Imperial College was created in 1907 from the merging of individual colleges and institutions, some of them with complex pasts of their own, dealing with different aspects of science. To some extent the three main constituent bodies of the nineteenth century retain their separate identities, and they have their own coats of arms or insignia. The three are: the Royal School of Mines, the Royal College of Science, and the City and Guilds College. To these, in 1988, we now welcome St. Mary's Hospital Medical School, Paddington.

This picture history follows the evolution of the College from its origins in the middle of the last century up to the present.
Royal College of Chemistry

October 1845 saw the opening of the College of Chemistry which later that year became the Royal College of Chemistry, under the patronage of Prince Albert as President of its Council. Academic prestige came from the appointment of August Wilhelm von Hofmann as Professor.

The Royal College of Chemistry occupied premises at 16 Hanover Square, which had an impressive frontage on Oxford Street.

The student places were filled by practical chemists from areas such as agriculture, industry and medicine.

In 1853, the Royal College of Chemistry (retaining its title) became part of the Government School of Mines and of Science Applied to the Arts, and the College moved to the South Kensington site in 1872.

The Museum of Economic Geology (later the Museum of Practical Geology), a collection of minerals, maps and mining equipment made by Sir Henry De la Beche, was opened to the public in 1841. It also provided some student places for the study of mineralogy and metallurgy.

The teaching aspect was expanded when the museum moved from Craig’s Court to Jermyn Street in 1851. Courses began in mining and applied sciences, and De la Beche became Director of the Government School of Mines Applied to the Arts in 1851.

The name was changed to Royal School of Mines in 1863, and it moved piecemeal to South Kensington between 1874 and 1891.
The Great Exhibition of 1851 provided much of the impetus for the formation of educational establishments in South Kensington. Its large profits provided some of the money for the purchase of the land.

Prince Albert took an interest both in the Exhibition and in the improvement of education. He supported the idea of South Kensington becoming the London centre of Science and the Arts.

Lyon Playfair encouraged the Prince in his ambitions, and the two worked closely together on the project along with Henry Cole. Henry Cole and Lyon Playfair became Secretaries of the Department of Science and Art.

It was Cole’s ambition to set up a national museum, and he realised this with the establishment of the South Kensington Museum in 1857. This became the Victoria and Albert Museum.

Henry Cole also invented the Christmas card.
Lyon Playfair (First Baron Playfair of St. Andrews) was a prominent chemist, noticed by Sir Robert Peel and Prince Albert. Playfair had an interest in the practical application of chemistry to agriculture, and was an exponent of technical science education. He held academic posts (such as Lecturer in Chemistry at the Museum of Practical Geology) and served on many Royal Commissions, including the 1851 Commission for the Great Exhibition.

In 1853 Playfair became Secretary of the new Science and Arts Department. He was Postmaster General in 1873 and an MP from 1868 to 1892.

Sir Henry Thomas De la Beche, an innovative geologist, became director of the Geological Survey in 1835. He opened the Museum of Practical Geology in 1841, which ten years later became the Government School of Mines and of Science Applied to the Arts. He too was an advocate of practical science education, a point he emphasised when the school merged with the Royal College of Chemistry in 1853. Despite a progressive illness, he continued to work until immediately before his death in 1855.

The Royal Commission on Scientific Instruction and the Advancement of Science (1870–75) recommended the setting up of a government Solar Physics Observatory. The Commission’s Secretary, Norman Lockyer (discoverer in the sun’s spectrum of the then unknown gas later christened ‘helium’ and a pioneer in the observation of sunspots), was seconded from the War Office to South Kensington in 1875. Appointed Lecturer (later Professor) in Astronomical Physics at the Normal School of Science in 1881, he also directed the independent observatory, starting there a loan collection of instruments; this became the Science Museum (on the same site). The Solar Physics Observatory became part of the Royal College of Science in 1890 and had an importance second only to that of Greenwich. Lockyer remained director until his resignation on the Observatory’s transfer to Cambridge in 1911.

Sir Norman Lockyer (1836–1920).
He founded the journal Nature in 1869.

The Solar Physics Observatory in 1893 on the site of the future Science Museum. There was at one time a proposal that the adjacent site, where the Post Office stands, should become the Tate Gallery.
The Royal College of Science was formed in 1881 by the joining together of the Royal College of Chemistry and the Royal School of Mines and the development of teaching in other science subjects at the South Kensington site. The Colleges of Chemistry and Mines retained their separate identities, and continued to confer their own diplomas.

Thomas Henry Huxley became Lecturer in Natural History in the School of Mines and Palaeontologist to the Geological Survey in 1854. He was keen to expand the teaching of science and recognised that co-operation with other established institutions was necessary to achieve this. A merger and move to larger premises would be beneficial to science and its teaching. There were opponents to this scheme, but Huxley continued his fight, and the departments of Chemistry, Physics and Natural History moved to South Kensington in 1872. These departments were gradually followed by the Mechanics, Geology, Metallurgy and Mining departments, the last in 1891.

Huxley was Dean of the Normal School of Science (The Royal College of Science and Royal School of Mines) from 1881 to 1895.

The Lectures to Working Men were a very popular series of classes on all aspects of science given by the lecturers of the Royal Schools of Mines and Science. Huxley was one of their greatest enthusiasts, and gave many lectures himself along with Frankland, Tyndall, Lockyer and other staff.

There were also public lectures open to anyone interested, and the audience frequently included women.

(Above) The Royal School of Mines, with the Goldsmiths' Extension to the left and part of the City and Guilds College. Designed in 1911 by Sir Aston Webb (1849-1930), who was also the architect for the Royal College of Science (1900-1906), the Beit Quadrangle, and the principal block of the Victoria and Albert Museum.

Royal College of Science.

LECTURES TO WORKING MEN.

ROYAL SCHOOL OF MINES.

LECTURES TO WORKING MEN.

The following Courses of Lectures each will be delivered in the Evening during the present Session.

<table>
<thead>
<tr>
<th>Course</th>
<th>Lecturer</th>
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<tr>
<td>Volcanoes: What they Are, and what they Teach</td>
<td>J. W. Jebb, F.G.S.</td>
</tr>
<tr>
<td>The Appearance presented during Volcanic Eruptions, and the causes which give rise to these appearances</td>
<td>J. W. Jebb, F.G.S.</td>
</tr>
<tr>
<td>The Nature and Sequence of the Series of Operations of which Volcanic Eruptions Form a Part</td>
<td>Franklin Gurney, F.G.S.</td>
</tr>
<tr>
<td>The Production of Tephra, and the Manner in which they are Extruded around Volcanic Vents</td>
<td>T. H. Huxley, L.L.D., F.R.S.</td>
</tr>
<tr>
<td>The Internal Structure of Tephra Cones, and the Light which their Study throws upon the Nature and Cause of Volcanic Action</td>
<td>T. H. Huxley, L.L.D., F.R.S.</td>
</tr>
<tr>
<td>The Distribution of Volcanoes upon the Surface of the Globe, at the Present Time, and during Earlier Periods of its History</td>
<td>T. H. Huxley, L.L.D., F.R.S.</td>
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Lectures will be delivered in the Theatre of the Geological Museum in Jermyn Street.

(Left) Thomas Henry Huxley (1825–1895).

(Right) The Lecturers in this set of courses include all three of the professors under whom H. G. Wells was to study.
H. G. Wells began what he called his 'fifth start in life' at the then Normal School of Science in 1883, with the award of a scholarship as a 'teacher in training' under a scheme designed to improve the then indifferent quality of science teaching. He found himself studying biology under Huxley, 'the great teacher, the most lucid and valiant of controversialists.' He found, under Huxley's teaching, stimulation that he was not to find again after the great man's withdrawal during the course of that session because of ill health. Wells did brilliantly in his first-year exams, being one of only three students to obtain a first-class pass.

The subject of study depended on available places, but his Physics professor, Frederick Guthrie (1833–1886), proved a bitter disappointment to Wells, who began to turn his interests to Fabian Socialism. He managed a Second and was able to return, this time to study geology under J. W. Judd. He failed his final exams in 1887. 'The path to research was closed to me for ever.'

Wells himself was well aware that disillusion coloured his attitude to university teaching and to the College. He felt he redeemed himself with a London University D.Sc. thesis in 1942, and his first published work was A Textbook of Biology (1892). It was he who started the Science Schools Journal, still published (as Phoenix) by the Students' Union.

In 1907, two of the three constituent colleges were incorporated in the Royal Charter of the Imperial College of Science and Technology. The two were the Royal School of Mines and the Royal College of Science. The Central Technical College of the City and Guilds of London Institute was renamed the City and Guilds College in 1907, but not incorporated until 1910.

R. B. (Lord) Haldane and Lord Rosebery, together with Sidney and Beatrice Webb, were instrumental in the merger and development of the new College, among whose most generous benefactors were Sir Julius Wernher and the brothers Sir Alfred and Sir Otto Beit, who had made their fortunes out of diamond mining.
The Imperial Institute opened in 1893, and was intended to commemorate Queen Victoria’s Jubilee in 1887. Its purpose was to encourage scientific study relevant to countries of the British Empire.

In 1895, London University took under its auspices as 'schools' institutions which were of a university standard. These schools then formed parts of the Faculties. The University had previously been only an examining body. The City and Guilds College, for example, became a member of the University's Faculty of Engineering in 1900. From 1900 to 1936, the Imperial Institute housed the administrative and examination offices of London University.

The Imperial Institute became the Commonwealth Institute, and the building was demolished in 1958 to make way for modern laboratories, but the Queen’s Tower was saved, and now dominates the campus of Imperial College.

The demolition of the Institute caused an outcry, led by John Betjeman. In order to preserve the tower, which was supported by surrounding buildings, a new base and new foundations and substantial reinforcements were necessary in a very considerable engineering feat. The tower contains the Alexandra peal of twelve bells, rung on royal anniversaries, and is open to the public in the summer.
Improvements in technical education were slow to follow the lead set by Europe, in spite of the improvements made in science education by the Department of Science and Art, set up under the Board of Trade in 1853. Because of their involvement in training craftsmen, the livery companies set up the City and Guilds of London Institute in 1878. Unable at once to find a site for their Central Institution, they established Finsbury Technical College, off City Road, under the Institute's director and secretary Philip Magnus, later University MP. By 1880 there were over 400 students. Two brilliant young teachers, H. E. Armstrong and W. E. Ayrton, were appointed to teach chemistry and physics, courses intended to pave the way for higher-level courses in the future Institution, and were sent to Germany in 1881 to investigate teaching methods.

Silvanus Phillips Thompson (1851–1916), 'Brother Magnetizer' of the Sette of Odd Volumes', applying experimental electromagnetic stimulation to himself.

Silvanus Thompson was appointed Principal and Professor of Applied Physics and Engineering at Finsbury in 1885. A pioneer in the development of applied electricity, he was an exceptional teacher with 'unusual experimental and inventive skill and the true instinct of an engineer'. He was also the biographer of Faraday and Kelvin; a book collector, he published a scholarly edition and translation of William Gilbert's sixteenth-century treatise De magnete.

Armstrong and Ayrton moved to the Central Institution on its establishment. Finsbury continued its separate existence until 1926.
The roll-call of distinguished scientists who have been associated with the College contains many more names than those mentioned, throughout its history. Invidious though it is to single out names among so many outstanding scholars, these few must stand for all: Edward Forbes (1815–1854), palaeontologist, humorist and founder of the Red Lions Club; Sir Joseph Hooker (1817–1911), botanist, friend of Darwin; W. H. Perkin (1838–1907), inventor (at the age of 18) of the first aniline dye, mauveine; Sir Edward Frankland (1825–1899), one of the first workers in biochemistry and pioneer of the concept of valency; John Tyndall (1820–1893), natural philosopher, famous for work on magnetism; Sir Roderick Murchison (1792–1871), leading nineteenth-century geologist; A. W. Rücker (1848–1915), physicist and worker on the magnetic survey of Britain; W. A. Tilden (1842–1926), chemist; H. L. Callendar (1863–1930), researcher into platinum resistance thermometry and the properties of steam; R. J. Strutt, fourth Baron Rayleigh (1875–1947), with whom modern physics may be said to have come to Imperial College with his work in radioactivity and particle physics; the younger Adam Sedgwick (1854–1923), zoologist; W. E. Dalby (1862–1936), remembered for his work on railway engineering and the balancing of reciprocating engines; Sir Richard Glazebrook (1854–1939), first Zahrhoff Professor of Aeronautics; W. A. Bone (1871–1938), organic chemist; Alfred North Whitehead (1861–1947), mathematician and philosopher; Sir Henry Tizard (1885–1959), Rector and radar pioneer; Sir George Paget Thomson (1892–1975), the College’s first Nobel Laureate and investigator of the microstructure of matter; A. J. S. Pippard (1891–1969), civil engineer; and P. M. S. Blackett (1897–1974), physicist and Nobel Laureate.

The Central Institution, later the City and Guilds College.
Finsbury College was intended as the first of a number of 'feeder' colleges for the Central Institution, but was almost the only one founded. The City Companies wanted the Institution to be in the City, but, faced with their inability to find a site, were eventually persuaded by the Secretary of the Science and Art Department, General Sir John Donnelly (like Captain Fowke, the architect of the Royal Albert Hall, a Royal Engineer) to found their Institution on the eighty-seven acre site at South Kensington bought by the 1851 Exhibition Commissioners (for £342,500) for 'purposes of art and science' in perpetuity.

Of the first four professors, Armstrong and Ayrton were transferred from Finsbury Technical College, and were joined by the engineer W. C. Unwin and the mathematician Olaus Henrici—a dazzling team. Teaching at this time was not limited just to engineering—the 'pure' sciences of chemistry and mathematics were taught, as were languages. Teaching by experiment rather than by verbal lectures was then a rather new phenomenon in England, encountering hostility because of its greater expense.

Armstrong, a pupil of Hofmann, Tyndall and Frankland, also studied in Germany. His work was in organic chemistry, especially dyestuffs, although he did original work in crystallography and other fields. A highly influential teacher, he is regarded as the father of chemical engineering in Britain.

Ayrton, who had worked with Lord Kelvin and taught in Japan, devised the first exhaustive course of education in electrical engineering, for which he created properly designed and equipped laboratories.

Henrici (1840–1918), a German mathematician, was a leading reformer of English mathematics teaching; he was opposed to the learning of Euclid by heart and introduced vector analysis.

Unwin (1838–1933), the Institution's Dean, was an outstanding civil and mechanical engineer who was involved in the introduction of the internal combustion engine and in the Niagara Falls power scheme.

The Central Institution building, which was to become known as the City and Guilds College after its incorporation into the new Imperial College in 1907, was designed by Alfred Waterhouse, better known as the architect of the Natural History Museum. The building, illustrated at the bottom of the previous page, was perhaps the most interesting of those at this site; in red brick, it cost the very large sum of £92,000. It was opened by the Prince of Wales in 1884, and the first full-time courses started in February 1885.
As the old Imperial Institute comes down in 1963 (with the Queen's Tower alone saved, to become free-standing in 1968), the expansion of the College is well under way. The view above, taken from the Physics Department's Blackett Laboratory (1960) looks past the 1957 completion of the 1951 Aeronautics and Chemical Engineering (ACE) Building and over the foundations of the Sherfield Building to the Electrical Engineering High Block, with Civil Engineering to its right and Mechanical Engineering behind; the Biochemistry Building has just been begun to the far right.

Various post-war plans were mooted to realise the Jubilee Scheme approved in 1957, some of which would have taken the College outside Central London. The arguments in the 1950s over the various plans at least ensured that, with the exception of the Royal College of Music, the whole of the so-called 'Island Site', bounded by Exhibition Road, Prince Consort Road, Queen's Gate and the Museums, was given to the College for concentrated single-site development. The old buildings came down—Waterhouse's City and Guilds building in 1962, then the Imperial Institute and some Norman Shaw houses in Queen's Gate.

The student population was to rise between 1957 and 1962 to 3,000. Residential student accommodation, the most inadequate of any major university or college in the country in 1955, was also increased. The first hall of residence, Selkirk Hall in Holland Park, was bought from a benefaction immediately after the war, but the main development followed the purchase of two sides of Prince's Gardens by a property company in 1955, with whom the College was able to negotiate a lease, permitting the building of substantial halls of residence, the first of which (financed by Vickers Ltd. and named Weeks Hall after its Chairman) opened in 1959. Further student accommodation was added by the raising of the Beit Quad to complete it to Aston Webb's original design.

Benefactions to begin the funding of a significant expansion of the College began in the last years of the war and received a significant (though nothing like as large as hoped) increase from the Appeal Fund launched with the centenary celebrations of the College's oldest forebear, the Royal College of Chemistry in 1945, attended by King George VI and his Queen. The Rector, Sir Richard Southwell, hoped that it would not only fund new buildings but also create a greater sense of community, especially for research students.

H.M. Queen Elizabeth the Queen Mother, the then Chancellor of London University, is greeted by the Rector, Sir Patrick Linstead, as she arrives to open the new Biochemistry Building in November 1965. Behind them is the plaque unveiled by H.R.H. Prince Philip in 1962 to mark the completion of the first phase of the replacement of the old City and Guilds Building.
Building expansion has been minimal since the completion of the new Huxley Building for Mathematics and Computing in 1975. The second stage of the Chemistry/Biochemistry Building has been long delayed, and only Computing's new William Penney Laboratory (1988) and the Biotechnology 'Spur' have been added on the South Kensington site. At Silwood, new student accommodation has been added, and the new Science Park has welcomed its first occupants.

The number of women students continues to increase, and there has been a recovery in the numbers of overseas students.

The links with industry continue to increase. Honda gave a new wind tunnel to Aeronautics in 1985. The 1980s have also seen the growth of companies formed by the College in association with other sponsors to utilise commercially the College's expertise. The first two—Imperial Software Technology and Imperial Biotechnology—were both founded in 1982.

The work of the College remains at the forefront of scientific and technological development. Recent work, for instance, has included study of industrial catalysts (Chemical Engineering and Chemical Technology); the preparation of a new antibiotic called Indanomycin (Chemistry); a new way to measure blood glucose level (Chemistry and Biotechnology); a new industrial glass-ceramic (Metallurgy and Materials); research in particle physics; a control system for paper-making (Industrial Systems Group), and ALICE (Computing).
The College has two out-stations, the Field Station at Silwood Park and the mine at Tywarnhale, Porthtowan, Cornwall.

The College was the first university institution in Britain to acquire a residential field station. The original one was at Hurworth, Slough, and was established by Professor James Munro in 1938, partly from funds from the Empire Marketing Board. A shared arrangement with the DSIR became much more difficult during the war, and a new site at Silwood Park, near Ascot, was acquired in 1947. Work in the fields of botany, zoology, atmospheric physics and geophysics has since then been carried out there, and at the adjacent Ashurst Lodge.

Silwood is also the home of the University of London Reactor Centre, set up in 1965 and run by the College for the University.

Tywarnhale Mine has belonged to the Royal School of Mines since 1909. An old tin mine, its workings, with vertical and inclined mine shafts, and its surface facilities provide a good practical site for instruction and research. The Geology Department also has access to the Carrock Fell Wolfram Mine in the Lake District for geological and surveying purposes.

(Right) Station 59, Tywarnhale Mine. Photograph by Ian M. Plummer.

(Below) Silwood Park, the College Field Station.
College model by the architects Norman and Dawbarn, originally made about 1968 and brought up to date in 1988.

1. 170 Queen's Gate (Rector's Lodging).
2a. Aston Webb Building (Royal School of Mines).
2b. Goldsmiths' Extension.
2c. L-Shape Building.
2d. Link and Spur.
2e. Bessemer Laboratory.
3. Bone Building (Chemical Engineering and Chemical Technology).
5. Mechanical Engineering (including The Management School and Humanities).
6. Blackett Laboratory (Physics).
7. Electrical Engineering Workshops and Boiler-house.
8. Electrical Engineering High Block.
9. Civil Engineering.
10. ACE Extension Building (Chemical Engineering and Aeronautics).
11a. Sherfield Building and Great Hall.
11c. Science Museum Library.
12. Queen's Tower.
Student life has changed greatly since the war, most noticeably with the increase in women students. As the College has grown so has the work of the Student Union officers, of whom four have sabbatical posts. About one-third of the student population of 5,000 now live in College accommodation on or near the campus. Phoenix, the journal started by H. G. Wells as the Science Schools Journal, celebrated its centenary in 1986, while the weekly student newspaper Felix (started in 1949) continues to flourish. Clubs and societies of all kinds abound, and sports provision is among the best in the University. Familiar events recur, such as the annual summer term Wind Band performance of Tchaikovsky's 1812 Overture, complete with pyrotechnics and the bells of the Queen's Tower. The mascots of the Union and of the Unions of the constituent colleges are cherished and jealously protected now as much as at any time in the college's past.

(Top left) In the Lounge.
By F. Peacock, 1958.

(Bottom left) One of the current crop of highly successful rowing crews, both of men and women.
A College four won the Visitors' Challenge Cup at Henley in 1985 and again in 1987, when it set a new course record.
The second Clementine is a 1906 Morris commercial lorry which replaced the first Clem, a steamroller, as the Mines’ mascot in 1959.

Boanerges is the name given to the 1902 James and Brown car which is the mascot of the City and Guilds Union. Since Bo’s acquisition in 1934 she has regularly run in the London to Brighton race.

Jezebel, a 1916 Dennis fire engine, has been the mascot of the Royal College of Science Union since 1955 and has fifty-five square feet of brass to keep polished!

These are inviolable, but the College Unions have other mascots eligible for abduction by rival Unions. Spanner (belonging to City and Guilds) may have been adopted because of its engineering relevance or because Bo’s driver was said to have used one to ward off abductors of the mascot. Bolt joined it in the early 1960s. The Mines’ mascot is Davy, a Davy lamp, and the outsized thermometer Theta belongs to the Royal College of Science. The giant micrometer Mike is the Students’ Union mascot.

(Right) Prince’s Gardens and the Southside Halls.
Four of the Imperial College Nobel Prize Winners

Professor Abdus Salam for Physics 1979.


Professor Dennis Gabor for Physics 1971.

Professor Ernst B. Chain for Physiology and Medicine 1945.

Commemoration Day, the main academic occasion of the year, is held in the Royal Albert Hall on the last Thursday in October. It commemorates the visit of King George VI and Queen Elizabeth (now the Queen Mother) on the occasion, in October 1945, of the Royal College of Chemistry's centenary.