

IV POETRY AND SCIENCE

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SCIENCE, as the term is now understood and as the study denoted by the word is now pursued, is a birth of the modern world. Its growth was coincident with the earlier development of the United States, where its practical application has expanded to keep pace with the ever increasing demands of a national growth more swift and complex than has elsewhere been known. Within the last two or three generations it has also taken its place as an important, and even an indispensable, part of higher education. Technical institutes have sprung up on all sides in response to public demand. The study of science has been taken up by the older universities, and is the main pursuit in most universities of modern foundation. Even higher claims are made for it. Its exponents speak of it not only as having won an assured place in the front rank of human studies, but as occupying in that rank a predominant, if not, as some of them venture to assert, a practically exclusive place. A note of triumph is sounded in these utterances. The Royal Society of England has this year [1913] been celebrating, with splendid ceremonies and before audiences containing many of the foremost names of the present age, the two hundred and fiftieth anniversary of its foundation. In connection with these meetings, the importance and dignity of science were asserted in these eloquent words:

‘Our children are born into a time in which science has already ceased to be a plaything; it has become, or is fast

becoming, the dominant factor in human affairs; it will determine who shall hold the supremacy among nations.'

So far, the note is one of exultation: yet the satisfaction of those who urge the claims of science is not complete. They complain that science is not yet studied as it should be; that other studies, whose value is inferior and whose day is over, are allowed to encroach on a field and share an authority which ought to belong to science alone. 'It has as yet,' the writer from whom I have just quoted goes on, 'no adequate place in the intellectual equipment or in the education of those who aspire to be the governing classes of the country.'

This sentence is significant in more than one way. Whether or not there are to be governing classes in the country—be that country England, of which the words were spoken, or America, to which they likewise apply—is exactly the problem which lies for solution before modern democracy. But however this may be, whether the nations will hand over their government to a trained class, or whether, according to the ideal impressed upon the United States by the founders of the Republic, the governing power shall comprise all classes and be the whole organised body of a self-governing nation, the claim is in either case made that science in its modern sense is to be the staple of their intellectual equipment.

Part of this claim has been already conceded. Immense endowments are lavished on scientific research and study. The axis of education has been sensibly shifted. Science has taken its place as an integral part of school and university education. The scientific methods of observation, record, and experiment have been introduced into other studies, and the scientific spirit, developed through the pursuit of the sciences, has become a general instrument of human culture.

Unhappily, however, this great and beneficent change has not taken place smoothly, or without grave conflicts and violent misunderstandings. Partly from exaggerated claims made by enthusiasts for the new learning, and still more largely from a narrow and obstinate conservatism among the supporters of the old, friction has ensued which is as needless as it is prejudicial. The idea has grown up that science is in some way opposed to art and letters. The unity of all knowledge, the co-ordination and mutual support of all human effort, has been lost sight of on both sides in this controversy. On one side were vested interests, old traditions, the jealousy with which innovations are apt to be regarded by those whose minds have been set in a particular pattern, and who cannot shift their perspective to the changes which the course of time brings about. On the other side were a revolt against the domination of these interests and traditions, a rejection of the stagnation involved in mere conservatism, and a necessary assertion of new needs and new methods of meeting them. But together with these came also an impatience of the past, an outlook narrowed by its own eagerness, and a recurrence of the belief that the path of progress lies in one, and in only one, direction. The fancied opposition of science to art and letters, and more particularly to poetry, is injurious to the general interest of mankind, to which all more special interests are subordinate. In a national life which executes its functions fully, science and poetry will not be in conflict, but in co-operation. Each corresponds to a need of life; in the full and harmonious development of life each reinforces the other; and in any sound system of national education both have their place, their proper and indispensable function.

We may regard this co-operation from either point of view: that which has primary regard to what poetry gains

from science, and that which looks, conversely, at what science gains from poetry. The creative instinct, the imaginative impulse, which find expression in poetry, are powerfully reinforced by the discoveries of science and by the growth of the scientific spirit. For that spirit affects the whole field of mental activity. The discoveries of science present the creative imagination with an ampler, richer, and more wonderful world; the spirit in which they are made and the methods by which they are pursued give a greater insight into that world. The scientific imagination is akin, though it works in a different field, to the poetic imagination. Both are creative energies; both work towards bringing out the organic laws of truth or of beauty which underlie the structure of man and of the universe in which man finds himself. The poetic imagination is, or ought to be, kindled by the work of science. The scientific imagination is, or ought to be, kindled by the work of poetry.

If we look to history, instances will at once occur where this conjunction has actually taken place. Ancient Greece invented science and perfected the art of poetry; and the development of Athenian poetry into what became, and still remains, the delight and wonder of the world, was coincident with the first growth, among the same race and in the same civilisation, of scientific enquiry, that is to say, of the search into the meaning and connection of things. The physical sciences were no doubt then still in their infancy: but the impulse towards them had been created and went side by side with the more patent and wide-spread impulse towards the scientific study of language and the operations of the human mind.

So too, at Rome, the great poem of Lucretius, in which Latin poetry for the first time reached its full stature, was inspired by the Epicurean philosophy; and that philosophy

was not only a system of ethics and a rule of life, but was—and was thereby distinguished from other philosophies—a systematic and brilliant attempt to solve the laws of nature and apply scientific principles to the construction and working of the physical universe. This scientific ardour was fixed by Lucretius as a poetic ideal. It was transmitted by him to his great successor in poetry. Virgil, in the celebrated passage where he gives utterance to his own ideal of life, prays that the Muses whose servant he is may before all else instruct him, not in the beauties of what is called a poet's world, river and woodland and a pastoral Arcadia, but in the 'causes of things,' the structure and law of the universe. Beyond poetry and beneath it lay the magnificent revelations of science; and only through the mastery of science could man enter into his inheritance, conquer fate, and dispel fear.

Once more, at the Renaissance, poetry and science found themselves working in close union. Each had a new birth; each gave the other mutual stimulus. Milton, in whom English poetry culminated, and who represents, for us as for his own time, the classic standard in poetical art, was a profound student of two sciences which in his age were making immense advances—those of music and astronomy. His scientific knowledge enriches and gives fibre to his whole poetry. In the 'Paradise Lost' he mentions only one of his contemporaries by name; and that one, it is significant to notice, is not a man of letters, but the most eminent man of science of that generation—the physicist and astronomer Galileo. Had he lived two hundred years later, we may guess that the name he would have chosen for this proud eminence would have been that of Darwin. Christ's College in the University of Cambridge, where both Milton and Darwin received their education, has lately been celebrating the memory of both. In that double celebration we may see

vividly not only the continuity and interconnection of learning, but the kinship of poetry with science, and the ideal of a university.

The expansion of science in more modern times has been concurrent with a similar expansion of poetry. The difficulty which both poetry and science have now to face lies just in this immense expansion of their field. Material accumulates faster than it can be dealt with. It is the day of the specialist both in science and in the art of letters. Against the narrowing effect of over-specialisation in his own particular field, the only safeguard is that width of outlook which is gained by grasping life as a whole, by mastering its pattern, as that pattern is discovered by the investigation of men of science, and is re-created or reinterpreted by the poets.

What poetry gains from science is strength and substance, a closer contact with the truth of things, and the power given by the use of a trained intellect. What science gains from poetry is something more impalpable, but not less important; it is what a French scientist calls *élan vital*; it is the impelling and organising force of ideas and imagination. Without ideas, pure science is little more than a record of facts. Without imagination, applied science is sterile. The earliest scientific theories were expressed in the imaginative forms of poetry: the latest are the application, to enormous masses of facts gathered through observation and experiment, of what may be almost called a creative insight, akin to, and based on, that imaginative power which is the essence of poetical creation, and which is fostered by the study of poetry. For by studying poetry we become partakers, to some extent and according to our powers, of the genius of the poets; we develop our own power of creative imagination. Now this creative imagination is not a separate fac-

ulty, shut off from the rest of our faculties. If it is treated as such, the results are disastrous: much of the suspicion and dislike with which poetry has been regarded among men of science is the natural result of a claim arrogated by men of letters, or by people brought up in the tradition of a time before science was recognised as a part of human culture and before scientific method had been applied to all the processes of life, that art and letters were the only sphere in which the imagination can work. But it remains true that it is normally through these that it is first kindled. It remains true that the study of science is most effectively pursued by those who approach it with an intelligence made sensitive, an imagination quickened, by the patterns of life created by poets and the pattern-making power which the study of poetry develops.

If there are defects in the present system of American education, they are due, according to the judgment of many thoughtful observers, to the fact that it hurries towards results without the wide preliminary training which develops the powers of the mind on all their sides. So far as this is the case, it condemns men to work with inferior tools, with an inadequate mental equipment. The result is like that of an engine racing: the mind is not in gear with the whole system of its surroundings, and much of its work is wasted. Energy and capacity are there in full measure; but the capacity has not the proper field to deploy itself in; the energy is forced to run in contracted channels, or, beyond these, to run to waste. Let me quote here the striking words used recently by a distinguished man of science and one of the most zealous advocates for giving science a primary place in national education.

‘Several Americans have told me,’ says Mr. A. E. Shipley, ‘that comparatively few things are actually invented in

America, that most inventions come from abroad, but are eagerly taken up and exploited in the States. Where the American really shines is not as an inventor, but as a manufacturer. It is a striking fact that originality is rare in America, and I think it must be accounted for by the educational system. It stifles originality.¹

This is a grave charge; but so far as the defect actually exists it should be realised, and so far as it is realised it can be remedied. We need to lay stress—and stress is being effectively laid by nearly all educationalists—on the necessity and value of scientific training for those who are destined to pursue art and literature. We need to lay stress likewise—and this need should not be neglected or postponed—on the necessity and value of literary and artistic training for those who are destined to pursue science. But to put it so is to state the case inadequately. For it is only a minority in an educated nation who will do either, whose life will be devoted wholly either to literary and artistic, or to scientific pursuits. Not only for these two limited classes, but for the whole of the nation of the future, the ideal which rises before us is that of an education developing all the faculties in harmony; of a nation brought into touch with the facts of Nature and her laws, and into touch no less with the best of what has been thought and felt by mankind and with its noblest and most beautiful expression. And this last is given us by poetry. Nature, as Bacon said, is conquered by obedience; and science teaches us the laws to be obeyed and the mastery over Nature which may be achieved by this obedience. Life is grasped and ordered by imaginative insight; and poetry teaches us the pattern of that order, and creates in us a new meaning, a new beauty and value, for the world and for ourselves.