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JOHN HENRY NEWMAN AND SCIENCE

DURING 1852 J. H. Newman delivered a series of lectures in University College, Dublin, which were known as "Discourses on the Scope and Nature of University Education". They are now usually read, as finally published in 1873, under the title of "The Idea of a University Defined and Illustrated". Newman founded the University College and was its first principal for some years. Opinions differ concerning the value of his work in Ireland—even Shane Leslie thought that it was a failure—but a series of lectures, given a century after Newman's endeavours to put before the Irish his ideas concerning the aims and functions of a university, were delivered by leading members of the staff of the institution which he founded and helped to create.

Prof. T. S. Wheeler* has dealt systematically and with commendable objectivity with Newman's views on the place of science in a university. Although Newman regarded the teaching of science and professional subjects as a duty of a university, nevertheless he considered the development of the mind the primary end of university education. His object was to form, particularly in his junior students, a cultivated intellect on which other knowledge could be grafted. Although Newman insisted that he had been fighting liberalism all his life, he intended his objections to concern the liberalism which was more recently known as rationalism or scientific humanism. He was a champion of a liberal education in the modern sense. A 'gentleman' was one who had been improved and sensitized by such an education (but even in his day Newman was not the only antagonist of the more partial of Locke's educational theories). Newman insisted that it is only the mind trained and developed by a liberal culture that can profitably absorb and utilize knowledge of all kinds. On one hand, we have to distrust the view that the liberally educated man can control everything—"a view that has flowered to its greatest exuberance in the Civil Service" (and is occasionally found in modern universities). On the other hand, we have to face the dangers which arise from over-specialization. Since Newman wrote, science has developed at an enormous rate. About a million scientific papers are published each year, and the scientist is overwhelmed by a flood of knowledge. As a result, there is more and more pressure of material for inclusion in a university course and an increasing tendency to specialization. The point of view of the average

* "Newman and Science," By Prof. T. S. Wheeler. *Studies*. An Irish Quarterly Review. (The Talbot Press, Dublin, Summer 1953.)

science graduate is narrow: neither at school nor at the university does he receive the training which Newman regarded as fundamental, except in rare cases. There is an increasing complaint that scientists know more and more about less and less, and that they are not always able to express themselves clearly by mouth and pen. If this is true, the disease is more apparent than the remedy; but it is satisfactory to note that in England most schools are trying to do something to overcome the intellectual narrowness of both their science and their arts students; and, if little has yet been done, the universities are at least aware of the needs.

Prof. Wheeler comments as follows: "In Newman's view the great object of a university is to make something or other of its students and not simply to protect the interests and advance the dominion of science. The modern estimate of the place of research in a university department of science is completely at variance with that of Newman; though he tended to modify these views later in life. At present, discovery is regarded as more important than teaching, and the standing of a science department is determined by the quality of the research work it produces rather than by the quality of its teaching. The plums in the academic profession go to the research worker. The good teacher seldom reaches the top". (In the modern university there is, of course, the 'good organizer' whose abilities and qualifications it is extremely difficult to define.)

Surprisingly, Newman was alive to the need for the development of teaching applied science in his University. The Great Exhibition of 1851 had shown that British industry was losing its premier place owing to the manner in which Continental nations were fostering applied science. The teaching of engineering, agriculture and medicine involves a practical as well as an academic approach and yet these subjects have been successfully incorporated in a university discipline.

Since the 'thirties of this century we have had theories, in spate, of the aims and nature of a university: we have had Allison Peers in "Red Brick", Moberly in "Post-War Crisis", the Harvard Report, Goodhart and Livingstone from an old university, Colonial and international conferences, the 'synthetics' of the Anglo-American peripatetics, and so on. In the midst of all this there is still something of relevance in the elegant writings of Newman.

W. L. SUMNER

STRUCTURAL BASIS OF THE CROSS-STRIATIONS IN MUSCLE

By DR. JEAN HANSON* and
DR. HUGH E. HUXLEY†

Department of Biology, Massachusetts Institute of Technology,
Cambridge, Massachusetts

THE myofibrils of striated muscle consist largely of protein (more than 90 per cent of their dry weight)¹, and it is believed² that the only proteins present in significant quantities are myosin, actin and probably a small amount of tropomyosin. We shall describe here evidence that the cross-striation of the

* Fellow of the Rockefeller Foundation. On leave from the Medical Research Council Biophysics Research Unit, King's College, Strand, London, W.C.2.

† Fellow of the Commonwealth Fund. On leave from the Medical Research Council Unit for the Study of the Molecular Structure of Biological Systems, Cavendish Laboratory, Cambridge.