

Extracts from College Annual Report 1972 - 1973

DEPARTMENT REVIEW

We were sorry to lose Dr. K. J. Barnes in July 1972 on his appointment to the Chair of Theoretical Physics at the University of Southampton. In the three years he spent in the department he had made a notable contribution to almost all important aspects of our work.

Around the same time, several research associates left the department to take up posts elsewhere: Dr. J. R. Dean, Dr. A. Q. Sarkar, Dr. G. Tindle, Dr. D. T. Williams, Dr. K. C. Gupta, Dr. D. Siapkas, Dr. J. Subba-Rao and Dr. C. Hojvat in Spring 1973. And the beginning of the new session brought others in their stead, Dr. W. Tait as a Temporary Lecturer and, as Research Associates, Dr. and Mrs. Koski from Finland, Dr. B. Carli from Italy, Dr. L. Bessler from U.S.A., Dr. K. Mizuno from Japan, Dr. J. Rae, Dr. M. Coupland and Dr. R.C. Brown. Three of our own research students, Mr. I. Robson, Mr. P. A. R. Ade and Mr. P. T. Davies, were also appointed to Research Associateships.

Professor Bastin spent the period February-August 1973 on leave at the Lunar Science Institute, NASA, Houston. While there he developed a new hypothesis for the formation of the maria and a method for measuring the temperature at formation of the lunar globules. Dr. Batchelder completed his leave in the U.S.A. as Visiting Associate Professor at the University of Delaware for July and August.

We welcomed Dr. V. N. Murzin from Moscow for six weeks in October/November to collaborate with Dr. Burfoot's ferroelectrics group. As is frequently the case with visitors from countries to the East, he left presents with us from his home country, including a very fine Shostakovitch record and a Russian translation of a book edited by Professor Martin. Incidentally, Dr. Burfoot has assisted T. Mitzui, I. Tatsuzaki and E. Nakamura in the preparation of an English version of their book, "Introduction to the Physics of Ferro electrics," from the Russian.

During the session astrophysical research took Dr. Clegg and Dr. Ade to the Kitt Peak Observatory, Arizona, where, in collaboration with Dr. Rather of the resident staff, they made first observations of a number of new and interesting sources at millimetre and sub-millimetre wavelengths. Dr. Clegg, Dr. Robson, Mr. Vickers and Mr. Huizinga spent six weeks during April and May at the Scientific Balloon Facility in Palestine, Texas, on a major experiment to measure the submillimetre spectrum of the Cosmic Background Radiation from a high-flying balloon platform. They had the misfortune to see the flight fail because of balloon collapse; the equipment suffered minor damage, however, and another flight may not be long delayed. Dr. Beckman has continued his researches on the nature of the lower solar chromosphere, in particular (in an experiment that was discussed on television and in the national press) from Concorde, from which the July eclipse remained total for a crowded 20 minutes. The infra-red telescope on Tenerife was also visited in February by Professor Martin, Dr. Carli, Mr. Puplett,

Mr. Marston and Mr. Pugh. At a public discussion on the results of the Apollo programme at the Institute of Physics Exhibition, Mr. Pugh gave a review of the department's work on moon rock.

The development of techniques for the submillimetre spectrum has been a special interest of the department for a considerable time and this received recognition during the year in the form of a substantial grant from the Royal Society's Paul Instrument Fund, to Professor Martin, for a continuation of the development of submillimetre and far infra-red interferometers for laboratory and astronomical spectrometry.

The high energy and nuclear group completed the experimental part of their first proton-antiproton experiment at CERN, Geneva, in July 1972, and moved on to the analysis of the data, carried out in Britain and now nearing completion. Preliminary results were presented to conferences in Southampton (September 1972) and Liverpool (March 1973) and in seminars by Dr. Kalmus at University College and Imperial College. A more sophisticated continuation of the experiment using antiprotons incident on a polarised proton target, started taking data at CERN in Spring 1973, requiring members of the particle physics group to pay extended visits to Geneva. The computing for this work is mainly carried out on the IBM 360/195 at the Rutherford Laboratory using the terminal in the department to which reference is made below. Approval has now been received from SRC for experiments on neutron scattering to be carried out at the TRIUMF high intensity meson source in Vancouver, and Professor Bugg and Dr. Edgington are now working on the preparation of these experiments. Dr. Edgington continues his experiments on neutron scattering at AERE, Harwell, and gave invited talks on these, at conferences in Los Angeles (August 1972) and Geneva (April 1973).

In polymer research the year saw the department's first preparations of mono-crystalline chain-extended polydiacetylenes that exhibit remarkable optical properties (looking like metallic gold with light in one plane of polarisation and jet for the other); these preparations were carried out by Mr. Ando in the chemical preparation laboratory set up in the Physics Department by Dr. Bloor under the SRC grant that established a Major Centre for Polymer Studies at the College. Dr. Burfoot spent some time in Russia in September and October 1972, visiting institutions in Moscow and Leningrad and giving invited talks on his ferroelectrics studies. Dr. Sandor attended the 9th International Congress of Crystallography in Kyoto, Japan, 27 August-7 September 1972, when he presented two papers on his studies of molecular dynamics in solids and acted as Chairman of the session on "Frontier Topics". He also took the opportunity to visit universities and research laboratories in Japan and, as he often does after a visit abroad, entertained us later with another Frontier Topics session, that is to say a lunch-time talk, illustrated with slides, about his visits.

Dr. Charap attended Symposia in Trieste (September 1972) and in Coral Gables, Miami (January 1973). He went on to give seminars at CERN, MIT and Rockefeller University. In August 1972 he broadcast on BBC Radio 3 on the occasion of the 70th birthday of Professor P. A. M. Dirac, and acted as scientific adviser to Tattooist International in the making of their film "Shadows of Bliss" for BBC TV "Horizon" and CERN. This film generated a great deal of subsequent argument, in the press and journals and at the Institute of Physics Exhibition, about how well the film managed to convey to a lay audience what it is that excites particle-physicists.

Dr. Newman spent the months of July and August in the Physics Institute of Karlsruhe University at the invitation of Prof. Dr. H. G. Kahle, where he gave a series of lectures on the relation between localised and delocalised states in solids and collaborated in research with several members of the Institute. Dr. Sewell gave a course in mathematical physics at the University of Salerno, Italy.

July 1972 saw the first graduation of students from our two-year part-time M.Sc. course in Astrophysics. 22 were awarded the degree of M.Sc., some of the original 45 registrants fell out on the way—it is not an easy matter to maintain serious study for a higher degree while in full-time employment (most registrants are teachers). Several, however, are continuing in the similar course commenced in October 1972, with a registration of 34.

In November 1972, an outstanding course of two Special University Lectures was given in the department by Dr. D. W. Sciama. The lectures, held on 17 and 24 November under the title “Black Holes and the Future of Astronomy”, attracted an audience of more than 400 on each occasion. Among these must have been many people from outside the University. The Chair at the first lecture was taken by Professor Bastin, and a small dinner was held in the College in honour of Dr. Sciama following the second lecture.

For several years we have organised a postgraduate lecture course in particle physics, jointly with Westfield and University Colleges. For the first time we concentrated much of this into the first term, on a full-time basis. This eased the problem caused by students having to spend time away from London when they became involved in experimental work at the various accelerators. A new postgraduate lecture course in solid-state physics was inaugurated in October by the department. This takes up Monday morning each week and takes place at QMC in the first term, King’s College in the second and at Birkbeck College in the third.

We had been aware of a growing interest in the undergraduate astrophysics courses offered by the department and the first intake of undergraduates under our new UCCA code Astrophysics joined the department in October 1972. They numbered 16 and it became clear during the year that they would be unlikely to desert their special interest even though they are at liberty to do so under the course-unit structure.

Three “May Evenings” were held to give sixth-formers an insight into the research and teaching of the department, and were well attended. Each evening had its own theme, being Cryogenics, Elementary Particles and Astrophysics respectively.

In the autumn a 12in. diameter optical telescope was mounted at 7th floor level in the department (F/5 Cassegrain, equatorial mounting, by Astronomical Equipment Ltd., Luton). This telescope is currently being used mainly for teaching at undergraduate level. It has a rotating dome and is equipped with finder telescopes and a sidereal drive, and is of very considerable use in giving insight into the techniques of visual astronomy at, of course, a very convenient location.

Access to the IBM 360/195 computer at the Rutherford Laboratory is now much more

convenient since the provision in Spring 1973 of a Remote Workstation in the Physics Department here. This consists of a small computer and peripherals linked to the Rutherford Laboratory by private telephone line.

We have now taken over from the Department of Chemistry the responsibility for supplying the College with liquid nitrogen. During the first full year of operation we have supplied some 100,000 litres to the College and of this total about 80% was produced by our own plant at negligible cost.

The installation of a new Philips helium cryogenerator at the beginning of the year was somewhat of a disaster; like its five sister machines installed in other universities in this country it has consistently refused to live up to specification and, after producing only a few hundred litres, has been finally rejected. Messrs. Philips have promised us a new machine of different design and have been paying for the greater proportion of our bought helium costs, but although the College has not lost financially it has been a very frustrating period.

In the course of the year the grade re-structuring of Technician Staff took place, following agreement between the Universities' Committee for Non-teaching Staffs and the ASTMS and AUEW, after long negotiations. This might therefore be an appropriate time to note the important changes over the past 15 years or so in the role played by Technician staff in research. Much of what used to be done by research students—construction, assembly and operation of complex instrumentation—is now done in large part by technician staff. Even the process of design of instrumentation is shared. This leaves postgraduate students with the problems of designing experiments and the interpreting of data. Current constraints on the numbers of research students in physics will ensure that the academic staff, at the apex of the pyramid, do not disappear through the clouds.

During the past year a wide variety of exhibitions have been presented in Gallery 273, some of which have proved most successful, together with a demonstration by one of the exhibiting artists. It has been most rewarding to see the interest shown after attempts to make the College community more aware of the Gallery.

DEGREES AWARDED

Ph.D.

GROUT, Peter J.	October, 1972
LEE CHI KWONG, Louis C. Y.	October, 1972
DAVIES, Peter T.	November, 1972
HOWARD, Victor J.	November, 1972
ABDULLAH, Faruq	December, 1972
GEORGE, Richard A.	December, 1972
MOYA, Rafael P.	May, 1973

CLARK, Christopher D. June, 1973
MARTIRENA, Horacio T. June, 1973
ROBSON, Edward I. June, 1973
CLARKE, Roy August, 1973
CLAYTON, Frank August, 1973
THOMSON, Robin M. August, 1973
JHA, Dhirendra Kumar August, 1973