MANCHESTER
1824

The University of Manchester

Combining the strengths of UMIST and
The Victoria University of Manchester

A New University for the 21st Century

- Established on 1st October 2004
- Royal Charter granted on 22nd October 2004
- 34 000 students from over 150 countries (1/3 postgraduate)
- 2000 academic staff & 1200 research staff
- £504M turnover (2004-5)
- £300M capital investment programme
- Manchester 2015 Agenda launched

Organisational Structure

- 4 Faculties (led by Vice-Presidents and Deans)
  - Engineering & Physical Sciences
  - Medical & Human Sciences
  - Life Sciences
  - Humanities
- Cross-Faculty Research Institutes
- Vice-Presidents for: Innovation & Economic Development; External Relations, Research; Teaching

Agenda for Excellence

To make The University of Manchester, already an internationally distinguished centre of research, innovation, learning and scholarly inquiry, one of the leading universities in the world by 2015.

An Inclusive Agenda

- To make the University of Manchester the UK's most accessible research-intensive university
- Primary Vision
- New access agreement to benefit almost 2000 students

Research Agenda

- >£4M from NWDA for:
  - NW Composites Centre
  - UK Centre for Tissue Regeneration
  - NW Embryonic Stem Cell Centre
- £11M from EPSRC for collaborative industrial postgraduate training

Research Agenda

- £1M from EPSRC for the Nuclear Technology Education Consortium
- Launch of ESRC National Centre for e-Social Science
- CoEBio3: Centre of Excellence in Biocatalysis, Biotransformations and Biomanufacture

Research Agenda

- 15 new Professorial appointments
- Rolls Royce UTC for Electrical Systems in Extreme Environments
- Partner in £7M Cockcroft Institute for Accelerator Science
- New magnetic resonance scanner

Economic Agenda

- £1.4 billion injected into the economy of NW in 2004-5
- University employs 9000 people, and directly responsible for >15000 jobs in the region
- 100 spin-off companies, with current capitalisation of £300M

Economic Agenda

- 2015 Agenda will deliver:
  - Additional £1.4 billion pa injected into goods and services in the regional economy
  - Additional >15000 jobs created
  - Additional 250 spin-off companies as direct result of commercialisation of University IP

Cultural Agenda

- 370 000 visitors pa to cultural assets – Museum, Whitworth Art Gallery, Jodrell Bank
- Stan the T-Rex
- John Casken's Symphony *Broken Consort* premiered July 2004

MANCHESTER
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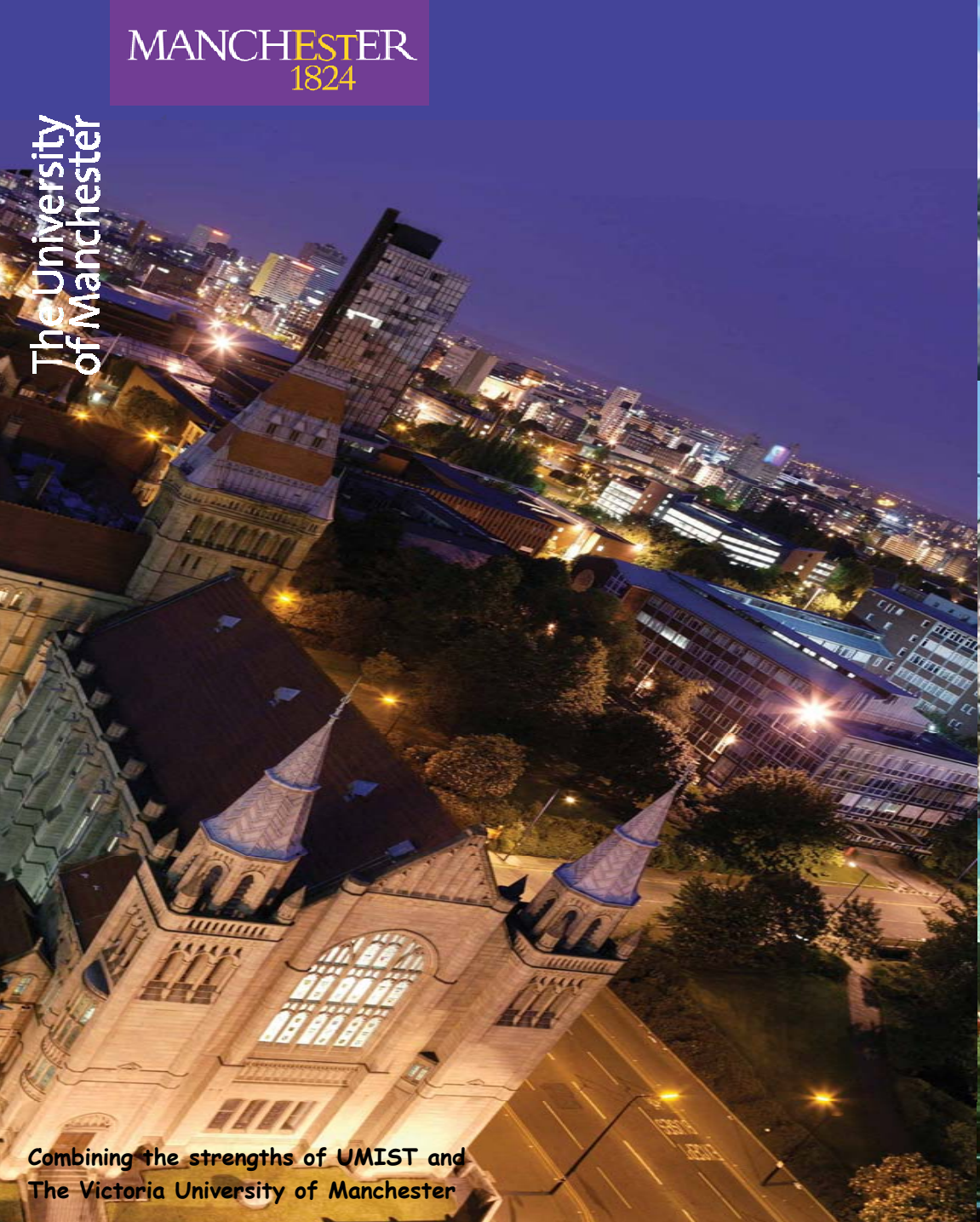


Combining the strengths of UMIST and The Victoria University of Manchester

The School of Chemistry:

Past Present and Future

Paul O’Brien

Head School of Chemistry

I know the chemical profession best, I devised two questions, for instance, to tell a chemist from a nonchemist. Here they are:

(1) How do you pronounce UNIONIZED?
(2) What is a mole?

- *In response to the first question, the nonchemist is bound to say "YOO-yun-ized," which is the logical pronunciation,*
- *and the dictionary pronunciation, too.*
- *The chemist, however, would never think of such a thing; he would say without a moment's hesitation: "un-EYE-on-ized."*

(2) What is a mole?

How Important is Chemistry?

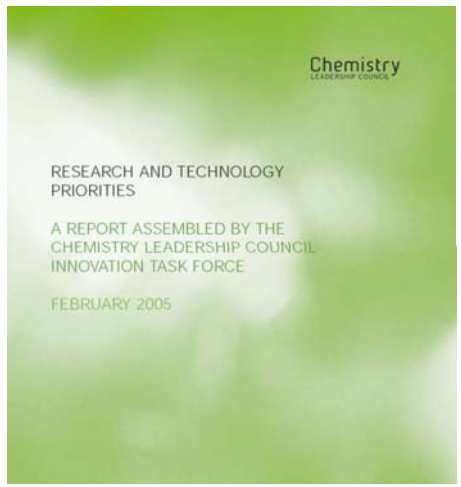
In 2002

- £26 billion of products from the chemical industry
- £2.4 billion to the balance of trade or 7% of added value in manufacturing

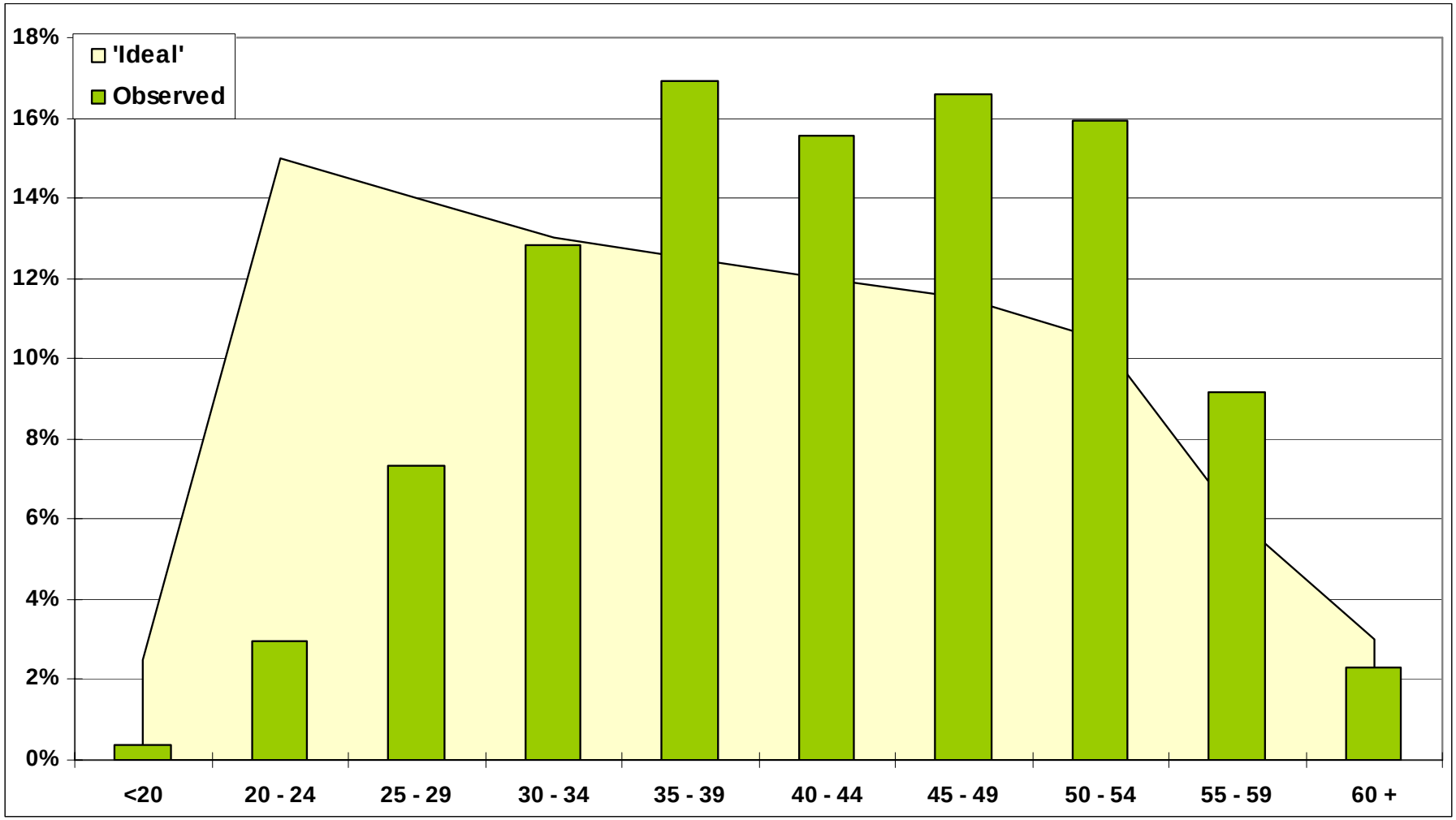
But more

- £51 billion in 2002 from ‘chemical using industries in 2002, 11% of manufacturing segment of economy

Source Research and Technology Priorities- a Report Assembled by the Chemistry Leadership Council Innnovation Task Force Feb 2005



REGIONAL DEMOGRAPHICS

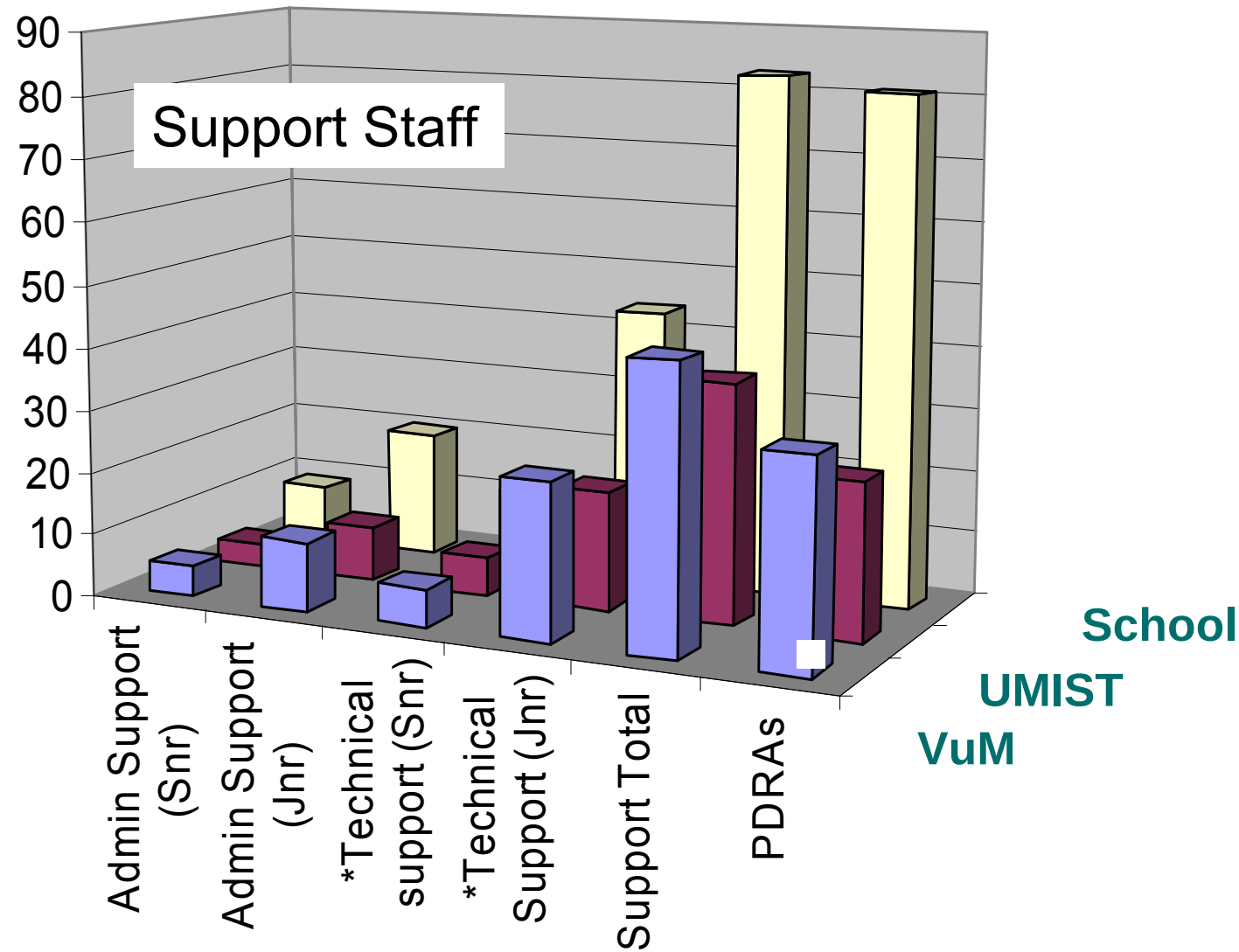


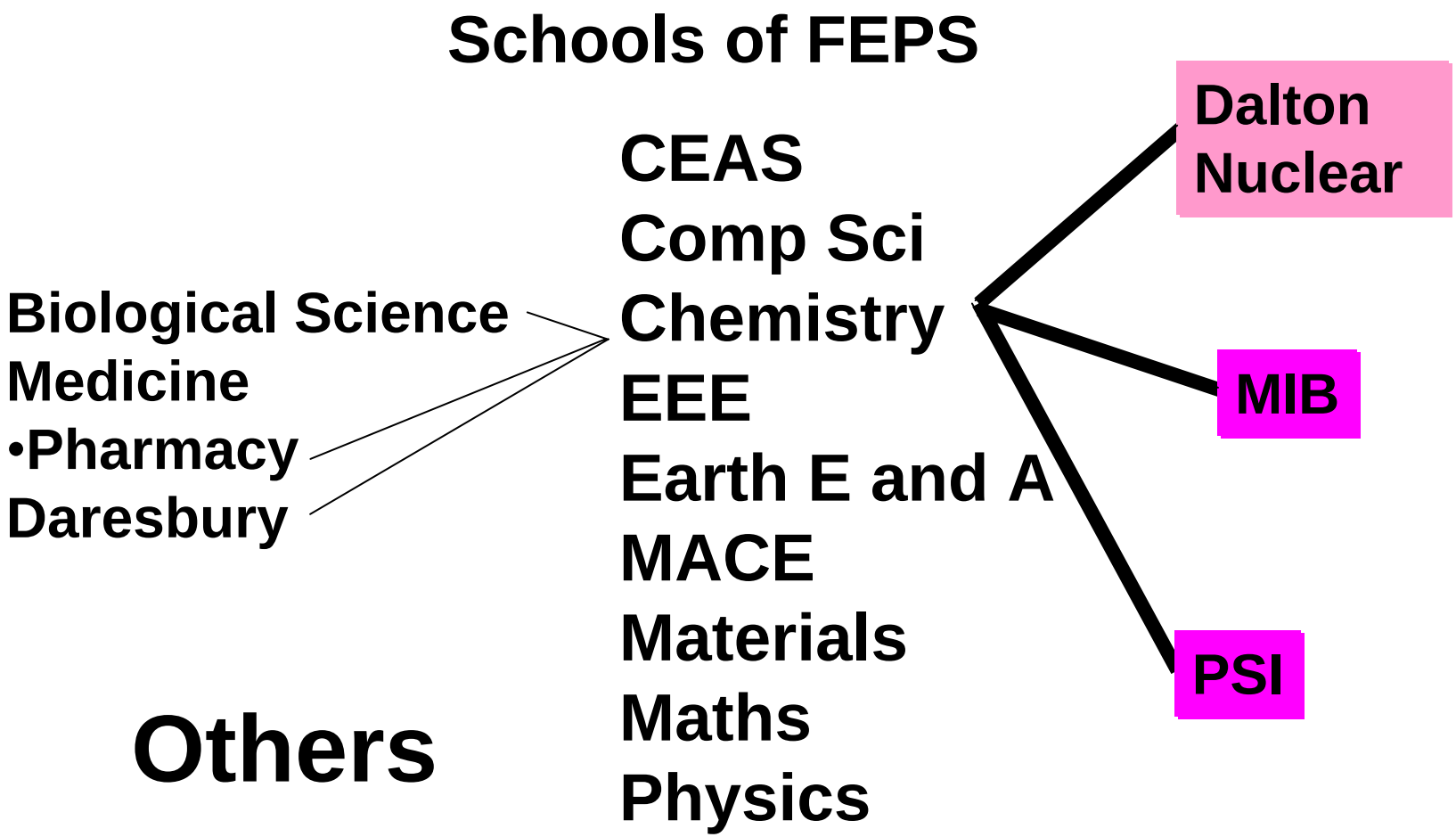
Based on a Report to the NWCI Steering Group, Dec. 2002

Introduction

- Origins of the School of Chemistry
  - Historical
  - On the formation of the New University and new School
- The challenges we face

The Present School two Components People and Estate





Joint academic appointments with 4 Schools

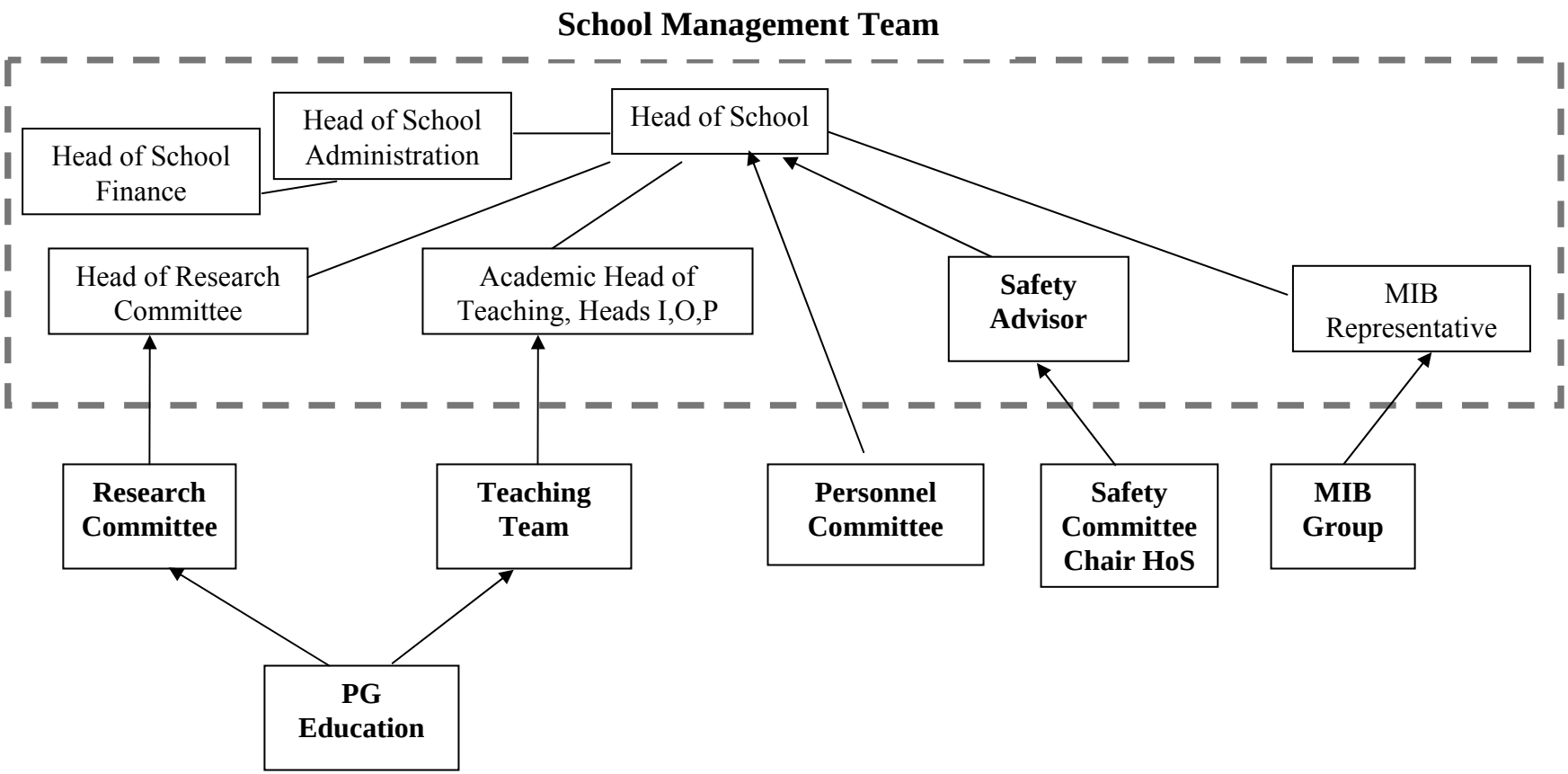
The School at a Glance

Indicator	*Value 2004*	*Value 2005*
Turnover	17 M	17 M
Number of Academic Staff	59	58
Percentage of Academic Staff on Fellowships	10	7
Number of EPSRC Grants	48	45
Value of EPSRC Grants (inc.DTA)	>£ 13.5 M	>£13M
Number of BBSRC Grants	20	22
Value of BBSRC Grants	>£ 7.5 M	>11.6M
Number of Support Staff	93	81
Number of Undergraduate Students	604	623
Percentage of Overseas UG Students	4	4
Percentage of Students reading for M.Chem	81	9
Number of PGT Students	30	23
Percentage of Overseas PGT Students	13	13
Number of PGR Students	179	170
Percentage of Overseas PGR Students	18	20
Number of PDRA workers	78	75

November 2005

Some Observations Stop Press

- School of Chemistry has the highest number of current EPSRC grants (Chemistry) and the 2nd highest value.
- Largest BBSRC portfolio for a Chemistry Department or School
- The New School has >200 FTE Graduate Students
- Ca 60 Academic Staff with >10% on prestigious fellowships or externally funded posts



Principal Connectivities Between Academic Management and Leadership and Administrative Structures

The School at Present

- Geographical context

School of Chemistry

www.manchester.ac.uk/chemistry

- **Facts and Figures:**

– ***one of the largest chemistry schools in the UK, with international profile***

– ***ca.* 60 research active academics**

– **> 200 postgraduate students**

– **> 600 undergraduate students**

– ***ca.* 6000+ m^2 of refurbished labs**

– **A >£13M new build and refurbishment in 2004 – 2006 (Project Unity)**

Home to several research centres with extensive industry/RC support

– **BNFL centre for radiochemistry**

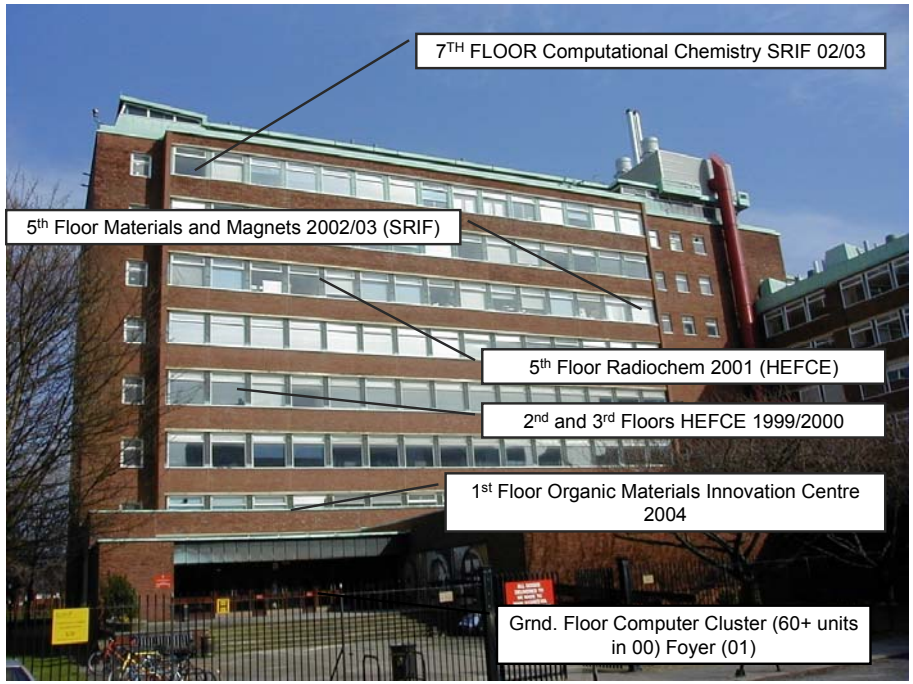
– **EPSRC national epr service**

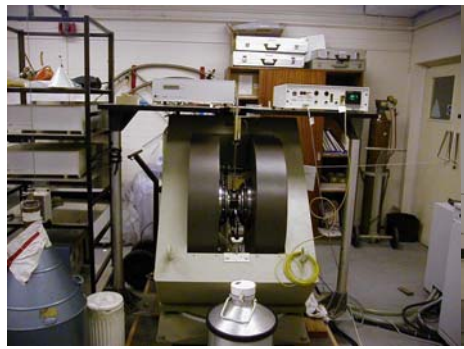
– **OMIC organic materials centre**

– **Centres for mesoporous materials (CMM), mass spec. (MBCMS)**

– **Michael Barber Centre for Mass Spectrometry**

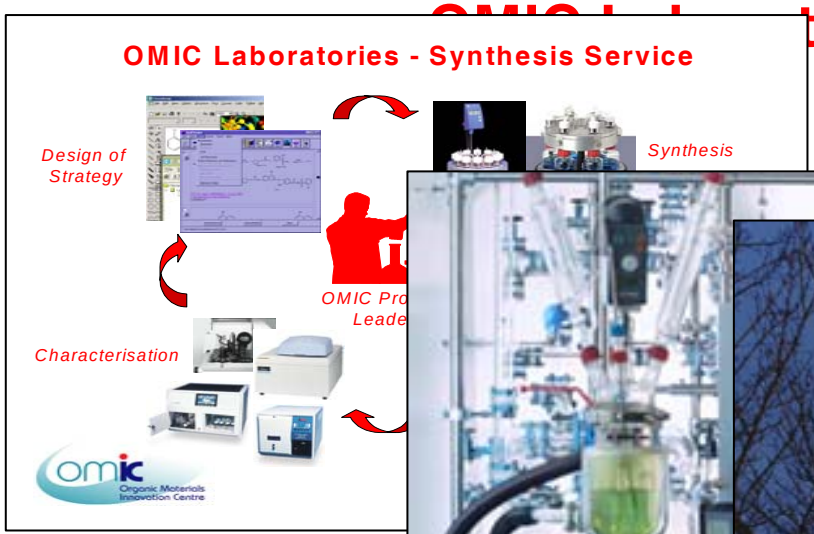
– **Links with interdisciplinary institutes: bioscience (MIB), photonics (PSI), Dalton**





→ New U has 2nd largest value of current EPSRC grants, largest current value BBSRC grants

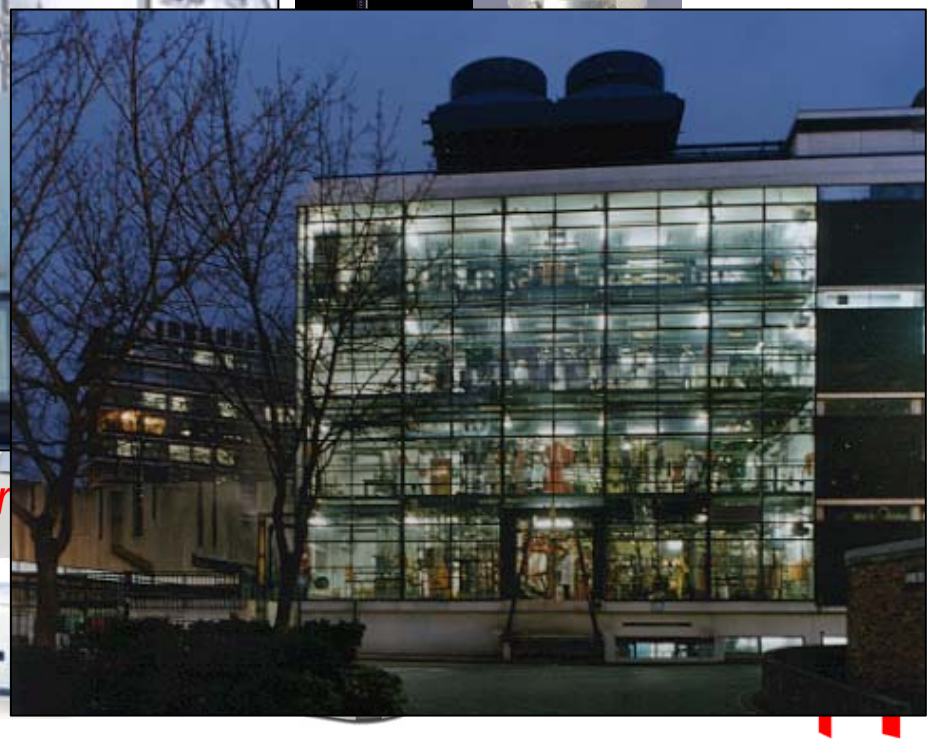
OMIC Laboratories - Microscale to Pilot Plant



Laboratory Sc

Characterisation

Large Labor



Pilot Plant – CEMIST facility

THE UNIVERSITY of MANCHESTER

omic
Organic Materials Innovation Centre

Laboratory Scale

MMC
Molecular Materials Centre

Before OMIC Laboratories

After!

Most Recently
Completed Project

Engagement with industry

Collaborative research

- CASE studentships
- Fully-funded studentships
- PDRAs
- Research council co-applications
- RAIS
- KTPs
- Centres/Institutes

- Contract research
- Facility access
- Analytical services
- Startup companies
- External advisory board
- Consultancy
- Embedded research groups
- CPD / training
- U/g sponsorship, prizes
- Endowed chairs

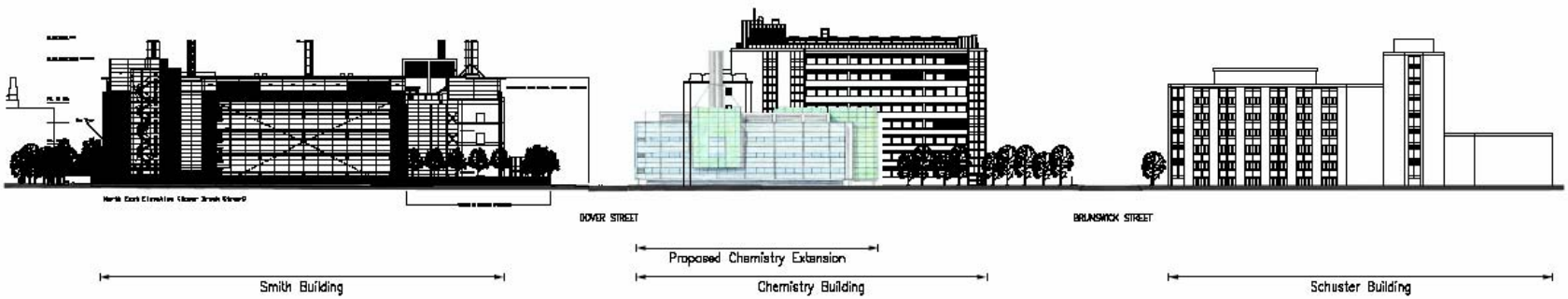
MIB

CoEBio3 launch

- Centre of Excellence for Biocatalysis

South West View

A New Wing Mainly for Teaching




05/10/2005


KIER
KIER GROUP
05/10/2005


05/10/2005


05/10/2005


05/10/2005


05/10/2005


05/10/2005

- **A GOOD START**!
- THES
- Chemistry World
- BBC1 Politics Show
- UniLife

The Present and the Future

- We have a single entry from September 2005
- Now teaching a fully unified course across all years from September 2005
- Split site operation will cease with co-location in the Chemistry Building from September 2006 and the opening of the new Teaching Laboratory Extension

School of Chemistry, University of Manchester

http://www.ch.man.ac.uk/ and http://www.umist.ac.uk/departments/chemistry/

- **Undergraduate Courses**
  - ***Chemistry***
  - ***Chemistry with Industrial Experience***
  - ***Chemistry with Study in Europe***
  - ***Chemistry with Study in N. America***
  - ***Medicinal Chemistry***
  - ***Chemistry with Patent Law***
  - ***Chemistry with Forensic Science***
  - ***Analytical Chemistry***
  - ***Chemistry with Business & Management***
  - ***Chemistry with Computing & IT***

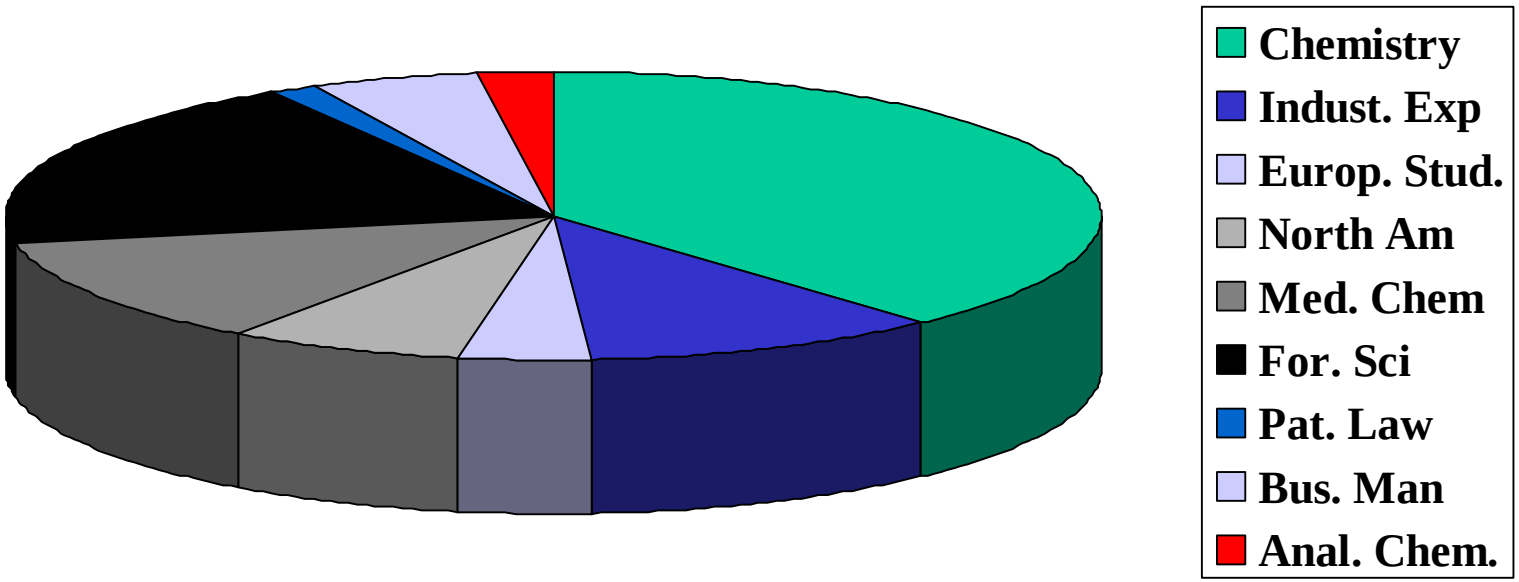
  ***ca* 30 industrial placements per annum**

- **Postgraduate**
  - Full time and part time study
  - **Taught MSc courses (MTPs) in:**
  - Cheminformatics
  - Polymers
  - Post-genomic science

  MSc, MPhil and PhD by research

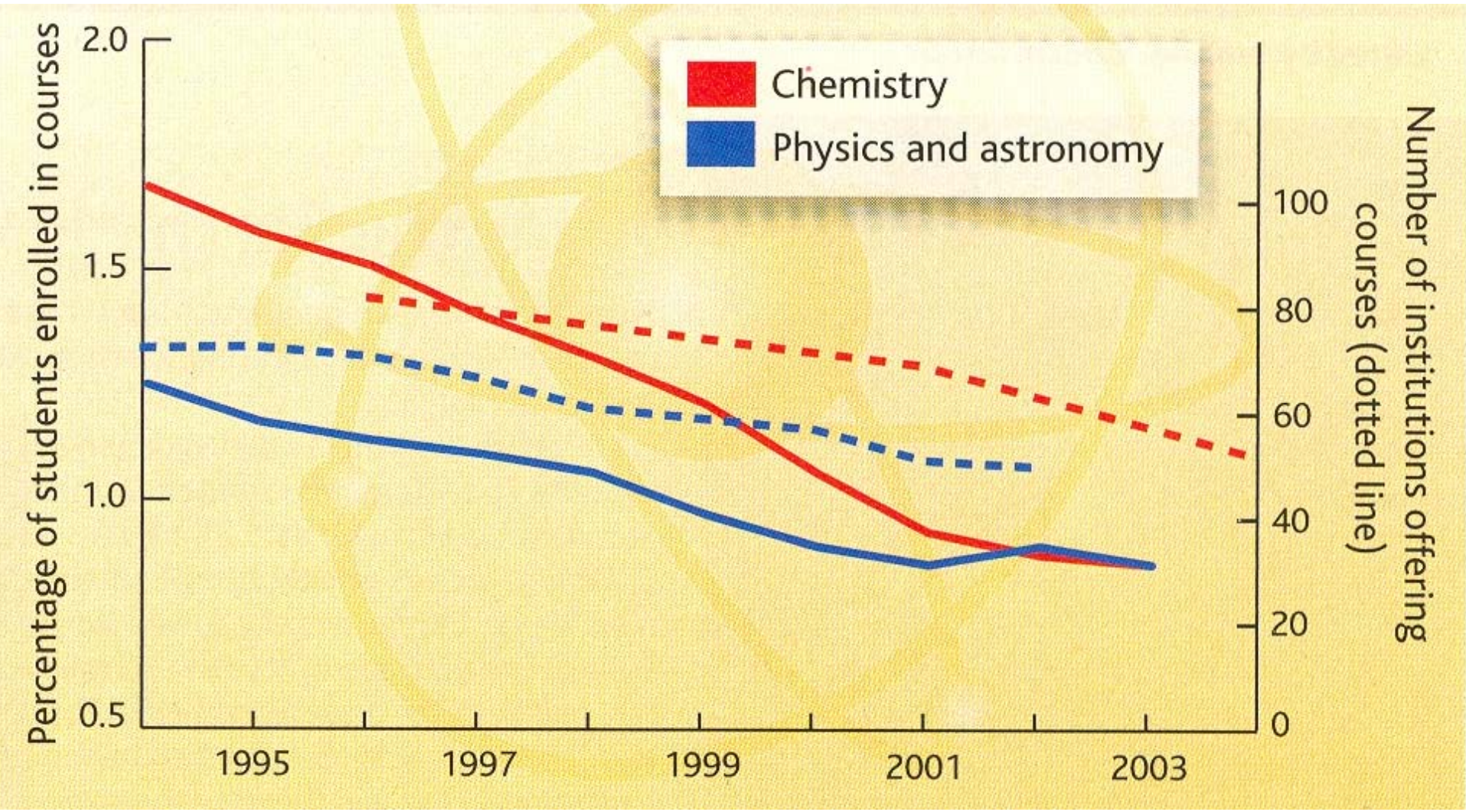
- **Outreach Activities**
  - schools liaison (primary → secondary)
    - Salters'
    - RSC
    - IOMMM
    - Aimhiger/WP
  - specialist taught courses
  - OMIC
  - BNFL Centre

Applications 2005/6



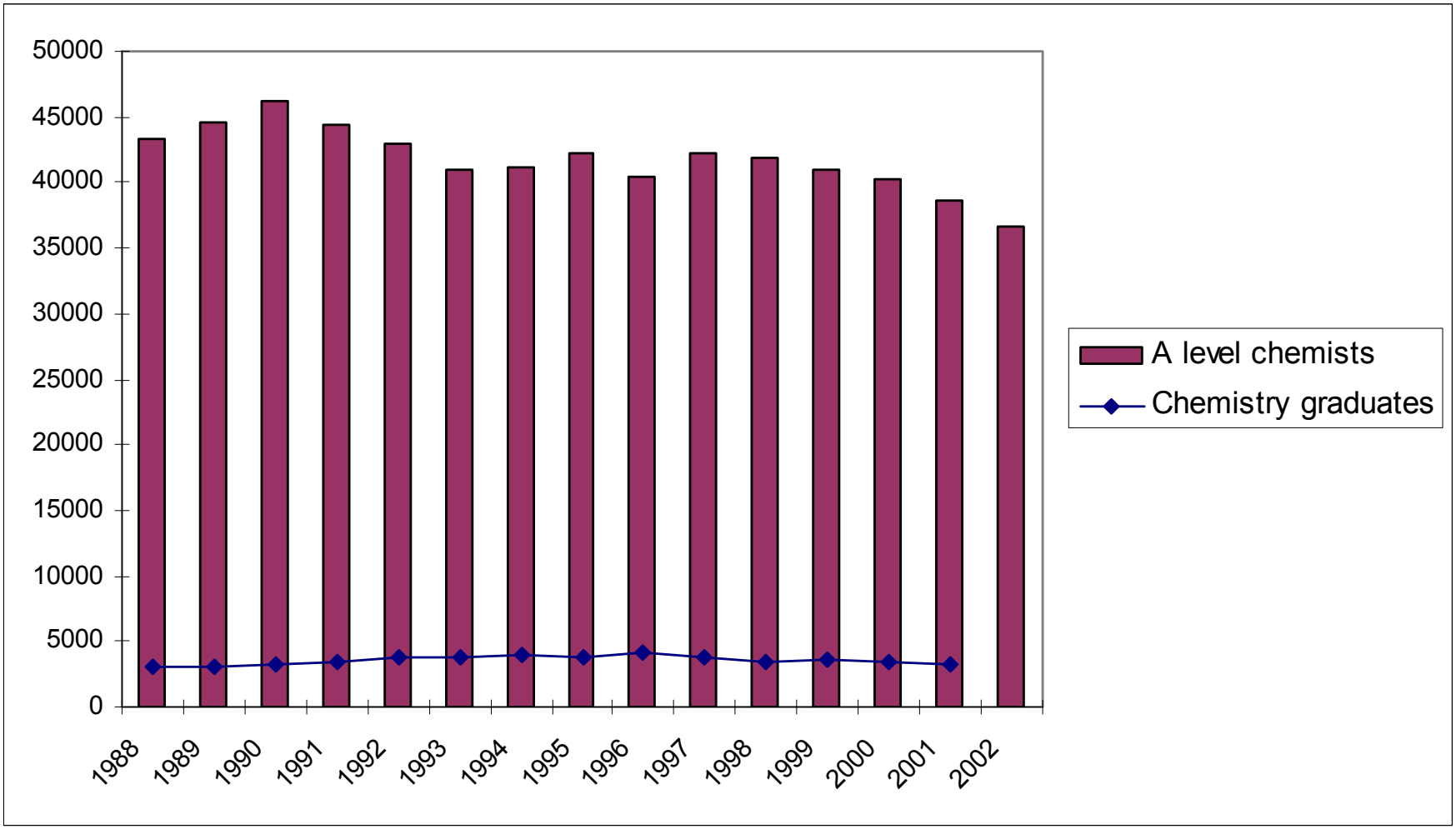
New course developments commented on favourably by EAB (CLC)

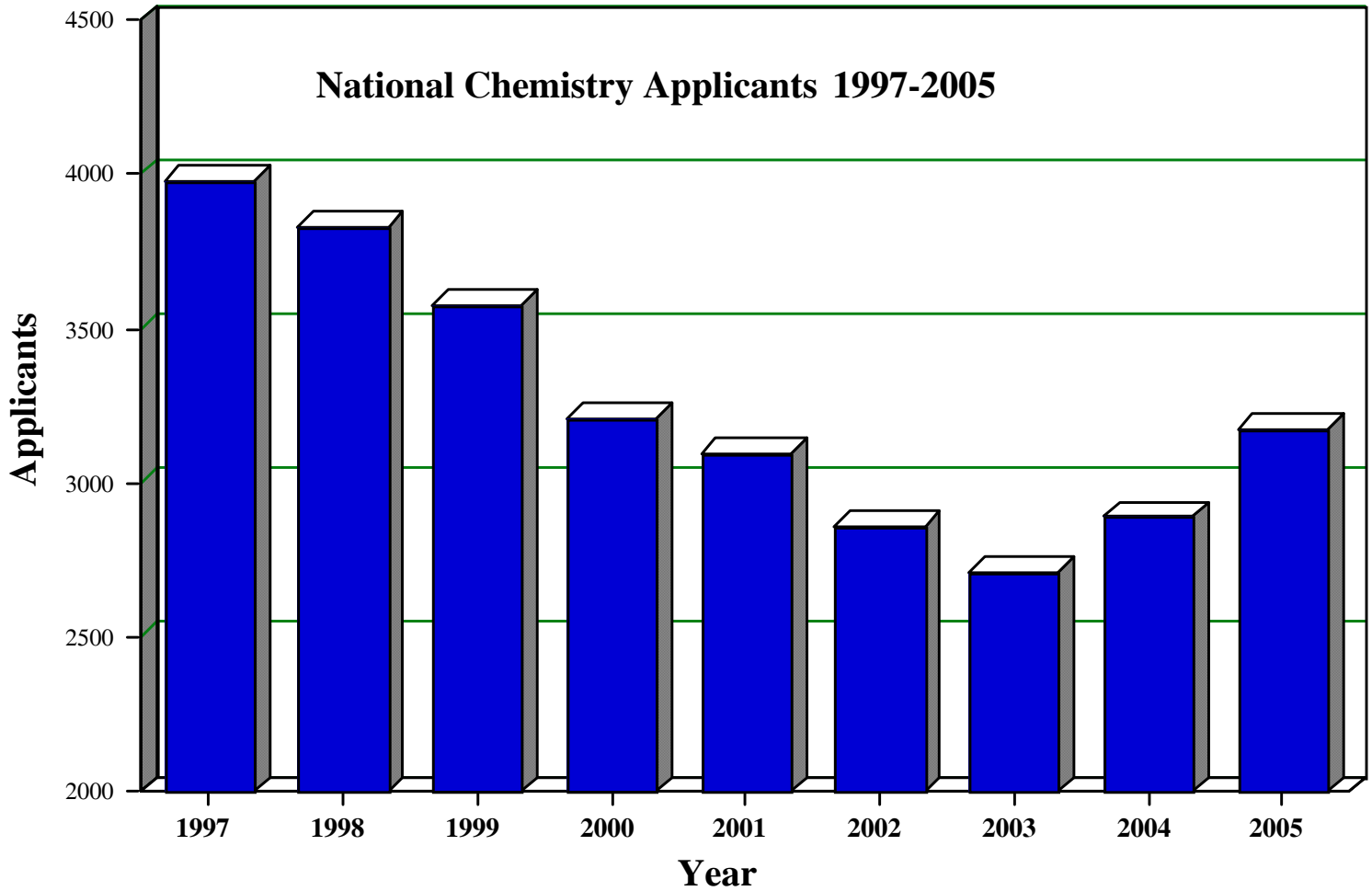
The Decline of Popularity of the Physical Sciences ?

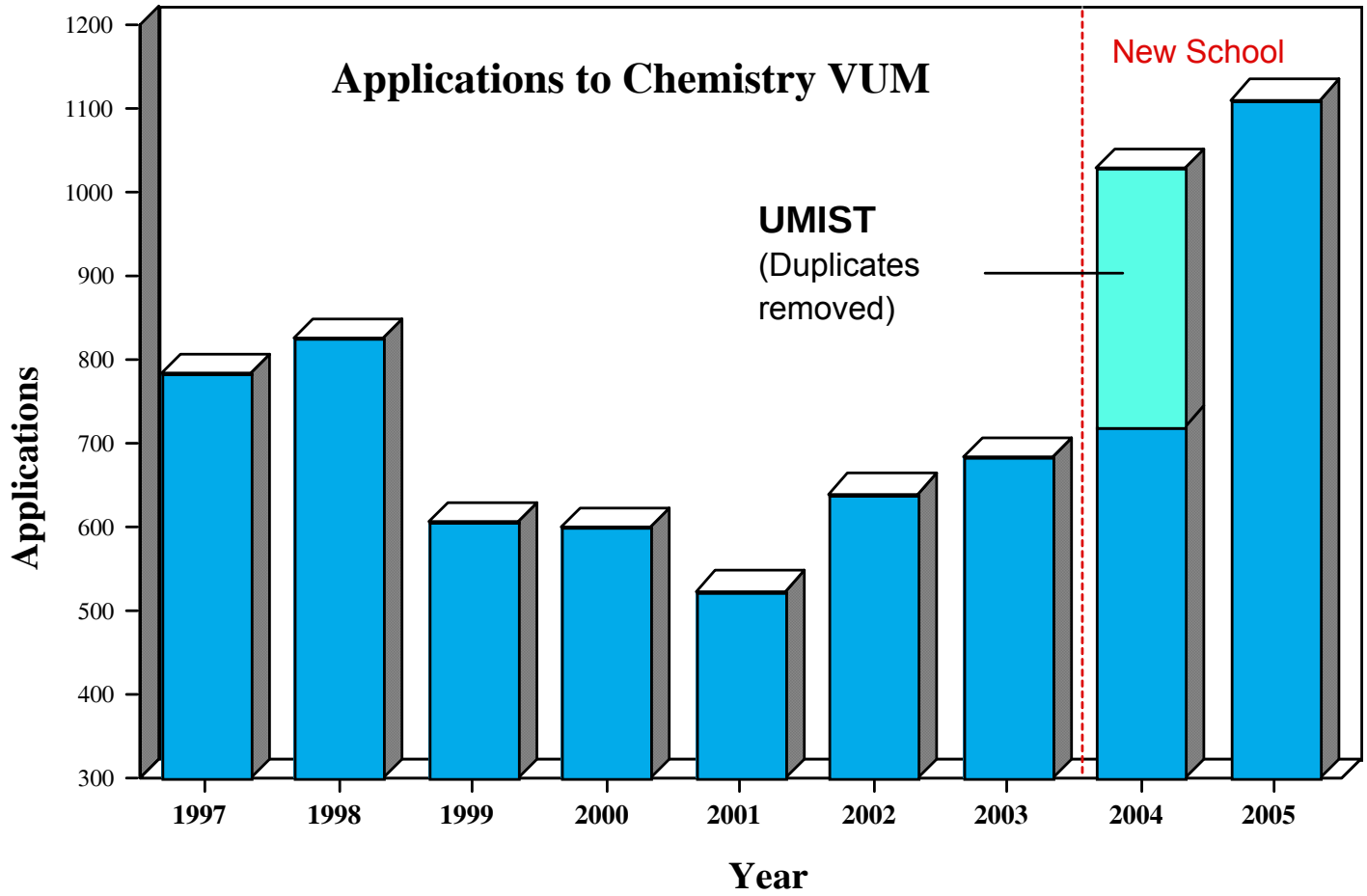


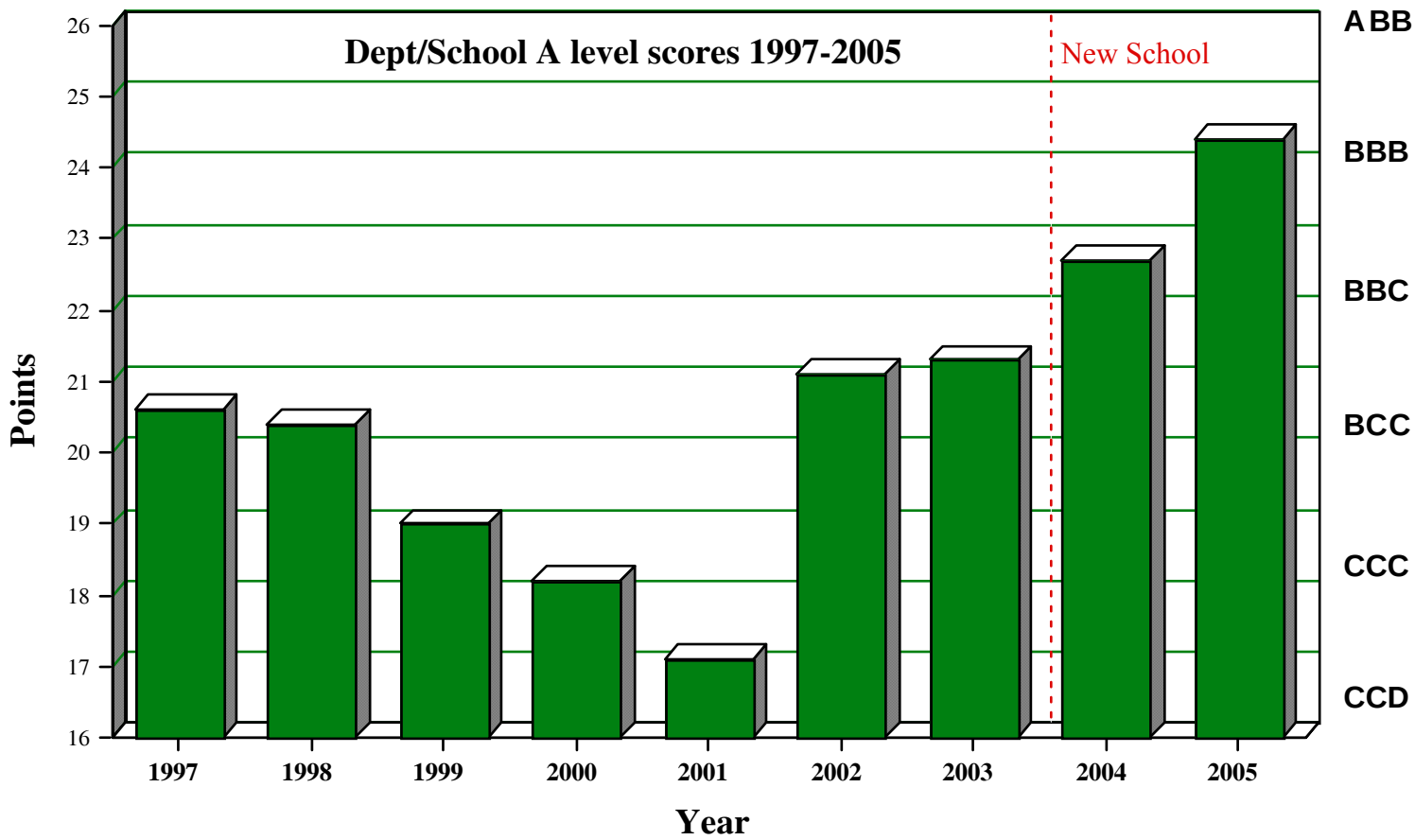
[Nature **307,** 670 (2005)]

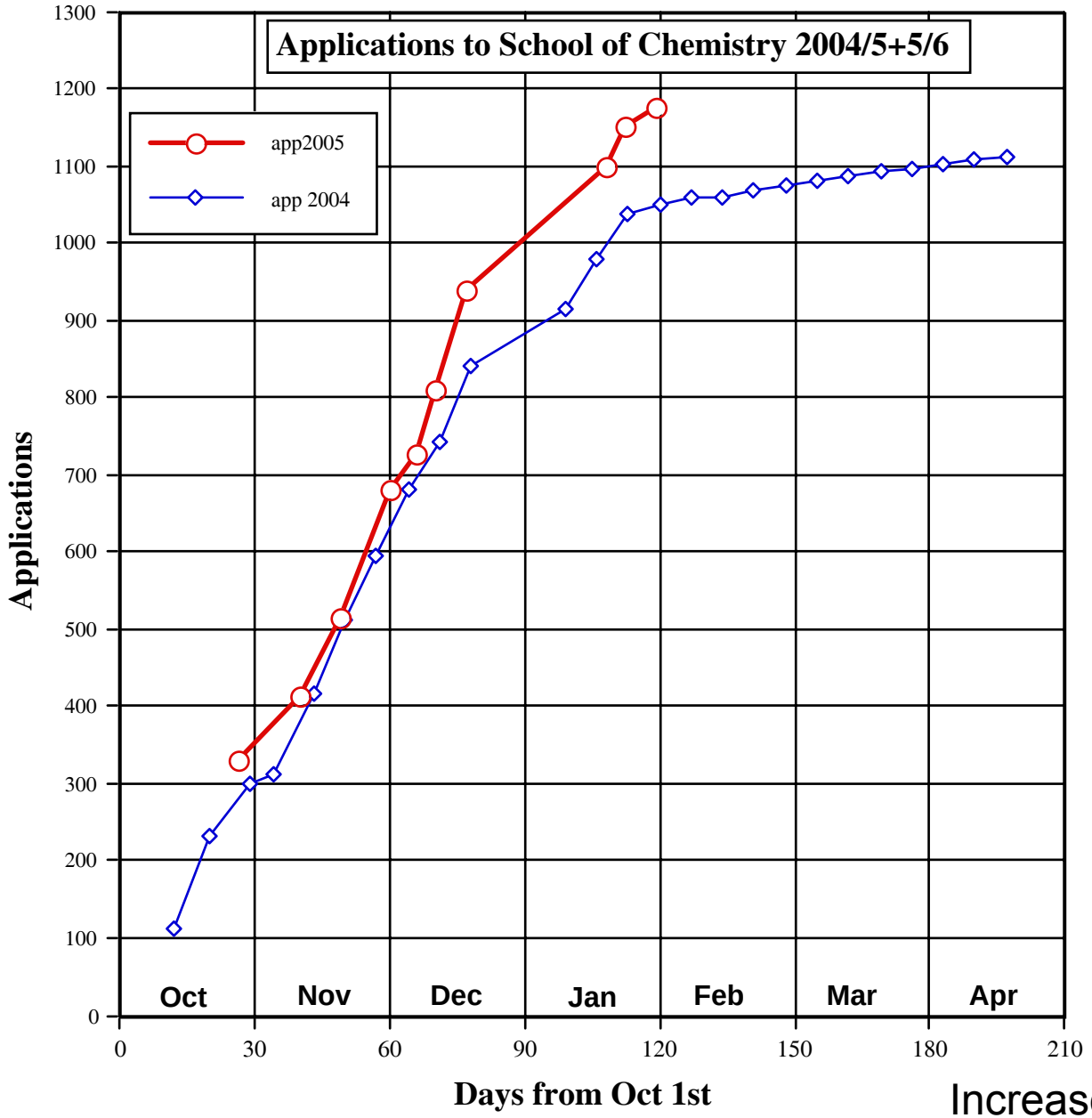
Trends in Student Numbers




National Chemistry Applicants 1997-2005
Applicants
4500
4000
3500
3000
2500
2000
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year


Applications to Chemistry VUM
New School
UMIST
(Duplicates
removed)
Applications
1200
1100
1000
900
800
700
600
500
400
300
1997
1998
1999
2000
2001
2002
2003
2004
2005
Year


Dept/School A level scores 1997-2005
New School
Points
Year
26
25
24
23
22
21
20
19
18
17
16
1997
1998
1999
2000
2001
2002
2003
2004
2005
A BB
BBB
BBC
BCC
CCC
CCD



Increased applications

Russell Group Comparisons (2002/3)

Student FTEs 2002/2003	Total UG	TotalPG (R+T)	Total (ug+pg)	PGR	PGT
Oxford	667	257	924	256	1
Manchester + UMIST	601	239	839	198	41
Glasgow	462	57	519	55	2
Leeds	459	205	688	170	35
Bristol	454	205	658	202	3
Nottingham	390	156	546	156	0
Manchester	373	132	506	122	10
Edinburgh	361	114	475	114	0
Cambridge	351	244	597	244	0
Birmingham	316	152	468	70	82
Imperial	288	159	447	135	24
Sheffield	270	140	410	140	0
UCL	268	68	336	67	1
Warwick	241	86	328	71	16
Southampton	191	130	321	130	0
Liverpool	179	104	285	93	11
Newcastle	174	80	259	69	11

And the result? – and this is going to happen again and again……

THE TIMES
HIGHER
EDUCATION SUPPLEMENT

King's punished for closure

Anna Fazackerley

The dangers of axeing science departments were driven home to universities this week when it emerged that King's College London had lost out on a multi-million-pound research partnership because it had dropped chemistry.

For months, King's has been pitched against University College London to secure a groundbreaking merger with the Medical Research Council's National Institute for Medical Research.

Last week, the MRC announced that the prestigious institute — which has produced five Nobel prizewinners — would move to UCL, with a new focus on patient-based research. Council members told *The Times Higher* this week that chemistry had been the deal breaker for King's.

Michael Wakelam, professor of molecular pharmacology at Birmingham University and a member of the MRC council, said: "There is a clear lesson for universities here. If you look at the most successful science-based universities in this country, they have a wide breadth of science."

He confirmed that while King's was "very impressive", its decision to close chemistry in 2003 had been a key reason for declining its bid.

King's tried to salvage the deal at the beginning of this year with a drive to recruit academics for a new chemical biology programme. But this was perceived as too little too late.

Professor Wakelam said: "My feeling and that of academics I spoke to around the world was that you need to build chemical biology out of very strong basic chemistry."

Although King's was offering a tempting £40 million package to develop the new NIMR site, UCL was able to capitalise on its rival's scientific shortcomings because it has a thriving chemistry department as well as strong physics and engineering departments.

Kay Davies, professor of anatomy at Oxford University and another council member, said that universities such as King's needed to realise they could not do biological or medical research in isolation.

"It is shortsighted. Even medics need to have an understanding of the basic sciences," she said.

She warned that universities should think of their long-term research strategy rather than simply reacting to falls in student numbers by scything less popular science departments.

Chemistry at King's had always enjoyed a high profile due to its association with Rosalind Franklin, whose work at the university contributed to the groundbreaking discovery of the structure of DNA.

The news that a traditional research-based university was abandoning chemistry reverberated across the sector in 2003.

But it is far from an isolated case. The Royal Society of Chemistry reports that 28 institutions have dropped undergraduate chemistry courses in the past nine years.

The picture is similarly bleak in physics, where 30 per cent of departments have been axed since 1992.

Simon Campbell, the president of the RSC, said: "We often hear of universities that want to put their efforts into medical schools and close chemistry, but that is a fundamental misunderstanding of how closely the two disciplines are linked."

He added: "Small molecules control many of the biological processes in the body and most of

continued on page 8

Research Areas

Research Groupings

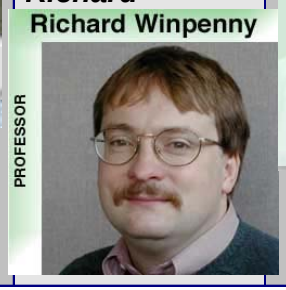
- Biological Chemistry
- Inorganic Chemistry
- Materials Chemistry
- Organic Chemistry
- Physical Chemistry
- Theoretical Chemistry

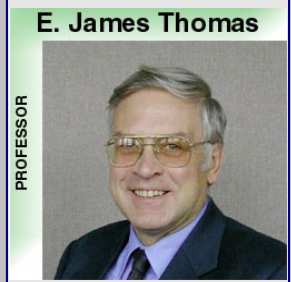
Research Centres

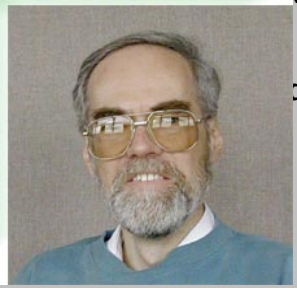
- Radiochemical Centre
- Microporous Materials Centre
- Michael Barber Centre for Mass Spectrometry
- Organic Material Innovations Centre
- Molecular Materials Centre
- 3rd Generation Proteomics Centre

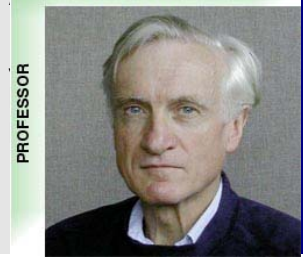
Research Leadership

Biological Chemistry	Inorganic Chemistry	Materials Chemistry	Organic Chemistry	Physical Chemistry	Theoretical Chemistry
David Berrisford Sabine Flitsch Simon Gaskell Roy Goodacre John Helliwell *Douglas Kell*	Alan Brisdon Nick Bryan Ben Coe David Collison Stephen Faulkner Kevin Flower Sarah Heath Francis Livens (.5) Robin Pritchard Iain May Eric McInnes Mark Whiteley *Richard*	Michael Anderson Martin Attfield Paul Christian Peter Budd Frank Heatley Frank Mair Bob Munn Paul O'Brien *Mike Turner*	Pat Bailey Jonathan Clayden Daren Dixon John Gardiner David Procter Peter Quayle Andrew Regan John Sutherland *Jim Thomas*	Robert Dryfe Peter Gorry Andrew Horn *Gareth Morris* Gareth Morris (0.5) PROFESSOR d	Neil Burton Jonathan Connor Richard Henchman *Ian Hillier* Ian Hillier PROFESSOR









School of Chemistry, University of Manchester

- **Initial targets**:
  - attain position as a top rated School 5 * or the equivalent in RAE
  - forging stronger links with business and industry (External Advisory Group/EAB)
  - increased research spinout and commercial activity
  - regional, national and international strategic research planning for new and emerging sci./tech.
  - to further improve our international profile
- **Teaching/Training targets**
  - excellence in UG and PGT
  - meeting the needs of regional and national industry (feedback)
  - outreach to SMEs, schools and the public

Achievements, Objectives, Milestones

- **2004** We have established a strong external advisory board (chaired by Jim Feast, chair of RAE 2001).
- **2004/5** Planning for the Chemistry with Forensic Science course
- **2005/6** Interactions with the Dalton Nuclear Institute plans for a funded appointment, probably in radiation chemistry. Collaborations with the Paterson group formalized. (panel meets Feb ’06)
- **2005/6** Planning for the commissioning and fitting out of the new teaching wing.
- **2004-** A series of high profile lectures to follow on from the successful launch of the School; Sir Tom McKillop and Simon Campbell have both agreed to make presentations.
- **2006/7** New appointments in Physical Chemistry Chair
- **2006** Work with CEAS on funding work at the Chemistry / Chemical Engineering interface, especially in support of Physical Organic Chemistry.
- **2006** MIB established and functioning as a centre of excellence; staff have moved to MIB, financial model of MIB understood and transparent.
- **2006** CeBio3 functioning as a major new initiative with significant School involvement.

Milestones in Chemis

1824 Mechanics Institute chemistry a foundation subject

1851 Frankland appointed start of chemistry Owen's

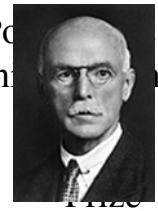
1867 Roscoe isolates elemental vanadium

1887 BA Meeting with Mendeleev.

1903 Faculty of Technology

1915 Weizmann works on starch into butyl alcohol

1907 Po on chiral n d sulfur



Harden Nobel Prize

933 M.Polanyi arrives n Manchester

Haworth Nobel Prize

1947 Robin el Prize

1957 Todd Nobel Prize

1964 New Chemistry g Jack 1-67

1961 Calvin Nobel Prize

1952 John Polanyi Ph.D.

1966 Faraday Building

1986 Polanyi Nobel Prize

2004 New Scho University of Ma

1998 Major refurbish programmes started

1993 Nobel Prize to Michael Smith

William J Pope and *S Peachey* make the first splitting of nitrogen-,sulfur-, tin- and tellurium compounds with their optical active compounds

1901 - 1908

BRITISH ASSOCIATION MEETING 1887
SOME DISTINGUISHED CHEMISTS IN MANCHESTER
STANDING LEFT TO RIGHT
WISLICENUIS, QUINCKE, SCHUNCK,
SCHORLEMMER, AND JOULE.
SEATED LEFT TO RIGHT
LOTHER MEYER, D.I. MENDELEEV,
AND SIR HENRY ROSCOE.

Metallic vanadium was not made until **1867** when Henry Enfield Roscoe reduced vandium chloride (VCl_3)

Walter Norman Haworth 1883-1950

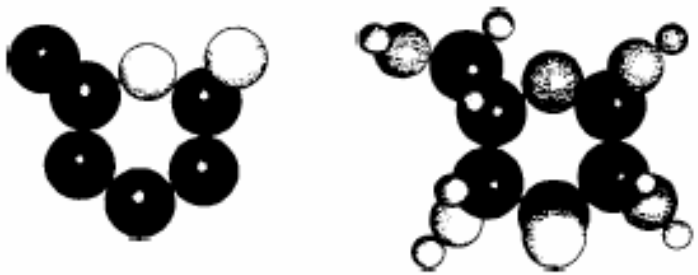
1883. March 19th Born Chorley Lancashire Schooled to 14
1903 University of Manchester (Owen's College) a pupil of W.H. Perkin, Junior.
1906 1st class honours
1906- Studied in Wallach's laboratory at Göttingen.
1910 Doctor's degree
1911 Manchester D.Sc.
1911 Demonstrator at the Imperial College, London
1912 St. Andrews, Scotland, as Lecturer and Reader in Chemistry.
1920 Chair in Chemistry at the University of Durham 1921 Director.
1925 Professor and Director Department of Chemistry University of Birmingham February
1937 Nobel Prize in Chemistry with with Paul Karrer (1889-1971) for work on carbohydrates and the synthesis of vitamin C.
1947 Knighted.

Haworth was President of the Chemical Society (1944-1946), and Fellow (1928), and Vice-President (1947-1948) of the Royal Society. He received honorary science degrees from the Universities of Belfast, Zurich and Oslo, honorary Doctor of Law, University of Manchester, and foreign memberships of nine foreign scientific academies. He was the Longstaff Medallist (Chemical Society), 1933; Davy Medallist (Royal Society), 1934, and Royal Medallist, 1942.

W A L T E R N . HA W O R T H

The structure of carbohydrates and of vitamin C

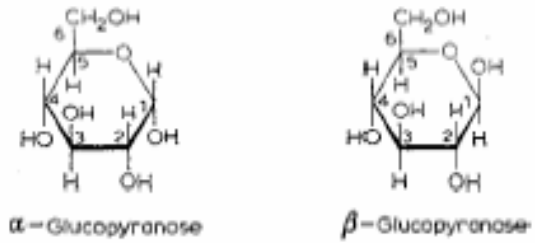
Nobel Lecture, December 11, 1937



Skeleton model of glucose

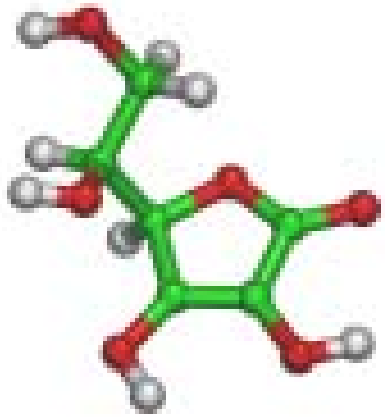
Model of β-glucose

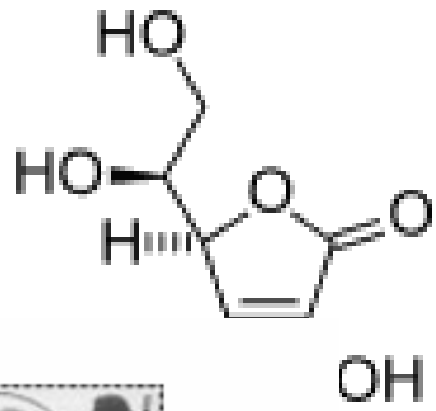
glucose it will be best to have this model in mind and represent it by perspective formulae.

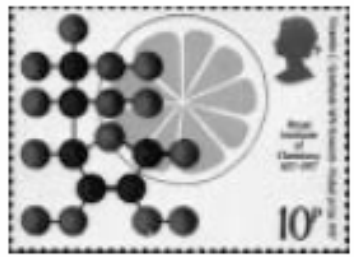


α-Glucopyranose

β-Glucopyranose







Walter Haworth—Synthesis of Vitamin C

He was honoured on a stamp issued by Great Britain in 1977. The stamp shows the chemical structure of vitamin C and an orange, a source of the vitamin.

Run Video


Dr Dalton