Lord Chesterfield wrote to his son : the knowledge of the world and that of books “assist one another reciprocally ; and no man will have either perfectly, who has not both. The knowledge of the world is only to be acquired in the world, and not in a

¹ I have quoted this passage from an article of my own in the first number of the *Oxford and Cambridge Review*.

closet. Books alone will never teach it you ; but they will suggest many things to your observation, which might otherwise escape you ; and your own observations upon mankind, when compared with those which you will find in books, will help you to fix the true point." That is perfectly true. The world is far more intelligible to us if we have studied history and literature. We understand Hamlet or Brutus, when we meet them in the flesh, far more readily if we have already met them in Shakespeare. Their actions have a meaning for us because we have the clue to their character. We are like visitors to a foreign town who have already studied its map ; the lie of the land, the plan of the whole is already familiar for us, and we pick up our bearings quickly, instead of wandering vaguely about the streets.

Consider what a literary education in theory is, and in fact might easily become. The student of literature moves familiarly in an infinitely vast and varied assembly. Even if he confines himself narrowly to the classics, he meets there all sorts and conditions of men—neurotics as different as Lucretius and Propertius, conservatives as different as Pindar and Aristophanes ; he meets the man of letters as politician in Isocrates and Cicero, and the

politician as man of letters in Caesar ; he learns to know worldly commonsense incarnate in Horace, reason incarnate in Socrates ; he sees the pessimists of an over-civilised society—Juvenal, the disappointed bourgeois, Tacitus, the soured aristocrat, Marcus Aurelius, the disillusioned saint ; he notes how differently Plato, the imaginative idealist, and Aristotle, the clear-sighted analyst, prescribe for their distempered age. These are only a few of the types whom he learns to know as intimate friends, whose dispositions become familiar to him, into whose moods and personality he can in a moment throw himself. And I have said nothing of the characters they have painted in their books.

The value of history is even more obvious. The nation might have been saved something by a little knowledge of German history ; and a study of the Napoleonic wars might have preserved us, if not from certain strategical mistakes, yet from our worst fits of despondency about ourselves and our rulers : while one great danger, as we set about social reform, is that the democracy knows very little history. Yet even so, we have learnt immensely from history, and our whole political attitude, consciously or unconsciously, is coloured

by our knowledge of it.¹ One point in which we differ most profoundly from the Greeks and Romans, in other ways so like us, is that we have more history behind us, and have learnt more from it. It is history that has taught us the lesson of political toleration; it is history that gave a constitution to South Africa, and is giving a parliament to Ireland.

If history needs no apology, philosophy needs a good deal. Its name is against it; and we forget that when we think, argue or act, it stands behind us, the unseen framework of all our practice, which becomes visible as soon as we ask how or why. Bishop Berkeley's grave and measured saying is its best justification: "Whatever the world thinks, he who hath not much meditated upon God, the human mind, and the *Summum Bonum*, may possibly make a thriving earthworm, but will certainly make a sorry patriot and a sorry statesman."²

It is as the study of man that the humanities claim their predominant place in education, and in this age of material things, while we honour science

¹ A boy must be very badly taught if he studies the Civil War without modifying some of his views; to understand Cromwell, Strafford and Laud is a political education.

² *Siris*, § 350.

and pay her dues, we shall do well sometimes to remind ourselves that man is more important than nature, and man's spiritual, more important than his physical, constitution. Philosophically it may be disputable, practically it is admitted, that the world exists for him ; and those who deny it with their lips assert it by their actions and their attitude to life. "Quand l'univers l'écraserait, l'homme serait encore plus noble que ce qui le tue." "Social progress means a checking of the cosmic process at every step and the substitution for it of . . . the ethical process."¹ Pascal and Huxley are here agreed. We cannot in our education give the chief place to the junior partner.

Then a further point. One of the chief objects of education is to train flexibility of mind, to make a man quick to comprehend other points of view than his own. Obviously, no power is more necessary in dealing with men. To be able to discard for the moment his own opinions, and see the world through the eyes of other classes, races or types, is as indispensable to the merchant as to the statesman ; for men are hardly to be controlled or influenced unless they are understood. And yet

¹ Huxley, *Evolution and Ethics* (Eversley edition), p. 81.

no power is rarer. It is almost non-existent among uneducated people. A man who has not risen above the elementary school, is hardly ever able to seize an attitude of mind at all different to his own ; he may acquiesce in it because he trusts or respects the character of the person in question, but he does not understand it ; he cannot perform the great feat for which our intellectual gymnasia train us, of being in two (or more) people's skins at the same time. And this is not due to the absence of any organ from his body, but simply to the fact that he has never practised the art. Nor is the failing confined to the quite uneducated. We all of us spend half of our time in misunderstanding our neighbour, and in most controversies misunderstanding is the dividing line between the parties concerned. Now the power of sympathetic insight is trained by a literary education. A man learns above all from the study of literature and history to put himself in the place of other men, races and times, to identify himself with them, to see what they mean and how they felt. And so, by continual practice, he becomes quick at seizing the views of other people than himself, seeing what is in their mind, and accommodating himself to it.

Here physical science gives no help. In literature the mind must continually be moving from one place to another ; in twenty-five pages the reader must successively become Polonius, Hamlet, Horatio, Laertes, Gertrude—to mention no other characters of the play. In fact, he must do, what the merchant does who wishes to sell goods in half a dozen different markets, or the statesman who has to consider the interests and temper of half a dozen different classes and nationalities. But science keeps on one plane ; she is not puzzled by the subtle and profound variations of outlook which separate a Russian from an Englishman, a Herefordshire farmer from a Tyneside artisan. Minerals and nerves, alkalis and engines have no point of view, no outlook on life, into which it is necessary to enter ; understanding them is very different from understanding Shakespeare or Euripides. You deal with them and all the while remain your own insulated self. Science does not train sympathy, because nothing in its subject-matter has feelings with which we can sympathise.

So far the work of the humanities in education is obvious ; but its further task, though often for-

gotten, is perhaps the most important of all. Jowett was thinking of it when he said to Matthew Arnold, then professor of poetry at Oxford, "Teach us not to criticise, but to enjoy." Hitherto we have seen how the humanities teach us to criticise ; now we are concerned with their second lesson.

Imaginative literature in prose or poetry helps us in our turn to see the world with imagination,

The poet in a golden clime was born,
With golden stars above.

But the ordinary man is not born in a golden clime, and though his happiness, and in the best sense, his success, depends on his reaching it, little in his surroundings helps him to do so. He was probably born among smoke and red brick ; there is not much beauty in the streets around him ; the literature which in the ordinary course he is most certain to see, is the daily press ; and here too, he will get little help. On his paper's first page, he will see (typical of the whole) the three most wonderful events of life, presented by a bare enumeration of dates, names and places, and as he turns the sheets, life unrolls itself before him in a list of Stock Exchange prices, law court reports and so on. None of this suggests the golden

clime; nor is its atmosphere one which man breathes with delight.

Besides human nature is sleepy. It suffers from a pervading apathy. The world is full of an incredible wonder, and yet somehow we are not much stirred. Horrible things happen, but we are not moved by their horror; we read of Zeppelin raids, and unless we have suffered ourselves, we do not realise the horror and havoc of bombs dropped in a crowded street of peaceful families. How much heroism lies behind the bare announcements of V.C.'s and D.S.O.'s, and yet how little of it pierces through the black type as we read our paper! We know that our feelings would have been different, if we had seen the actions which they reward, but not having seen them, we remain untouched. Almost any line of a daily paper conceals romance, but we tramp through it as we walk over a ploughed field in January, unconscious of the wealth and beauty that lie germinating just below the soil.

An idle poet here and there
Looks round him, but for all the rest,
The world, unfathomably fair,
Is duller than a witling's jest.

How then does literature help us? I can

illustrate my point best by some examples. Take the following passage from a daily paper on the day following the Queen's Diamond Jubilee: "The Queen left Buckingham Palace yesterday at 10 a.m. and drove amid the plaudits of the crowd. . . . The German Emperor and the King of Portugal will leave Charing Cross to-morrow at 10.15 p.m. by special train for Dover on their way to the Continent." Now see the same event through a poet's eyes.

The tumult and the shouting dies ;
 The captains and the kings depart :
 Still stands Thine ancient sacrifice,
 An humble and a contrite heart.
 Lord God of Hosts, be with us yet,
 Lest we forget—lest we forget !

If Kipling had never written that poem, or if we had never read it, we should have viewed the Diamond Jubilee very differently. He taught us to see it with imagination, he lifted us for a moment into the golden clime. And how much poorer should we have been had he not done so!

Another instance. The press of the war is on us, and we are swallowed up in a bewildering crowd of urgent problems, doubts, dangers, successes. Our object seems to kill German trade,

to stop German imports, to encourage the descent of the mark, to take Achi Baba or defend Salonika, to relieve Kut, to break the German line in the West, to munition Russia, to bring Rumania in on the side of the Allies. This is in October, 1915, and in October, 1916, a number of other aims, different in detail, similar in kind, will be engaging us. Now let a poet shew us the real issues at stake in war, the spirit and meaning of the struggle in which we are immersed :

It is not to be thought of that the Flood
Of British freedom, which to the open Sea
Of the world's praise from dark antiquity
Hath flowed, "with pomp of waters unwithstood,"
Roused though it be full often to a mood
Which spurns the check of salutary bands,
That this most famous Stream in Bogs and Sands
Should perish ; and to evil and to good
Be lost for ever. In our Halls is hung
Armoury of the invincible Knights of old :
We must be free or die, who speak the tongue
That Shakespeare spake ; the faith and morals hold
Which Milton held.—In every thing we are sprung
Of Earth's first blood, have titles manifold.

I have drawn my instances from a limited field, but everywhere it is the same. Everywhere the world suffers from its aeonian disease—there is no open vision ; and where there is no open vision

the people perishes. Everywhere we are weighed under the burden of which Goethe spoke, "was uns alle bändigt, das Gemeine." Both in politics and in life we are inevitably immersed in details, and forget to see with the eyes of imagination. We run no risk of overlooking the details, they force themselves on us and prevail. The newspapers will never fail to remind us that the German emperor left Victoria at 10.15 p.m., and that fats are trickling into Germany in spite of Orders in Council. But we may easily miss the illumination by which we can see the whole *sub specie aeternitatis*, the light without which the whole body is full of darkness. Our power of delight is impoverished; we are actually unhappier if the Diamond Jubilee is to us a mere moving past of elaborately dressed men along well-known streets in accordance with a fixed time table, and not the vision of Kipling. Our practical success suffers if we are not able to rise from the obvious details and compelling instincts of the moment to a wider point of view. If anyone doubts this, let him turn from a leader of the — on the war to Wordsworth's sonnet, and ask himself whether the change does not make him wiser as well as happier. Or let him remember what Burke said in reference

to one of the great disasters of our history, the loss of the American colonies: "We ought to auspicate all our public proceeding . . . with the old warning of the Church, *Sursum Corda*." And if this is true of politics, it is also necessary in life as a whole to lift up our hearts. Here it is that the poets and men of imagination help us. They touch the springs of our hearts, and let the poet in us loose.

That is why literature holds so important a place in education. It is a country where the light of imagination is continual, and all things are illuminated by it. It is the world we know, inhabited by the men and women around us. The Grecian urn of Keats was a black clay vessel, with white and red figures, in a glass case in a Museum, his nightingale and Shelley's skylark and Wordsworth's cuckoo are the birds of our fields; the England of Wordsworth's sonnets is the same country whose soil is beneath our feet; we have all met Kent and Horatio, Imogen, Cordelia and Juliet, or we have been very singular. Only, since we are not poets, our eyes have been held, and we have not known the meaning of what we saw. But the poet sees the secret beauty and inner significance of things,—whether it be

Nature, as when Keats describes a wood on a still night,

As when upon a trancèd summer night,
 Those green-robed senators of mighty woods,
 Tall oaks, branch-charmed by the earnest stars,
 Dream, and so dream all night without a stir ;

or a building, as Propertius outside a gate in Rome divines its inner life and history :

Quae fueram olim magnis patefacta triumphis,
 Ianua Tarpeiae nota pudicitiae ;
 Cuius inaurati celebrarunt limina currus,
 Captorum lacrimis umida supplicibus,¹

or men fallen in battle for their country, as Lowell writes of the dead Harvard alumni :

Salute the sacred dead,
 Who went, and who return not.—Say not so! . . .
 We rather seem the dead that stayed behind.
 Blow, trumpets ! all your exultations blow !
 For never shall their aureoled presence lack . . .
 They come transfigured back,
 Secure from change in their high-hearted ways.

We are happier, wiser, better, for being taught thus to see the world.

¹i. 16. 1 ff. 'I, the gate, once flung open to great triumphs, the gate known to Tarpeia's shame ; whose threshold has been crowded with gilded chariots, and wet with captives' supplicating tears.'

So instead of handing our youth over wholly to mathematics, to live with the abstract skeleton of the world, or to science, to study the causes of the phenomena of the physical universe, we hand him over to literature, to the prophets of humanity, in the hope that he may learn to see the world as they saw it, and catch something of their joy, nobility and inspiration. This is not to surrender him to idleness or day-dreams. Shakespeare and Milton, Bacon and Burke were not the worse men of business because they had genius. Indeed imagination is necessary to the highest success in any way of life. Its possession raised Rhodes above a mere money-maker, and made Gladstone and Disraeli more than mere politicians. Without it, a man may be a "flourishing earthworm"; he will never be great, he will hardly be a man. Imagination is like the soul in Matthew Arnold's poem :

Still does the Soul from its lone fastness high
 Upon our life a ruling effluence send ;
 And when it fails, fight as we will, we die,
 And while it lasts we cannot wholly end.

In writing thus I do not of course intend to throw a puny dart at physical science, or to dispute its place in education. Obviously we want more belief in it everywhere, more application of it in

our industries, and possibly more, certainly better, teaching of it in our schools. To be ignorant of the world in which we live, to have no idea how plants and animals grow, of how the earth came to wear its present appearance, to know nothing of electricity and chemistry, is to deny ourselves whole provinces of knowledge, and the pleasure that comes from their possession ; it is to pluck out an eye, and cut off a limb, in order, not to enter into the kingdom of heaven, but to exclude ourselves from part of the kingdom of man. Further, physical science corrects the vices of a literary training, its tendency to make men retrospective, critical, inactive spectators of the world. She turns the eye forward, because her goal is in the future ; she gives a sense of power because her own power is so immense ; she exhorts us to act because she is so fruitful in results. Obviously any good education will include the teaching of science. But at the moment the public is in danger of being mesmerised by the word—it is continually being mesmerised by words—and is inclined to regard it as a skeleton key to unlock all doors, a universal medicine to cure all diseases. Unfortunately physical science is not this. It is no use thinking that she can, even partly, take the

place of the humanities, or that we can get from her what we get from them. It would be as sensible to suppose that by increasing the quantity of fats in our diet we could entirely dispense with albumen. We have already indicated what science fails to do. She studies things rather than man, and where she studies him, studies only his physical, and least important aspect; we shall learn little from her of human nature. She can never teach us to enter into other men's minds; one of the most obvious weaknesses of the mere scientist is the difficulty of making him see other points of view than his own. She is of herself unimaginative, for her business is with the causes of things not with their spiritual values; and though her great representatives have brought imagination with them to their work, the quality is curiously absent in her lesser lights. Nor does she make her followers good guides in regions outside her own confined kingdom. When he leaves it, the scientist is no better judge of the right road than anyone else, and if all his training has been in science, he is probably considerably worse. Anyone who reads the biographies of scientific men, while he admires the infinite patience, subtlety, sureness and humility of mind

shewn in their scientific work, will be amazed to find them uttering preposterous judgments on matters which lie outside it. 'For many years,' wrote Darwin, 'I cannot endure to read a line of poetry. I have tried lately to read Shakespeare, and found it so intensely dull that it nauseated me. I have also almost lost my taste for pictures or music.'¹ Metchnikoff, wishing to prove that persons, who live sufficiently long, welcome death, actually argues seriously from the (quite mythical) ages attributed in the Bible to the patriarchs, and even says that "old and full of days" (the phrase used of Job) "simply refers to the instinct of death developed in well-preserved old men who had attained ages of from 140 to 180 years."² Herbert Spencer writes: "I have seen nothing more of Carlyle's (*Life of*) *Cromwell* than is to be gathered from the reviews. As you correctly surmise, I have no intention of wading through it. . . . I find so many things to think about in this world of ours, that I cannot afford to spend a week in estimating the character of a man who lived two centuries ago."³ Spencer's

¹ *Life and Letters*, i. 100.

² *The Nature of Man* (English translation), p. 281.

³ *Autobiography*, i. 295.

Autobiography contains many examples of dogmatic fatuity, but none more striking than this implicit rejection of the study of history, as unworthy of an intelligent man.

Our danger in education to-day comes, not from men of science as a whole, but from her less liberal devotees, and from that part of the public, which (in a thoroughly unscientific spirit) talks about education without studying it. While supporting any attempt to improve the teaching of science where it is deficient, and to bring more science where it is needed in national life, we shall remember that an education based on physical science would not only leave the mind unflexible, unsympathetic, unimaginitive, undeveloped, but would ignore what is more important than the Cosmos itself. Our motto was written 2500 years ago on the walls of the temple of Apollo at Delphi, Γνῶθι σεαυτόν, 'Know thyself.'