

The Suppression of The Cambridge University Department of Colloid Science

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Abstract. The Cambridge University Department of Colloid Science, founded in 1930, was suppressed by the University after the retirement of the Department head, Roughton, in 1966. The closure was long and acrimonious, requiring two debates in the University Senate House and a University-wide vote. Decisions were taken by committees that included three Nobel Prize winners and many distinguished Cambridge scientists, but there was little consultation with the wider UK colloid science community, either academic or industrial. In times of financial stringency it is sometimes necessary to close university departments, and this review of an unsatisfactory closure may help future generations of university administrators to

avoid some of the potential pitfalls.

Keywords. Colloid Science; Department Closure, Cambridge

1. INTRODUCTION

The suppression of the Cambridge University Department of Colloid Science (CUDCS), proposed by the University authorities on the retirement of the Department Head in 1966, was sufficiently controversial that it was debated in the University Senate House. I found the debate¹ in the *Cambridge University Reporter* during my time as a research student in the 1970s, but only now have I been able to investigate this affair, which is mentioned explicitly in the memoirs of Mott.² My curiosity was further raised when I saw that the University Library contained relevant papers, with a catalogue entry stating “Some items are restricted at the discretion of the Keeper of Manuscripts”.³ All the actors in this affair are now dead, and as far as I am aware my access to the papers has been unrestricted.

Colloid Science, including both colloid physics and colloid chemistry is an interdisciplinary subject lying on the boundaries of several traditional disciplines, including biophysics. Overviews of the areas included in the field are in the two-volume texts by Alexander & Johnson⁴ (both sometime members of the CUDCS) and by Kruyt & members of the strong Dutch colloid community.⁵ Journal titles indicate the extent of the field: *Journal of Colloid and Interface Science*, *Colloid and Polymer Science*, *Soft Matter*, *Colloids and Surfaces A: Physicochemical and Engineering aspects*, *Colloids and Surfaces B: Biointerfaces*.

It is difficult to encourage interdisciplinary collaborations within a university, where teaching (and therefore research) tends to be organized along the lines of traditional disciplines. Exceptions include chemical engineers, who require skills in both chemistry and engineering, and applied mathematicians, who are happy to use mathematics to solve problems in any field. Here we look at the history of a university department formed with the express aim of fostering interdisciplinary research: the Cambridge University Department of Colloid Science, which studied areas of interest both to Physical Chemistry and to the emerging field of Biophysics, a field which had come to prominence with the publication⁶ in 1953 of the double helix structure for DNA by Watson & Crick, working in Cambridge.

2. EARLY HISTORY OF THE DEPARTMENT

In 1928 the Rockefeller Benefaction for the new Cambridge University (C.U.) Library and for Agriculture, Biology and Physics was announced,⁷ from which the chair of colloidal physics was created in 1930, with E.K. Rideal⁸ as the first Professor. Soon afterwards, the John Humphrey Plummer bequest to the University provided funds for new chairs. The chair in colloidal physics was allowed to lapse, and Rideal was appointed to a Plummer chair. Such chairs came without any departmental administrative duties, allowing Rideal to concentrate on research. The appointment of Rideal led to a division between his group and that of T.M. Lowry,⁹ the Professor of Physical Chemistry, recounted by Tabor.¹⁰

In 1943 it was proposed to re-organise¹¹ the Department of Chemistry to form a Department of Colloid Science and a Department of Chemistry (with sub-departments of Inorganic, Organic, Physical and Theoretical Chemistry, and of Metallurgy). Rideal had requested that “since Colloid Science includes the Physics and Chemistry of Colloids and their application to Biology, his laboratory should be in a position to collaborate with the biological Departments and should not be an integral part of the Department of Chemistry.” But by January 1944, prior to the

arrival of A.R. Todd^{12,13} as Professor of Organic Chemistry, this proposal was changed¹⁴ to a division into Departments of Colloid Science, Metallurgy, Physical Chemistry, and Organic & Inorganic Chemistry. Thus, quite apart from Colloid Science, Chemistry itself was divided into two separate departments, headed by Todd (Organic) and Norrish (Physical). “Their personal relationship was cool”¹⁵ and the two departments were combined only in 1986.

In 1946 Rideal resigned in order to go to the Royal Institution as Professor of Chemistry and director of the laboratories.¹⁶ He took with him his research student Paley Johnson, who subsequently returned to take up a CUDCS lectureship in 1950. The following year Dr F.J.W. Roughton¹⁷ (C.U. lecturer in Physico-chemical aspects of physiology) was elected to replace Rideal.

The history¹⁶ of the Department up to 1962 is recorded and discussed by D.A. Haydon¹⁹ & R.H. Ottewill²⁰ who in 1962 were Assistant Directors of Research (ADR, an untenured position, typically held for five years) in the CUDCS. Haydon & Ottewill were helped by a series of Annual Reports²¹ which listed the staff of the Department, their current teaching and research activities, and their publications.

In a Senate House discussion¹ concerning the closure of the CUDCS (to be discussed in Section 3), Roughton states that Haydon & Ottewill's history was in response to an invitation from the Society of Chemical Industry. The nature of this weekly journal was such that it would have been easy for Roughton to suggest to the editor that there was scope for such an article.

Figure 1 shows a 1961 group photograph of members of the CUDCS, including, on the front row, Haydon, Johnson, Roughton and Ottewill. There is no need to repeat the content of Haydon & Ottewill.¹⁶ However, two items caught my eye and merit comment.

2.1 The Oppenheimer Laboratory

J.H. Schulman was appointed ADR¹⁶ in 1937, and eventually promoted to a personal readership.²¹ In 1949 the Rhokana Corporation donated funds that were used to set up a laboratory in Cambridge, on the Madingley Road, to study surface chemistry, especially effects that play a role in the flotation process used in the mining industry.¹⁶ The work was directed by Schulman, and was sufficiently successful that in 1952 the Rhokana Corporation donated additional funds (£146,650) for the permanent endowment of work in Surface Chemistry, to be known as the Ernest Oppenheimer Fund. As long as Schulman continued as Reader in surface chemistry, the fund was to be used to support research under his direction, in particular, research on the application of surface chemistry to metallurgical problems.²²

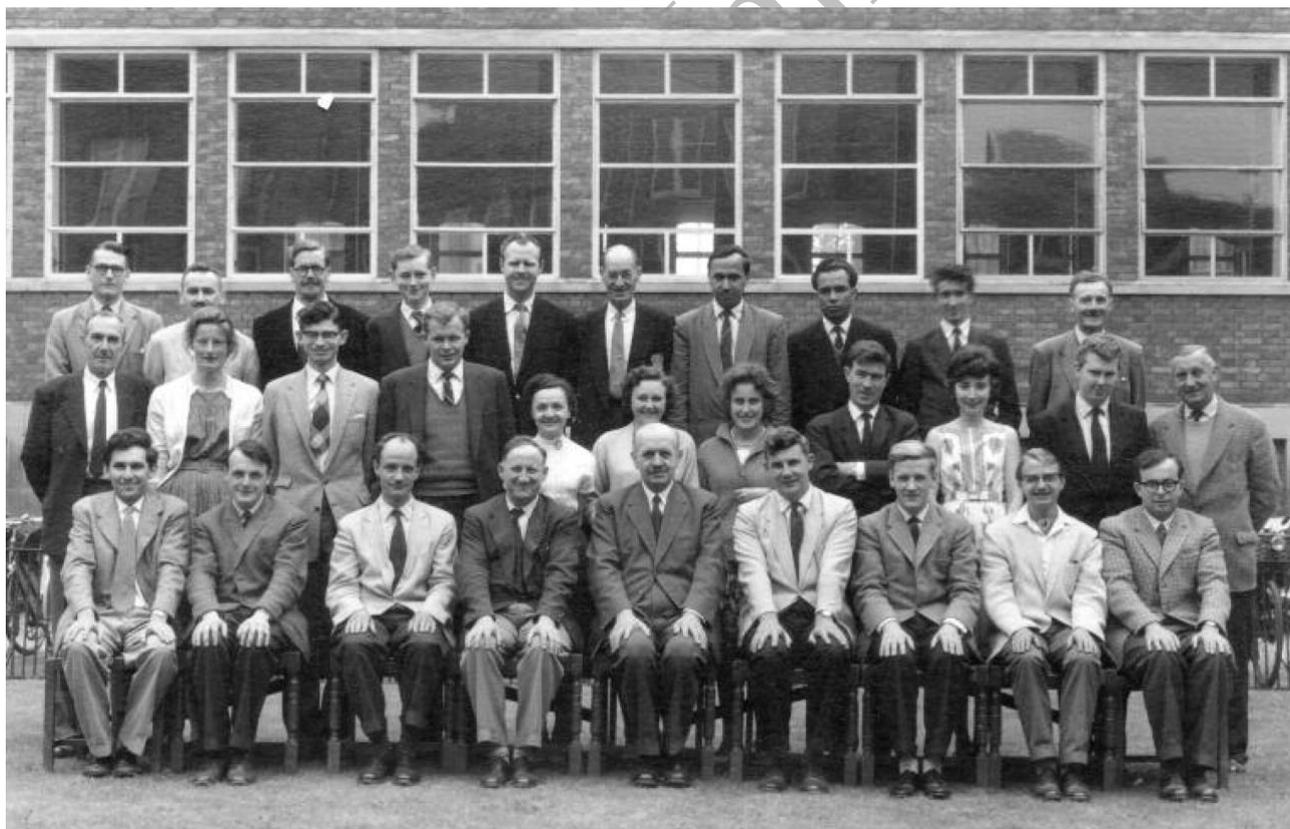


Figure 1. Group photograph of the Colloid Science Department in 1961. On the front row, positions 3–6 (from the left), are Haydon, Johnson, Roughton and Ottewill.

Schulman resigned in 1957 on being appointed Professor of Chemical Metallurgy at Columbia University. As a result, the Oppenheimer fund became available for work other than that directed by Schulman, and the regulations concerning the fund were changed to reflect this.²³ The Report of the Council²⁴ and subsequent Senate House discussion¹ indicate that there was a general acceptance that the fund was intended by its donors to be used for inorganic surface science. Current practice is that the fund (the capital of which had risen by July 2024 to over £10 million²⁵) is used to finance the Ernest Oppenheimer early career Fellowship.

In the Senate House discussion,¹ Roughton stated that one of the chief reasons for Schulman's resignation was uncertainty surrounding what would happen to the Department on Roughton's retirement in September 1966. Schulman could not expect to be promised Roughton's chair in advance, and it is only normal that when offered a chair in the USA he decided that a bird in the hand was worth two in the bush. This was a period when pay and conditions in the USA were sufficiently attractive that many scientists left the UK, a phenomenon known as the “Brain Drain”.²⁶

The precise location of the Oppenheimer Laboratory at High Cross is not stated by Haydon & Ottewill:¹⁶ it can be found on Ordnance Survey maps published in 1970 and 1972, labelled “laboratory” and recognizable due to its footprint.

The laboratory eventually became a store for the Museum of Archaeology and Anthropology, and was vacated during the academic year 1984–85 to allow the site to be redeveloped for the British Antarctic Survey.²⁷

2.2 Weissenberg

A rheological group was established within the Oppenheimer laboratory, directed by

Dr K. Weissenberg,²⁸ after whom is named (i) an effect, (ii) a Dimensionless Number, and (iii) a scientific instrument. The Weissenberg effect is the tendency of some elastic (e.g. polymeric) liquids to climb up a vertical rotating rod inserted into the liquid free surface (perhaps in order to mix the liquid). The Weissenberg number is the ratio of elastic forces to viscous forces in a flowing elastic fluid. The Weissenberg rheogoniometer^{29,30} was a versatile device for measuring all manner of rheological flow properties of liquids, though this versatility made the device complicated and not the first choice for simple measurements (e.g. viscosity). Little has been written about Weissenberg's links to Cambridge: his papers are now in the archives of Churchill College (not founded until 1960). Despite Weissenberg's international reputation, he seems not to have held a C.U. post, but acted as a consultant to the Ministry of Supply 1950–58, based in Cambridge. He supervised Grossman's thesis,³¹ a copy of which was issued as a report³² of the Armament Research and Development Establishment, Langhurst, Sussex. Weissenberg is mentioned in the CUDCS annual reports²¹ for 1955–56, 56–57 and 57–58.

3. ROUGHTON'S RETIREMENT

After Schulman's resignation in 1957, Roughton wished to sort out the future of the Department, of the readership vacated by Schulman, and of the Oppenheimer Fund. He consulted the Faculty Board of Physics and Chemistry,¹ who referred the matter to the General Board of the University. It became clear that decisions concerning the future of the Department could not be made before decisions concerning the Plummer Professorship of Colloid Science, which would become vacant on Roughton's retirement.

It was therefore decided in 1959 to establish a Plummer Professorship committee to discuss these matters.³³ The committee was chaired by the Vice-Chancellor, Prof. Sir Herbert Butterfield (a historian), with members Prof. Sir William Hodge (Pure Mathematics), Prof. Sir Nevill Mott (Physics), Dr H. Godwin (Botany), Prof. R.Y.

Jennings (International Law), Prof. Sir Alexander Todd (Organic Chemistry), Prof. R.G.W. Norrish (Physical Chemistry), Prof. F.G. Young (Biochemistry), and Prof. Sir Bryan Matthews (Physiology). The committee interviewed Roughton, and considered written documents including the annual Departmental Reports and other documents prepared by Roughton concerning the history and future work of the Department. However, it took no evidence from other members of the CUDCS, and the Faculty Boards were not consulted.¹ It concluded, in a report²⁴ dated 18 July 1960, that (a) on Roughton's retirement, his Plummer chair should become a chair of Biophysics, (b) the CUDCS should be wound up, and provision made for the creation of a Department of Biophysics, and (c) that if recommendations (a) and (b) were accepted, consideration should be given (i) as to which of the current work of the Colloid Science Department should be continued (and where), and (ii) to the use of the income of the Oppenheimer fund.

Roughton states¹ that he was shown this report, in confidence. The University did not wish to impose a ready-made team on a new Professor of Biophysics,³⁴ though it recognised that Haydon's work would be relevant and was prepared to offer him a 5-year extension of his ADR up to 31 December 1968. Ottewill, however, would only be offered an extension from 31 December 1963 to 30 September 1966 (Roughton's retirement). Johnson, a lecturer with tenure, would perhaps be moved to Biochemistry. Roughton fought for Ottewill to have parity with Haydon,³⁵ but to no avail. This difference in treatment was not something that anyone wished to announce to those concerned.³⁶

However, in January 1963 Ottewill was offered a post at Bristol by the Head of the Department of Physical Chemistry, Professor D.H. Everett,³⁷ and sought advice from Roughton concerning the future of the CUDCS. Roughton sought (and was granted) permission from the General Board to inform his staff of some of the key points in the Board's decision. Johnson states¹ "In February 1963 Professor Roughton was instructed to read out certain selected passages from these findings [the report of 18

July 1960] and from those of a subsequent sub-committee to myself and other senior members of the Department of Colloid Science. Apparently the documents were of such a confidential nature that we were not allowed to read them or even part of them for ourselves, and even now we have not seen them.”

Not surprisingly, Ottewill accepted the invitation to take up a lectureship in the Department of Physical Chemistry at Bristol University, in order to establish an MSc course in surface and colloid science.²⁰

In May 1965, the Council of Senate issued a report²⁴ concerning the Quick Professorship of Biology, the Plummer Professorship of Colloid Science, the Department of Colloid Science, the Oppenheimer fund, and the Bles Bequest (funds for Animal Embryology or more general Biology). The General Board considered the report of the Professorship committee, and agreed that the next Plummer Professorship should be in Biophysics, but decided against the immediate creation of a Department of Biophysics. They were “firmly of the opinion that the subject of Colloid Science does not warrant the continuation of a separate Department and that, subject to the University's approving the change of subject of the Professorship, the Department should be suppressed.” The University Council agreed with the General Board,²⁴ stating that “the General Board will in due course report to the University on the suppression of the Department of Colloid Science”.

However, the Ordinances of the University allow reports to be discussed in the Senate House, and such a discussion¹ took place on 25 May 1965. The first speaker, Prof. Sir Joseph Hutchinson, was concerned about the Quick Professorship and the Bles Bequest. There then followed a long, and somewhat rambling, contribution from Roughton, which takes over three and a half pages of the *Reporter*. He went into the history of the Department and its output of teaching, research publications and trained researchers destined for industry, government or academic posts. He regretted that the General Board and its committees had not sought a wider range of views concerning

the future of colloid science, including those of the current members of the Department and opinion from outside the University. He felt that work on surface chemistry, colloid science and biological physical chemistry should be kept together, either as a Department or a sub-Department. He also regretted the decision not to proceed with the creation of a Department of Biophysics.

Speeches were also made by Prof. G.K. Batchelor,³⁸ Dr P. Johnson, Dr J.F. Davidson,³⁹ Dr D.A. Haydon and Prof. R.G.W. Norrish.⁴⁰ Roughton, Batchelor, Johnson and Davidson were all fellows of Trinity College, elected in 1923, 1947, 1962 and 1957, respectively. However, my own recollections of Batchelor are such that I do not believe he would allow high table friendships to take priority over what he thought right for both the University and its employees. Batchelor thought that the General Board had failed to make satisfactory arrangements for the staff of the CUDCS. Six years after Roughton first raised these issues, the Report stated only that “The General Board will in due course report to the University on the suppression of the Department of Colloid Science”. Batchelor continued, “In due course? Mr Vice-Chancellor, I suggest that this is not the kind of considerate and fair treatment of the graduate and assistant staff of the Department that we expect from the University.....The Report shows little appreciation of the value of an active and well-established scientific team. A good deal of capital is required to establish a research laboratory, in the form of graduate staff with complementary interests and good working relationships, suitably trained assistant staff, and a well-stocked laboratory.” Batchelor, an applied mathematician, was aware of the importance of interdisciplinary science and as founder of the C.U. Department of Applied Mathematics and Theoretical Physics^{38,41} in 1959 he would have known only too well the effort required to establish a scientific group. Batchelor suggested that the CUDCS should be kept together, perhaps as part of the Department of Physical Chemistry, and that a good use of the revenue from the Oppenheimer fund would be to provide a senior office in the subject of Colloid Science. “In the absence of any information about the General Board's intentions regarding the Department, other

than the bald statement that it should be suppressed, I do not think it is right that the University should be asked to approve a recommendation to continue the Plummer Professorship now held by Professor Roughton in a field other than Colloid Science.”

Next Johnson spoke first to re-affirm the links between biological aspects of colloid science and work on inorganic colloids; he stressed the importance to industry of a supply of trained colloid scientists. He argued that the CUDCS should be renamed (to become, presumably, the Department of Biophysics). Finally, he criticised the procedure by which decisions had been made, with the loss of an ADR (Ottewill) and of Johnson's own valuable and highly trained laboratory assistant. The uncertainty had made it extremely difficult to recruit Research Students.

Davidson (later to become head of the Chemical Engineering Department) felt that Colloid Science was important both academically and industrially, and that the subject should be encouraged rather than suppressed.

Haydon supported the idea of a Department of Biophysics, and that the Professorship of Colloid Science should be converted to one of Biophysics. “This requires no comment as the Professorship of Colloid Science has been, in everything but name, a Professorship of Biophysics for at least the last twenty years.”

Finally Norrish, the outgoing Professor of Physical Chemistry and a member of the original Plummer Professorship committee, spoke. He would have liked to see the CUDCS go on as it was (perhaps with the title changed). If it had to be broken up, the Physical Chemistry Department would do anything it could to support the physical chemistry aspects of the CUDCS.

This discussion took place at the end of the Easter term 1965, just before the long vacation, and it was not until October that a Notice,⁴² dated 18 October 1965 was published. As regards Colloid Science, the Board were “still of the opinion that if the

University approves the change in scope of the Plummer Professor [i.e. to one of Biophysics] the Department should be discontinued... The Board, contrary to what might be supposed from some of the remarks made at the Discussion, gave very lengthy considerations to the question of the future of the staff of the Department. In reporting to the University on the discontinuance of the Department they have said that they intend, with the concurrence of the Professor of Physical Chemistry, to recommend that any officer in the Department whose tenure does not end before 1 October 1966 shall be transferred to the Department of Physical Chemistry. There remains the problem of accommodation, which the Board are reconsidering..."

It seems strange that the results of these "lengthy considerations" were not conveyed to the people concerned, and the episode seems, at best, to be a fine example of the mushroom farming approach to Personnel Management ("Keep in the dark and feed bullshit").

The Council also agreed to submit to the Regent House (the ultimate governing body of the University, which includes all lecturers, readers and professors, together with many college fellows etc.) a separate Grace for the approval of each of the recommendations of the report.⁴³

However, after the 18th October, the General Board received further representations, with a request that the recommendation concerning the Plummer Professorship should be withdrawn until more was known concerning the fate of the Department and its present staff. The appropriate Grace was withdrawn⁴⁴ on 25 October but on 8 November the Council issued a Notice⁴⁵ that the General Board considered it was "imperative to reach a decision..about the Plummer Chair without further delay." And so the Grace was re-submitted for approval.

In 1965, if ten (or more) members of the Regent House requested a ballot, approval of a Grace was conditional on the results of such a ballot and the University

Ordinances allow fly-sheets, signed by members of the university, to be published, giving reasons for (or against) the proposals. [The number of members required to request a ballot has since been increased, and in 2025 stands at twenty-five.⁴⁶] Two such fly-sheets, dated 6 December 1965, appeared in the *C.U. Reporter*^{47,48} prior to the ballot to be held on 9–10 December 1965. The first flysheet⁴⁷ applauded the proposal to create a Plummer Chair in Biophysics: such a professor would not be encumbered with the administrative burden associated with the Headship of a Department. It also supported the winding up of the CUDCS. “The term ‘Colloid Science’ is however outmoded and to-day there is, for example, little in common between research on proteins and on the dressing of ores.” The flysheet was signed by 25 members of the University, including nine of the twelve members on the General Board.

The second flysheet⁴⁸ was signed by 144 members of the University, including Batchelor, Johnson, Davidson, Haydon and Norrish, all of whom had spoken at the Senate House discussion. Many of the signatories were applied mathematicians, whom Batchelor would have found easy to canvass in the Department of Applied Mathematics. Some, such as E.R. Lapwood, had interacted with the CUDCS.³¹ Even if others had little concern for Colloid Science, they would have felt solidarity with fellow University employees left in uncertainty by the University. Amongst the signatories was J.R.G. Bradfield,⁴⁹ a cell biologist and Senior Bursar of Trinity. He founded the Trinity Science Park, and probably looked favourably on the needs of industry. Joseph Needham also signed. A biochemist, he is now better remembered for his monumental work on the Science and Civilization of China. He had already formulated the “Needham Question”,⁵⁰ asking why China, which had been technologically ahead of Europe (e.g. paper, printing, gunpowder) did not develop industrially and scientifically as Europe did with its Industrial Revolution after the Renaissance. The organisation of scientific and technological research was thus of interest to him.

This second flysheet agreed that a Cambridge chair in biophysics was long overdue, but did not accept that this should be created in such a manner as to “decapitate Colloid Science”. The flysheet was glad to note that the General Board had accepted that the CUDCS should be transferred administratively to Physical Chemistry, and urged that “the graduate and assistant staff of the present Department of Colloid Science should be allowed to remain in their present premises....until suitable long-term accommodation..can be provided for them.” “The members of the Colloid Science Department as yet have no information about their laboratory working conditions in ten months' time...they naturally feel considerable concern.”

Everyone accepted that it was appropriate that the Plummer chair of Colloid Science should become one of Biophysics. Those who argued against the Grace did so in the hope that consideration would be given to the fate of the members of the CUDCS.

In the meantime, the Chemistry Department was realising that if the two remaining senior members of the CUDCS (plus their teams) moved to Chemistry, not only would it become harder to justify additional appointments (of their own choosing) in the future, but more space would be required. They therefore requested that the CUDCS should remain in its Free School Lane laboratories. But Physics, still on the New Museums site, had its eye on these adjacent laboratories. Prof. A.B. Pippard⁵¹ (Physics), felt he could not openly support the closure of the CUDCS lest he be accused of doing so out of self interest, so despite being on the General Board he did not sign the first flysheet. However, he sent a memo⁵² to all members of the Physics Department in the Regent House (i.e. those entitled to vote) pointing out that if the CUDCS was moved to Chemistry, the Chemistry Departments would still have 770 square ft per research worker, compared to 395 square ft per researcher in Metallurgy plus Physics, and urging them “to think about the issues involved and to make a point of casting your vote.”

The ballot resulted in the Grace being rejected, with 80 votes for the grace and 186

against.⁵³

Mott relates the affair in his memoirs:²

“Some departments, such as physics, were expanding because the number of students admitted by the colleges increased. So such departments applied for more staff and, funds being available, got them. But it was felt by some, particularly the Secretary-General (Harold Taylor) that even if funds were available the total number of dons should not increase. One reason was that most university teaching officers wished to be college Fellows, felt themselves second class citizens if they were not, and the places in the colleges were limited. So if there was to be expansion in—for instance—physics, there had to be compensating contraction elsewhere. But the question was—where? If a scientific department was envisaged, the professor would fight to the death for his private empire. The General Board picked on a very small department, Colloid Science, from which the professor was retiring. But even so, they could not bring it off. The department found enough friends to come and vote against the General Board tyranny. Compensating contraction seemed impossible.”

This account is inaccurate in that Harold Taylor, who held the post of treasurer from 1945–53, was Secretary General from 1953 to 1961, when he was replaced by W.J. Sartain. So although Taylor was in place when the future of Colloid Science was first discussed, he had left the scene well before the discussions of 1966. Mott was himself very capable of keeping expenditure within bounds, and one of his first decisions after his appointment as head of the Cavendish (Physics) Laboratory was to cancel a project to build a linear particle accelerator in Cambridge,⁵⁴ thereby abandoning the Cavendish's leading role in nuclear physics established by Rutherford. Mott's comments concerning the desire of University teaching officers to hold a college fellowship are supported by Todd, who in his memoirs⁵⁵ states that when he went to Cambridge in 1944 “the stipend of a university lecturer was quite derisory (I think it was £150 p.a.) and included payment for a few hours of teaching.... If the lecturer

was a fellow of a college he would receive in addition a college stipend plus payment for teaching or other work in college; in this way he could make quite a reasonable living. If he were not a fellow, however, he received from the university a modest 'Fellowship Allowance', but if he were to get a living wage he had to do a lot of extra teaching." So Mott's "second class citizens" suffered both poor social status and poor financial status.

Todd does not discuss the suppression of the Department in his memoirs. However, he states⁵⁶ when considering the possibility of a move to Cambridge, "There was a long history of internecine warfare between R.G.W. Norrish who was Professor of Physical Chemistry and E.K. Rideal who, although also running what was in effect a second school of physical chemistry, did so under the banner of Colloid Science." Thus for Todd, "Colloid Science" meant "Colloidal Physical Chemistry", and it would appear that even before he arrived in Cambridge he was against the existence of a separate Department of Colloid Science. Brown and Kornberg¹³ report "*Both physically and as a personality Todd was a towering presence at any meeting or committee on which he served. This presence, with complete confidence in his own decision making, led to his holding a series of important positions relating to science policy and other public matters.*" Whether or not Todd dominated the Professorship committee, we do not know. Mott was also on the committee, and there was at that time a saying "Todd thinks he's god; Mott knows that he's not".⁵⁷ But Todd had already won his Nobel prize in 1957, whereas Mott became a Nobel Laureate only in 1977. A third member of the committee, Norrish, was awarded the Nobel Prize in 1967, and of the three he alone supported CUDCS, signing the second (non placet) flysheet.⁴⁸ Although not a colloid chemist, he had been a research student of Rideal.⁴⁰

In his memoirs⁵⁸ Todd reveals that when Master of Christ's College he offered the job of Senior Tutor without consulting the College Council, and as chairman of the University Press he appointed a chief executive without consulting the Syndics of the Press. Communication in the days before email and mobile telephones was harder

than it is today, and time was of the essence in these appointments. Nevertheless, we can conclude that Todd was happy to keep people in the dark when it seemed necessary.

4. THE SECOND DISCUSSION

By 1968 Roughton had retired, and the CUDCS consisted only of Johnson and Haydon, with six assistant staff, and many vacancies. The possibility that members of the CUDCS should join Physical Chemistry was mentioned in the first Senate House discussion. However, in his memoirs Johnson⁵⁹ states that although Prof. J.W. Linnett⁶⁰ (the incoming professor of Physical Chemistry on the retirement of Norrish) was initially enthusiastic, it was made clear to him “from a high university level” that any addition to his staff would mean no further appointments in the foreseeable future. So the idea was dropped.

In July 1967 the Council of the School of the Physical Sciences recommended that Johnson and Haydon's posts should be transferred to the Faculty of Physics and Chemistry.⁶¹ Five vacant posts (one ADR, two Senior Assistantships in Research and two Assistantships in Research) would be suppressed. A temporary Committee of Management would be established to act as Head of Department, and these proposals were recommended by the General Board in a report⁶¹ in January 1968. The 1967 Council statement also suggested that Johnson and Haydon should remain in the Free School Lane premises minus the top floor, with little-used equipment stored in the Oppenheimer Laboratory. Oppenheimer money no longer required to fund research posts could be used to improve sub-standard parts of the Free School Lane building. In a second report the Council of the Senate proposed that Roughton's Plummer chair should be continued in the subject of Biophysics.⁶²

These reports were debated⁶³ on 20th February 1968. The only comment concerning

the Plummer chair was by Roughton, who welcomed the prospect of a chair of Biophysics.

There was rather more discussion of the report on Colloid Science. Johnson pointed out that with only two senior staff (himself & Haydon) and fourteen researchers remaining, it was not surprising that laboratory space and equipment were under-used. There was a strong moral case for supporting Assistants in Research from the Oppenheimer fund, in the spirit of the terms of the original gift, rather than expenditure on buildings, and there was no case to be made for the removal of laboratory space (i.e. the top floor of the building). Johnson thought that a transfer to the Department of Chemistry, while remaining in the Free School Lane laboratories to resolve problems of space, would be a solution that removed further years of uncertainty.

Contributions by Davidson, Dr D.A. Blackadder (Chemical Engineering), and Linnett emphasized the importance of Colloid Science and urged that it should be encouraged, rather than left to decline. Haydon spoke along lines similar to those of Johnson. Roughton, though now retired, spoke at length (nearly two double-column pages in the Reporter) before he was asked by the chair to bring his remarks to a close.

Finally Pippard, a member of the General Board, spoke in favour of the Board's proposals. He acknowledged that they concerned an extremely delicate matter, in which he had played some part, and, so he believed, not a very popular part.

As a result of the Senate House discussion, and subsequent discussions, the General Board concluded that the proposals were the most satisfactory solutions likely to be found.⁶⁴ They were aware that the solutions were a compromise, but no higher measure of agreement was likely to be attained, and that the protracted discussions had already damaged the University and the field of study at issue. They left to the

new Committee of Management the task of determining the amount of space required, and the possibility of proposing new graduate posts if these were funded by the Oppenheimer fund alone, without any call upon University Education fund.

5. AFTERMATH

A new advisory committee for the Professorship of Biophysics was established⁶⁵ in February 1969: the only person common to both this committee and the previous one was Todd. Sir Alan Hodgkin⁶⁶ was elected Plummer Professor of Biophysics⁶⁷ in July 1969. He had previously held a Foulerton Research Professorship of the Royal Society and a Senior Research Fellowship of Trinity, and had won the Nobel Prize in 1963 for his work with Huxley⁶⁸ on cell membranes. His group of researchers “was a well-defined unit but it did not have a formal existence as a sub-department”.⁶⁶ So Roughton's chair did indeed become one of Biophysics, albeit several years after Roughton's retirement.

When Hodgkin became Plummer Professor, Haydon moved to a new sub-department of Biophysics¹⁹ in the Physiological Laboratory. Haydon's research interests, and his comments at the Senate House discussion, suggest that this was an entirely appropriate move.

Johnson⁵⁹ moved in 1970 to the Department of Biochemistry (headed by Professor F.G. Young⁶⁹) until his retirement in 1984, after which he was given an emeritus position at the Cavendish by Sir Sam Edwards,⁷⁰ together with space for his experimental equipment. Such moves are relatively easy for theoreticians, who need simply to transport their pencil and paper, books, and (nowadays) computers. For an experimentalist, such as Johnson, they present considerable difficulties and disruption, with re-assembly and recalibration of equipment.

Ottewill had already left for Bristol in 1963, before the Council issued their 1965 report that led to the Senate House discussion. There he created what became the leading UK group studying colloidal suspensions. Activities included the synthesis of model colloidal systems and their characterisation by light scattering, neutron scattering, electrophoresis and osmotic pressure measurements. Ottewill subsequently became head of Physical Chemistry, Chair of the School of Chemistry and Dean of Science.²⁰

In the Senate House discussion¹ Roughton stated that over 400 people had carried out research within the CUDCS, of which about half had gone into academic posts and the other half posts in industry & government. Leading research scientists in industry were particularly concerned about support for UK Colloid Science. An Industrial Physical Chemistry Committee was set up in 1969 by the Royal Society of Chemistry to explore how links between academic and industrial research could be encouraged by the Faraday Society.⁷¹ The driving force behind this committee was Dr B.A. Pethica, who in 1953–1958 had been a Senior Assistant in Research in the CUDCS before moving to Unilever Research. He became head of Unilever's Port Sunlight Laboratory in 1965,⁷² eventually leaving in 1976 to go to Clarkson College, New York. The members of the Committee, and particularly Pethica, persuaded the Chemistry Committee of the Science Research Council (which funded much of the UK academic research in the physical sciences) to set up a Colloid Science Panel in 1971. The panel had seven members from academia and two from industry, and had the object “To review the present status of the science of colloidal dispersions, both in academic institutions and in industry; to document the case for special support of this subject and to recommend methods of achieving its development”.⁷³ Pethica would certainly have appreciated industry's need for colloid scientists. He also had to ensure that his laboratory was as well staffed as Unilever's laboratory in Vlaardingen, Holland, which could draw upon the strong tradition of colloid science in the Netherlands.

Johnson points out:^{59,74} “Four out of the ten members of the panel were from the then suppressed Colloid Science department. The summary and conclusions represent a complete reversal of the actions taken in Cambridge and provides a useful pointer to the general scientific wisdom of specialised Nobel Prize winners.”

Colloid Science survived in C.U. by the work not only of Johnson and Haydon, but also that of several other groups. Batchelor had first made his name in turbulence, but by the 1960s it was becoming hard to see how to make further progress³⁸ and he concentrated on editing and writing his *Introduction to fluid dynamics*.⁷⁵ In this he discusses Einstein's result for the viscosity of a dilute suspension of spheres. Problems with Einstein's analysis led to Batchelor's first paper on the fluid dynamics of suspensions, and his group in the Department of Applied Mathematics and Theoretical Physics became active in this field.

Mott had arrived as Cavendish Professor in 1954, and Philip Bowden¹⁰ & David Tabor⁷⁶ changed the affiliation of their group studying friction between solid surfaces from the Chemistry Department to the Cavendish Laboratory in 1957. This enabled them to stay on the New Museums site when Chemistry moved to its new laboratories¹⁵ on Lensfield Road (built as one of the conditions required by Todd if he were to move to Cambridge). Although much of Bowden & Tabor's work would not normally be classified as mainstream Colloid Science, mention must be made of the surface force apparatus,^{77,78} which made direct measurement of the forces between mica surfaces. Subsequent developments by Israelachvili are documented in his monograph.⁷⁹

Edwards⁷⁰ arrived at the Cavendish Laboratory in 1972 (though he was given leave of absence almost immediately, 1973–1977, to become Chair of the Science Research Council). He had already been introduced to polymer dynamics by Geoffrey Gee,⁸⁰ head of Chemistry in Manchester University, and at Cambridge he went on to develop the Doi-Edwards theory of entangled polymers⁸¹ and establish a group

working on statistical mechanics and soft matter.⁸² An annual *Edwards Symposium* has been established to commemorate his work.

6. CONCLUDING REMARKS

Roughton put up a spirited and logically sound defence of his Department in the light of Todd's opinion that the CUDCS was in fact a second school of physical chemistry. Roughton saw problems looming as soon as Schulman resigned, and initiated a series of Annual Reports showing that the Department was very productive and emphasizing the Department's biological activities. Haydon & Ottewill's history of the Department¹⁶ also emphasized links to biology, which was surprising in a publication aimed at mainstream chemists working in industry in the 1960s.

Roughton had publicly advocated⁸³ as early as 1955 the creation of a special advisory committee for the CUDCS, containing “strong representation of relatively knowledgeable people from outside the university”, similar to that existing for the Department of Geodesy and Geophysics, but his repeated requests fell upon deaf ears. Such a committee might have been able to convey to the University the scientific and industrial importance of colloid science. The modern University is far from adverse to Advisory Boards, which now exist for the Hamilton Kerr Institute, the Judge Business School, the Museum of Zoology, and the Department of Land Economy, to name but a few.

Ottewill's departure to Bristol was detrimental to Colloid Science at Cambridge, but Cambridge's loss was Bristol's gain, and UK science would be in a sorry state if there were no top-class scientists outside Oxford & Cambridge. Ottewill's career clearly flourished at Bristol, as did Bristol as the UK centre of excellence for Colloid Chemistry during this period.

Cambridge learned from its mistakes with Colloid Science. In 1966 The Vice-Chancellor of the University received a letter from the UK Government's University

Grants Committee suggesting that Cambridge's undergraduate teaching of agriculture should be discontinued. Various consultations and reports led to the redistribution of staff, either to the Department of Land Economy or to a new Department of Applied Biology. This was accepted by the University without debate.⁸⁴ In 1987 the General Board recommended the suppression of the Department of Applied Biology, and included details of what was proposed for each of the ten tenured academic staff, the Director of the University Farm and a Technical Officer, though there was no similar announcement for lower grade assistant staff.⁸⁵ Although this led to a discussion in the Senate House, the suppression went ahead without a vote.

Cambridge University now has many more administrators, including Human Resource managers, than in the 1960s, and its actions today would presumably be more professional (though I am in no position to confirm this).

It is clear that modern Cambridge would not hesitate to rename a laboratory in order to signify a change in direction. The BP Institute for Multiphase Flow, established in 2000 after a £21.65 million donation by BP,⁸⁶ was a multidisciplinary institute bringing together mathematicians, geophysicists, engineers, chemical engineers, physicists and chemists. It was announced⁸⁷ in 2022 that the Institute had been renamed the “Institute for Energy and Environmental Flows”, to better reflect the scope of its research. One might wonder to what extent the timing of this announcement was linked to pressure from academics, and from students who occupied the institute and demanded an end to fossil fuel funding.^{88,89}

I finish by quoting from Johnson's memoirs concerning the response of Johnson, Haydon & Ottewill when in 1963 they were read parts of the General Board reports: “we (three) together sent a memorandum to the General Board criticising not only the conclusions reached but also the secretive methods used in reaching them. Though receipt of the document was acknowledged, no reply was ever received. Looking back now on the episode after 30 years, I can scarcely believe that a supposedly

democratic organisation could act in such an underhand and dictatorial manner.”⁵⁹

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APPENDIX: CAMBRIDGE GOVERNANCE

The governance of the University of Cambridge is based on a complex structure of committees which attempt to govern by consensus, rather than by decree. The Statutes and Ordinances of the University have evolved over time, with the last major revision in 2012–13. The brief (over-simplified) explanation below is based on the statutes⁴⁶ of 2024.

The **Council** is the principal over-seeing body of the University, with members elected from among the Heads of Colleges, Professors, other members of Regent House, and students. It is chaired by the Vice-Chancellor. In 1966 the equivalent body was the **Council of Senate**.

The **Regent House** consists of the academics, senior researchers and senior administrative staff of the University. They can vote for (or against) **graces** (i.e. proposals) initiated usually by the General Board, or the Council, or by members of Regent House itself.

The term **placet** (3rd person singular present indicative of the Latin verb *placere*, i.e. “it pleases”) indicates a vote of assent. **Non placet** indicates a dissenting vote.

The **Senate** consists of all holders of the Cambridge MA degree and current members of the Regent House.

The **Senate House** is a large hall, situated in the centre of Cambridge, where gatherings, such as Degree ceremonies and Discussions, can take place.

The **Faculties** are bodies of academic persons, grouped by subject and divided into one or more **Departments**.

Each Faculty has a **Faculty Board**, consisting of elected members of the Faculty.

The Faculties are grouped into **Schools** of broadly similar disciplines (e.g. The School of the Physical Sciences). Each School has its own Council.

The **General Board** is responsible for management of the University's academic and educational policy. It reports to the Council. Its members are appointed by the Council and the various Councils of the Schools.

Suppression is the technical term used in the Statutes and Ordinances for the closure of a Department, Faculty or even a post such as a professorship or lectureship.

The **Cambridge University Reporter** is the University's journal of official business. It appears weekly during term time, with special issues devoted to major reports (e.g. financial accounts).

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