The following is Aitken Couper's account of the development of the Honours Degree of B.Sc. in Biological Chemistry (1949-1963) at Bristol University.
As detailed in Raymond Holland's "No Rules, No Minutes", Dr Couper was BSC Secretary (initially as Junior then Senior Secretary) from 1959 to 1967 and then from 1969 to 1970.

UNIVERSITY OF BRISTOL

Honours Degree of B.Sc. in Biological Chemistry, 1949-1963

Applicants to the Faculty of Science in 1949 were offered the option of reading for a degree in Biological Chemistry. The requirement was that the students should study one of three biological subjects, and chemistry for their first two years, taking these two subjects in the Part 1 examinations. A special course of study and practical work in a newly-equipped laboratory was devised, equally divided between chemistry and biology for the final year. Dr. Whitehouse records that when he arrived to register for his degree course, Professor Wilson Baker noticed that he included biology with chemistry etc. for his Higher School Certificate, and said “we have just started a new course in Biological Chemistry; would that interest you?”. I said it would and that was that!

A lone student (Phillips) studied a pilot course in the year 1950-51, graduating in 1951. Sadly he died of polio while working at the Long Ashton Research Station soon afterwards.

In the summer of 1952 the first group of seven students graduated with honours in Biological Chemistry, one gaining a First, four with Upper Seconds and Two Lower Seconds. Altogether eighty seven completed this degree; several had very successful academic careers, including several Fellows of the Royal Society, one its Biological Secretary, and a research student of one of its staff who won a Nobel Prize. This was unsurprising because they were courageous to embark on a course which was the first venture in interdisciplinary studies in the Faculty of Science, and was correspondingly demanding.

From early times the relevance of organic chemistry to living organisms was recognized, and the similarity of enzyme activity to catalysis interested some physical chemists. The caption at the head of the Journal of the Faraday Society, founded at the beginning of the 20th century by F.G. Donnan and others, included the application of physical chemistry also to biology. The first step in promoting this interest was taken by Professor W.E. Garner, Head of Chemistry, by inviting Dr. D.D. Eley to come from the Colloid Laboratory of Sir Eric Rideal in Free School Lane, Cambridge, in 1945, to become Lecturer in Colloid Chemistry. In 1948 he became Nash Lecturer in Biophysical Chemistry and Reader in 1951. Rideal’s group comprised post-doctoral chemists with a wide range of interests in colloid and surface chemistry (now rejoicing in the name of “nanotechnology”), several of whom were applying the techniques of physical chemistry to the study of biological macromolecules.

In 1947 Dr. Eley gave the first of three post-graduate lectures (then a new concept) in Biochemical Kinetics to a large audience from many departments in the Science Faculty, including the Long Ashton Research Station.

The founding of a school of veterinary science in 1948, under Professor C. Grunsell, afforded the opportunity for Chemistry to make two new appointments in Organic (Dr. L. Hough) and in Physical (Dr. A. Couper), and an experienced biochemist from Cambridge (Dr. Stephan Bach) was appointed in the Veterinary School.

W.E. Garner and Professor J.E. Harris of Zoology, whose first degree was in physics before he turned to biology, enlisted the support of Professor W. Baker of Organic Chemistry, Professor M. Skene and Dr. E. Yemm of Botany, and Professor Brocklehurst and Dr. C. Ashford of Physiology in the Faculty of Medicine, to collaborate in the new adventure. Money was obtained from the University Grants Committee and the University to build a temporary laboratory in the "Inner Court", behind the Great Hall and below the O.T.C. miniature rifle range. This was designed to provide three rooms for experimental work in Physical and Organic Chemistry, and with the largest room being shared by the Biological departments. There were also a preparation room, a cold room and a room for large apparatus, in which we installed a Hilger-Tiselius micro-electrophoresis machine with schlieren optics. We acquired our first spectrophotometer, a Unicam *SP500* UV/visible. The biologists bought a Geiger counter for radio-tracer work.

Dr. Eley prepared a course of 24 lectures on physico-chemical aspects of biological systems, and Dr. Couper undertook the construction and setting-up of about ten experimental projects to illustrate kinetics and thermodynamics of biological processes, methods of structural investigation, and improvised methods to reproduce some of the most recent experimental discoveries. When Dr. Eley left Bristol to go to the Chair of Physical Chemistry in Nottingham in 1954, Couper continued the lectures in biophysical chemistry, and Dr. Yemm, who made the main contribution from Botany, was elected to the Chair in 1953.

Dr. J.K.N. Jones undertook most of the organic chemistry lectures, with special attention to his own field of carbohydrates, while Dr. Hough supervised their synthetic and analytical experiments, particularly for the development of the recently devised method of paper-chromatography, which Martin, Synge and Sanger had applied with spectacular success to the sequencing of amino acids in insulin and other proteins. When Dr. Jones left to go to the Chair of Chemistry at Kingston, Ontario, Drs. L. Hough and A.R. Battersby and Dr. A. Couper took on the whole responsibility of the chemistry department's contribution to its teaching. In the biological laboratory Dr. J. Kitching of Zoology set up work on sodium and potassium metabolism using radio-tracer methods, later assisted by Dr. P. Caldwell. Professor Yemm, Dr. Folkes, Dr. Willis and Dr. Frost illustrated photosynthesis, plant metabolism and genetics. Dr. Ashford supervised experiments on human physiology.

Two laboratory technicians, Mr. A. Sparkes and Mr. A. Brittain supported all this work most ably, and since experiments involved bovine haemoglobin and albumin, there were frequent visits to the city abattoir to collect several litres of bovine blood, from which the proteins were extracted and purified.

The first group of students attained their final year in 1951. Lectures in chemistry were given in the senior theatre of that department, and those of the three participating biological departments in theirs. The laboratory classes began with many experiments still in development, and both staff and students learnt from them as we went along: there was a real feeling of a joint adventure.

In due course Dr. Kitching became the first Professor of Zoology at the University of East Anglia, to be followed by Dr. Folkes in Botany. Professor Garner retired in 1954 and Wilson Baker became Head of Chemistry and it fell to Professor Harris to initiate plans for the future of the subject.

Throughout the twelve years of the course Dr. Stephan Bach undertook the arrangements for visiting lecturers to give research colloquia through his many contacts at Cambridge. There were many memorable occasions, such as when Dr. Sanger came to describe the sequencing of insulin by paper chromatography of di- and tri-peptides, and Dr. Perutz brought the first complete model of the haemoglobin molecule. During these years there were so many epoch-making discoveries which set new directions for biochemistry.

About one third of all the graduates in Biological Chemistry proceeded to research in one of the participating departments, many of them in chemistry, so that an active, if somewhat dispersed research school in the subject developed. However, many of these students found that employment in biochemistry was very hard to find, and made their careers in the more traditional chemical or biological fields. Many proceeded to careers in other universities. In the perspective of 2007 it is evident that the Bristol enterprise was far ahead of its time. Now the most widely publicised advances in science are being made in those fields we sought to propagate.

Prior to the establishment of this joint degree course, biochemistry had been taught under the heading of “chemical physiology” by Dr. Ashford in the physiology department of the Faculty of Medicine, most students being pre-clinical medics. By 1963, plans for a new and greatly enlarged Medical School were advancing. The University Grants Committee, funding this development, enquired into the setting-up of a biochemistry department in this school, and it became apparent that there could not be two such departments in the University. A committee was nominated by the participating departments, to be convened by Dr. A. Couper, to make proposals to meet this requirement. After two or three meetings, he had to report that there was much reluctance to accept the closure of the joint degree course, and no agreement about policy was emerging. Professor Harris asked Couper to try again, allowing a week or two to elapse. What gentle persuasion intervened was never disclosed, but clearly Harris, Wilson Baker and probably the Vice-Chancellor had made it clear that plans for the future could not include a department of medical biochemistry and a school of biological chemistry separately. The committee proceeded to draw up plans to create a new department to serve both the science and medical faculties, and to discontinue the School of Biological Chemistry.

In 1964 the Department of Chemistry was vacating the buildings of 1910 on the west side of Woodland Road, to a new building which would be completed in 1966. So a scheme for each of the first three years of the new Biochemistry Department to re-

equip the vacated laboratories and lecture theatres was drawn up. At the same time the requirement to appoint new members of staff in each of these years was determined. Dr. Ashford retired at about this time and several staff members were given the option of joining the new department or remaining in their parent department; all chose the latter.

These plans were successfully executed and the new department was headed by Professor Randles, with a laboratory of molecular enzymology under Dr. (later Professor) Gutfreund, in the Inner Court Building.

Following the building of new and much larger laboratories for Chemistry and the Medical School, and the extension of the H.H. Wills Physics Department, together with the expansion of biological sciences into the old chemistry and physiology buildings, several interdisciplinary courses were developed, leading to joint degrees. These were often very demanding, but were pursued enthusiastically by both students and staff. These courses paved the way for progressive development of degree courses based upon modular components, which prevail in most universities into the twenty-first century.

Acknowledgements

The author has consulted several staff, now retired, and graduates of the school of biological chemistry, some of whom are also now retired. All have made valuable suggestions and some corrections, especially Professors Eley, Hough, Pickering and Cocking, Drs. Whitehouse, Cardew and Spragg and Mrs. Priest (nee Sully). His thanks are due to all of them.

Aitken Couper
Physical Chemistry, 1950-1985.