History of the Department of Physics at UWA

Issue No. 13: "The Opening of the New (Current) Physics Building"

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Introduction.

As described elsewhere (see Issue 12), at the beginning of 1962 the Physics Department moved into a completely new, purpose-built, building which is the one it still occupies today (2009). In conjunction with the Laboratory Manager, Mr. D.W. Everson, this building had been designed, and the construction overseen, by Professor C.J. Birkett Clews whilst he was Professor of Physics and Head of Department (1952 – 1961). Thus it is perhaps ironic that by the time the official Opening Ceremony took place in early 1962, Professor Clews had already taken up his new appointment as the University's first Deputy Vice-Chancellor and Mr. J. Shearer was the Acting Head of the Department.

The Opening.

The new Physics Building was formally opened by Sir John Cockcroft on Tuesday, 17th April, 1962, although use of the building had begun at the start of the academic year. Cockcroft was a very high profile English physicist and the fact that he could be persuaded to perform this ceremony was due to two factors. Firstly, he was a personal friend as well as a former professional colleague of Clews. Secondly, he was already traveling to Australia at this time for another reason, namely that he had been invited to become the Chancellor of the Australian National University (ANU) and was to be installed into that role during the week before the Opening. It is interesting to note that at that time it must have been considered more important to have an eminent English scientist as Chancellor of the ANU than to have someone who was permanently resident in Australia. Be that as it may, this made it possible for Clews to invite his friend to visit our University on his way back to the UK.

Sir John Cockcroft O.M., K.C.B., C.B.E., F.R.S., F.A.S.A., Hon. LL.D. was, as mentioned above, a man of extremely high scientific profile and therefore it was very prestigious for the University, through Clews, to have him perform this opening ceremony. Even an abbreviated list of Cockcroft's qualifications, appointments, honours, medals and awards takes more than a page to list so I will include here only a brief statement to show his main interests prior to 1962.

> Sir John Cockcroft had a distinguished career in Cambridge, particularly as a Nuclear Physicist, leading eventually to his appointment as Jacksonian Professor of Natural Philosophy. During the Second World War he controlled the military radar establishment, until his special qualifications in Nuclear Physics led to his transfer to Canada to direct the Atomic Energy work being carried out there. He was appointed to the Directorship of the Atomic Energy Research Establishment at Harwell when it was set up in 1946, and was associated with it until his election as Master of the newly-created Churchill College in Cambridge. He has been one of the principal forces in the development of the nuclear power programme in the United Kingdom. His outstanding contribution to fundamental physics has been recognized by the award of the Nobel Prize.

A file of correspondence in the University's Archives (File No. 2070) gives an interesting insight into the planning and preparation for the Opening. Some interesting features are as follows.

After it was established that Cockcroft would perform the opening, the University moved to offer him an Honorary Degree of Doctor of Science, which he accepted. In association with this, Cockcroft was asked to supply various measurements, including size of head, so that Doctoral robes, cap and gown, could be prepared for him. It was also arranged that the Honorary Degree would be conferred at a ceremony on the Monday evening so that he could wear these robes at the Opening ceremony on Tuesday. After receiving the degree he presented an address, at the University's suggestion, on "The Development of Nuclear Power". Also a formal dinner (dress formal – dinner jacket) was arranged for Sir John and Lady Cockcroft on the Tuesday evening, with 25 people in attendance. I am appending (see Attachment 1 below) the menu and associated notes for that dinner as it gives an interesting insight into customs at that time including the choice of wine and a request for the availability of "cigarettes and cigars at the appropriate time".

Cockcroft, Court, Clews and Bayliss

(See text for titles, etc.)

Williams, Shearer, Stanley, Walker, Reid, Cockcroft, Court, Clews and Bayliss.

The Opening ceremony took place in what is now known as the Lower (or Ross) Lecture Theatre with the official party, as shown in the pictures included here (UWA Archives 2378P and 2380P), sitting behind the uniquely designed (see Issue 15) lecture bench. This official party consisted of Sir John Cockcroft; Professor C.J.B. Clews, Deputy Vice-Chancellor; Sir Alex Reid, Chancellor; The Hon. C.W.M. Court, representing the Government; Professor K.F. Walker, Chairman of the Professorial Board; Professor N.F. Stanley, Dean of the Faculty of Science; Professor N.S. Bayliss, representing the Australian Universities Commission; Mr. J. Shearer, Acting Head of the Department of Physics; and Mr. A.J. Williams, Registrar.

A booklet distributed at this ceremony contained the Programme for the Opening, a list of the academic staff of the Department and a brief statement describing the new building. A copy of this brief statement also is included herewith (Attachment 2).

The Programme shows that Cockcroft, after being introduced by the Chancellor, presented another address before formally opening the building. The full text of this address is included here (Attachment 3) and it makes interesting reading as it records the thoughts in 1962 of an eminent scientist looking at the developments in physics that had occurred since he began his own research 40 years before that.

About 200 people attended the Opening including representatives from the Senate, the Professorial Board (which included all Professors holding Chairs within the University), the Physics Department, the Institute of Physics, Members of Parliament, the Public Works and other Government Departments, selected industrial companies and other persons within or recently retired from the University. The names of all those invited are recorded in the archival file.

The fact that every member of the Physics Department was on this invitation list presents us with a rather unique record, as this is one of the very few occasions where we have a full list of names of every member of staff, i.e. academics, technicians and general staff. I am attaching hereto a copy of this list (Attachment 4), as I believe that many of these names from 1962 will stir the memories of various readers.

As a final act in this Opening ceremony, Cockcroft was asked to move to the south wall of the theatre supposedly just to unveil a brass plate that recorded his role in the opening of the building. However, as will be described in a future Issue, the walls of this lecture theatre contain eight plaques commemorating the names and major works of prominent physicists, including Cockcroft himself, and it was under Cockcroft's own plaque that the brass plate had been mounted. Thus in the unveiling, Cockcroft, unknowingly, revealed both the plate and the plaque containing his own image (see picture, UWA Archives Photo 3315P).

There is no copy of Clew's formal response after Cockcroft's address but one can imagine that he must have felt profound satisfaction that, as he took up his new position as the University's first Deputy Vice-Chancellor, following 10 years as Professor and Head of Physics, he was leaving the Department with what was at that time a truly magnificent new building in which it could forge the next phase of its development.

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For Attachment 1, see next page.

Attachment 1.
[This letter was sent by the Registrar to the Manageress of the Hotel Esplanade.]

The University of Western Australia

12th April, 1962.

The Manageress,
Hotel Esplanade,
Esplanade,
PERTH.

Dear Madam,

Dinner for Sir John and Lady Cockcroft
17th April, 1962.

Below are details of the menu for the dinner being given in honour of Sir John and Lady Cockcroft, in the private dining room of the Hotel Esplanade on Tuesday 17th April at 6.30p.m. for 7p.m.

Seafood Cocktails Oysters in Shells	-	Sherry
Consomme a la Royal		
Dhufish Bercy	-	Moselle
Roast Turkey and Ham	-	Claret Sparkling Burgundy Sparkling White Wine
Bombe Vesuvius	-	Port

Fruit Cup Coffee Liqueurs

With regard to the drinks, we would like a Mildara Supreme Sherry, Burings Leonay Moselle, Cawarra Claret and Galway Pipe Port. Against the main course I have indicated Claret, Sparkling Burgundy and a suitable Sparkling white wine. We leave the choice of the Burgundy and the white wine to you and guests will be given a choice of Claret, Sparkling Burgundy and Sparkling white wine, as there will be ladies present and many of them prefer a sparkling white wine.

We should like Seafood Cocktail and Oysters in Shells as alternative dishes for the first course as a number of people do not like oysters. We shall require the usual drinks between 6.30p.m. and 7p.m. and also cigarettes and cigars at the appropriate time.

A total of twentyfive people will attend the dinner.

Yours faithfully,
A.J. Williams
Registrar

For Attachment 2, see next page.

Attachment 2.

[This description was included in the Official Programme distributed at the Opening of the New Physics Building in 1962.]

DEPARTMENT OF PHYSICS

When the University was established in the city in 1913 Mathematics and Physics were combined in one Department under Professor A. D. Ross and housed in a wooden building on the St. George's Terrace frontage of the University site. The site was bounded on the North, East and South by Hay Street, Irwin Street and the Terrace.

In 1929 the joint Department was subdivided into the two Departments of Mathematics and of Physics. Professor Ross was appointed to the Chair of Physics.

In 1933 the wooden building that housed the Physics Department on the Irwin Street site was transferred to Crawley. Then in 1935 the first stage of the permanent building currently being vacated was opened. The old wooden building was retained as a first year laboratory. After the war, first and second year laboratories were added to the permanent building and the old wooden structure was completely vacated. It was subsequently taken over and is still occupied by the Department of Botany. The present west frontage is the old St. George's Terrace frontage.

The new Physics Department is the first stage of a building estimated ultimately to house the maximum number of Physics students expected on the Crawley site. Its present floor space of 80,000 square feet is about two and a half times that of the building being vacated.

The three-floor block of the new building is in the main the undergraduate section including lecture theatres. The six-floor block houses staff, Honours and postgraduate students, research projects and library. The workshop is located in the basement.

Many decorative features are of interest. In the lecture theatres are wall-panels depicting something of the life and work of famous physicists. On the walls of the atrium are two features depicting recent world-famous events:- the automatic interplanetary station, launched by Lunik III in 1959, which went round the moon, took photographs of the far side and televised them back to earth; and secondly a beautiful photographic emulsion technique developed in the late 1940's by C. F. Powell for the study of nuclear interactions produced by incident particles of high energy. In this example, obtained in 1953, the main "star" A is a nuclear disintegration produced by an incident cosmic ray particle. The small "star" B is the decay of a relatively large nuclear fragment (hyperon) ejected by the disintegrating nucleus.

The building was designed by the principal Architect, Department of Public Works, and the contractors were A. T. Brine & Sons Pty. Ltd. The total cost of the building is £639,000.

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For Attachment 3, see next page.

Attachment 3.

[This address was given by **Sir John Cockcroft** at the official Opening of the **New Physics Building** for the Department of Physics at The University of Western Australia on **Tuesday, 17th April, 1962**.]

UNIVERSITY OF WESTERN AUSTRALIA

OPENING OF NEW PHYSICS BUILDING

Address presented by

Sir John Cockcroft

I am very pleased by your invitation to open your new Physics building and very glad to have the opportunity to visit, for the first time, Western Australia and to meet again Professor Clews who was a colleague in the war years.

The opening of a new Physics Building is always an occasion for celebration, because physics continues to be one of the liveliest of sciences, one on the principal creators of new knowledge, responsible more than any other science for the stretching of the imagination both in its exploration of the atomic and nuclear underworld and in stretching out to the limits of the universe. At the same time, its interests and influences reach ever more profoundly into the biological sciences providing them with new tools and turning its century old habit of model making from the atomic nucleus to the cell nucleus with equally profound results.

I have been fortunate in being an active worker in Physics and Applied Physics during a period of about 40 years, coming into this as a young research worker soon after Rutherford had carried out 'in odd half hours' during the 1914/18 war years his classical experiments on the transmutation of atomic nuclei.

Physics, at that time, was carried out with primitive tools – it has been irreverently described as the 'Old Stone Age' of Physics. We had primitive vacuum pumps worked by hand, ammeters which went back 50 years in time, home-made Wilson Cloud Chambers to register the tracks of flying particles, gold leaf electroscopes or scintillation screens to measure radiation. All of this was soon to change and in eight years we advanced into the New Stone Age of nuclear physics, an age where the scale and cost of our apparatus increased from £10 to £1,000; electronics were introduced to enable us to count atomic particles at 1,000 times our previous rate, and we found that these new tools paid off in a major way, enormously extending our powers of transmuting matter and of observing what was going on leading inevitably and inexorably, though we didn't know it, to the release of nuclear energy in Fermi's Atomic Pile ten years later, to the 300,000 kilowatt nuclear power stations of Britain and unfortunately also to the Atomic and Hydrogen bombs. It is not for the first time that the unveiling of the secrets of nature has brought both great potential benefits and the possibility of catastrophe.

These discoveries of nuclear physics have profoundly affected our ideas of the physical world. Our concept of the atomic nucleus in the 1930's was a simple conglomeration of minute billiard ball like objects, red for protons, white for neutrons, held ever so closely

together by some force whose nature was hidden from our sight. Today equipped with our million fold more powerful and costly tools, we think of the atomic nucleus as rotating and vibrating with clouds of mesons surrounding the individual particles like a planetary atmosphere, jumping from one to the other to help to keep them in contact, whilst we can with our new eyes see the creation, in close impact, of the strange new family of particles, the nuclear underworld, which live for a millionth of a millionth of a second or less and quickly change like chameleons into another member of the family or into a meson and then into a familiar electron or gamma ray, all of these events sending out signals to the observing, though mainly uncomprehending, physicist. It is certain, however, that these events are closely related to the immensely important nuclear energy which alternately excites and terrifies the world.

These revelations have also enabled us to understand how the stars get their energy, first of all by the fusion of hydrogen to form helium and then by the fusion of helium to form heavier nuclei, and how the super nuclear explosions of the Novae occur, creating in the process heavier elements. We can also see from the relative abundance of the heavy elements that the time scale of our galaxy is much longer than Kelvin's estimate of a few 100 million years for the earth, Rutherford's estimate of 3 to 4 billion years and the 20 billion years or so which is favoured today. This provides plenty of time for the evolution of the universe and plenty of time for light signals to reach us from distant receding galaxies which started out 5 billion years ago.

We have also seen similar striking progress in other perhaps less glamorous fields of physics. Our picture of solids has come alive with the development of ever more powerful and discerning artificial eyes – the electron microscopes and allied tools, so that we can now obtain pictures showing the individual atoms in an array and study the disturbances produced by impacting bodies: we can see imperfections in crystal planes and understand how this is related to important properties such as plasticity or fracture, and this helps us to understand how metals fail and give rise to catastrophes of aeroplanes or ships or pressure vessels, leading to losses of life and often great financial losses. We are also seeing the development of new metals, new polymers – fibres, plastics, greatly extending the range of design possibilities. We have also seen, within a decade, the development and application of the semi-conductors, germanium and silicon to enable transistors to be born and found a new £100 million a year industry. And from this has sprung a new race of much more powerful computers which are now a tremendous help to science and which are beginning to permeate industry, whether on a small scale to control machine and factory operation or on a large scale to control inventories and keep a continuous watch on costs or to make up pay rolls, or even to help the operations of a Stock Exchange or to study how the national economy really works. No doubt, as computer memories increase so that they can store the whole of the Oxford English Dictionary or the corresponding Russian one, they will be able to improve their present pidgin-English translation from the Russian and no doubt they may also solve for us the present problem of storing and extracting the tremendous quantity of scientific information which pours out from the laboratories of the world.

Computers and the application of physics are also fast changing biology. Professor Clews worked at one time with Sir Lawrence Bragg in the Cavendish Laboratory. Bragg's interest turned in the late 30's to the study of biologically important molecules and a sub-department under Dr. Perutz was founded. When Sir Lawrence moved to London, the sub-department continued in some temporary huts in the courtyard of the Cavendish and greatly flourished. The X-ray tools for the study of molecular structure became much more discerning and the

interpretation of the X-ray data was greatly helped and indeed made possible by the Cambridge University home-made computer, so that it was possible to unravel the complex tortuous structure of important molecules like myoglobulin and haemoglobulin which determine the functions of the blood. It has also been possible to discover how changes of a single sub-unit in these large molecules can cause a serious disease like anaemia.

More remarkable still, the X-ray data of Wilkins led Crick and Watson to evolve, in 1953, the remarkable model of the D.N.A. molecule – the long double stranded helix, containing many million atoms which is the stuff of the chromosomes which determine our hereditary characteristics. The sequence of four sub-groups in the D.N.A. molecules spells out in a four letter alphabet of millions of words all our characteristics and provides the instruction to the cell for fabricating the all-important protein molecules which control our bodily processes. The cracking of the genetic code, or the near cracking, has been truly remarkable and its consequences for biology will be profound and may some day enable us to control hereditary characteristics or to mitigate the serious consequences to a human being of errors in the coding process.

You will see from this that physics is far from a dull subject today. To be effective it requires adequate nourishment, for the majority of its tools can no longer be homemade and must be bought. It is not unusual today for a first class University Physics Department to cost over £3,000 English per research worker when salaries are included, since equipment and supplies alone cost over £1,000 per annum.

It is important, too, that there should be a good supporting number of technicians, a semi professional, highly skilled technician to help each staff member to enable him to pursue his research as well as teaching duties, and also a number of general service technicians such as electronics technicians, glass blowers, as well as mechanics. These conditions are necessary if research is to flourish and I hope that this fine new building will be well provided with such essential aids.

I feel sure that the development of physics will be of great importance to Western Australia, and congratulate the State and City on their wisdom in making this possible. I also congratulate the Architect and Professor Clews, the client, in jointly designing such a fine building.

I declare the building formally opened and inaugurated.

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For Attachment 4, see next page.

Attachment 4.

[This list of names was included under the heading of Physics Staff in the Invitation List for people invited to attend the Opening Ceremony of the New Physics Building in 1962.]

As such it probably constitutes a
Listing of the entire Physics Staff,
academic, technical and general, in 1962

Mr. & Mrs. J. Shearer
Dr. & Mrs. S. E. Williams
Dr. & Mrs. P. M. Jeffery
Dr. & Mrs. J. B. Swan
Dr. & Mrs. L. N. D. Lucas
Dr. & Mrs. R. A. Anderson
Miss Elsie York
Dr. & Mrs. E. N. Maslen
Dr. & Mrs. H. H. Thies
Dr. & Mrs. W. C. Macklin
Dr. & Mrs. P. D. Jarman
Miss D. M. Arndt
Mr. & Mrs. C. H. Barnes
Mr. & Mrs. D. W. Everson
Mrs. S. Bridger
Miss E. D. Beckett
Miss R. Powell
Mr. T. C. Berg
Mr. A. T. Burtenshaw
Mr. & Mrs. J. R. Budge
Mr. J. B. Eygenraam
Mr. & Mrs. F. P. Fruet
Mr. & Mrs. R. H. Jones
Mr. & Mrs. J. E. Marsh
Mr. & Mrs. J. Schreurs
Mr. & Mrs. A. J. Woods
Mr. & Mrs. W. R. Wright
Mr. & Mrs. J. W. Stephens
Mr. & Mrs. W. J. Meyer
Mr. & Mrs. W. Hauptli
Mr. J. McLennan
Mr. & Mrs. S. R. Smith
Mr. & Mrs. J. S. Stasiw
Mr. J. Woodward
Mr. G. S. Bowden
Mr. & Mrs. R. A. Platt

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