ASPECTS OF UNIVERSITY EDUCATION

I
CAMBRIDGE VIEWS ON THE FUNDAMENTALS

THE War has set the world to taking stock of enterprise, of resource, of men. Challenged by the conflict, civilization has challenged in turn the stewards of her spiritual strength. All have been called to account. In particular, philosophy, history, science, and religion have been called to account, for failure to foresee or forewarn, to forewarn and forestall. Most favorably viewed, the conflict is a clash of ideals. Each ideal had inspired a philosophy, each inherited a history, each invented a science, each invoked a religion, each informed a society. It was the bees and the ants and the wasps against freedom, fair play, and the flowering of spirit. It was the soulless machine against millions of souls.

These five and twenty Cambridge essays are in a way inventories incident to such taking of stock. They survey the fields of educational tradition and of modern research. They are calm surveys on the part of experienced teachers, administrators, and scientific investigators. They are philosophic surveys, reappraising old values and assessing new ones. They are mining surveys into permanent elements of "educational theory and motive." They are deep-sea soundings to the foundations of educational reform, readjustment, and reconstruction, that lie below all controversy.

"Mere current controversial topics," says the Master of Magdalene in his preface, "we have attempted to avoid, and to encourage our contributors to define as far as possible the aim and outlook of education, as the word is now interpreted." Similarly, in his preface the Master of Downing writes: "Schemes of reform and reconstruction formulated under the present abnormal conditions are apt to be hastily conceived and ill-proportioned. To be successful they must be based on the firm


foundation of experience: it is the aim of these essays to present the results of experience in scientific investigation, to illustrate by concrete examples the sources of progress in a few departments of knowledge and so make clear to the layman the position of research as a factor in national prosperity."

"The value of Essays such as these, dealing, broadly speaking, with the whole Realm of Science," writes Lord Moulton, himself Senior Wrangler and First Smith's Prizeman at Cambridge exactly fifty years ago, "is at the present moment difficult to overestimate. They will prove invaluable to those who seek to broaden the interest of our Nation in Scientific Research." Nor is this distinguished gentleman under any illusions when writing thus, for he goes on to say: "The word 'research' has of late years been used too frequently as little more than a cant phrase dear to educationalists but carrying with it no clear or definite meaning, and if there is any patent or latent hostility to research it is mainly due to the way in which the word has thus been treated by its self-styled champions. But (as I am glad to say is frequently the case even in the arena of legal conflicts) the blunders of the advocate have not been sufficient to hide the merits of his case. Not only thoughtful educated men but even the members of the general public are beginning to realize that it is to research in its proper signification that we owe the knowledge of the wealth of the world in which we are placed—of the power that is within our grasp."

Of equally "supreme importance to the progress of the nation," says

Viscount Bryce, the Oxford humanist and world-known publicist, in his introduction to the Education Essays,¹ “is the best talent it possesses.” “What is wanted now is quality rather than quantity.” “The problem is how to find the finest minds among the children of the country and bring them by adequate training to the highest efficiency.” Nor does Lord Bryce suffer any illusions concerning that other word subjected nowadays to much ignoble use, for says he: “The 'efficiency' which is on every one's mouth cannot be extemporised by rushing hastily into action, however energetic. It is the fruit of patient and exact determination of and reflection upon the facts to be dealt with.” “As respects those we have called the best minds,” continues Lord Bryce, “there are three chief aims to be solved. One aim is to fit men to be at least explorers, even if not discoverers, in the fields of science and learning. A second is to fit them to be leaders in the field of action, leaders not only by their initiative and their diligence, but also by the power and the habit of turning a full stream of thought and knowledge upon whatever work they have to do. A third is to give them a taste for, and the habit of enjoying intellectual pleasures.”

Research and efficiency, institutional and individual; training the exceptional few for leadership in thought and action in government, in commerce, in learning; training the energy of the many for the earning of an honorable livelihood and the enjoyment of leisure on terms heretofore vouchsafed only to the few; training the enthusiasm of all for the enlargement of human relations and the enforcement of human peace—these are some of the ends of education in a democracy encountered in the pages of these two volumes. They appear again and again. They are omens of hope illuminating these dark days. If government with the consent of the governed should survive this war—and it will survive

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with the last Anglo-Saxon—then some form of universal suffrage should follow; if universal suffrage, then *a fortiori* universal education, universal but not necessarily uniform, voluntary where possible, compulsory when necessary, competitive and selective always. These are conditions spreading the world over, by whatever names the furthering movements may be called.

A great protagonist of popular education has lately risen in England, an Oxford scholar and Sheffield administrator, the first professional educator to be made cabinet minister of education. And in his campaign speeches for the Education Act lately passed by Parliament, the Right Hon. H. A. L. Fisher has been ringing the changes on these ends of universal education. "Education," he has declared on appealing to the people, "is the art of drawing out of a man all that is best and most useful in him so that it may be employed to the advantage of the community and of himself as a member of it. We must regard it not as bearing fruit in the science and art of earning a livelihood alone, but as yielding the science and art of living. It is the means by which the individual citizen may be trained to make the best use of his innate qualities and the means by which the State may be enabled to make the best use of its citizens. Spiritually conceived, it is Plato's 'turning of the soul towards the light'; materially conceived, it is Napoleon's 'open career to talent.' In any case it is of great democratic interest, for indeed a wise democratic government is impossible without it." Nor does Mr. Fisher consent to the doctrine that "the State should pick out the genius from the gutter" and "leave the rest on the theory that the great majority of the human race are condemned to be hewers of wood and drawers of water."

Accordingly the first and foremost problem of education becomes that of discovering and developing the leaders of democracy. The resolution of the problem is not simple. It is no less complex than that of life itself. Neither leadership nor law can be imposed from above; both must be inspired from within. If education is a drawing out and fostering process, it is also a searching out and finding process. "You will not find your highest capacity," to quote another Oxford humanist, Mr. John (now Viscount) Morley,—"you will not find your highest capacity in statesmanship nor in practical science, nor in art, nor in any other field where that capacity is most urgently needed for the right service of life, unless there is a general and vehement spirit of search in the air." This "general and vehement spirit of search" is the chief contribution made by the science and scholarship of the nineteenth century to the educational problem of the present. It is fresh and clear in the study of the natural sciences, it is equally clear and fresh in the newer spirit of
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classical studies. In seeking character and ability, it reckons primarily with "faculty and aptitude," reprehending alike compulsory science and compulsory humanities. When it comes to the testing of theories, there may be quite as much of the scientific spirit in a classical seminar as in a science laboratory, but recent events have inevitably thrust the natural sciences and the modern humanities into the foreground. To this America was already aroused and England has wakened up. "If there is one lesson more than another," said the Master of Balliol lately, "which the War is going to teach us, it will be the lesson as to the future place of Natural Science in our education." The same note had been sounded from across the Channel twenty years before. Reading the Rede Lecture, June 1st, 1899, at the golden jubilee of Sir George Gabriel Stokes in the chair of the illustrious Sir Isaac Newton at the University of Cambridge, the late Professor Alfred Cornu, of the École Polytechnique, said, "Cette humble origine de la plupart des grandes découvertes dont l'humanité est bénéfice montre bien que c'est l'esprit scientifique qui est aujourd'hui le grand ressort de la vie des nations et que c'est dans le progrès de la Science pure qu'il faut chercher le secret de la puissance croissante du monde moderne."

The same high note was struck by Professor Sir Richard T. Glazebrook in the Rede Lecture of last year. Recalling the address of the Prince of Wales at the opening of the National Physical Laboratory in 1902, when he said: "The object of the scheme is, I understand, to bring scientific knowledge to bear practically upon our every-day industrial and commercial life, to break down the barrier between theory and practice, to effect a union between science and commerce," the lecturer points out that in this process there are three distinct stages calling for careful correlation: the work of the man of science in his Laboratory; the investigations which go on in a Laboratory of Industrial Research, developing new processes or introducing new products; the Works Laboratory proper, controlling the quality of raw materials, or of finished products. And with respect to the fruitful coöperation of the schools and the universities towards such correlation, quoting a recent letter in Nature by Mr. M. D. Hill, an Eton Master of twenty years' experience, in which he writes: "The boys who are best at classics are also best at science. . . . Every intelligent boy must be given equal opportunities in science and languages in the widest sense of the word.

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until he is old enough to show which line of study he can most profitably follow," the lecturer continues, "Here is a problem which the University must attack at once. . . . Cambridge must open her doors wide to every son of our great Empire who can show that he can reap benefits from studying within her walls any branch of knowledge for which she offers opportunities. . . . The University must remain the home of Ancient Learning, but the course pursued to secure this end must not be such as to demand that Latin and Greek should remain the principal part of the school tasks of all boys. It must train men to be leaders in all walks of life, and not least in industrial pursuits, and this not by undertaking the technical training of the men who go out hence into the world, but by laying a broad foundation of the scientific principles and laws on which technical knowledge, be it of theology, medicine, or law, or of the more modern branches of applied science, must rest. And lastly, but most important of all, it must produce the leaders in every branch of science."

For the promotion of industrial and scientific research—which, as Lord Moulton remarks, differ only in the nature and circumstances of the problems with which they deal—there has lately been established a permanent government organization under state aid, to be advised by an advisory council, on: proposals for instituting specific researches; proposals for establishing or developing special institutions or departments of existing institutions for the scientific study of problems affecting particular industries or trades; and the establishment and award of research studentships and fellowships. Moreover, the universities, new and old, are passing statutes instituting new research degrees. Furthermore, the school and university programmes are the subjects of recent elaborate reports of government committees on the place of science and modern studies in any reconstruction of English education. Finally, the Education Act of 1918 has enlarged the scope of public education from the elementary school to the university. These are some of the evidences that, in ways hitherto unrealized, state, school, and university are about to coöperate for the promotion of research in pure science and the preservation of the humanistic spirit in English education advocated in these Cambridge Essays on Science and Education.