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RUTHERFORD MEMORIAL

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Ernest Rutherford came to Canterbury College in 1890 with a Junior University Scholarship; he left us for Cambridge with an 1851 Exhibition Science Research Scholarship in 1895.

In 1890, the staff of Canterbury College consisted of five professors and three lecturers. There were about 170 matriculated students. F.W. Haslam was Professor of Classics; J. Macmillan-Brown occupied the Chair of English Language, Literature and History. Captain F.W. Hutton, who had held the Chair of Biology from 1879, succeeded Sir Julius von Haast as Professor of Geology and Palaeontology in 1887, but he resigned in 1892 to take over the curatorship of the Canterbury Museum.

Two foundation professors, namely A.W. Bickerton and C.H.H. Cook, were responsible for the teaching of chemistry and physics, and of mathematics and natural philosophy.

In 1890, the course for the Bachelor of Arts - which Rutherford commenced - required a pass in at least six subjects, of which Latin and pure Mathematics were compulsory. Rutherford won an Exhibition - a term applied to a local scholarship of the annual value of £20 - in each year of his undergraduate course; in mathematics in 1890 and again in 1891; and in experimental science and mathematics in 1892.

It is clear from these records that his main contacts were with Bickerton and with Cook; and the influence of both professors extended to Rutherford's honours year when he gained the coveted double first in mathematics and physical science.

One of Rutherford's fellow undergraduates has stated that "Rutherford came to Canterbury College a boyish, frank, simple and very likeable youth, but with no precocious genius." "He was a normal healthy student amongst other students. In the outdoor world he held his own at least.. (he) played in the first fifteen... as a forward, though without particular distinction. On the whole he was of a conservative type of mind, though very fond of discussion.

Scientific Society.

It is known that Rutherford took a prominent part in the newly founded Scientific Society. The minute book of this society from its foundations in 1891 to 1895 has fortunately been preserved. Rutherford was present at the inaugural meetings on April 11, 1891, and he played an active part in its deliberations until he left for Cambridge in 1895. Professor Bickerton was the first honorary president; his address dealt with "The Lessons of Science". On July 6, 1891, B.S. Bull read a paper on "The Evolution of the Elements"; curiously enough, both E.ve and Sir Henry Tizard credit this paper to Rutherford! At the annual meeting of 1893, Rutherford was elected honorary secretary. The late R.M. Laing, who was contemporary with Rutherford at Canterbury College, has reported that Rutherford "was with difficulty persuaded to take the secretaryship of the Society" which had, Rutherford felt, gone rather too far, in daring to discuss the then scarcely respectable subject of organic evolution. The minutes record that he spoke in a discussion on a paper on "Atoms and Molecules" by E.S. Buchanan.

The third annual report, no doubt prepared by Rutherford, records that "The experience of past years has shown that there is no difficulty in obtaining an abundant supply of interesting and instructive papers.. In 1894, Rutherford was elected to the committee. On May 12, he read a paper "On Electric Waves and Oscillations". The minutes tell us that "the paper was very fully illustrated by experiments performed by Mr.

Bickerton, gave a short account of the importance of "Quartz fibres".

It is not an exaggeration to conclude that the activities of the Scientific Society were an important factor in the development of Rutherford's ideas. The very titles of the papers read by him and by his fellow students are prophetic of his mature and life-long preoccupations. Truly "the child is father to the man".

Research Year

After graduating M.A., Rutherford continued his experimental researches in what Sir Henry Dale called that "crucial fifth year", working largely on his own initiative.

"These first experiments at Canterbury are noteworthy, indeed, not only for the bright promise which they gave of Rutherford's later supremacy among experimentors, but also as providing, in essence, the methods and ideas for his first research at Cambridge, which was, in fact, an extension of them." So Sir Henry Dale summed up this stage of Rutherford's career.

This post-graduate research won Rutherford the 1851 Exhibition which took him to Cambridge and J.J.Thomson.

Bickerton and Cook

It is worthwhile I think to attempt to assess what Rutherford owed to his principal teachers at Canterbury College. It is a difficult task; the influence of a teacher is a subtle one, built of intangibles, yet having far-reaching effects for good or ill.

It has sometimes been said that Rutherford was no mathematician; thus implying a weakness in basic training. On the other hand, as his biographer, the late Professor Eve, has pointed out, if he really needed a piece of mathematics he could generally produce it. On the same topic Professor H.R.Robinson wrote, "Mathematician or no mathematician, he had a very sound geometrical instinct, and with a little trouble he could have beaten many professed mathematicians at their own game."

The evidence suggests that Rutherford obtained sound instruction in mathematics from Professor Cook. The latter was perhaps not an inspiring teacher but his soundness is generally acknowledged. R.M. Laing says of him that he was "thoroughly orthodox in all his views and strictly scholastic in his methods, and with in his limitations a very able man..." His impress on his students was through honesty of purpose and clarity of exposition."

It may be said at once of Bickerton that he was thoroughly heterodox in all his views. He was a lovable erratic individualist, stimulating and provocative, full of original ideas which embraced the whole universe. He may have been a poor teacher of the average student and it has been stated that he was out of touch with current developments in his own field; but he was an enthusiast. As Laing puts it, he "was an enthusiast for research and (he) had the power of making others share his enthusiasm."

Hight and Candy record that one of Bickerton's colleagues said of him that he supplied "the exhilarating, I might almost say, the inebriating element to the work of the students; he was ever cheering them on and filling the atmosphere with a kind of intellectual champagne..." His versatility, hatred of the conventional, zest for life, and personal charm, no less than the sparkle of his powerful imagination, had a profound effect on the minds of his students.

It cannot be doubted that Rutherford owed a great debt to his contact with Bickerton. It is characteristic of Rutherford that his theories involved totally new concepts for example the spontaneous disintegration

ability to break away from the trammels of orthodox physical thought. This power was no doubt innate in Rutherford but it was surely strengthened by the teaching and example of Bickerton. The latter taught, contrary to then current belief, that in physics world-shaking discoveries were just round the corner. Rutherford's whole career bears witness to the validity of that point of view. One is forced to agree with Rutherford's fellow student R.M. Laing, that Bickerton's teaching "suited Rutherford's type of mind".

But that is not all. Bickerton had another characteristic which Rutherford shared - he was, as Hight and Candy state "a facile inventor of apparatus and a skilful manipulator thereof. It is a commonplace that Rutherford was without a peer as an experimentalist. Bickerton's example cannot be without significance.

There is, however, a striking difference between these two men. Unlike Bickerton, Rutherford planned his theories to test his theories. His methodology was compounded of bold speculation and and rigorous testing. His imagination was held in leash; intuition was checked by the finding of well-conceived experiments.

It seems probable that the orthodoxy of Cook served in some measure to offset, in Rutherford's growing mind, the effect of the too unruly speculations which were so typical of the undisciplined Bickerton. If this be accepted, it is not fanciful to suggest that Rutherford's profound understanding of scientific method in which imagination - the building of theories - is so nicely constrained by the rigour of testing by controlled experiment, owes something to each of his teachers.

Fortunately, it is not necessary to accept local assessments of Rutherford as he was when Canterbury College had played its part in his development and training. Others with unbiased minds have written of him at this time. Sir J.J. Thomson, under whom Rutherford worked at the Cavendish Laboratory, wrote as follows: "He was at that time.... a fine, stalwart, impressive man, and he had not been more than a few weeks in the laboratory before it was evident that he was a man of great determination and driving power.... I became convinced that he was a physicist of exceptional promise, energy and strength of character."

Sir Henry Tizard in his Rutherford Memorial Lecture to the Chemical Society (1946) summed up thus: "He was then twenty-four years of age, robust, full of energy and confidence, and endowed with a fighting spirit that never left him. He arrived with one great advantage over Faraday; he had had a good education. One is tempted to add that he had an equally great advantage over many other people then and now; he had not had too good an education. He had been taught science at Canterbury College by a man who was completely unorthodox, who, it would not be unfair to say, did not know very much, but who was convinced that there was a great deal yet to be known and discovered. Bickerton must surely have credit for stimulating, if not for moulding, the genius of Rutherford, whom he left alone to pursue his own experiments on the detection of Hertzian waves in a miserable, cold, draughty, concrete-floored cellar, which was usually known to students as the 'den', and in which they were accustomed to hang up their caps and gowns....."

Sir Henry continued: "Contemporary memories of Rutherford are to the effect that he had the usual difficulties of a new-comer, and of a new-fangled newcomer at that, and got over them by force of character and good nature; that he worked very hard, but liked to stroll round the laboratory and see what the other people were doing, and help them if he could; and that his own apparatus generally looked like nothing on earth, but worked."

"Rutherford had not been in Cambridge for long before it became quite clear to the majority of his associates and of others that he was

These, I venture to suggest, are fair testimonials to a struggling university institution and its teaching staff.

I permit myself one further assessment of Rutherford at this time; a fellow student at Cambridge wrote of him: "We've got a rabbit here from the Antipodes and he's burrowing mighty deep."

Conclusion:

In one sense we gave Rutherford to the world. It is our reward to inherit - in the record of his life and work and through his association with this university college - a tradition which must ever be as precious as it is inspiring.

Rutherford will live in our hearts and minds, warming the one and firing the other, as long as the universality is true to its proper purpose. "No university", Rutherford once said, "that does not do everything in its power to promote original research in its laboratories."

The story of his scientific achievements will fascinate generations of students yet unborn. His personality in its robustness, boyishness, simplicity, generosity and courage were happily blended, will perpetually delight us and our children. His approach to problems, with its nice combination of imagination and experimental skill, will be a guide and a challenge to future research students as long as science endures. We do well to honour our greatest graduate; as Sir James Jeans said of him, "His greatness as a scientist was matched by his greatness as a man... Rutherford was ever the happy warrior - happy in his work, happy in its outcome, and happy in his human contacts."

Happy are we for the benison of his gifts and his example.

RUTHERFORD AND CANTERBURY

Dr. G.P. Tarrant, senior lecturer of the physics department, who was for some years a research student under Lord Rutherford, here tells why and how we should support the Rutherford Memorial Appeal.

Any brief glance at a higher examination syllabus or at "Physics Abstracts" shows immediately that as much attention is now being given to the constitution of atoms and of atomic nuclei as to the rest of physics put together. Expressed differently, we may say that the work of one genius, Lord Rutherford, has doubled the field of physics.

It so happened, however, that Lord Rutherford was not a mere genius in experimental physics; he was one of those darned nice chaps that inspire others, the sort of chap that passes over good ideas and then pretends that the other fellow thought of it first, the sort of professor who lies in bed at night wondering how he can get more post-graduate scholarships for his students, the sort of professor who gives good lectures himself and, in addition, puzzles out ways of getting even better lecturers to come and talk to his students.

It was therefore very fitting that the Rutherford Memorial fund should be organised by the Royal Society of London for the purpose of endowing post-graduate scholarships in the natural sciences for students within the British Commonwealth and for sending lecturers overseas to different university centres, one in three to be delivered in New Zealand.

It is hoped to collect £150,000 for this fund from Britain and the countries within the British Commonwealth. Of this the New Zealand committee here at C.U.C. aims to collect £5000.

Now it is well known to those charged with the duty of collecting

he was a graduate of the University of New Zealand so graduates of that university might be asked to subscribe, he was a student of Canterbury University College so, surely, students of that college will be anxious to do their share.

But to that we add that the fund itself is designed to help students. Therefore, of a certainty, students of C.U.C. will wish to do more than merely subscribe themselves; they will, in addition, feel it their duty to persuade others to subscribe also, their parents, their parents' friends, and odd people that they meet. In the long run the total subscribed to a fund is dependent not on broadcasts, newspapers, or letters but is dependent on odd conversations partially overheard in a bus, on social talk, on statements such as "New Zealand is a bit slow in responding to the Rutherford Memorial fund appeal", etc. The success of the appeal would be assured if 2000 students talked about it five times a day for a single week to the people they meet. The address to send the money to is easy to remember "Rutherford Memorial Fund, The Registrar, C.U.C." Just remember the two words, Rutherford and Canterbury. Anyone can think the rest out.