The First Fifty years of the Physics Department at Lancaster University

By

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Edited by T. Sloan.

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Introduction

On 13th September 2014 the Physics Department at Lancaster University celebrated its 50th anniversary. The celebration consisted of a gathering of over 120 former students and staff and current staff members. At the meeting, held in the Faraday Lecture Theatre at the University, four talks were presented mapping the history of the department since its foundation in September 1964. The foregoing is a summary of these four talks.

Physics | LANCASTER UNIVERSITY

50 Years of Physics at Lancaster

Saturday 13th September 2014

Faraday Lecture Theatre, Faraday Building

Programme

11:30	Welcome
11:35	The Early Days (Speaker: Prof. W.M. Fairbairn)
12:00	The Consolidation Years (Speaker: Prof. G.R. Pickett)
12:30	Lunch (Rooms C1 and C36, Physics Building)
13:30	The turbulent years (Profs. P.M. Lee, A.M. Guenault, P.V.E. McClintock)
14:00	The 5* years and the future (Prof. P.N. Ratoff)
14:30	Physics Laboratories open for viewing

Figure I.1 Programme of events at the celebration to mark 50 years of Physics at Lancaster

In the early 1960s several "new" universities were created in the face of the growing number of students wishing to take up tertiary education. Up to that time this role in England had been filled by the ancient Universities of Oxford, Cambridge and Durham and the "red brick" universities created in the 19th century. Lancaster was one of these "new" universities.

In the early days of the University it was decided to set up a physics department. Physics was in the ascendancy at that time driven by advances in technology coming from the scientific establishment during and after the second world war. The department was then set up in this era of strong positive growth for the subject. This growth up to the present day is documented here.

Chapter 1 The first talk on "The Early Days (1964-2000)"

This talk was assembled by Walter Fairbairn, Peter Lee, Hubert Montagu-Pollock and Ian Saunders and delivered by Professor Fairbairn.

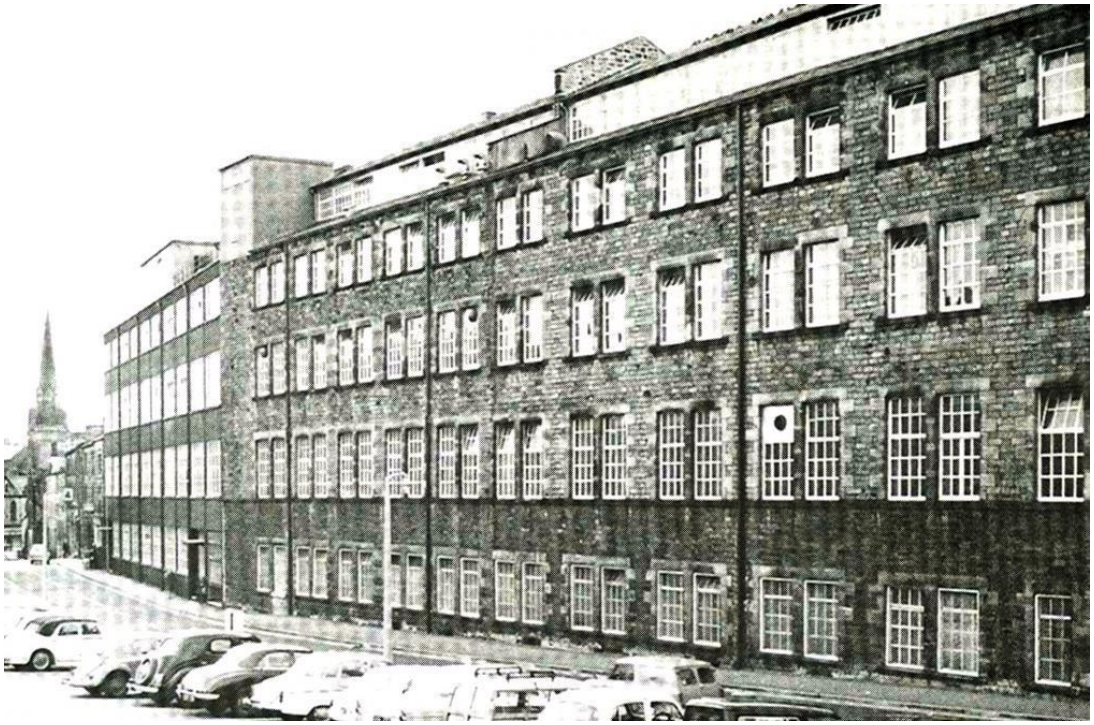
In December 1963 the University of Lancaster announced that a Dr E R Dobbs from Cambridge would be the first Head of the Department of Physics. This individual became known to us all as Professor Dobbs (formally) or Roland (socially).

Roland Dobbs lives now in Sussex but sadly cannot be with us today (13 Sept 2014 at the 50th Anniversary celebration) because of ill-health. He sends greetings and good wishes to all his former colleagues and friends, and very best wishes for the future to the Department.

Roland Dobbs in 1964 had a vision - to establish here on the green fields of Bailrigg one of the best, or indeed the best, Department of Physics in the country. Today's presentations form a report on the progress of this project.

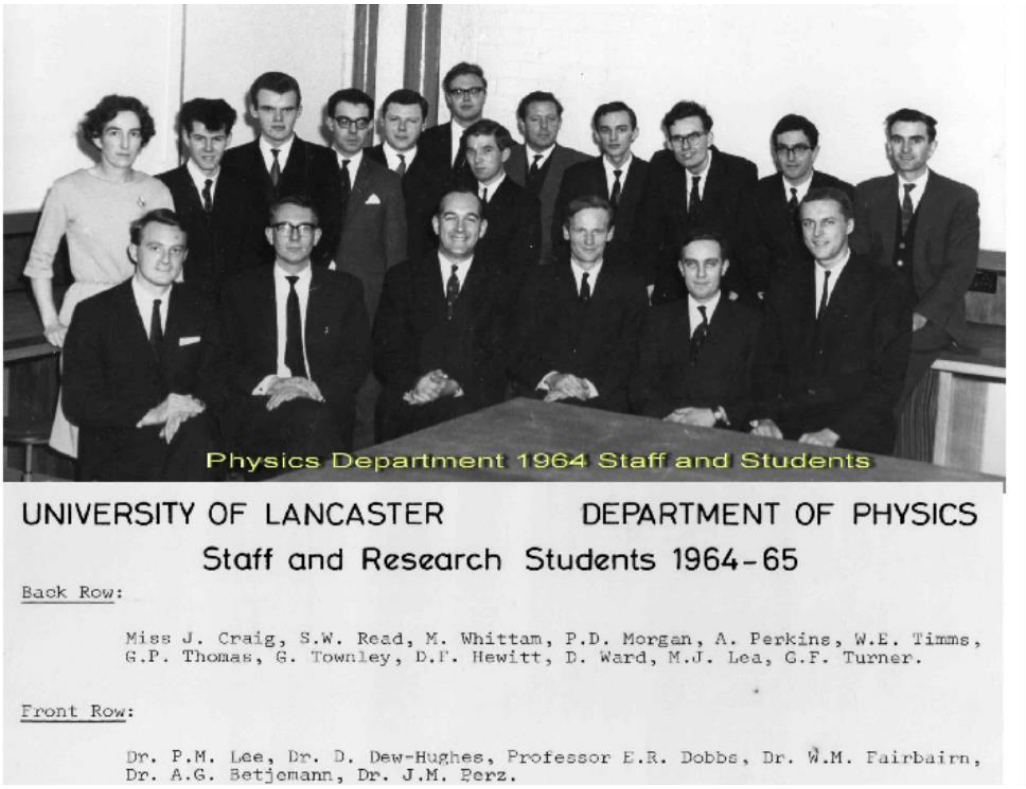
However, initially the Department had to operate, as did the rest of the University, in the centre of Lancaster at St Leonards House, the former factory of the furniture manufacturers Waring and Gillow.

Photograph 1.1 shows Professor Dobbs explaining to the first University Chancellor, Princess Alexandra, his plans for the departmental buildings in a marquee on the Bailrigg site.



Photograph 1.2 St Leonard's House in St. Leonard's Gate, Lancaster the first home of the University in Lancaster.

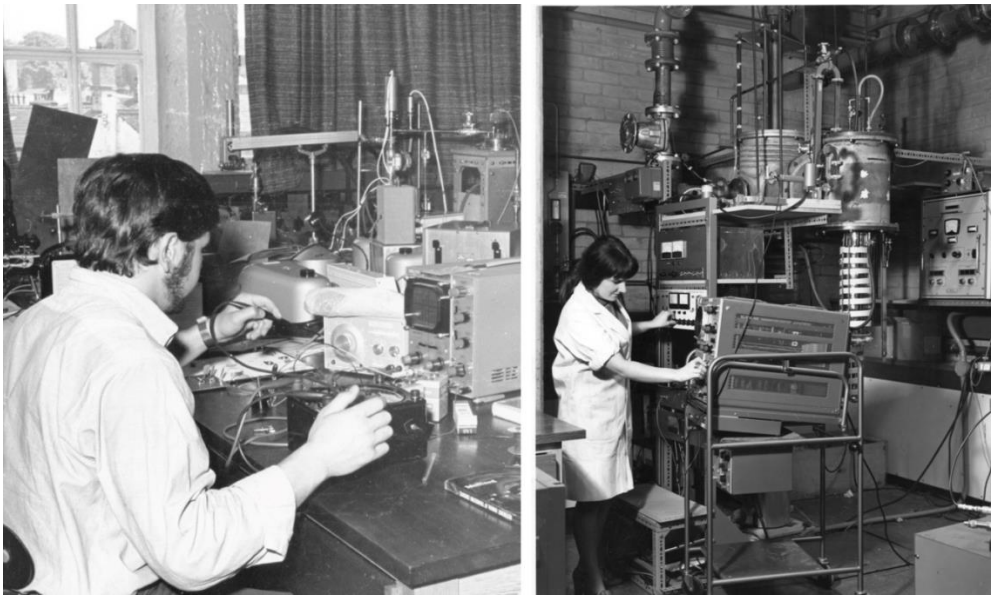
During the first half of 1964 Roland Dobbs had to design the laboratories (both research and teaching), workshops, stores and offices within the space allocated, and to oversee the provision of appropriate services. He also had to appoint members of staff and to recruit post-graduate students. All to ensure that on 1 October 1964 the Department was established and ready to take its first intake of undergraduate students in the following year.



Photograph 1.3 shows the staff and research students recruited in 1964-5.

Photograph 1.3 shows the staff recruited in 1964-5. There were 18 persons: 11 members of staff (6 academic, 3 technicians, 2 administrative) and 7 postgraduate students (4 PhD, 3 MSc). The academic staff were "organized" in two Divisions: Solid State and Theory. There were NO undergraduates.

Photograph 1.4 Shows ongoing work in the research laboratories at St Leonard's House.



Photograph 1.4 Work in the laboratories at St Leonard's House ca 1966 (left, undergraduate Andy Christou and right, research student Eileen Hughes).

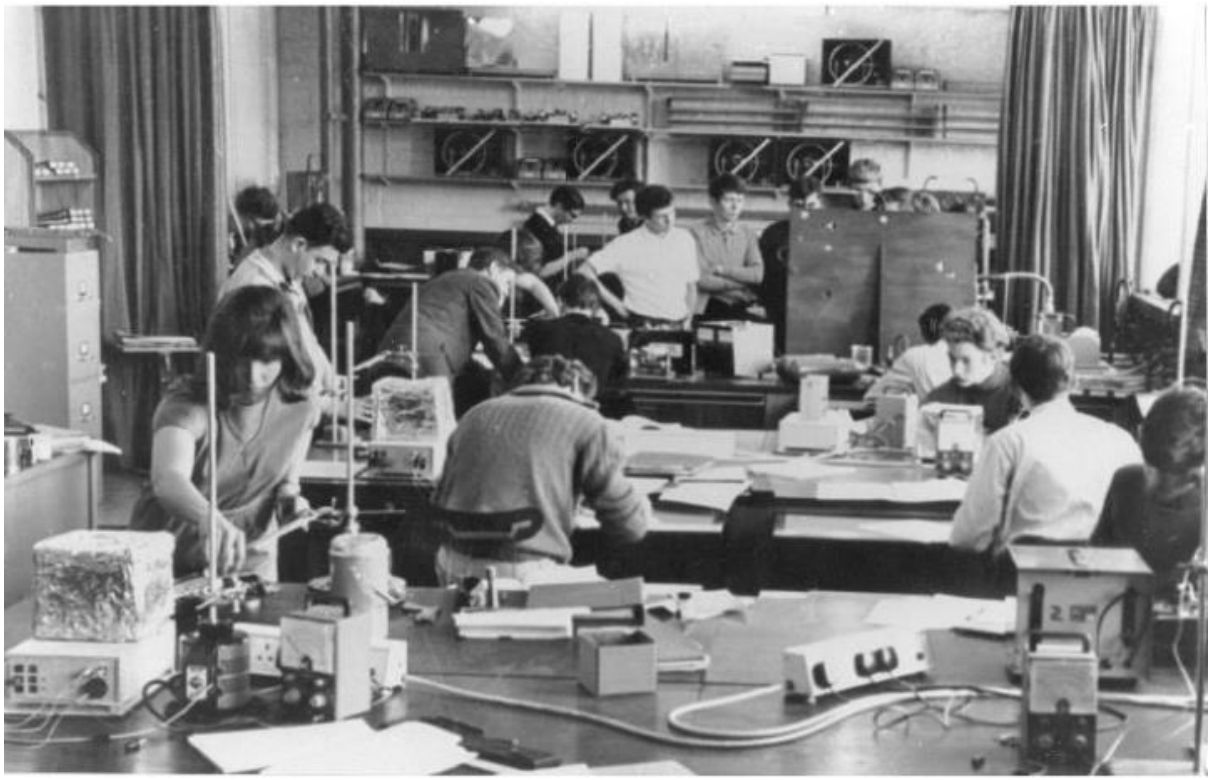
What did we do in 1964-65? Staff continued with research, including supervision of research students on projects in laboratories such as those shown, and running the one-year MSc course on Low Temperature Physics (the first such in the country).

Everyone was involved also in the design of the undergraduate degree course ---- the titles and content of the various lecture courses and the experiments in the laboratories. Further staff appointments were made during the year.

Photograph 1.5 shows the staff and research students in 1966 taken outside St Leonard's House before the arrival of the Nuclear Physics and Physical Electronics divisions.

The first intake of undergraduate students arrived in October 1965, numbering 34, to three degree schemes --- Physics, Applied Physics and Theoretical Physics. The policy of the University at that time was that in the first year students could take any subject they wished as a third subject in addition to two subjects demanded by their major area of study. With this 3-subject first year there were another 17 students in the physics class. The Department had increased in number as shown in photograph 1. 5.

All teaching was in St Leonard's House, but the students' living accommodation was largely in Morecambe, mainly in boarding houses used in the holiday season, at the cost of £4. 3. 0 per week for bed and breakfast with full board on Sunday.

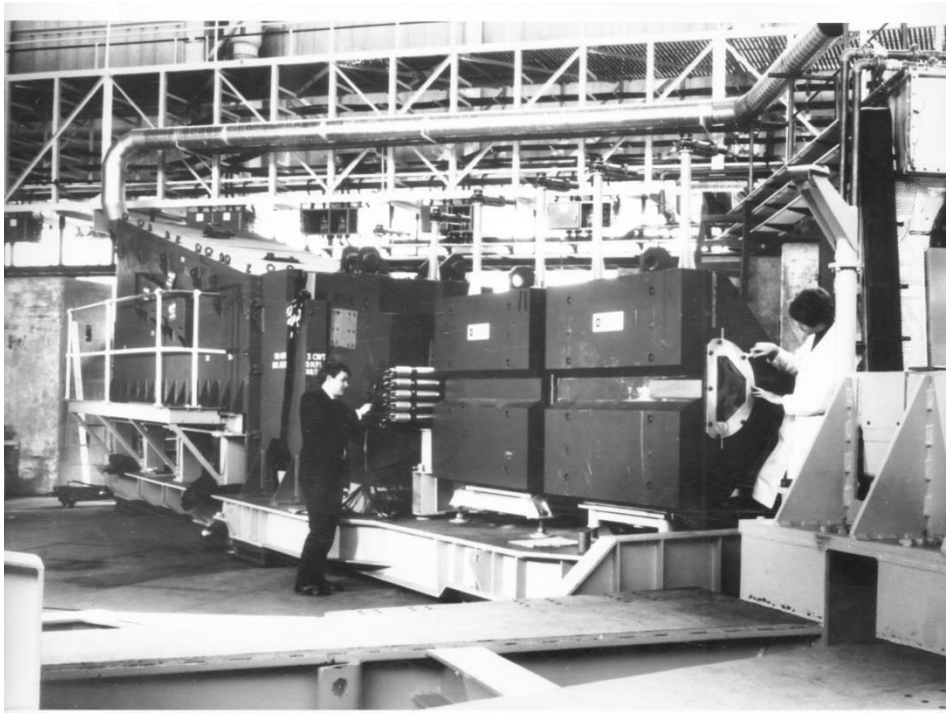


Photograph 1.6 shows an early undergraduate teaching laboratory in St Leonard's House.

The appointment of Arthur Clegg, a nuclear physicist from Oxford in 1966, as the leader of a new Division viz. Nuclear Physics, widened the research interests. Even though the division was named Nuclear Physics all the research undertaken was to be particle physics. Arthur recruited academic and technical staff (including the Editor of this) to do experiments at the 5 GeV Electron Synchrotron at the national laboratory at Daresbury in Cheshire, about 60 miles away.

Photograph 1.7 shows Arthur Clegg and Roland Dobbs in discussion.

The experiments at Daresbury were of a different scale to those in the labs at St Leonards and involved collaborations with physicists from other universities. Photograph 1.8 shows one half of the



Photograph 1.8 Tim Brodbeck and Rodney Hellings (the first Particle Physics Research student) making adjustments to the apparatus on the electron arm of the Mancaster collaboration's apparatus to study the interactions of 5 GeV electrons with protons.

experiment performed by a collaboration of the Lancaster group with a group from Manchester University which became known as the Mancaster Group. This group studied the properties of inelastic electron-proton scattering.

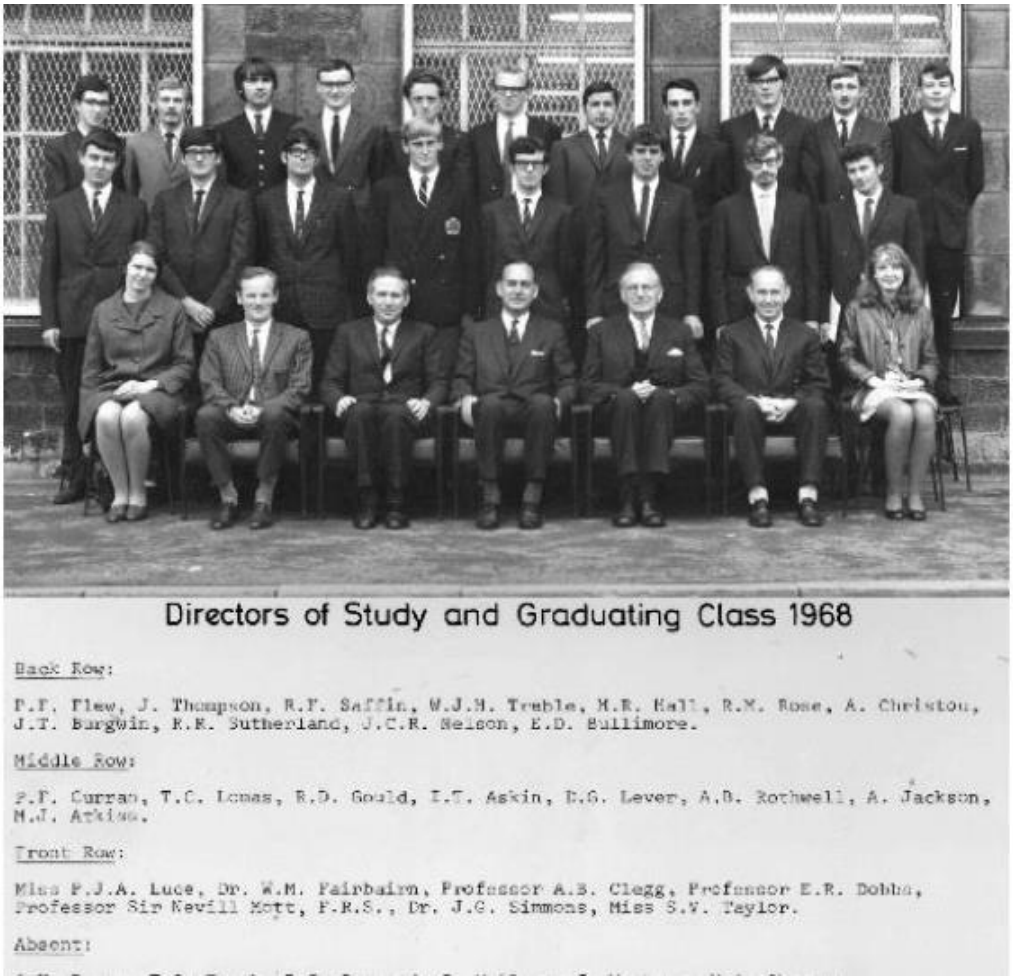
By summer 1967 the Department had grown to 41 members of staff and 16 graduate students. Many of the technical staff would form the backbone of the support services at Bailrigg --- such as Fred Turner, Derek Darvill, Dave Bidle, Bob Dunn, Peter Gilligan, Andy Muirhead, Ken Knowles, Les Bailey and Norma Millett, Margaret Gardner, Joan Woodman as secretaries. The Department could not have thrived without their dedication.

Another Division (Physical Electronics) was formed at this time under the leadership of John Simmons who joined the Department from Standard Telecommunications Laboratories. This expanded the possibilities of cooperation between the department and industry, an integral and important part of Roland's vision.

Photograph 1.9 the building at Bailrigg under construction.

All these people were looking forward to the move out to the new buildings at Bailrigg. This had been designed by Roland Dobbs in close consultations with the site architects

Completion of Phase 1 in the summer of 1967 allowed some of the Department to move to the new accommodation by October 1967. All undergraduate teaching then took place at Bailrigg and student residences became available on the Bailrigg site. Combined degree schemes with Environmental Science and with Philosophy were introduced. However the workshops, the stores and many experimental research projects remained at St Leonards House.



Directors of Study and Graduating Class 1968

Back Row:

P.F. Flew, J. Thompson, R.F. Saffin, W.J.M. Treble, M.R. Hall, R.M. Rose, A. Christou, J.T. Burgwin, R.R. Sutherland, J.C.R. Nelson, E.D. Bullimore.

Middle Row:

P.F. Curran, T.C. Lomas, R.D. Gould, I.T. Askin, D.G. Lever, A.B. Rothwell, A. Jackson, M.J. Atkins.

Front Row:

Miss P.J.A. Luce, Dr. W.M. Fairbairn, Professor A.B. Clegg, Professor E.R. Dobbs, Professor Sir Nevill Mott, F.R.S., Dr. J.G. Simmons, Miss S.V. Taylor.

Absent:

Photograph 1.10 the first graduating class. This photograph was taken outside St Leonard's House.

In the summer of 1968 the first B.A. graduation took place. This involved 28 students and an honorary degree for Sir Neville Mott pictured on the front row in photograph 1.10. The ceremony took place in the Town Hall since the Great Hall at Bailrigg had not yet been completed.

By late summer of that year Phase 2 of the new building had been finished and so all those who still remained at St Leonard's House moved to the new site at Bailrigg. The awkward split-site period (of 12 months) was over and everybody was at the one location.

The relief of having the workshops and stores on site was immense. A second MSc course (in Semi-Conductor Devices) was introduced in October 1968.

The Department was opened officially on 4 January 1969 by Mr J A Ratcliffe, an eminent radio-astronomer from Cambridge. With all the staff and students now being together at Bailrigg with the appropriate services, the first stage of Roland Dobbs' Vision was successfully completed. Photograph 1.11 shows Mr Ratcliffe with the Vice Chancellor (Charles Carter) and Roland Dobbs at the opening ceremony of the Bailrigg building. The picture was taken in the Faraday Lecture Theatre.

Photograph 1.11 The opening ceremony of the opening of the Bailrigg building. Pictured are Mr Ratcliff (left) who opened the building, the Vice-Chancellor (Charles Carter centre) and Roland Dobbs (right).

Photograph 1.12 Staff and Research Students in summer 1969.

The Department continued to grow and photograph 1.12, taken in Alexandra Square shows this growth. There were now 28 academics (14 teaching, 14 research), 20 technical, 6 secretarial, 1 porter, 21 PhD students, 10 MSc students, 108 undergraduates (45 year 1, 27 year 2, 36 year3).

The occupation of Phase 3 of the building in 1970 allowed consolidation to take place.

Hence Roland's dream began to come to fruition and his hope was that the growth would continue indefinitely. However, storm clouds were gathering and these will be described in the following two chapters.

Chapter 2 The Consolidation Years 1970-1990

This is a summary of the second talk given by George Pickett.

As mentioned above storm clouds began to gather towards the end of the 1960s. The influence of physics during and just after the second World War gradually was being forgotten towards the end of the 1960s. In addition, the Viet Nam war was in full swing and in the USA students were beginning to protest more and more vociferously about the USA involvement. These protests seemed to spread among students throughout the World and the protests expanded to cover many other grievances as well as the war in Viet Nam. These erupted into rioting in many cities around the World and most notably in Paris in 1968. In the UK there were no riots as such but we did have to endure sit-ins. Some of these occurred in Lancaster with the main administrative block in University House being taken over by students on more than one occasion.

In parallel to this physics as a subject to study was becoming less fashionable. It had gained the reputation of being a difficult subject and new subjects for study were becoming available which were perceived to be easier. The result was that World-wide interest in physics waned and the numbers of students wishing to study the subject started to fall.

The situation was exacerbated in Lancaster by two scandals. A suggestion was made by one Senior Lecturer in another department that the new student residences in Cartmell College should have male and female rooms side by side on the same corridor rather than separate male and female floors as in other colleges. He also declared that if students of different sexes were in a close relationship, he saw no harm in them sharing a room. Such a statement would become quite uncontroversial only a few years later but at the time it raised many eyebrows. The sensationalistic press got hold of the story and proceeded to paint a picture of Lancaster University as a hot-bed of promiscuity. The second scandal involved internal disagreements about the running of the English Department within the University. A bitter quarrel broke out which was widely reported in the press at the time. The result of these two scandals was that some departments attracted more students but it repelled the more serious minded physics students.

The upshot of this was the realisation that we had to do some advertising to attract more students. Photographs 2. 1 and 2.2 show the cover and a typical page in the first glossy brochure which was produced. Similar brochures were produced to attract students for our postgraduate degrees. In addition to this several joint degree schemes were introduced, e.g. Physics with Philosophy, Physics and Environmental science, Geophysics etc. in which students spent roughly half of their study time in Physics and the remainder in other departments.

A further cloud which was to have consequence for Physics was the move to Thatcherite austerity to balance the national books. This followed a period of rather poor performance for the UK economy.

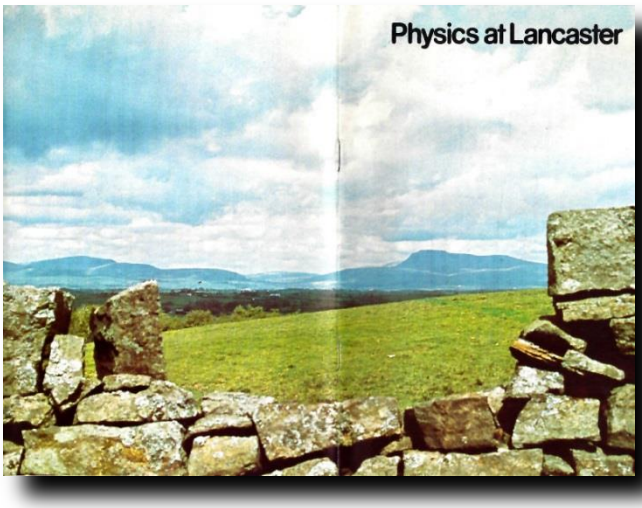
The way the University did the accounting did not help. Since we got essentially no overhead income from our vast research portfolio, research was regarded as a drain on resources not a gain. Physics departments were regarded as expensive since they needed services such as power, water, workshops etc. The accountants did some other tricks on us which reinforced this feeling in the rest of the University. However, we should pause for a moment in the midst of this sad story, because it

is only half the picture. All was not doom and gloom and the Department soldiered on. There were triumphs with excellent research output as illustrated in photograph 2.3. Such excellent performance in the department has continued over the whole history of the University and the outstanding research income generated might have been expected to put Physics in a strong position within the University.

The student numbers continued to increase in the arts and social science departments as they decreased in science subjects. The productivity of departments was measured by their student to staff ratios. At first Physics had a respectable ratio due to the number of research students. These each were weighted by 3 according the Universities' Governing body HEFCE. This weighting was suddenly reduced to 1 and so our student to staff ratio changed from satisfactory to poor almost overnight. This reinforced the view in the rest of the University that Physics was an expensive subject. Irritatingly for the University, we simply would not quietly throw in the towel and go away but we continued to produce high quality research and teaching. However, little or no expansion in Physics was allowed by the University and staff numbers were to remain constant throughout the 1970s. Despite this, a small biophysics group was formed in the 1970s.

The lack of expansion meant that we continued with no new staff from 1972 until the mid-1980s when some new lecturers were appointed under the "new blood" schemes. These were introduced to rejuvenate University departments whose staff were becoming increasingly middle aged. Physics was unique at Lancaster University in winning several of these.

During these years there was a good atmosphere in the department and this is described in the reminiscences of Bob Jones below.



Teaching in the Department

Supervisor and students discussing a project in nuclear physics

Teaching in the department is through lectures, problems-classes, tutorials, laboratories and projects. The 50-minute lecture forms the basic teaching medium, with the student attending about nine per week, usually three from each of three separate courses. Lectures provide the basic bones of the subject. Several times during a course the lecturer hands out problem sheets to reinforce ideas introduced during the lectures. After attempting the problems the students attend a special problems-class where the lecturer runs through the solutions and clarifies any difficulties.

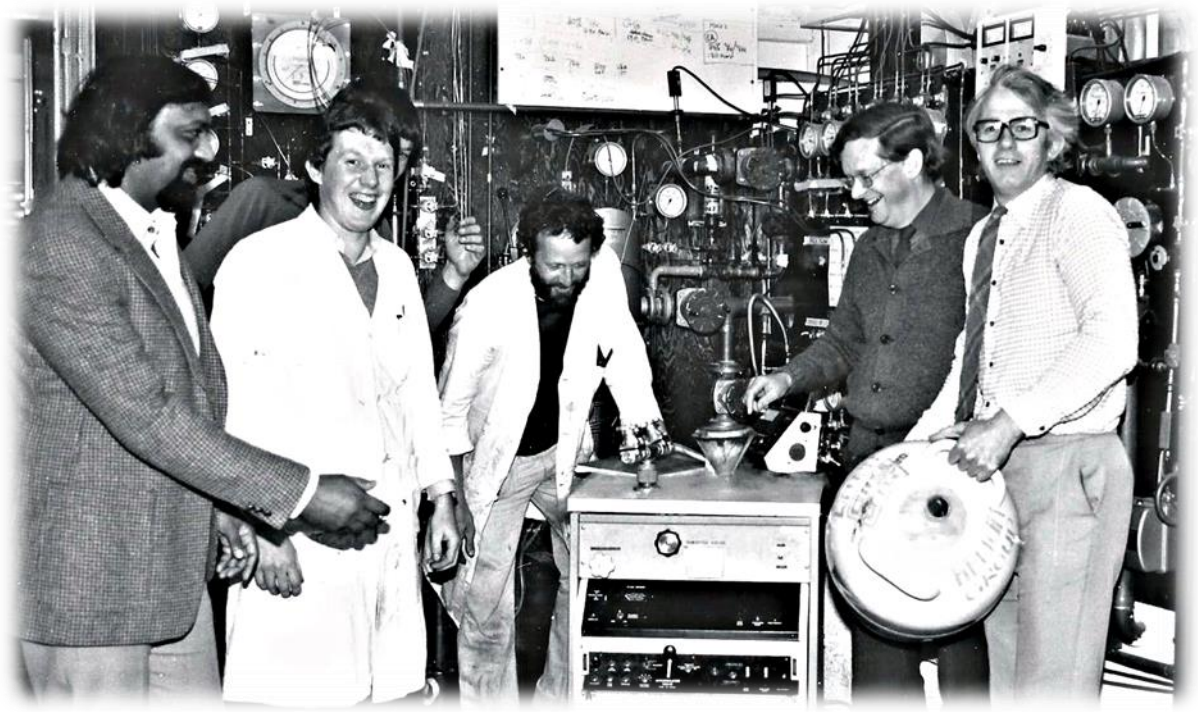
More personal contact with the staff comes in the weekly tutorials in which two students (three in the first year) meet a member of staff for an hour's discussion. The tutor may initiate a discussion on some topic, the student can raise problems which he does not understand, and the lecturer gains some feedback on whether his lectures are being understood. The tutorial is one of the principal ways in which students and staff get to know each other.

The laboratory courses serve three main purposes: they illustrate physical phenomena described in the lectures; they familiarize the student with operating apparatus; and they encourage a methodical approach to making measurements and drawing the appropriate conclusions. There are no laboratory courses in the third year. Instead, each student with the help and direction of a member of staff undertakes a project investigating some physical problem, which may be either experimental or theoretical in nature. For example, the student, faced with the problem of making measurements of some specific physical property, may need to design his own apparatus and get it working before making the necessary measurements, and afterwards draw his conclusions and write report. This approaches the 'real-life' situa in that the student is put in the position of a professional physicist required to solv a problem essentially on his own.

Contacts between staff and students in the department are good. With tutorials an the fact that in Part II very few laboratory or problem-classes contain more than fifte students, the student rapidly gets to know many members of staff. Directors of Study for the various major courses are freely ava able for students to discuss general prob lems. The departmental social life is in the hands of the University Physical Society, r by students, which provides a programme internal and external speakers on a wide range of subjects and also arranges outside visits.

A tutorial

Photographs 2.1 and 2.2 Show the front cover and a typical page from the first glossy brochure produced for the Physics Department.



Photograph 2.3 shows the low temperature group celebrating the World low temperature record (left to right Vepan Keith, Martin Ward, Chris Kennedy (partly hidden), Ian Miller, Tony Guénault and George Pickett).

The atmosphere in the Department during the consolidation years - Recollections from Bob Jones, Research Officer, 1978-2009

I arrived in the department in 1978, having previously been in turn a technician, an undergraduate, a research student and a post-doctoral RA in four other universities. My background could be described as physics with a strong bias towards biophysics and other biological sciences. I was employed do experimental research, cocooned in a small, happy research group, naïvely unaware of departmental politics, teaching, the trials and tribulations facing the department even in those early years. The joys of lecturing, administration, computers, PowerPoint presentations, e-mail, health and safety, committee meetings, etc, crept up on me later, insidiously, in the 1990's.

With my background, I should be well placed to compare the department with others. My first impressions were of a happy, hard-working department, with friendly relations between academic staff, students, and technical staff. The senior staff certainly seemed to have done a good job of shielding most of us from the global onslaught facing Physics from politicians, the rest of the University, and the vagaries of fashion, and just let us all get on with our work.

During the “consolidation years” my undergraduate teaching duties were minimal and I will leave it to others with first hand experience to describe the degree schemes, teaching methods and assessment methods current at the time. Not surprisingly, I will focus on smaller details, the building, research labs, some quirky features, technical staff, interesting characters that made the department unique.

The Physics Building and its research labs

What were my first impressions on arriving, after the remarkably good weather of May 1978? Overheated south facing offices, windowless, cave-like research labs, North-facing airy teaching labs. For some strange reason the warmest places of all were the low temperature labs, they still are! Could it be something to do with the Second and Third Laws?

One floor for each research division. A floor, Low Temperature and Solid State Physics; B floor, "Nuclear Physics"; C floor, Applied Physics and Electronics. To emphasize this division further, there were even separate coffee rooms. Particle physics people did not have coffee with low temperature or applied physics people...was the coffee not up to their standard? I am told that, before my time, there were even separate workshops and stores for each floor. Could this really be true? However, on occasion everyone did come together like one big happy family. Such as for departmental photographs, or fire drills.

After about 1990 this "consolidation", or "stratification", period, gave way to the "mixing" and "turbulent" period, with staff changes, new research interests and shortage of space, when new labs had to go wherever space was available. So we now have an applied physics clean room in the middle of particle physics (the new name for B floor), and a departmental common room on C floor that used to be a teaching lab, where people do seem to mix more.

Meticulous floor cleaning, gents toilets in abundance, helium return lines, magnet trenches, photographic darkrooms. The "powers that be" that planned the physics building at Bailrigg have provided a "snapshot" of how they saw the physics world around the mid sixties. Little chance of predicting female staff in any numbers, the digital revolution, e-communication, the large amount of "interdisciplinary" research that couldn't easily be pigeon-holed, the inexorable rise of theoreticians and big science, the number of labs that would have to be converted to offices.

The disproportionate number of gents toilets (about half as many as there were academic staff in the early days) was easy to explain...there were very few females in evidence apart from secretaries. But it could be slightly embarrassing if a rare female visitor asked for the ladies room and we couldn't remember where IT was. In more recent years, with the department bursting at the seams, there was talk of converting toilets to labs or offices. One toilet equals about four offices, but apparently the work would be too expensive.

In the early mornings, a small army of cleaning ladies would invade the department, with secret cupboards dotted about the department only accessible to them. Visitors were sometimes known to remark on how clean the floors were. But that alone did not seem enough to explain the meticulously cleaned floors. It required a look inside all those windowless research labs.

In the early days, a typical small research lab on A floor or C floor would be characterised by the gentle hum of rotary vacuum pumps, the faint aroma from oil diffusion pumps, dewars large and small containing cryogenic liquids, racks of electronics, usually home-made out of dexion angle iron and towering up towards the ceiling, high voltage power supplies, and maybe a large electromagnet or radioactive source or two. Work surfaces would often be covered with bits of equipment and the bare brick walls would often have home-made shelving full of more equipment (some research labs still look a bit like this!)

It must all have been intimidating to cleaners anxious to do a bit of dusting, and possibly hazardous, too. So I suspect they focused all their attention on the main corridors and larger labs. And of course the gents toilets, which they seemed, and still seem, to be perpetually cleaning, with special warning notices. The good impression of the department was somewhat spoiled by the battered doors (again, no change here), due to the trundling of numerous dewars of liquid nitrogen and helium all over the place. However, it showed we were an active department.

Magnet trenches in the ground floor labs (for running the heavy duty cables to power electromagnets) progressively fell into disuse over the years, but they became very useful for storing general lab clutter (when they didn't flood in a summer cloudburst). Similarly, the photographic darkrooms (two per floor) were mostly converted to other uses as convenient small labs, such as for Scanning Probe Microscopes in the 1990's. The helium return lines endure, and continue to be well used as low temperature experiments and superconducting cryomagnets spread around the department.

In general, staff on A floor and C floor, Keith Wigmore, David Meredith, Peter Lee, Hubert Pollock, Dick Collins, Ian Saunders and Brian Jones seemed to be happy working in windowless labs. There were few distractions and the environment (at least on A floor) was cool and stable. But there were exceptions. Max Lazarus had an electronics lab with windows and Richard Tredgold, who arrived in 1974 to set up a new Biophysics Research Group, insisted on a research lab with windows, or so he told me.

However, it was obvious that two research groups had ambitions far beyond windowless research labs. B floor, the domain of particle physicists Arthur Clegg, Frank Foster, David Newton, Terry Sloan, Gareth Hughes and others, with its superior coffee room, always seemed a haven of peace. No clatter of vacuum pumps there, no claustrophobic little labs. Just offices, wide open spaces, fancy computing facilities, but no PC's yet back in 1980. At first, naively, I wondered where they did all their experiments. Apparently, in faraway places like Daresbury, in Cheshire. Or even further away, like CERN in Geneva, or the early Universe.

The low temperature group, dominated by George Pickett, Tony Guenault and Peter McClintock, seemed to have other ways of staking their claim to be the most important research activity in the department. They got into concrete in a big way. Truly, a consolidation period. This was essential for the very sensitive millidegree experiments being set up, modestly and affectionately called “fridges”. It all paid off. The department has for long periods held the world record for ultra-low temperatures. Our technical staff, noted for their great sense of humour, produced appropriate posters to celebrate this. One I particularly liked was a “Wanted” poster for a certain member of staff for “Conspiracy to violate the Third Law”. But the Third (and Second) Laws were not to be violated. Which explains why the efforts to achieve ever lower temperatures resulted in the warmest rooms in the department.

Academic Staff

Despite the austere segregation by floor, I found friendly, approachable staff from the beginning, even if, in the early days, some dressed like bank managers. Most students would surely agree. The Physics Department has always had a respectful but informal and welcoming character. This applied at all levels, senior academics, postdocs, technical staff, research students and undergraduates.

Dress has always been a matter of personal choice. By the late 1970's ties were no longer usual for students in laboratories and lectures as they had been in the 1960's, but there were still quite a few jackets, ties and tidy shirts about among staff, not to mention the thick-rimmed glasses. Today's universal student uniform of dark tee shirt, dark sweater, jeans and trainers did not start to be commonly adopted by staff until quite recently, mostly by younger staff.

The Department has always seemed a remarkably civilised and restrained place. Very little evidence, to me at least, of heated arguments in committee meetings, rivalry and in-fighting among different factions, and assorted scandals that seem to affect some other university departments...even, dare we say (?) occasional science departments. Or do we just hide it better? No big scandals in physics, but mild eccentricity is fine.

There wasn't much "diversity" among staff in the "consolidation" years, unless "diversity" means having a few Scottish or Welsh staff. As a new arrival in the department in the 1970's I saw almost without exception devoted academic staff, white, male, British, many from the North but with a fair sprinkling from other regions and born around 1940.

They seemed to live for their work...even in those windowless research labs. It was not unusual to see academic staff around the department late in the evenings, at weekends, and in vacations. This behaviour is more usually associated with overseas students and research students desperate to get a PhD finished for some deadline. And this devotion to work doesn't change much, though maybe people are away rather more now for conferences and holidays.

The age profile of staff was remarkably narrow until the mid-1980's, a direct result of recruiting many young staff to the new department over just a few years. Even more remarkable, there was almost no turnover of staff until this time. For about a decade, from the mid 70's to the mid 80's, no-one seemed to join the "permanent academic staff" or leave it for pastures new. It seemed that the department would be the same forever. Lack of new arrivals was easily explained...no new "permanent" posts in physics were being created. Lack of departures suggests a great contentment for those lucky enough to get in near the start. A combination of love of work, getting research set up and established, promotion, putting down roots (or, in the case of the low temperature group, concrete), families at school, and general liking for Lancaster and its surroundings must explain this long period of relative equilibrium. This also applied to me, as a mere Research Officer. Many former Lancaster students show a similar reluctance to leave the area.

Alumni may well ask what became of a favourite member of the academic staff. In a nutshell...most behaved like "permanent staff"...unless they died. Several staff from the older generation acquired new research interests, or moved away from research altogether into other fields. Many have, of course, "retired", though to most academics total retirement is an alien concept. The most fortunate still have their own offices, research grants, others are herded together in communal offices, and they are in the department surprisingly often. I considered myself lucky to have part time work in the department for three years after "retirement" in 2009. Several have sadly died, including (in order) Arthur Clegg, Max Lazarus, Richard Tredgold, Frank Foster. I am sure the department would be happy to update anyone with more details about their favourite lecturer.

Non-academic and technical staff, and lost jobs reminiscent of a bygone age

Physics once boasted a Departmental Photographer, initially Joe Thompson and then Isabel Matthews following Joe's retirement, a Departmental Purchasing Officer, George Townley, a (red-faced) Departmental Glass Blower, Alan Thompson (shared with Chemistry) a Departmental Porter, initially Tom Grundy and then Cliff following Tom's retirement (though his duties were shared), a Departmental Car (invariably a large estate), a van, and a departmental Garage. Why did we ever need them? How could we afford them? We also had kind Departmental Secretaries who would spend hours typing up research papers, grant proposals, lecture notes and other documents. Now we do our own presentations, word processing, ordering, drive our own cars, move our own stuff, with a little help. How times change! I discovered, to my disbelief, that Tom Grundy acted as Departmental Chauffeur driving the Department car (a large Humber Snipe), presumably to meet important visitors and drive gentlemen to conferences and airports.

Some jobs just change to comply with the times. Secretaries now have extra duties unknown in 1970, thanks to IT, bureaucracy, accountability, more stringent teaching protocols. PC's and e-mail don't seem to make less paperwork, and secretaries now would laugh at the prospect of typing someone's work. In the 1970's “Chief Technician Research” Fred Turner (like George Townley, a member of the department from the earliest days) seemed to spend most of his time servicing the regiments of vacuum pumps on A floor and C floor. His successor, Ron Oswald, or his successor, Shonah Ion (now called Departmental Superintendent) would never have the time for such mundane tasks with a myriad of new duties, including safety and supervising the ever increasing number of room changes and new labs after 1990. “Chief Technician Teaching” John Windsor seemed to be perpetually going round the department putting labels on equipment, when he wasn't looking after the teaching labs. In the new age of IT, he became absolutely indispensable sorting out everyone's computer problems in addition. How will the department manage now he's just retired?

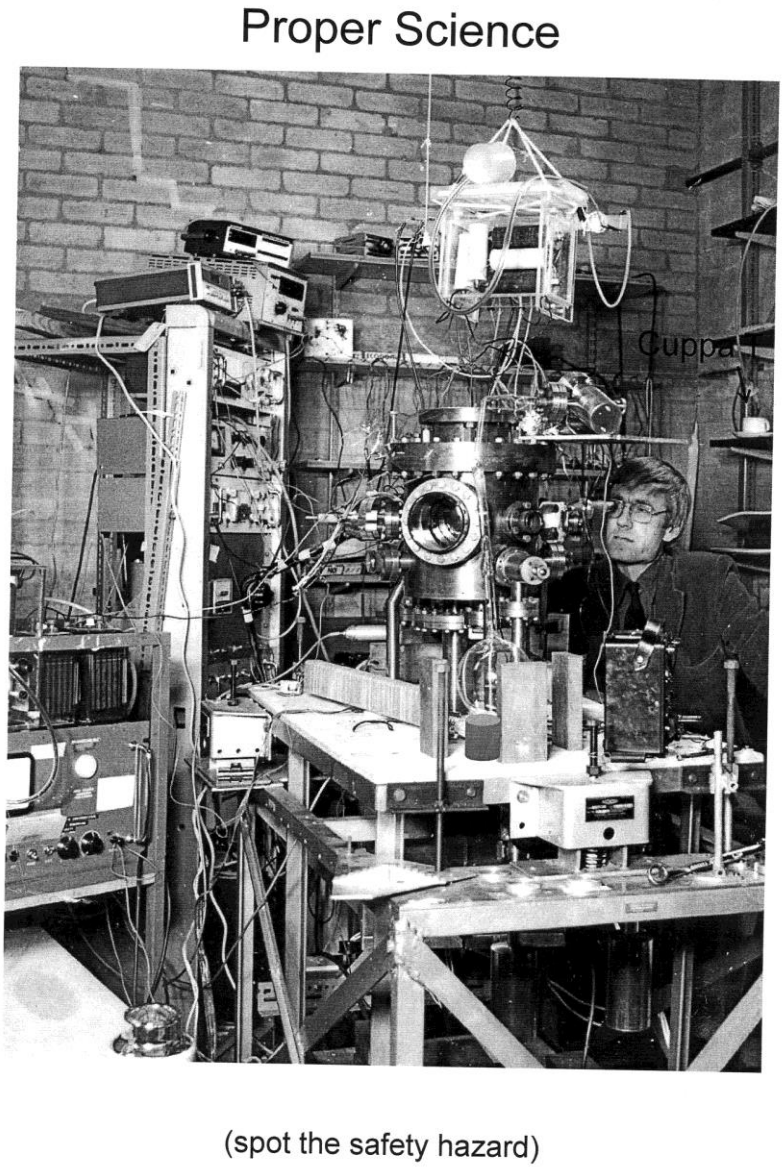
The department has always had excellent mechanical and electronics workshops which were, and remain, central to its routine functioning. I remember best Andy Muirhead and Dave Bidle from the years in question, but there were many others, long since retired and some dead. Many were very well qualified, having worked before in a variety of technical jobs, and invariably found work in the department more interesting and varied than elsewhere, and might have chosen to stay in the department even if better paid work became available elsewhere. How true for technicians and academics alike! Nevertheless, it did not stop the odd domestic TV from being repaired “on the side”.

There were many other characters, attached to a particular research group or workshop, invariably friendly and helpful. Ian Miller, almost a part of the furniture in the low temperature labs, with his direct talking and cockney expletives, Derek Darvill in nuclear physics, Bob Worthington on C floor, a mine of technical information for students on the now-defunct MSc in Semiconductor Devices, and many more too numerous to mention individually.

The end of an age of stability

1990 was a turning point for the department, and coincidentally for myself because Richard Tredgold retired, the Biophysics research group was disbanded, and I had to be absorbed into other research activities in the department. This was just one of a wave of retirements, beginning slowly at first. A wave of new staff arrived, slowly at first with a few “new blood” appointments in the 1980's, but gathering pace. Many had new research interests that did not fit neatly into the three “Divisions”, such as optoelectronics, nanoscience, non-linear physics, cosmology, medical physics. Many were theoreticians needing office space. Many were from overseas, unlike the staff from the 1970s era. And one or two new staff and an increasing number of students were, believe it or not, female! So, goodbye to one or two of those gents toilets. Rooms on C floor and A floor fell eerily silent, in line with the relative peace that had always characterised B floor, and awaited new uses.

More ominously, Physics came under attack once more for a variety of reasons, just when it was hoping to expand. The idea that we might not be “permanent” staff crossed our consciousness...even before we'd retired! Parts of the building were lost to other departments (not for the first time), there was an uneasy amalgamation with Chemistry, disliked by all. There were research and teaching quality assessment exercises, major restructuring of degree schemes. The department emerged triumphant, but all this story is for someone else to tell...



Photograph 2.4 Shows a youthful Hubert Pollock at work in his windowless laboratory.

<u>The Department in the years 1972-1980</u>

The academic staff employed in each division were (with the nominal division head placed first).

Low Temperature Division E. Roland Dobbs (left 1973), Anthony M. Guenault, Peter V.E. McClintock, David J. Meredith, George R. Pickett, J. Keith Wigmore,

Nuclear Physics Division Arthur B. Clegg, Frank Foster, Gareth Hughes, David Newton, Terry Sloan

Physical Electronics Division Brian Jones (replacing John Simmons), Dick Collins, Max Lazarus, Hubert Montagu-Pollock, Ian J. Saunders

Theory Division Walter M. Fairbairn, Peter M. Lee, David H. Lyth, Robin W. Tucker, Richard Watts-Tobin.

Biophysics Group Richard Tredgold and Bob Jones

"New Blood" Lecturers appointed in the 1980s Chris Bowdery (Particle Physics), Ian Bradley (Low Temperature Physics), Colin Lambert (Theory Division) and Tony Krier (Physical Electronics division).

Roland's dream had been for each division to have its own infra structure of workshops and stores. However, under the pressure to save money in the 1970s these were all combined into a common infra structure. This produced a team of dedicated support workers as alluded to in the previous section who helped keep our research at the frontier.

Chapter 3 The Turbulent Years 1990-2001: How the Department Survived and Prospered in Difficult Times.

This is a summary of the third talk prepared and given by Peter Lee, Tony Guénault, and Peter McClintock, the three heads of department during the period.

The Ambiance of the 1990s

During these years the Department was buffeted by turbulence from its external environment but, internally, it continued with quiet growth and consolidation - largely unrecognised by the outside world. The successive Heads of Department did their best to insulate the staff and students from the external perturbations.

The New Universities created in the 1960s, including Lancaster, were reaching middle age and along with the university system in general moving from a "Two Cultures" scenario of the early sixties to a more multicultural one. The funding body for UK Universities, the University Funding Council (or UFC, which succeeded the earlier University Grants Committee which had founded the New Universities) was itself restructured and became the Higher Education Funding Council for England (HEFCE). This ruled, but with effectively less money to distribute. At this time it was decided that research funding would be awarded according to the results of a national Research Assessment Exercise (the RAE – see below). This was charged with coming up with a grade score to be used as a measure of research quality in each University department. The first review took place in the late eighties.

The sciences were under pressure in many University institutions, because of: (i) being expensive, in terms of space, running costs (electricity, water) and equipment; coupled with (ii) recruiting low student numbers, leading to poor student/staff ratios and reduced income. The result was that Vice-Chancellors chose to close several chemistry and physics departments to save money (physics was closed in e.g. Bradford, Brunel, Newcastle, Portsmouth, Reading). In Lancaster a debate took place in some quarters to decide whether or not to turn Lancaster into an arts and social science university, dropping technical subjects such as physics. However, common sense prevailed and the technical subjects survived.

On account of the economies enforced by HEFCE, strong pressures were brought to bear on all departments in the University to save money. There were also pressures to conform, so that we lost some of the original Lancaster characteristics such as our faculty-free structure (a positive decision at the time the University was founded) and the 3-subject Part I. We also lost the "distant minor" due to the stronger central management and a new financial model under which departments were only rewarded for the students they actually taught – so that they discouraged students being adventurous by enrolling on modules in other departments. Retrenchment measures were made to reduce costs, such as the closures of the Chemistry and Classics & Archæology departments.

At this time, throughout the UK, a variety of measures was introduced to demonstrate accountability for public funds expended. In the Universities these included The Teaching Quality Assessment (TQA) to quantify teaching standards in Universities, and the Research Assessment Exercise (RAE) to assess research quality. These were schemes instituted by HEFCE.

Despite the economies the University continued to grow e.g. by developing Graduate College, New Pendle College, Peter Scott Gallery, the CHP plant, the purchase of its freehold, the Pre-School Centre, the Sugar House in the town centre, the Graduate School, the Ruskin Library, and the Institute of Health Research. Most importantly for us, it chose to keep Physics going.

In physics, within the spirit of these economies and under continued pressure from the University, great attention was paid to keeping costs down. Fortunately for us, the real running costs – for space, water, electricity – were never fully devolved to departments. Nevertheless, it was necessary to cut staff costs. So at a time when digital electronics was rapidly taking over much of the old analogue and mechanical approaches, and secretarial staff in particular were having to take on a more technological approach to their mode of work, support staff bore more than their fair share of these cuts. The loyalty of staff during this period was much to be admired. As far as academic staff were concerned, the department had won five "new blood" lectureship appointments.

The achievement of only a moderate RAE result in 1992 meant that there was little HEFCE support for research (see below). RAE gradings were to become more and more important, partly from the point of view of funding, but also for the prestige of the Department. The lowly grade 3 achieved in 1992 did nothing to help us and was very bad for morale given that all other indicators showed that in reality we were doing well. For example we continued to win strong support from the research councils SERC, PPARC and other bodies. HEFCE repeated the RAE in 1996 with disastrous results for Lancaster Physics yet again, with a late demotion from RAE Grade 4 to 3A, bringing a corresponding reduction in income and opprobrium within the University.

To add to all these problems there was also structural turbulence at Lancaster with the dissolution of the Boards of Study and their replacement by Faculties in 1990. This change meant more bureaucracy and a less collegial atmosphere. It also reduced the independence of departments. It led to the creation of the School of Physics and Materials (SPAM) as the smallest of 3 science faculties (1990), following the closure of Chemistry as a result of its disastrous RAE result in 1989.

Nevertheless we maintained our commitment to excellence in teaching and research in a friendly atmosphere. The Department was converted to the School of Physics and Chemistry (SPAC) to support the excellent polymer chemistry (1994). However, Polymer Chemistry was allowed to depart to Sheffield in 2000 and we reverted once more to being the Department of Physics. All of this occurred within an ever-increasing Faculty and finance-driven central bureaucracy.

Physics Teaching in the 1990s.

It was a time of tight budgets, and Physics was perceived as expensive. So we concentrated on three things. First, finance, to make Physics teaching a viable "business". Staff cost money but students bring income, so the Student-Staff Ratio had to increase. Secondly, teaching styles had to be adjusted, with less small-group teaching such as tutorials. All this had to be done while, thirdly, maintaining a friendly and approachable department, in which we knew and cared about our students.

Nevertheless, teaching underwent several significant developments in the 1990s. From the beginning in 1964, we had maintained a close link between teaching and research and it was our aim to continue this.

In 1994 the MPhys degree was introduced, following the 1990 IOP report on "The Future Pattern of Higher Education in Physics ". This added a 4th year to the 3-year BSc, already accredited by IOP. Advanced physics courses were introduced in the 4th year together with a research project. This followed closely our original aim of linking teaching and research. We had an outstanding range of optional modules and our pioneering MPhys (USA) degree scheme was the largest such programme in the UK.

Other 1990s innovations included Elements of Physics, a Part I course, covering the basics for scientists who were non-physics-majors, and Universe as an Art, a Part I course for humanities students, covering the whole of physics but without using mathematics. The Physics Studies BSc, for which no mathematics A-level was required, used Elements of Physics.

Then came the Teaching Quality Assessment (TQA) which reviewed the teaching quality in every department in the country. It was run by a QUANGO known as the Quality Assurance Agency (QAA). They required a massive provision of advance documentation, followed by a 3-4 day on-site visit by a visiting assessment team. The team tested a department's aspirations against the actuality by asking the question "Do they do as they claim?" One could in principle declare low aspirations to win high marks – but at the same time destroying one's department's reputation!

Each department was given an assessment out of 24 marks, with up to 4 marks in each of 6 categories: curriculum design, teaching learning & assessment, student achievement, student support and guidance, learning resources and quality management. There was a high-profile public announcement of provisional results on the final day of the QAA visit

QAA scores for 2000 (out of 24)

Department	Total	Department	Total
Bath	24	Nottingham	23
Birmingham	23	Nottingham Trent	24
Bristol	23	Open University	23
Cambridge	23	Oxford	23
Central Lancashire	19	Portsmouth	20
Durham	24	QMW	21
Exeter	22	Queen's Belfast	23
Hertfordshire	21	Reading	24
Hull	23	Royal Holloway	23
Imperial	22	Salford	23
Keele	22	Sheffield	22
Kent	21	Sheffield Hallam	24
King's College London	22	Southampton	22
Lancaster	23	Staffordshire	22
Leeds	24	Surrey	23
Leicester	23	Sussex	22
Liverpool	24	UCL	23

Loughborough	23	UMIST	21
Manchester	24	Warwick	24
Newcastle	21	York	24
Northumbria	23		

Table 3.1 The results of the 2000 TQA for physics departments in English Universities.

The preparations and submission for the TQA convulsed the entire Department for several months. Keith Wigmore did a heroic job in spearheading our submission. A "paper-trail" was required for every decision, requiring near-perfection in procedures and paperwork of all committees over several years.

During 31 January – 3 February 2000, the visiting QAA team took over the Seminar Room C1 to use as their base. The team were given a set of agendas, minutes, and associated paperwork for practically every committee over the previous 5 years. They attended lectures, workshops, seminars and tutorials unannounced. They talked to members of staff, in separate groups, as well as to students, both undergraduate and postgraduate. They also talked to the V-C, the Librarian, to teaching-related administrators in University House, and to staff in Student Support

The provisional result was finally announced to the V-C and the whole Department gathered together in the Senate Chamber. We were awarded 23/24.

Our single lost mark was for Curriculum Design. This was slightly annoying but, overall, the result was very satisfactory in the national context (see Table 3.1). We completely agreed with Geoff Pert (University of York) who was quoted in Physics World as saying: "I was horrified at the amount of time needed and the stress it caused."

Subsequently, TQA has metamorphosed into quality assurance with a "lighter touch".

Physics Research in the 1990s.

Roland Dobbs's original vision was being realised, with internationally competitive research burgeoning in all areas, for example in Ultra-low Temperature Physics, including cold superfluids with a World record low temperature (see Chapter 2), Condensed Matter Theory, Particle Physics with involvement in several experiments at CERN and DESY, and Particle Cosmology Theory.

The quality of this research can be judged from the number of papers in "high impact" journals such as Physical Review Letters, Physics Letters B, and Nature. Many of these papers were highly cited by other scientists, internationally. In addition to this we achieved large numbers of invited papers at international conferences and there was a continuing succession of distinguished international visitors to the Department. The research activities of the Department continued to receive strong financial support from the Research Councils (known as SERC and PPARC at the time).

One way in which the high quality of the Lancaster physics research was demonstrated was through George Pickett's "PRL Test", continued over several years, including the era of our lowly RAE grade 3 score in 1989. He counted the number of papers from each UK institution published in the prestigious Journal Physical Review Letters, and compared it with the UFC grading awarded in the RAE. The result published in Physics World was as shown in Table 2. It resulted in some strongly-

worded correspondence from departments with high UFC grades but low scores in the PRL Test. Of course, all this occurred long before the advent of "citation science". It can be seen at a glance that the Lancaster Physics Department was clearly out-performing its lowly UFC rating of 3.

Name of institution	PRL equivalent	UFC rating
Cambridge	27.00	5
Imperial	17.70	5
Manchester	10.38	5
Oxford	10.00	5
Liverpool	7.13	5
Edinburgh	7.02	3
Lancaster	6.30	3
Nottingham	4.88	5
Warwick	4.55	4
Royal Holloway	4.09	2
Bangor	4.04	-
Sussex	3.85	3
Bristol	3.33	5
Surrey	2.84	4
Stirling	2.80	2
Birkbeck	2.71	4
Southampton	2.33	4
Heriot-Watt	2.00	3
Reading	1.83	3
UCL	1.74	5
Newcastle	1.50	3
King's College London	1.25	3
Bath	1.17	2
Dundee	1.00	-
Strathclyde	1.00	3

Table 3.2 George Pickett's PRL test. The number of papers published in Physical Review Letters (the equivalent" scales by the % of co-authors at the institution, and it takes no account of the size of the department. Published in Physics World, December 1989.

Number of physics departments at each grade; funding will be based on the weighting factor

Grade	Number of departments	Weighting
5*	2	4.05
5	11	3.375
4	26	2.250
3A	7	1.500
3B	3	1.000
2	3	0
1	4	0

Table 3.3 Relative weighting used by the UFC in distributing research funding, from Physics World, February 1997.

Worse was to follow. The RAE was repeated in 1996. Our rating was again a grade 3 but this time a grade 3A. UFC research funding was very dependent on the RAE grading, as seen in Table 3. Unsurprisingly, there were powerful pressures within the University at this time, either to close the Department, or to "rationalise" it by some sort of amalgamation. However, we were helped by the fact that it became known (via a leak) that we had been classed initially as a grade 4 which had been downgraded to grade 3A at the last minute.

The rather poor grading of the Lancaster Department of Physics did not reflect the views of the outside World. In his analysis of RAE grades published in the Physics World issue for May 1997 John Saunders (Royal Holloway) wrote "Some departments appear overrated, while others are seriously underrated. An extreme case is the physics department at Lancaster University. "It has the second highest impact factor in the UK, but was awarded a 3A." He backed up his statement by the graph shown as Table 4.

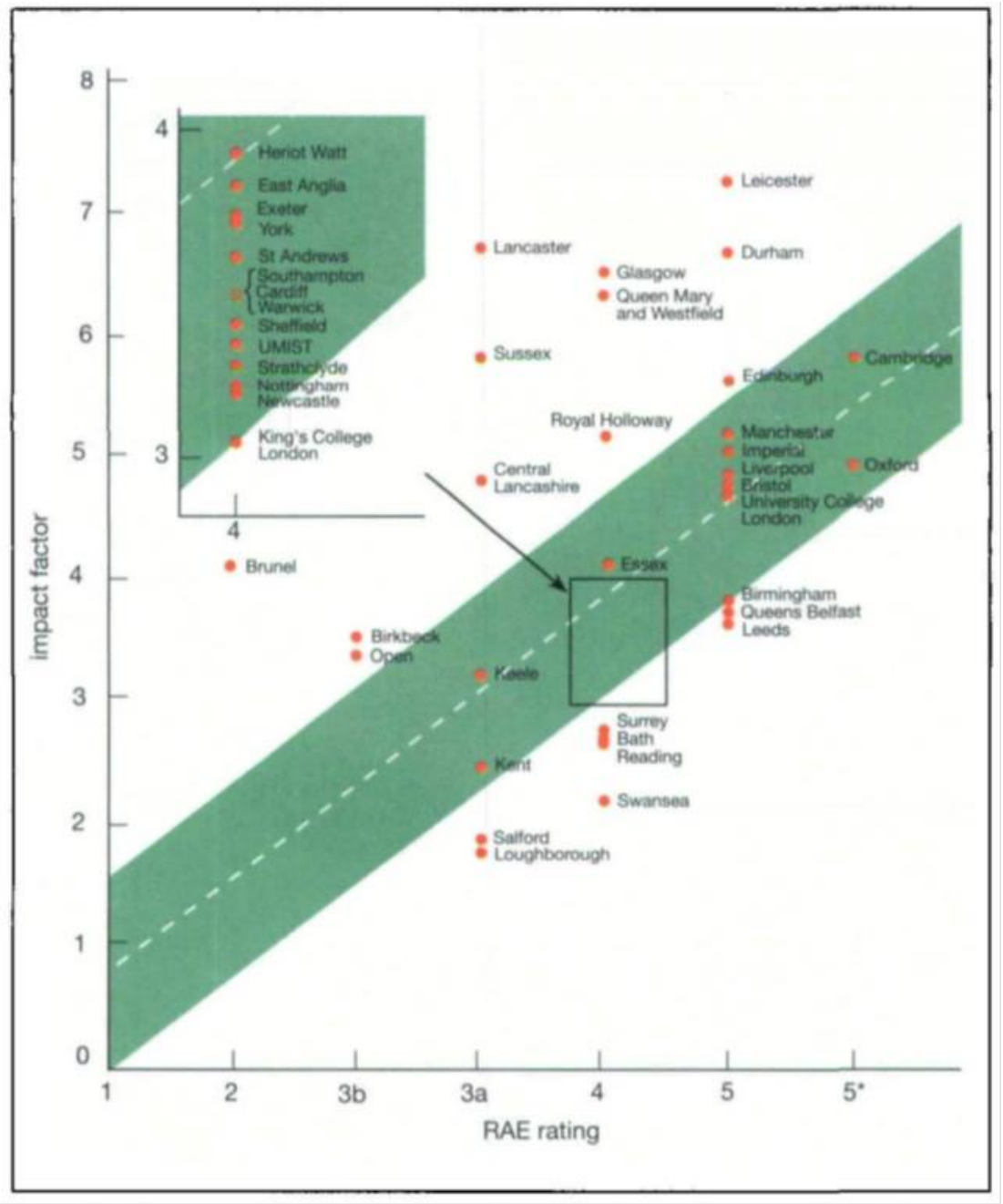


Table 3.4. The impact factor of each department plotted against the UFC's RAE grading. The green band is the norm and Departments above the green band are outperforming their RAE grading while those below are underperforming. It can be seen that on this rating Lancaster was outperformed only by Leicester. From Physics World, May 1997.

An external review of Physics research at Lancaster was then organised by the University at the request of the Department. It involved three distinguished physicists from other universities: Prof Lawrie Challis of Nottingham (a condensed matter physicist), Prof John Dowell of Birmingham (an elementary particle physicist) and Prof John Inkson of Exeter (a theoretical physicist).

They found that the objective evidence pointed to the Department's excellent performance and health. Their report was positive and helpful.

After a telephone discussion between the VC and the Chairman of the RAE Physics Panel, it was decided not to close the Department – but to await the results of the next RAE in 2001.

Preparing for the 2001 RAE

Given that the report of the External Review had been positive and encouraging, and that objective indicators (e.g. impact, and research grant income) pointed to excellence, no major changes were made. The first draft of the submission documents was written by George Pickett. It was largely rewritten by Peter McClintock, and then largely rewritten again by Colin Lambert, followed by general editing. At each stage it got better. Mostly the same academic staff were entered into the submission, pursuing mostly the same internationally competitive research. They were helped by mostly the same dedicated support staff together with a sequence of first-rate postdoctoral research fellows and PhD students, and many distinguished international visitors. So activity and quality were much the same as before. However, the result was very different, as shown in Table 3.5.

Grade 5* Cambridge, Imperial College,
Lancaster, Oxford, Southampton

Grade 5 Birmingham, Bristol, Cardiff,
Durham, Edinburgh, Exeter, Glasgow, Leeds,
Leicester, Liverpool, Manchester,
Nottingham, Queen Mary, Queen's Belfast,
Royal Holloway, Sheffield, St Andrews,
Surrey, Sussex, Swansea, University College London, Warwick

Grade 4 Aberystwyth, Armagh Observatory,
Bath, Central Lancashire, City, Heriot-Watt,
Hertfordshire, King's College London,
Liverpool John Moores, Loughborough,
Newcastle, Reading, Strathclyde, UMIST, York

Grade 3a Brighton, Keele, Kent, Open,
Paisley, Plymouth, Sheffield Hallam

Table 3.5. The 2001 RAE results for physics, from Physics World, January 2002.

The 5* grade awarded to Lancaster was one of only five such grades awarded (out of a total of 47 departments assessed) putting the Lancaster Physics Department on a par with the Oxford, Cambridge, Imperial College London and Southampton University Physics Departments.

This result brought welcome recognition of our successes and was to transform our prospects for the future, as described in the next chapter.

Chapter 4 The 5* Years and the future.

This is a summary of the 4th talk given by Peter Ratoff, the current Head of Department.

The RAE was repeated again in 2008 and, under the new grading system, the Department was ranked first in the UK (i.e. we had the strongest 'quality profile'). Since then, the Department has grown considerably in size. It is clearly a leading international centre for fundamental physics research and a provider of high quality undergraduate and postgraduate teaching. The Department is in the top 10 in the country in the Tables published by the Guardian, Times and Independent newspapers. In 2014 the Department has grown to 47 academic staff, ~50 research associates and ~105 PhD students.

The make-up of the Department is shown in figure 4.1. The growth of the Department is illustrated in figure 4.2, phopgraphs 4.3 and figure 4.4.

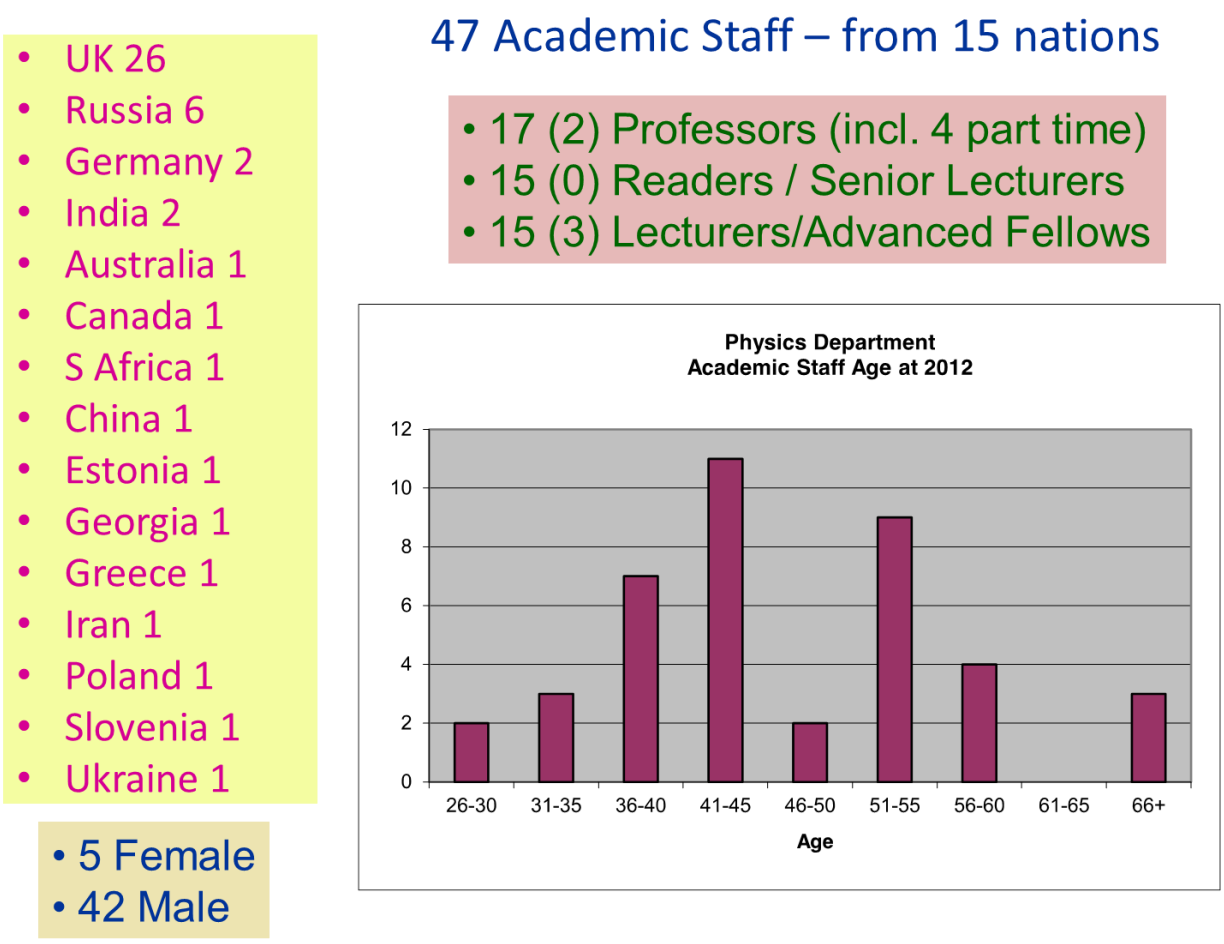


Figure 4.1 – the distribution of personnel within the Lancaster Physics Department in 2014.

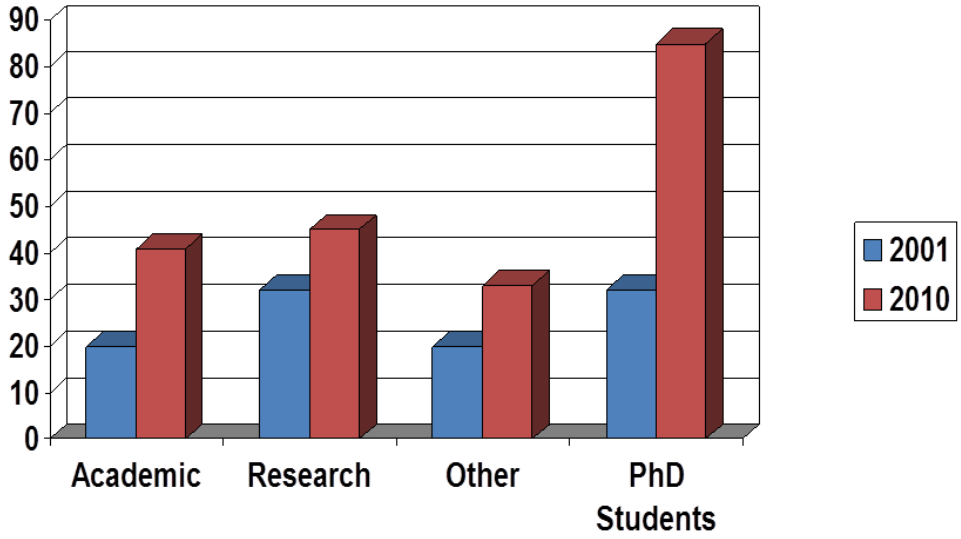


Figure 4.2 Growth in staff numbers since 2001. In 2012 there were of order of 200 people involved in research in the department. Academic staff includes advanced fellows and fixed term lecturers. Other includes technicians, visitors and active emeritus staff.

Photograph 4.3 shows the staff in 2014.

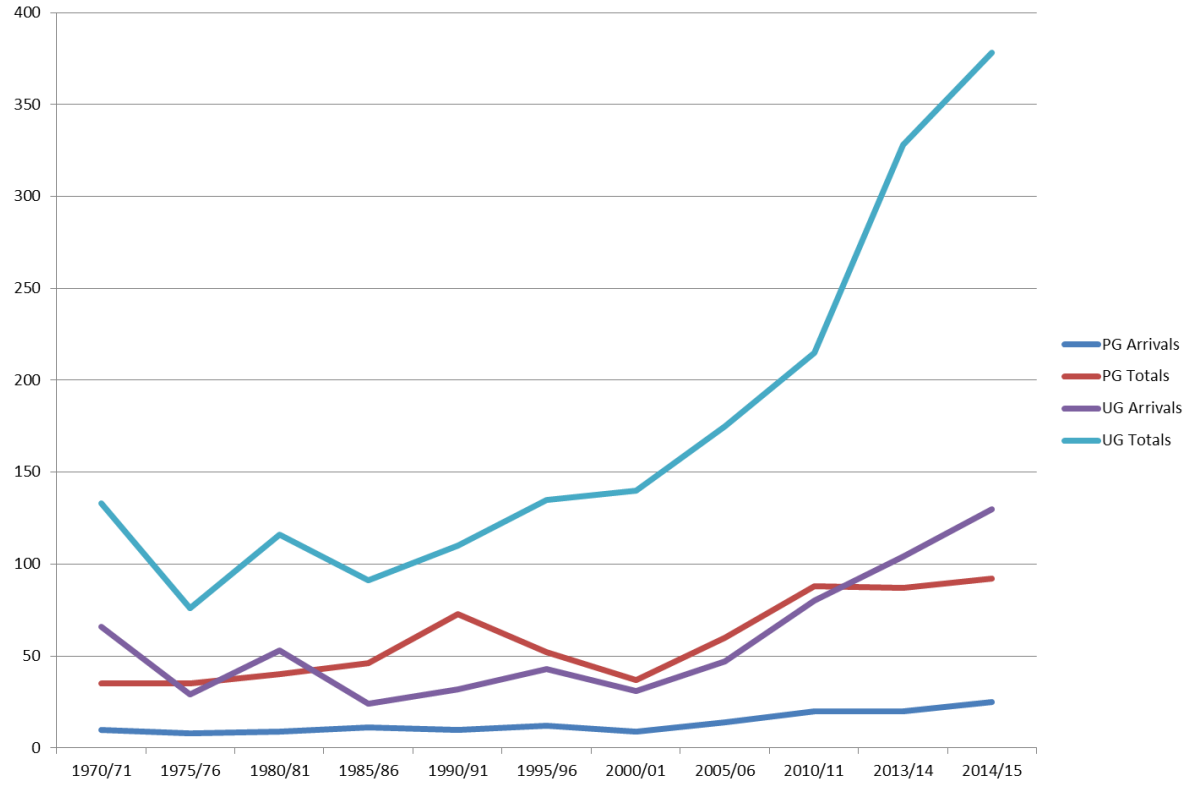


Figure 4.4 shows the total number of students in the Department against time from 1970-2014.

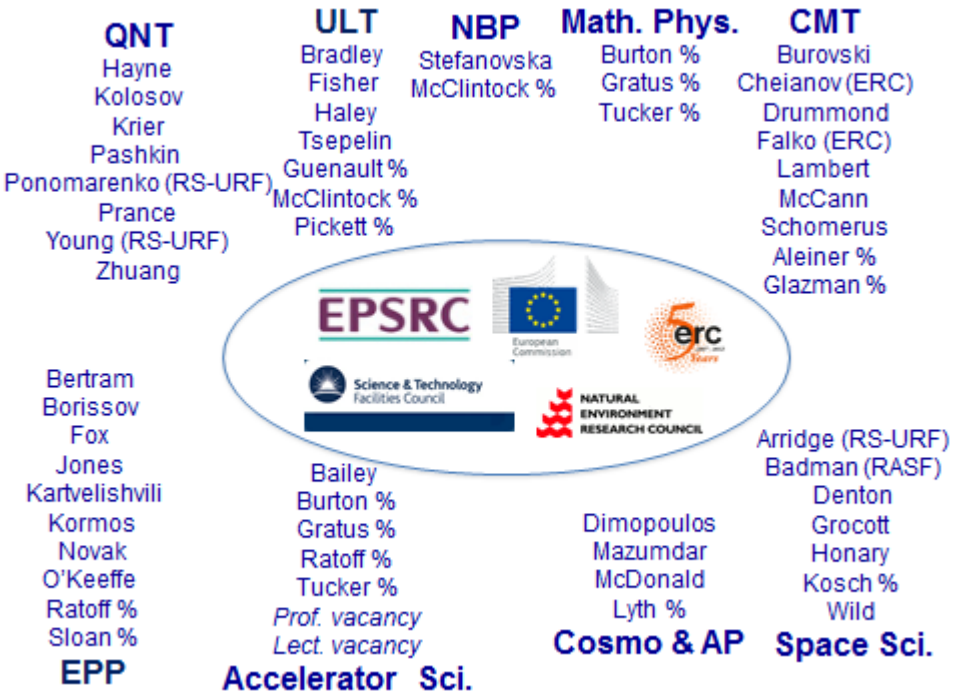


Figure 4.5 shows the current Academic Staff in the department and the research groups in which they work. The groups are QNT (Quantum Nano-Technology), ULT (Ultra Low Temperatures), NBP (Non-Linear Biomedical Physics)), Math. Phys. (Mathematical Physics), CMT (Condensed Matter Theory), EPP (Elementary Particle Physics), Accelerator Sci. (Accelerator Science as part of the

Cockcroft Institute), Cosmo and AP (Cosmology and Astro-Particle Physics), Space Sci. (Space Science), (% means part time). The inset shows the supporting agencies.

Research in the Department in 2014.

The current research in the Department is summarised in figure 4.5. There are 9 research groups in total. The growth in activity since the initial three divisions in the early 1970s is apparent.

Each group has access to World leading facilities. For example the Quantum Nanotechnology Group has access to its own clean rooms (130m^2 of Class 100/Class 1000) and nanofabrication facility in Lancaster with £2.5 million worth of equipment (including electron beam lithography). It also has 4 molecular beam epitaxy machines for multi-layer semiconductor growth. It does research into q-bits, quantum dots and novel memory devices as well as well as microscopy. The condensed matter theory group has been responsible for a number of advances, for example a carbon nanotube windmill (Lambert et al. Nature Materials 4 (2005) 335-339) and optical modes in microcavities (Schomerus and Hentschel Phys. Rev. Letts. 96 (2006) 243903). The group was involved in the development of graphene (Novoselov, McCann, Morozov, Falko, Katsnelson, Zeitler, Jiang, Schedin, Geim - Nature Physics 2, 177 (2006)) which eventually led to the award of the 2010 Nobel Prize for Physics to Konstantin Novoselov and Andre Geim of Manchester University.

The Mathematical Physics group works on a variety of topics. It has published studies of gravitational waves, modelling relativistic elasticity, post-Einsteinian orbital dynamics, the exploration of rain-wind induced vibrations of cable stayed bridges. It also works on the exploration of charged particle dynamics in novel accelerator designs as a member of the Cockcroft Institute (see below).

The Ultra Low Temperature group has held/still holds various records for the World's lowest temperature and has World class facilities. Its research is focussed on quantum fluids, liquid He^3, quantum turbulence and the simulation of cosmic strings.

The Non-linear Biomedical Physics group studies complex dynamical systems such as those occurring in the human body.

The Cosmology and Astroparticle Physics group specialises in the early Universe at its inflationary epoch when particle physics played a crucial role. The Space Physics group works nearer home studying the Solar System and the Planets. The Elementary Particle Physics group performs its experiments at CERN in the ATLAS Collaboration using the Large Hadron Collider (LHC). It also has a group studying the properties of the neutrinos, performing its experiments as part of the T2K Collaboration working at the JPARC Laboratory in Japan.

The University is a member of the Cockcroft Institute along with the Universities of Manchester and Liverpool and STFC. Peter Ratoff is currently the acting Director (and from next year the full time Director) of the Institute, and staff from both the Lancaster Physics and Engineering Departments work there. The Institute was opened in 2006 with the purpose of studying advanced accelerator physics. It is funded principally by the Science and Technology Facilities Council (STFC). The Institute is housed in a building situated at Daresbury Laboratory which was funded by the North West Regional Development Agency (NWDA).

Honours awarded to Members of the Department.

1992 Terry Sloan: Rutherford Medal and Prize of the Institute of Physics (IoP) (joint with Erwin Gabathuler of Liverpool University).

1997 George Pickett: Elected to a Fellowship of the Royal Society

1998 Tony Guenault and George Pickett: Simon Memorial Prize of the IoP.

1998 Sean Fisher: Charles Vernon Boys Prize (later known as the Moseley Medal and Prize) of the IoP.

2006 George Pickett: Elected a Foreign Member of the Russian Academy of Sciences.

2008 Viktor Tsepelin: Young Scientist Prize awarded by The International Union of Pure and Applied Physics (IUPAP)

2010 Vlodya Falko: Official guest at the 2010 Nobel Prize ceremonies

2010 Ian Miller: The Hawksbee Award from the Royal Society.

2011 Guennadi Borissov: The annual prize of the Division of Nuclear and Particle Physics Division of the IoP for his work in B physics.

2012 David Lyth: Hoyle Medal and Prize (Cosmology) of the IoP.

2012 Nick Kay (Undergraduate): The SET Awards (Science, Engineering & Technology Student of the Year). “Europe's most important awards for science and technology undergraduates”

2012 Cherry Cadovan (PhD student): The Very Early Career Woman Physicist of the Year award 2011 by the IoP.

2013 Laura Kormos (on behalf of the Dept.): IoP Juno CHAMPION 2013

2014 Laura Kormos & Farideh Honary (on behalf of the Dept.): Athena SWAN Silver Award 2014

The Future.

In December 2014 we look forward to the outcome of the REF (the replacement for the RAE).

In the future we will continue to consolidate the work of all the existing groups in the Department.

In 2015 we intend to found a new observational astronomy group to complement the work of the Cosmology and Astroparticle Physics, Space Physics and Elementary Particle Physics groups. It is envisaged that this group will consist of 4 academic staff members together with research associates and postgraduate students.

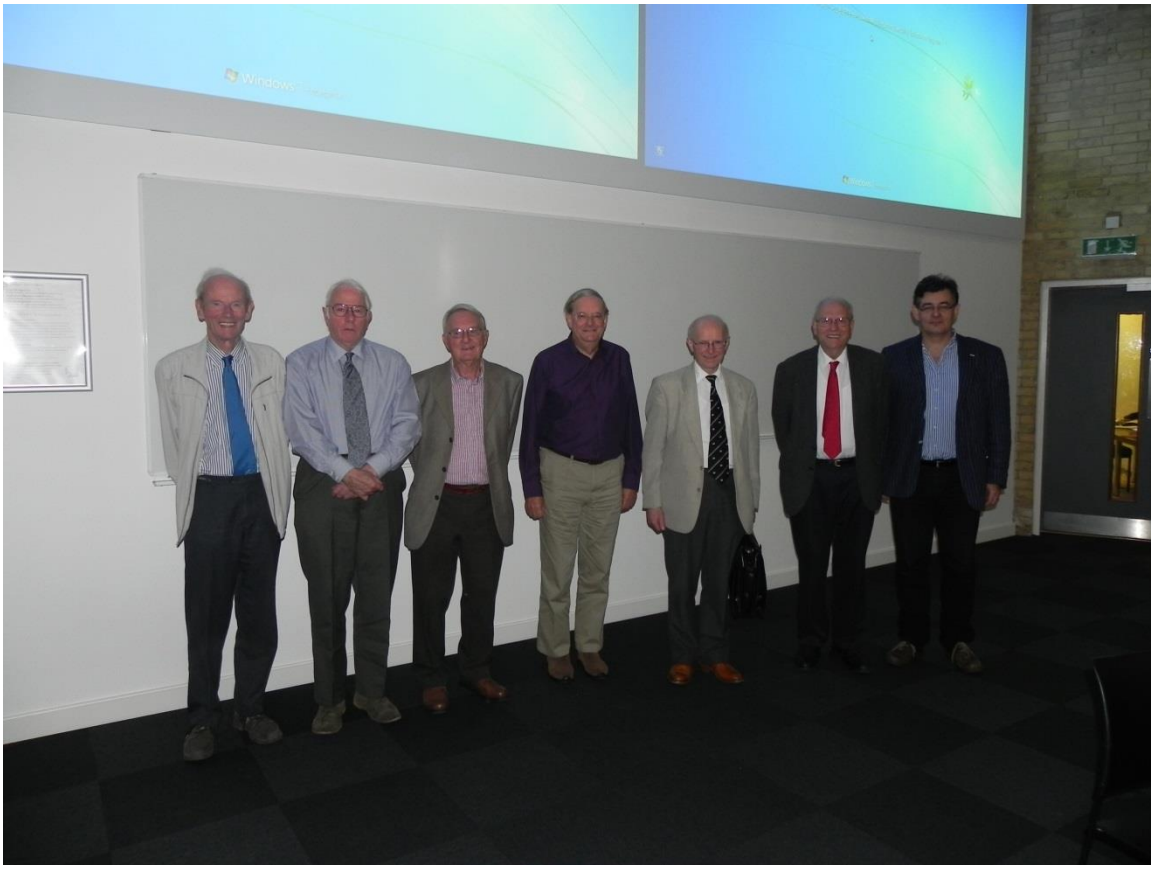
In 2015 there will be a complete refurbishment of the Physics Building to bring it up to 21st century standards.

Epilogue

This short tour through the history of the Lancaster Physics Department shows that while we are not the largest Physics Department in the country we have become a very significant department. Hence Roland Dobb's dream from the 1960s has at least been partially fulfilled.

In collecting together this material I realise how poorly we have archived our records over the years. The early years are well documented in photographs from the time when we had a professional photographer. However, there are fewer photographs from the later years. Furthermore, our written records of past events is almost non-existent and we have only a scant knowledge of the whereabouts of former staff members and students. Furthermore, we do not have a collection of the publications from the work of the Department.

This history is a summary of the four talks presented at the celebration of 50 years of physics in Lancaster as it has been gleaned from the participants and the speakers. The speakers and the editor are shown in photograph E.1 below.



Photograph E.1 The speakers and the editor (also chairman of the meeting) at the 13 September 2014 event to celebrate 50 Years of Physics in Lancaster (Left to right) W.M. Fairbairn, G. R. Pickett, P.M. Lee, A.M. Guénault, P.V.E. McClintock, T. Sloan, P.N. Ratoff.