Contacts of Science with Social Problems

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PROSPEROUS States and societies are in a state of statistical equilibrium somewhat comparable, for the purposes of argument, to the state attained at the end of a limited chemical reaction. If we consider our present civilization, such a stable state seems to exist no longer, and the departure from 'moving equilibrium' must, indeed, be large, since everybody agrees about its existence. . . . That one of the causes of this new—and uncomfortable—state of things is to be found in the ever-accelerated industrial and scientific development, or rather in the social, sentimental and ethical aspects of our world lagging behind that development, few people would now care to deny.

This means that science—the word is here used to signify the natural sciences—has slowly come to have a social and *political* importance of the first magnitude. There is no reason to insist upon this idea, which has been often stated and discussed in *NATURE*. A century ago, politics and science had only a nodding acquaintance; the influence of the second on the first has since grown more and more powerful, more and more *direct*, until at last a development which could have been foreseen so early as the beginning of this century has taken place. Men, in various countries, speaking severally, have claimed, in the name of science, a share in the ruling of nations. This claim—which has had its echo in the columns of the present journal—is far reaching and important enough to attract study.

Common sense points out that 'Science', being only a spiritual construction made up of countless sheets of thought laid up and sealed by countless dead or living men, has no separate and discrete existence, no personality, no will and no power to act. Scientists, being men, possess those properties; men who are not scientists also do. Therefore, when we hear someone speaking 'in the name of science' about political matters, three possibilities are to be considered, namely, (1) the speaker is a politician influenced by scientific ideas; (2) the speaker is a scientist influenced by political or non-scientific ideas; (3) the speaker is a scientist interested in a new field of application.

In the first instance, by the term "politician influenced by scientific ideas", we allude to those men whose speech has caught the knack of scientific wording, but whose minds continue to run along

the well-worn political grooves. The political language has a marvellous way of generalizing and distorting ideas, principles and laws. We have seen, during recent years, outstanding examples of such a technique, and the world is teeming with such attempts. Racism is nothing else than a provocative distortion and generalization of well-known biological results, yet it seems to have become powerful enough to rule a great nation. Another and much older example of the curious sentimental reactions and upheavals which a badly understood scientific theory may originate is to be found in the anti-Darwinist movement in the United States, which, so I am told, is still discussed there from a religious point of view. It is unnecessary to give more historical examples of this kind: they are well enough known. These contacts between misunderstood science and politics are not the principal object of the present paper. Indeed, they would be dismissed with contempt if their advent was not, in itself, a danger to science, a risk of creating, in the mind of men, uncalculated aversion for the innocent techniques thus misunderstood or misapplied.

Far more interesting is the same claim, when it is made by real scientific workers. It is not intended here to contest the principle that, if a little more scientific thinking were used in the ruling of countries, some blunders would be avoided and some progress made. What has to be considered is the claim as to a proposed scientific experiment and, treating it as such, to find whether that experiment has any limitations (voluntary or otherwise), whether it can be stopped and started again at will, whether, finally, it will endanger in any way the human commonwealth already acquired. It is at once evident that caution is necessary: the experiments of a mathematician are dangerous only to his paper supply: those of a physicist or chemist may raise the roof of his laboratory and reduce him to small particles; those of the biologist or pathologist may be fatal to thousands of people. What can be said of an experiment in the science of ruling nations? Wars have shown that mistakes in this art have led to the death of millions and the misery of generations; it is conceivable, also, that they may be dangerous to the spiritual qualities of mankind, since we know next to nothing about this side of things.

It follows that great pains must be taken to ascertain that the claim we are considering is pure. We have seen Governments making a masquerade of scientific principles. Scientific workers, being human, might do the same and could be infinitely more dangerous, since the disguise would be much better worn. . . . If a man of science is moved on such a course by purely personal motives or feelings, such as money, lust of power, family politics, etc., the process is generally petty and cheap, as it is in ordinary political life; and the activities of the man will cease when he reaches his small goal. Very different is the result of a metaphysical bias. The mixture of metaphysics of any kind with scientific theories and results is constantly occurring in second-rate scientific minds; and it is very easy to understand: such a mixture leads to single-minded pictures of the world, generally easy to grasp; these appear endowed with absolute, fixed, immovable properties, rules and laws; this again, is very satisfying to the human mind, as creating what one of this school aptly termed a 'rational religion'. One is led, along such a line of thought, to the idea that science rules the world, and that no principle of hers may be transgressed by Nature. From such a conclusion, it is evident that rules of government may be deduced and that further experiments to prove them are unnecessary: this is why such schools of thought (which are as old as science itself) are always unable to admit failure: if facts disappoint their hopes, facts are wrong; and if people do, people should know better, or had better die.

The first modern trials at 'scientific' interference of this kind have already happened. One, born in the United States, based upon a misunderstood conception of the principles of thermodynamics, was called technocracy. Another is slowly developing in the U.S.S.R., where the simple creed of Marxism is slowly being replaced by the metaphysic faith known as 'empirical materialism'. Another, born in France recently of the same principles as the Russian theory, can be followed and studied in its rapid growth in the sayings and doings of some well-known physicists of that country. The 1937 Congress of the Palais de la Découverte afforded, in its opening speeches, some good examples.

From these views it would be gathered that science, supreme master, is not the servant of men, but should be served by them: thus new gods are born in fair disguise; they are no longer anthropomorphic, but they are still man-made. It is indeed a shattering thought for those who hope in the ultimate progress of humanity to remember that misunderstood Christianity, in old days, was a foe of science, while a new religion

can be now found in the principles of thermodynamics and statistical mechanics. It is another shattering thought to reflect that most of the men who fall into such errors are sincere, and therefore powerful leaders of men. Have we made no moral progress since the spectacular failure of Auguste Comte, and of his "religion de l'humanité"?

Let us now consider the last kind of claim, that laid by fair-minded men who consider that a new field of application will be shortly opened for scientific thought through the helpless state of most political Governments in this our world. Indeed, we all feel it is highly desirable and urgent to make a start. But we are also convinced that prudence and humility must be the order of the day—rashness and pride would be fatal to this new-born cause. We must always remember that this application of scientific training, reasoning and principles to a field where the work already done is scarce and of a fragmentary character will be the biggest extrapolation that science has ever attempted.

It must always be remembered that experiments may fail; and while being ready to accept such failures and take them into account, we must keep before our mind the fact that social experiments are costly, and that failures must be few and far between; in ancient days experiments on living men were impossible—they are still rare and difficult: so will be experiments on nations. Also, we must never forget that this new development of science must introduce new variables into its reckoning: that it must be human, while remaining impersonal, that it must build a world not only efficient, but also happy. From this point of view problems, such as that of human liberty (its scope and limitations), sexual relations, the fostering and development of intelligence, appear as peculiarly dangerous, since few more mistakes can be allowed in their treatment. Indeed, had science only to deal with the financial conduct and foreign relations of nations, its task would appear almost light compared with the heavy burden it is now preparing to shoulder. It is, however, certainly high time for the proposed organization of the study of social relations of science to be established, and NATURE is to be congratulated since this journal was the first to urge its necessity.

[To prevent possible misunderstanding, it should be stated that the above article by Prof. Boutry was written by him several weeks ago, and submitted for publication in NATURE long before the recent Cambridge meeting of the British Association, at which it was decided to constitute a new Division of the Association to be concerned with social relationships of science.—Editor of NATURE.]