



The Scots College
Sydney Australia

THE GRAEME CLARK
CENTRE FOR INNOVATION
IN THE SCIENCES



Message from the Chairman of Council

I am delighted to see the completion of this high quality piece of infrastructure that provides facilities consistent with the standards of excellence in education to which The Scots College is committed.

Some ten years ago in consultation with the then Principal, Dr Robert Iles, Council set as the next major infrastructure priority within the College Master Plan a set of up-to-date facilities for learning by boys in scientific disciplines.

To have steered this project through concept stages, development approval, financing, construction, fit out and commissioning is a significant achievement by all those involved. It is one for which the College is justifiably proud and grateful, both now and for the years to come.

Philip Mitchell

BA (Asian Studies) (Hons), LLB (Hons)



Message from the Principal

The Graeme Clark Centre for Innovation in the Sciences will ensure that The Scots College is positioned at the forefront of the global quest for excellence and success in the sciences.

Matching the very best, this centre will serve as a national resource that addresses, in an integrated fashion, the preparation and development of the science student – lighting the flame early through its sustainability initiatives.

The centre will provide leading core infrastructure and technology platforms that are necessary to inspire the best from our students and teachers and transform the educational experience.

The Scots College has a long tradition of Old Boys serving and leading the community as scientists, and we trust that their example will encourage many of our students to pursue a life-long career in the sciences.

Dr Ian PM Lambert

BA, Grad Dip T, MA, PhD, MACE

THE GRAEME CLARK CENTRE FOR INNOVATION IN THE SCIENCES



The College set out to construct a state-of-the-art facility, designed to promote in the hearts and minds of our students a love and appreciation of the sciences so that they may continue to make a key contribution to Australia's future.

When considering a pre-eminent Scots Old Boy whose name would inspire the next generation of scientific endeavour and innovation, there was little debate. While there have been many illustrious Old Boys who have had notable careers in science and medicine, one name stood out. Professor Graeme Clark AC FAA FTSE FRS FAAS FAIMBE, MB, BS, MS, PhD

(Sydney), FRCS (Edinburgh), FRCS (England), FRACS is one of our most inspirational alumni. His Companion of the Order of Australia for "services to medicine and to science through innovative research to further the development of cochlear implant technology for worldwide benefit" has inspired the naming of this building in his honour.

Graeme Clark's empathy for the difficulties experienced by his father's deafness and his admiration for the work of Louis Pasteur, led to his determination to become an ear, nose and throat surgeon. Despite his successful practice, his frustration that he could do little for those who were profoundly deaf led him to leave a lucrative practice and return to university to become a research scientist. Despite much criticism from those who believed that such a device would never work, Clark's determination and commitment to helping those who are profoundly deaf led to the development of the first bionic ear.

Professor Clark epitomises all of the qualities that we hope our Scots boys will aspire to. In Sir Gustav Nossal's words, "*The qualities which it took to develop the bionic ear are ingenuity, dedication and an unshakable belief in the validity of the dream*". While many would be ready to rest on their laurels, Professor Clark continues to challenge himself. Currently he is working to help people with other neural problems like spinal cord injuries, epilepsy and those with heart pacemakers.

Professor Clark has received an extraordinary number of Australian and international honours throughout his distinguished career; however, he continues to be a man of great faith, integrity and humility. In his words "*being able to communicate with their parents and live like normal children and in a hearing world - that moves me every time.*"



“The illiterate of the 21st Century will not be those who cannot read and write, but those who cannot learn, unlearn and relearn.”

ALVIN TOFFLER

We live in an age where change is taken for granted – what we know today will quite probably be largely irrelevant in five years time. The student who entered Transition in 2009 will leave school in 2022 and will encounter a vastly different world to the one he currently knows.

In Science and Mathematics we aim to prepare students as best we can to enter a world that cannot yet be fully imagined. The importance of acquiring knowledge is still real but it is the process of acquisition that is becoming increasingly significant. The capacity to adapt, to think through different contexts, to solve problems using

different strategies (as opposed to simply remembering and comprehending) and to see challenge and difficulty as an exciting opportunity are important skills for our boys to acquire and develop.

The design of the building’s teaching and learning environments is based on our belief in the importance of inspiring boys, of student-focused teaching and learning, of goals of excellence and sustainable futures. Our boys need to appreciate the critical role of Science and Mathematics in preparing them to lead, learn and serve in the world in which they will live.

During the construction phase, significant work was devoted to ensuring that the interior design reflected our future vision for The Scots College and our commitment to ensuring sustainability. Energy and dynamism are evident in the fit out; from the symbolism of the tessellated patterns in the Mathematics rooms and the classical Greek elements evident throughout the Science floors, to the presentation of heroic images that effectively

link Scots’ heroes to other key inspirational figures from our past and our wider College community.

The learning areas provide flexible spaces which can accommodate different sized groups of students. Video conferencing technologies, data projectors, wireless networks, laboratory and theatre cameras, data probes and high quality sound systems allow students to access lectures, online data, qualitative and quantitative laboratory data, or discuss ideas as a class or with national and international experts.

In extending our representation of the elements of earth, air, fire and water throughout the Science floors, students are encouraged to monitor local conditions through the use of sophisticated electronic monitoring stations. Students have access to data from our wind generator and solar arrays. Our weather station is part of the Davis network, one of 11 stations in eastern Australia. Data is captured electronically, allowing students to monitor local weather and track weather systems.

Brave Hearts, Bold Minds

Displays throughout the building have been designed to provide inspiration and develop pride in our heritage.

Scots boys do grow into fine men and the College continues the tradition of encouraging and supporting our boys to become men of principle who strive to make a difference in the world in which they will live.

The Robert Iles Theatre forms the heart of the building. Here we honour the strength of conviction and determination of Dr Robert Iles, Principal of the College from 1994 to 2006 whose vision for this centre for excellence and innovation in the sciences has led to the construction of this facility.

In the Theatre, we reflect on the work of Graeme Clark and Robert Iles, but also feature Old Boys of the College who have been awarded Rhodes Scholarships, which reflect the values that we would hope our students will develop. Rhodes' aim was to encourage

recipients to develop their abilities, broaden their views and work to improve humanity.

Richard Ashburner BA (Hons) Syd BA BCL Oxon, Scots: 1918 – 1923, was a keen rower and distinguished Lawyer who continued his association with the College long after graduation, organising fundraising with the Old Boys for a boat shed at Rose Bay and contributing as an active member of the Scots Old Boys' Union. He became a King's Counsellor and completed his career as Deputy President of the Commonwealth Court of Conciliation and Arbitration Commission.

Ian Edwards BA (Hons) Syd PPE (Hons) Oxon, Scots: 1920 – 1924, was a genuine all rounder, representing the College in the 1st XV, 1st XI, in Athletics and Debating. A wordsmith, who edited 'The Scotsman' and 'Hermes', Edwards' verses and short stories were published in 'The Bulletin' and other war-time publications. He completed a degree in Modern Greats at Oxford where he represented in Debating and Rugby and founded the Oxford Australian Club. Ian

Edwards passed away on 20th August 1989 after a career in education.

Lloyd Williams BChem Eng (Syd) DPhil Oxon Scots: 1939-1940, was another talented all rounder with a passion for Rowing and Philosophy. At Oxford he completed a Doctor of Philosophy while participating prominently in Athletics, Swimming and Rowing. In 1949 he began work at the Atomic Energy Research Establishment in Harwell, UK before moving back to Australia to work with the CSIRO and in industry. Lloyd Williams passed away on 6th October 1996.

Professor Philip John Crowe MBBS Syd, DPhil Oxon, Grad DipHEd, FRCSC, FRACS Scots: 1961 – 1973, has made an indelible impression on the record books. While at the College, Crowe earned the regard of all as Deputy Head Prefect, Dux of the College and winner of the Honour Cap. He was an outstanding sportsman and represented Australia in Rugby, as a schoolboy and a Wallaby. Professor Crowe is a surgical oncologist and has received many academic awards and prizes throughout his career.

Pictured: Scots Spirit — 1951 Head of the River, Graeme Clark in College Uniform and boater (second from the right in the front row).



Inspired by Scots Old Boys, heroes of times past.



In the troubled times of the 21st Century, educators have a responsibility to equip students with the skills and values necessary to make a positive contribution to society and meet the challenges of their future world.

The College is committed to the development of learning experiences that will help shape our students to ensure their commitment to contribute to a sustainable future – a future that is not only ecologically but also socially, economically and politically sustainable.

Our objective is to ensure that sustainability themes are embedded in teaching programs T – 12. We aim to deliberately infuse social and environmental themes across all discipline areas, expanding the concept of sustainability

to a focus on social responsibility, ethical enterprise and cultural enrichment.

Displays in the main Science Foyer will be focused on sustainable futures issues and it is here that students will be able to monitor data from our weather station and power output from our generators. Our initial sustainability display profiles Old Boys who have been involved in sustainable practices in their lives.

Several of our Old Boys have won Nuffield Field Scholarships and Churchill Fellowships that have allowed them to travel around the world and undertake research that has led to improved farming practices and the maximisation of production without harming the environment.

Dr Anthony Hamilton (Old Boy 1977) won a Nuffield Scholarship in 2003 and studied diversification in farming. His PhD study involved the agronomy of azuki and kintoki beans; however, his innovative and highly technical approach to farming in a drier and more variable climate makes one realise just how ‘high tech’ farming needs to be today.

Cam McKellar (Old Boy 1976) was a recipient of a Nuffield Scholarship in 1991. His particular interest is in biological farming – searching for biological solutions to the problems that traditionally have been treated artificially.

Scott McCalman (Old Boy 1982) was the recipient of a Churchill Fellowship in 1995 and was NSW Farmer of the Year in 2005. Scott’s passion for soil amelioration, his commitment to zero tillage and strategic tree planting is inspirational.

Old Boy (1975) and ex-Wallaby **Bill Calcraft** is profiled for his commitment to renewable energy. Now based in London, Calcraft specialises in wind power with most of his investments in this area in Europe.

Perhaps one of our highest profile Old Boys, **Ian Kiernan AO** has accepted the position of Patron of our Student Sustainability Committee. He is perhaps best known for his initiative in developing ‘Clean Up Australia’ and his generosity and commitment to working with students at the College is much appreciated.

Thinking Sportsmen

The John Solomon Sports Club honours Old Boys who have excelled in a range of sports while providing state-of-the-art programs for students.

Honour boards listing Australian, Under 23 and Australian Schoolboy representatives have been placed in the foyer of the building.

The Thinking Athlete

For several years, Scots' staff have been encouraged to integrate contemporary 'thinking' approaches to the design of teaching and learning experiences in the academic context. These 'thinking strategies' have been developed from a host of research studies that are increasingly applied by students in the varying domains of their lives. Direct transfer of these skills and understandings is now being extended to the athletic domain, where students draw upon these strategies for enhanced performance.

In the sporting environment, students are expected to respond to rapidly changing stimuli. Their ability to develop insight, perseverance and apply strategic reasoning enhances performance under often challenging conditions.

The College's Academic Foundations Committee is exploring the crossover of skills between the athletic and academic environments. In particular, the skills of practice, organisation, mental rehearsal, problem solving and decision making are equally pertinent to learners across both domains. The impetus for this analysis was found in the research work of contemporary practitioners into the transfer of competencies across these domains.

Dr John Solomon (Old Boy 1947)

'The Thinking Man of Rugby'

John Solomon's prowess as an athlete was very evident during his time at The Scots College. He was a member of the 1st XV from 1944 to 1947, the 1st XI in 1946 and 1947, captaining

both teams in his final year. He broke sprinting and long jump records, winning two silver medals at NSW Schoolboy level as an Under 15 and was a member of the Scots senior athletic team that won the GPS athletics in 1947. He went on to represent the GPS for Cricket, Athletics and Rugby, and was joint winner of the Honour Cap in 1946, winning this award outright in 1947. He was also appointed both Senior Boarding Prefect and Head Prefect.

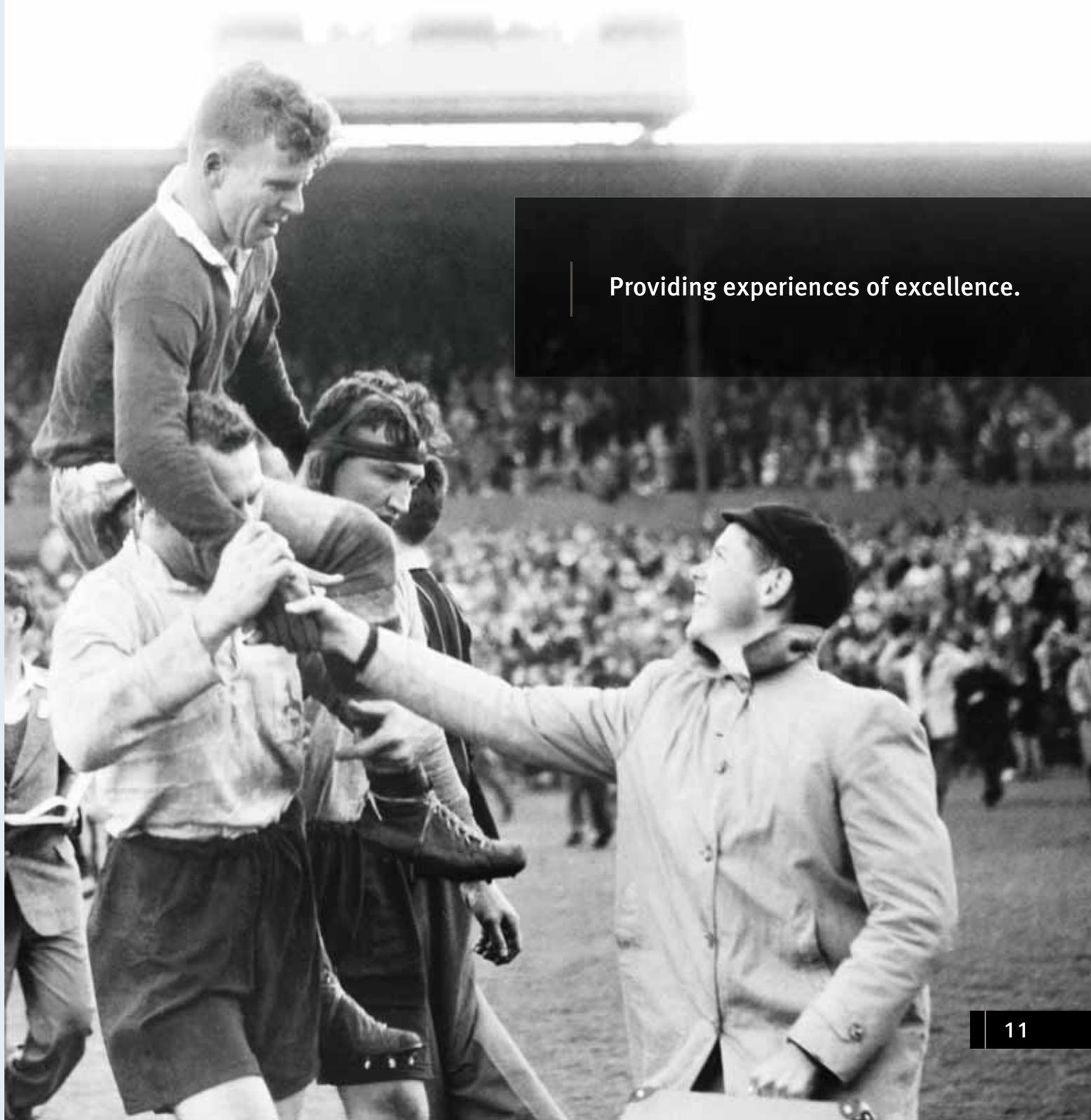
Solomon was renowned as an intelligent player who could read a Rugby game very effectively. He was much admired for his astute leadership, captaining and coaching the Sydney University side, and captaining Australia 31 times including eight tests.

John Solomon studied Medicine at Sydney University, specialising in Gynaecology at Oxford, later becoming a founding member of the King George V Gynaecological Cancer Unit, the first such unit in New South Wales.

One of Scots' and Australia's great heroes

John Solomon's representative career began in 1948, playing for New South Wales 19 times. His Australian representative career began in 1949 as a 19 year old and member of the Bledisloe Cup winning Wallabies – the first Australian team to win the Bledisloe Cup in New Zealand.

Pictured: 1953 — Australian Captain John Solomon is chaired from the field by Springbok forwards after Australia's win in Cape Town. At the time the Springboks were the world's number one team, while Australia had struggled with form. The Australian's attacking approach to the game had impressed all.



Providing experiences of excellence.

In keeping with the challenge of our Christian foundation, our Scots boys will be fine young men of integrity and principle who encourage each other in their quest for excellence.



The Breadth of a Scots Education

The College prides itself on the breadth of opportunities that are available to our boys. The Co-curricular program forms an important part of an holistic education.

The College Orchestra, Big Band and Pipes and Drums exemplify the rich traditions of which we are justifiably proud.

The College's Symphony Orchestra is one of the most successful school orchestras in Australia and has a well deserved reputation for high standards of performance.

Student membership extends from Year 7 to Year 12 with the Orchestra Leader, Section Leaders and the Captain and Vice-Captains of Music having key leadership roles. This is a premier ensemble with a repertoire drawn from four centuries of music including overtures, symphonic movements, suites and other

genres including film music and music for the Broadway stage.

The Orchestra performs at all major concerts throughout the year and takes a central role at the annual Speech Day in the Concert Hall of the Sydney Opera House.

The College's Big Band is a very popular ensemble with the College community. The Big Band plays at concerts, assemblies, lunchtime concerts in the Centenary Amphitheatre and a number of school and community functions, drawing its repertoire from Jazz standards and modern light rock pieces. The Big Band has also performed for the NSW Premier.

The Pipes and Drums, formed in 1900, is one of the oldest Pipe bands in Australia. Since 1931, students have worn the 42nd Tartan of the Black Watch (Royal Highland Regiment).

The Band has a proud record of representing the College at national and international events. In 1973 the Band was the first Australian band to perform at the Edinburgh

Tattoo. The Band performed at the 1979 Toronto World Festival, the 1987 Cardiff Searchlight Tattoo and in 1993 the Band appeared both at the Nova Scotia International Tattoo in Canada and Disneyland in California. Since then the Band has returned to take part in the Royal Nova Scotia International Tattoo in 1996, 2004 and 2008. In 2001 the Band did a three week tour of Scotland and England and in 2005 they took part in the Edinburgh Military Tattoo Salute to Australia.

2008 saw the Band win the Australian Championships in both Juvenile and Grade 4 which was an outstanding achievement. For the past ten years the Band has led the annual ANZAC Day March through the city and has undertaken a number of Regal and Vice-Regal engagements.

Boys voluntarily join the Band with some starting in the Preparatory School where they learn the chanter.

Architectural Notes

The building contains specialist facilities for the Science, Mathematics and PDHPE Departments of the College.

The lower level of the building contains a major aerobics area, extensive sports storage facilities and specialist classroom facilities which will ultimately form part of a new integrated enclosed swimming pool and gymnasium/competition basketball complex to be constructed on the site of the existing pool.

The central two floors contain Science facilities which are significantly in advance of those normally associated with secondary level Science education. The core interior design elements of the Science floors have been inspired by the classical Greek elements of earth, air, fire and water.

Eight separate science theory spaces are interconnected with the four major laboratory commons to support a wider range of practical experimentation in Science than more conventional facilities. Specialist research spaces facilitate student/staff interaction and allow senior students to undertake long-term experiments. The preparation and equipment storage areas adopt design principles evolved in tertiary and post-tertiary medical research facilities, enabling the Science staff to quickly and efficiently construct and service experiments across the full spectrum of Science courses. Centrally located staff and Science preparation facilities are visually connected to all student use spaces to support modern educational methods emphasising staff and student interaction.

A specialist Lecture Room with advanced audio visual facilities will support a wide range of exhibition and educational functions for the College, in addition to providing expert Teacher Science demonstration facilities for large groups.

The upper floor of the building houses the Mathematics Department containing ten classroom spaces plus interview, seminar and staff areas which will enhance high levels of student and staff interaction.

Environmentally sustainable design principles contained within the building include storm water storage and re-use for toilet flushing; photovoltaic cell arrays and a wind turbine to generate electrical power; energy efficient VRV air conditioning systems; and movement detection controlled, energy efficient lighting that is supported by extensive natural daylight and ventilation.

The new building complements the design character of the recently constructed Centenary Building and is carefully linked to other facilities to provide access and circulation throughout the total of the northern precinct with Aspinall House and oval level connection to the Quadrangle and Middle School Buildings.

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