

Are we entitled to extrapolate the curve showing number of discoveries against time, and to conclude that the next fifty years will provide sixty first-class discoveries seriously affecting human lives, and that some ten of these are likely to be death-dealing atrocities? Or can we expect a change in conditions which will stem or regulate this flood—perhaps a new economic system, as of Soviet Russia; perhaps a realisation that the seventy or so first class discoveries of science have not made the world of 1940 so greatly superior to that of 1790? Science has operated hitherto without any control other than the pay of the capitalist and the choice of the research worker. Is it not perhaps our part to consider whether and, if so, how research may be directed; or, alternatively, whether the exploitation of its results should not be restrained in such fashion that our civilisation may be saved from destruction. And indeed we may come to wonder whether our industrialised civilisation is worth saving and whether the world of the future may regret our downfall no more than we regret that of the Roman Empire.

F. SHERWOOD TAYLOR, M.A., D.Phil.,  
*Curator of the Ashmolean Museum.*

## SCIENCE AND REASON

FACED with the great human crisis of our times, it is only natural that the scientist should feel that he has his contribution to make towards a solution of our one great problem—to secure the survival of the things that are good. The scientist has, moreover, a certain confidence that his contribution is important, perhaps even decisive, and certainly indispensable. He is confirmed in this view by the reflection that a large proportion of the world's troubles may be traced to a desertion of scientific ideals, a neglect of scientific principles and the substitution of comfortable and muddle-headed *illusions* for the *facts* which are the scientist's stock-in-trade.

Scientists are now beginning to feel that they have something to give beyond their material contribution, something in the realm of values, of ideals, of human harmony and ordered social progress. This contribution has reference both to the war effort and to reconstruction—to the armed struggle in which we are now engaged, and

to the prolonged and fateful struggle to which we are committed when the clash of arms has ceased.

How has it come about that the somewhat aloof soul of science has awakened to this new warmth of spiritual and social apostolicity? Much may no doubt be explained by a realisation of the social implications of recent advances in the so-called biological sciences. Ecology, biochemistry, nutritional science, economics, sociology, anthropology, psychology, educational science have all presented us with discoveries which clamour to be integrated into the social fabric as speedily as possible. Or again, it may be the contrast which the modern scientist finds between his work and his environment. Within science there is harmony and order, and everything makes sense. Outside in the world there is jumble and confusion, irreducible discord, gigantic outpourings of opposed energies into a system that rocks and reels like a drunken man—nothing makes sense; modern man seems to be on the point of draining the cup of pessimism to its bitterest dregs by assenting to his own utter irrationality. Science again has always been attached to truth and has never wearied of proclaiming that the search for truth is its sovereign pursuit. But out in the world the words truth and falsehood have lost their meanings—they have become mere counters in a policy of aggression.

Now it is only upon truth that a theory of values can be founded, for the true is the good and the good is the true. When truth is tampered with, morality goes by the board, and man sinks below the human level. Thus it came about that for years before the present war actually broke out, the Nazi government had issued a declaration of war against civilisation in set terms. It was chorused through the wireless, it was thundered out in the Labour Camps, it was taught in the elementary schools, it was made the key doctrine of the Youth Movement—Germany's official proclamation of war with everything and everybody who would not bend to her will. But nobody over here seemed to regard it as serious—and yet it was the most damnably serious thing in all the ages of the world's chequered history. '*Moralisch ist was Deutschland nützt, unmoralisch was Deutschland schadet.*' 'That is moral which is of advantage to Germany, that is immoral which is harmful to Germany.' There, in one compendious sentence, you have the chaotic, the destructive, the supremely unscientific injected into the delicate organism of human affairs. If it is no longer advantageous to observe my solemnly pledged word and treaty, then I am not morally bound to do so; indeed, I am morally bound to act against my own solemn undertakings. Killing is no murder, treaty-breaking is no crime, faithlessness and perjury bring no shame, devilish cruelty is a duty—if

only these things are conducive to German honour. Small wonder then that the scientist feels that he has a message for the world to-day. To feel otherwise would be to apostatise from Science itself.

Most of you will be aware of the efforts which are already being made to make that message articulate. The British Association for the Advancement of Science held a special general meeting to discuss these topics. There has been a series of leading articles on these subjects in *Nature*, many of them extremely able, and a large number of similar articles in the daily press. Efforts are being made to establish an Institute of Social Biology whose work it will be to ensure that scientific knowledge in the biological sciences shall be duly utilised in social construction and reconstruction. In the British Social Hygiene Council, we have authorised the setting up of a Committee of experts in these various fields to advise the Council how best modern scientific knowledge can be exploited in that vast field of activity which is covered by the designation 'Social Hygiene.' This University Catholic Federation's General Meeting here in Birmingham is another and a very important step in the same direction.

A scrutiny of some of the suggestions which have already been made in various articles and books such as those I have alluded to, enables me to come to somewhat closer grips with the actual title of my address to you this afternoon: 'Science and Reason.'

Among very much that is wholly admirable in such writings, I find certain very strange and doubtful features, and I may say that the appearance of such factors was not unexpected. I find a very great heterogeneity, and a dismal lack of homogeneity in policy—homogeneity indeed could only emerge from a unity impressed by the adoption of certain elementary common principles, and these have not yet been formulated. I find therefore that a good many of the suggestions cancel each other out—indeed one not infrequently finds one and the same writer advocating points of policy on the strength of principles which are mutually exclusive. I even find certain writers advocating points of policy on the strength of principles which, if they were adopted, would by an iron necessity lead us straight into the very thing we are fighting against—complete State Absolutism and State Deification.

Now if the trumpet shall sound an uncertain note, how shall the people be called to battle? Why is the voice of science wavering and incoherent? If Science is the truth, as we hold it to be, how can it speak against itself? What I am going to say now will, I fear, leave the non-Christian, and perhaps even the non-Catholic, cold. I'm sorry for that, but this is no time for whittling down the truth in order to gain a measure of muddle-headed acceptance.

Science has not yet abandoned its pretensions of being either actually or potentially omni-competent—able either now or in the future to study and probe and pronounce upon all aspects of reality. Such a pretension, be it noted, is not a scientific position, it amounts to the statement of a philosophy. In its crudest form, the argument runs somewhat as follows : Science deals or can deal with every form of reality. BUT Science can only deal with that which is either mediately or immediately observable. THEREFORE, only that which is either mediately or immediately observable is real. That is Positivism. As a philosophy it dates back to 1850. For the trained philosopher it has only historical interest and absolutely no importance—and yet it is still, at least implicitly, the philosophy of Science !

Before it can come to its full stature, and rise to the full dignity of its grand calling, exact Science must recognise that there are unobservables which are real. It must realise that the nature and inter-relation of these unobservables may be probed and studied in a scientific manner by the use of human reason ; that there are depths too of mystery in this realm of the unobservable which it will always pass the wit of man to encompass ; that the Greatest Unobservable of all, the Creator of all things, visible and invisible, has aided the obscure groping of the human mind with rays of revealing light which have shown us truths we could never have guessed at, truths of surpassing richness and splendour, the crown and glory of life itself, giving us the meaning of meaning itself, the unity within which all diversity falls into that vast ordered harmony which alone can satisfy the quest of the true scientist.

I don't want to incur the reproach of being merely rhetorical in this matter. I want to be hard and plain and matter-of-fact about the fundamental truth as I see it. What I have just said lays itself open to obvious challenge. 'We know,' my critics will say, 'that Science has long been divorced from philosophy and theology, but it has continued to make progress in spite of it. Indeed the period of most outstanding progress has precisely coincided with the period of the divorce. There is no evidence that Science is in any way dependent on metaphysics and theology ; indeed, all the evidence points the other way.'

We must remember, however, that, while Science has largely dispensed with philosophy and theology, yet it has been unable to dispense with its own dependence on its environment—the environment of a civilisation which owes its character to the survival of traditional cultural values and traditional religious beliefs. Whether it likes it or not, Science as we know it has been embedded in the

matrix of a specifically *Christian* civilisation, and I am going to say that to the extent to which that matrix disintegrates or loses its Christian character, to that extent will Pure Science become sterile and cease to flourish.

Our civilisation, I say, is essentially a Christian civilisation. It was founded on Christian values, widened and extended and perfected on Christian principles. Its joys and benefits have been paid for in the noble coin of Christian virtues. Decade by decade, the cultural and Christian foundations of our civilisation have been whittled away, and to-day the whole structure is most perilously unstable. Men have been fools enough to believe that this civilisation of ours could continue to flourish, and that they could continue to enjoy its benefits, when the foundations which supported it had been knocked away. Self-deception, comfortable illusion, wishful thinking, softness, folly and the height of unreason perpetrated in the name of enlightened reason itself! We have been living riotously on our spiritual capital—and God send we still have enough left to begin a new account with.

Let there be no priggishness and humbug about this—let us not point at the wicked enemy and say what a dreadful object-lesson of the breakdown of civilisation he presents. Let us rather remember that we too were very far down the Gadarene slope down which the world has been plunging to a final engulfment. Britons have played a full-length violin concerto to Nero's little *morceau* on the fiddle! The war has shown us a dreadful weakness and disintegration of soul—thank God it has also shown that there is still that within us which can react against the torpor and leap to scale the heights again.

What is now needed is not more Science, nor indeed less Science. What is necessary is that men should use that same human reason, which they have so successfully employed in securing material advantages through the channels of the exact sciences, to formulate the real meaning and end of life, and so to order the social structure that that meaning and end may be attained within its framework. Here at last appears *unity* and cohesion, expanding fulness and the soul thrusting steadily onwards and upwards. There is only *one* unity; there is only *one* meaning which gives signification to all other meanings; only in the light of this unity can the glorious harmony of the manifold appear. All other unities are fragmentary and partial, sub-systems, whose true character can never appear until they merge into the one great whole. We in this room to-day know what is the meaning of meaning, what is the sovereign unity which crowns all. This does not derogate in the very least from the purity and

rigour of our scientific theory and practice. Rather it should safeguard and preserve it, since the rigorous truth that is inherent in the whole must necessarily subsist in each of the sub-wholes which form our several chosen fields of investigation.

Philosophy is the science of pure human reason. From what I have already said, it will be evident that philosophy is not an absolutely autonomous science, it cannot stand self-sufficient in its own right. It is partly dependent on those things which have been revealed, to the knowledge of which unaided reason could never aspire. Such dependence is, however, not derogatory to its scientific nature, since revelation is not an internal component but an external norm of philosophy. It provided a guiding post of general direction for those junctures at which the metaphysical obscurity is so profound that the unaided reason can discover no preference for one direction rather than another. Where this dependence has been recognised, philosophy has gone slowly but consistently forward; where it has been repudiated, philosophy has broken asunder into a jangle of warring schools battling over trifles.

In much the same way, the exact sciences have a certain dependence on philosophy as on an exterior norm. Not indeed that Science should accept any *a priori* dogmatism on its own subject from philosophy, but rather in the sense that philosophy, itself but a partial unity, is yet a larger unity than any of the exact sciences, and is able to furnish the unitary principles common to all sciences in terms acceptable to all.

The substantial body of accepted doctrine known as *philosophia perennis*, or traditional philosophy, runs like a fixed datum line throughout the ages of civilisation. Over and over again, material science has deviated from that datum line, only to regress to it once more inevitably, to deviate again afterwards, perhaps on the other side. It would be interesting to make a list of the various scientific dogmas which have been exploded and abandoned during the last 150 years: impossibility of organic synthesis from inorganic primaries, utter indivisibility of the atom, invariable uniformity of atomic weights, univocal conservation of energy and mass, etc., etc. If these were plotted out would they not form a sort of scatter diagram grouped homogeneously about the datum line of *philosophia perennis* which would pick its way through them as the 'best-fitting curve'? In my laboratory I am accustomed to use certain very sensitive measuring instruments whose pointers or indicators are never at rest—they are always oscillating over a small arc, oscillating about a mean position. That mean position, not indicated but estimated, must form my recorded reading. In much the same way, the stable

truths of philosophy form my recorded reading of the central meaningful unity about which the successive findings of Science are for ever oscillating.

It was the custom to attack the doctrine of free-will because it was said to run counter to the principle of the conservation of energy. The modern physicist would scarcely dare to put forward such an objection nowadays. It was disposed of on the basis of statistical predictability of human actions, since vital and social statistics showed smooth curves having no re-entrants and conforming to known mathematical formulae. It would be a hardy statistician who would venture on such an argument nowadays. It was rejected on Freudian lines, since if all choices are unconsciously motivated, then no choices are the subject of a deliberate election. But it is widely agreed nowadays that, great as Freud's genius undoubtedly was, his enthusiasm led him into generalisations wider than his facts warranted. Evolution again seemed to ring the death-knell of freedom. And yet it has always seemed to me that the almost universal conviction of free-will makes the acceptance of a thorough-going evolutionary theory quite impossible to one who stops to think. For how can undifferentiated matter, necessarily existing from beyond all time, by necessary and inevitable processes of differentiation, necessarily and inevitably produce men who are necessarily and inevitably convinced of their own freedom? If necessity can produce a conviction of freedom, there seems to be no reason why it should not produce freedom itself, and thus the whole argument falls to the ground. A writer in the *Times Literary Supplement* of April 12th, 1942, expresses a similar thought: 'A Universe that negates itself by evolving a mind and a conscience that repudiate and struggle against the processes that brought them into being, is a metaphysical monstrosity.' There are too many metaphysical monstrosities about to-day, and all too many of them have been foisted on the world in the fair name of Science.

Science and philosophy must re-marry. Asunder, they both pine and fade. United again, they have the grandest of all tasks before them.

J. LEYCESTER KING, S.J., PH.D.,

*Professor of Psychology, Heythrop College.*