

The Worshipful Company of Scientific Instrument Makers



A HISTORY THE SECOND 25 YEARS

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Worshipful Company of Scientific Instrument Makers

A History

The Second 25 Years

1989 – 2014

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Liveryman and Honorary Almoner

Diane Howse

and

Past Master Keith Etherington



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i. Preface

The Worshipful Company of Scientific Instrument Makers received its Grant of Livery, through receipt of its Letters Patent, at the Mansion House on 6 March 1964. It thus became one of the first ‘modern’ (post First World War) Livery Companies to be formed and in 2014 it celebrated its 50th anniversary. It is number 84 out of 112 in the City of London order of precedence. The roots of the Company were established in 1955 through the formation of a Guild to be known as the Company of Scientific Instrument Makers, and it was this Guild that petitioned for Livery status. The early history, formation of the Worshipful Company and the first 25 years of the Livery are to be found in the publication ‘1988 YOUNSON, Eric. Scientific Instrument Makers, Worshipful Company: A History - ISBN No. 0 9514365 0 3’. A PDF of this book can be downloaded from our website.

(<http://wcsim.co.uk/about/our-history/pdf-our-published-history>)

This volume covers the second 25 years of the Company’s history, development and activities from 1989 to 1 October 2014 and does not repeat information contained in this first history.

The Company celebrated its 50th anniversary with a one-day symposium ‘Instrumenting the Future’ which addressed the three major challenges of the next 50 years (Health, Transport and Energy) and the advances in technology which will be required to meet them. These are the areas, with their extreme measurement demands, where scientific instruments are going to make a major impact in the coming years.



C Gordon R Hall

1989-1990



Charles Gordon Richmond Hall was born at Benwell, Northumberland, on 22 March 1926.

He was educated at Rutherford Technical College, Newcastle upon Tyne, and Heriot Watt College, Edinburgh, and served in the Royal Navy and Royal Auxiliary Air Force between 1943 and 1957.

Gordon joined Sir Howard Grubb Parsons in 1947 as a Design/Development Engineer, engaged on the control systems for large astronomical telescopes and associated domes, together with Aviation Wind Tunnel Balances. In 1954 he joined Negretti & Zambra Ltd where he subsequently became Managing Director of the company and four of its Group subsidiaries, and was also a Group Board Director. From 1980 he was with AB Electronic Products Group as Chief Executive of two of its subsidiary companies, and on retirement held contracts with both the British Security Industry Association as Technical Consultant/Expert witness, and the DTI as a Small Business Consultant. He is a Fellow of the Institute of Measurement and Control.

Married to Nina, he is a member of The Royal Air Force Club and enjoys beekeeping, gardening, photography and reading.

Gift to the Livery: A tapestry of the Grant of Arms.



John E Herrin CBE

1990-1991



John Herrin was born on 15 September 1930. He was married to Heather. He served in the Royal Navy. He had a wide ranging career with companies such as British Thomson Houston, AEI (where he was PA to Lord Chandos, the Chairman), Federal Pacific (USA). He was Managing Director of Crystalate Holdings (1983-1999) – Crystalate Holdings included Welwyn Electronics. He was Chairman of Yeoman Technology

from 1988, of Powerpike from 1991, and of PRP Optoelectronics from 1992. He was a Director of Croster Electronics, Syntaq and Queensgate Instruments. His technical experience encompassed resistance and capacitance measurement standards, strain and stress measurement and analysis, sensors for auto engine control, LED drivers and displays and electronic memory modules.

John was appointed a CBE in 1985.

He was a member of several clubs including MCC, East India Club, Bardogs FlyFishers, 25 Club, Dynamicables.

He became a Liveryman in 1981 and Master in 1990.

His hobbies included sailing, fishing, cricket, opera and the theatre. John died on 31 May 2003.

Gift to the Livery: A set of badges for the Officers' Ladies.



Professor Carl S den Brinker

1991-1992



Carl was born in 1930 and was married to Margaret.

His career included working in British Telecom Research Ltd, Texas Instruments (R&D Research Manager), Redifon (Technical Director), and Hillard Communication Systems (Director).

He was a Visiting Professor at the University of Westminster (1991-1996). He was on the Defence Scientific Advisory Board (1984-1990), the Academic Board, University of Sheffield (1963-1968), the CNAA (1978-1984) and a member of the Research Board of the EEA.

He was experienced in solid-state measurements (R&D), crystallography optics, radio navigation, signal and noise and propagation measurements.

He became a Liveryman in 1979 and Master in 1991. He was also a Freeman of the Worshipful Company of Glaziers. When Carl was Technical Director of Redifon Ltd, which was a major supplier of naval communications systems, his guests at our dinners were mainly officers from the Royal or NATO Navies. They were known as the Den Brinker flotilla.

His hobbies included Saxon and Romanesque architecture, theatre, opera

and music. Carl died on 23 April 1998.

Gift to the Livery: A leather-bound guest book for recording the names of special guests attending livery functions.



David Townsley-Hughes

1992-1993



Also known by his patronymic heraldic name, Dafydd ap Maredudd, David was born on 27th April 1934, in Penclawdd, Gower and educated at Gowerton Grammar School for Boys, then the University of Wales, Aberystwyth, an agricultural BSc and a PhD for tumour research funded by the British Empire Cancer Campaign.

He is a Chartered Biologist (C.Biol), Fellow of the Royal Society of Biology (FRSB), Fellow of the Royal Society of Public Health (FRSPH), Fellow of the Royal Microscopical Society (FRMS). Honorary Life Fellow of the Association of Clinical Cytogeneticists (1999); Founder Member and Trustee (1978-99) responsible for registering as a corporate body for the advancement of Science.

Livery Companies: Liveryman of the Society of Apothecaries (1987), Founder Clerk (1993-95), Master (1997-98) of the Welsh Livery Guild (now the Worshipful Livery Company of Wales) the Honourable Society for Arts, Science and Technology.

He was clothed as a Liveryman in 1981, became a Court Assistant (1986), Master (1992-93), and was a Director of Glaziers Hall Ltd.

His Appointments in Human Cytogenetics (concerned with microscopically visible chromosomal maps of the human genome) included the Human Population Genetics Research Unit of the Medical Research Council in Oxford in 1959, followed by 39 years in the University of London in Medical Postgraduate Institutes of Cancer Research, Child Health, Obstetrics and Gynaecology and the Imperial College of Medicine, where he was the head of a department of Clinical Cytogenetics. His research included genetical engineering of diagnostic cytogenetic DNA probes. In associated appointments in the National Health Service : at Great Ormond Street Hospital for Sick Children, Queen Charlotte's Maternity Hospital and Hammersmith Hospital, he ran a diagnostic Service for congenital defects.

In 1993 David obtained agreement of the WCSIM Court to define a scientific instrument as follows: Any device or system of devices that is capable of applying or advancing science and technology by collection, analysis, storage and / or communication of scientific information.

He designed and collaborated with manufacturers to develop new scientific instruments to advance his research and diagnostic work, including Singer Instruments of Reading for single cell work and Ealing Beck Optics of Watford who custom built quartz optics.

He has been married to Enid since 1960 (with children and grandchildren). Enid is a graduate biologist, schoolteacher, then registered nurse (retired), now a Lay Reader in the Church in Wales.

Gift to the Livery: The Master's Chair

A Welsh Oak Bardic-style Chair

(made by Leslie Jones, cabinet maker of Llandeilo)

with a blue leather upholstered seat and blue leather

back panel engraved with the WCSIM Arms in gold.



Donald R Coleman

1993-1994



Donald Raymond Coleman, born 17 April 1925, attended Palmers School and the Royal Liberty School in Essex. Following a wartime Engineering Cadetship, he joined the Army in 1945 and gained entry to the School of Military Engineering at Ripon. He was commissioned into the Corps of Royal Engineers in 1946, subsequently serving with the Royal Indian Engineers in the Occupation Forces of Japan. He was based near

Hiroshima, then at British Commonwealth HQ in Tokyo, and later with the Royal Engineers in Malaya during the insurgency of 1948.

He returned to civilian life and studied at The Polytechnic in London. Following a five-year period with the Plessey Company as Laboratory Manager of the Aircraft Electrical Division and, after a brief period at the Sperry Gyroscope Company, he joined the Rectifier Division of Standard Telephones & Cables at Harlow in 1956 as a Development Engineer. He became Chief Engineer and subsequently General Manager of the Division, and ended his 33 years with the multinational business of ITT Components Group having European responsibilities for contracts and licensing. For many years he represented his Company's interests in National and International Trade Associations and Standardization Organizations.

In his year as Master he initiated the Livery's association with the Corps of Royal Engineers and, with the Chief Royal Engineer, General Sir John Stibbon KCB signed the Articles of Association in the Hall on 21 July 1994.

Donald became Senior Past Master in 2011 on the death of Ron Howard. Donald died on 14 June 2012.

Gift to the Livery: The Master's Banner, which hangs before the Master at Court Meetings and behind and above the Master at dinners in the Hall.



William John Goldfinch OBE

1994-1995



Bill Goldfinch was born in January 1932. He was married to Barbara. His extensive career included being CEO at Avo International from 1987-1992 and Chairman from 1992-94. He was a Director of Metrateg from 1996, Adviser to the Chairman & CEO of EMTA from 1995. He was a board member of Kent TEC, President of GAMBICA in 1987-88, Deputy Chairman of EnTra 1993-95, board member of EITB 1990-93 and

President EEF (South) in 1983-84. He was a governor of South Kent College in 1992. He was Chairman, from 1997, of the DTI Measurement Advisory Committee. He was awarded an OBE in 1994 for services to training.

He was experienced in development/manufacturing/marketing electrical/electronic test instrumentation and electrical calibration and standards.

He became a Liveryman in 1982 and Master in 1994.

He was a member of the United Wards Club, the Dynamicables Club and the 25 Club. His hobbies were swimming and golf.

Bill died on 20 October 2002.

Gift to the Livery: An early George III silver two-handled cup and cover made by Francis Crump, London, 1762.



David A Wallis

1995-1996



David Wallis was born in Beckenham, Kent on 24 November 1932. In 1946 he was apprenticed to the microscope makers Charles Baker and served his time, leaving to join the RAF for his National Service. On leaving the Service he joined the optical distributors CS Pyser Ltd. When travelling for CS Pyser he was able to purchase large quantities of government surplus instruments and profitably resold them after refurbishment.

So successful was this venture, they formed a new company called Survey & General Instrument Co. Ltd. The business took on many agencies covering the surveying field. SGI became the largest agent for Kern outside the USA, growing in the 1980s to a staff of some 45 sales and service staff. David acquired many famous British instrument companies during his career, including France Barker, J H Steward, Ross of London, T Glouser, Leach Optical and Newbold & Bulford. He later became Chairman of what was then Pyser Holdings plc. The Group was sold to its management in 1994 and David was retained as a consultant. In 1998, on behalf of the European Bank for Reconstruction & Development (EBRD) David rescued the Jupiter Lens Company a very large optical factory in Russia, with 1,200 employees.

David Wallis was Technical Director and President of the British

Photogrammetric Society, a Fellow of the British Cartographic Society, and an Honorary Life Member of the Royal Institution of Chartered Surveyors. He was a member and later Secretary and Chairman of the Field Survey Association (later to become the Defence Surveyors Association). In 2009 he was awarded the Ernest Ramus Prize for service to military surveying. He is also a member of the International Federation of Surveyors (FIG) and is the Deputy Director/Treasurer of the Permanent Institution for the History of Surveying & Measurement. He is a Fellow of the Chartered Institute of Marketing. In 1997 David became President of the BLWA (the association for the laboratory supply industry).

David had a close working relationship with the mining department of the University of Nottingham under the guidance of Professor Douglas Hodges. In recognition of David's work in this area, the university senate endowed the annual Wallis Award.

David is a Liveryman of the Spectacle Makers Company. During his year as WCSIM Master he arranged the affiliation with the Royal School of Military Survey as well as the Bridge Ward Club. He is a member of the Farringdon Ward Club and a Life Member of the Royal Society of St. George (City Branch). David Wallis is an active member of a number of Masonic lodges and Chapters and was Master in the Farriers' Lodge in 2009.

In 1956 David married his wife Edna who has played an important part in David's success.

Gift to the Livery: A pair of silver candelabra featuring a prism mounted on a base representing a circle and a series of angles.



William Lyons

1996-1997



William (Bill) Lyons was born on 5 September 1933 in West Hampstead, London. He was educated at King's School, Auckland, New Zealand, Eaton House School and Charterhouse (Weekites). He served in the RAF from 1952-1955, initially as a radio instructor and then commissioned service in Egypt, Aden, Cyprus and Libya before joining the family firm of Claude Lyons Limited in 1956. He is currently Chairman of

the Claude Lyons Group, Waltham Cross, Herts comprising Claude Lyons Limited, Lyons Instruments Limited, and The Transformer and Electrical Company Limited.

Married (1) Maura Ellen Bryce (died on 15 October 2004) on 2 September 1960, one son and two daughters. (2) Maura Elizabeth Holman-Henry on 25 May 2007.

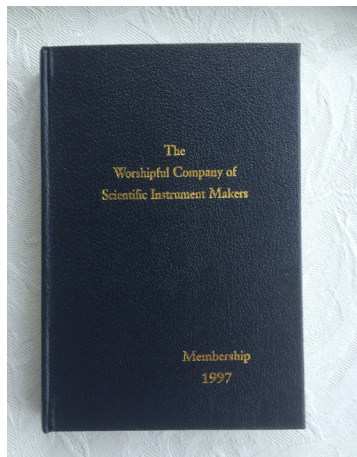
He is a Chartered Engineer, Fellow of the IET, Fellow (and Council Member to 2009) of the Institute of Measurement and Control, Life Senior Member of the IEEE (USA), past Fellow of the Institute of Directors and of the RSA. He was a member of the Council of SIMA, and of the Council of GAMBICA from 1982-1997, serving as President for 1991-92. He is a Life Honorary Member of the Council of BMTA. He was a member of the

National Measurement System's Measurement Advisory Committee and of the Electrical and Thermal Working Groups between 1994 and 2008.

In the City he is a member of Bridge Ward Club, Coleman Street Ward Club (Chairman 2000-2001), and the United Wards Club, and a Life Member of the City Livery Club. He is also a Liveryman of the Worshipful Company of Musicians (1998).

During his year as Master (1996-97) he was delighted to complement our existing relationships with the Royal Navy and the Army by establishing a relationship with his old service, the Royal Air Force, in the form of the Department of Specialist Ground Training at the Royal Air Force College, Cranwell. This relationship has recently been transferred to the Defence College of Aeronautical Engineering.

Gift to the Livery: With the help of Assistant Clerk Carole Hands, Bill organised the creation of a database of liverymen and subsequently the production and distribution of 250 copies of this leather bound directory.



Sir Ivor Cohen CBE TD

1997-1998



Ivor Cohen was born in London on 28 April 1931. After a grammar school education, he read History at University College London, obtaining a BA in 1952. He was commissioned into the Royal Signals. After National Service, he remained in the TA and reached the rank of Major. Despite his university discipline, he spent most of his career in engineering, much of the time with Mullard Ltd. In 1979 he became Managing Director of

Mullard Ltd, at that time the largest manufacturer and supplier of electronic components in the UK. During his time in Mullard he served on the Prime Minister's Information Technology Advisory Panel (ITAP), the steering group for Teletext and Viewdata 1981-86 and also for Telecommunications 1986-88 and a number of other government bodies.

He retired from Mullard in 1987 and undertook a range of activities, including Chairman of Remploy Ltd, Sira Ltd, Optima Group, and Deputy Chairman of Redifon Holdings. He was Non Executive Director of AB Electronic Products plc, Oce UK Ltd, PA Holdings Ltd, Magnetic Materials plc, Electron Technologies Ltd, Russell Partnership Ltd and Deltron Electronics plc. He was an advisor to the venture capitalists Apax Partners and to Mitsubishi Electric Europe and Comet Group 1987-90.

During his time in Mullard, the company established a strong position as a supplier of components to the Japanese TV industry in Europe and he was invited in 1991 to chair the newly-formed Japanese Electronics Business Association (JEBA), set up by DTI to encourage UK companies to sell electronic components to the Japanese electronics industry, which was very successful. He was Chairman successively of the Electronic Applications and Electronic Industry sector groups of NEDO, and of the Measurement Advisory Committee. He was a member of the Steering Board of the Radio Communications Agency and the sole industrialist on the Schools Examination Assessment Council.

He is a Fellow of University College London, an Honorary Fellow of the Royal Academy of Engineering, Companion of IEE and of the InstMC. He was awarded an Hon DSc by City University 1999.

He was awarded the TD for his service in the Territorial Army, the CBE for services to the electronics industry 1985 and was knighted in 1992 for services to the disabled.

He joined the Livery in 1982, was made Assistant in 1991 and Master in 1997 and was delighted when his daughter, Elisabeth, joined the Livery in 2004. During his time as Master and for several years after, he tried to establish the Instrumentation Industry Exchange.

He became Senior Past Master in 2012 on the death of Donald Coleman. He is a member of the East India and Reform Clubs.

Gift to the Livery: Cup and cover made by Jocelyn Burton London, 1997.



Brian G Atherton

1998-1999



Brian Godfrey Atherton was born on 26 December 1935. Stoneleigh Primary School and Kingston Grammar provided a sound basic education and an apprenticeship with Vickers Aircraft at Weybridge completed an ever-present interest in science and technology, with graduate membership of the Institute of Physics.

Too young for the war and too late for National Service, Brian completed 12 years with Vickers, working on computers, electron microscopes and linear accelerators. A move to Plessey at Poole, eventually as deputy head of the research laboratory, involved work on vehicle detection (now the ubiquitous 'loop' in the road); solid state sensors, particularly strain gauges and thin film techniques. During this time, the Ministry of Technology and the TSR2 programme came and went, leading to many leaving Plessey to establish their own companies.

In 1968, Brian founded Quest Automation, originally manufacturing photo plotters, the only UK maker, competing with Gerber and Computer Vision in the USA. Since the late 1970s, Brian founded several companies, doing electronics market research in the Middle East and then Japan; Robotic Insertion of components into Printed Circuit Boards and, lastly, Computer Telephony. He 'retired' as the millennium changed and then contented himself with

involvement in local affairs such as the Chamber of Commerce in Ross-on-Wye, near his home in Gorsley, Herefordshire. He also established a Business Angels group, to invest in young entrepreneurs, particularly in West Midlands rural areas. Brian died on 8 March 2011.

Gift to the Livery: A Rosewood Presentation Ceremonial Gavel and a circular stand applied with an inscribed silver plaque 'Presented by Brian G Atherton, Master 1998-1999' Maker TF, Birmingham.



M Trevor Dixon

1999-2000



Michael Trevor Dixon was born on 17 September 1936, the son of a Yorkshire farmer. He was educated at The Bentham School and Liverpool John Moores University. He qualified as an Associate of the Royal Institute of Chemistry and was later elected a Chartered Chemist. All his working life was spent in the scientific instrument industry where he was latterly Managing Director of the UK subsidiary of Beckman followed by

Heraeus. In addition to WCSIM he was also a Liveryman of the Worshipful Company of Needle makers, a member of the Millennium Masters Association and Bridge Ward Club, having served on the Livery Committee.

During his year in office WCSIM commissioned the Millennium Measure to commemorate 2,000 years of history from the birth of Christ to the year 2000 in the fields of science and instrumentation, the City, the nation and religious happenings. It was to be sited on the embankment underneath the bridge but, because of problems with the bridge, it was not presented to the City until 2002 at a ceremony with the Lord Mayor Alderman Michael Oliver.

In addition to the many livery events and visits to other liverys, the highlights of the year included the Garden Party at Buckingham Palace, his wife Jean

taking the grandchildren to the Lord Mayor's Christmas Party, Swan Upping on the Thames using a restored Edwardian steam boat, a medieval banquet as guests of the World Traders, a visit to the Players Theatre and the Master's weekend in Oxford dining in Wadham College. As appropriate for the son of a Yorkshire farmer, Wensleydale cheese was his gift to the ladies at his Banquet.

Trevor had two daughters and four grandchildren. His main hobbies were gardening, reading and enjoying the company of friends and family with good food, wine and conversation. In retirement he spent much time in his beloved 'home in the sun' in a quiet corner of Mallorca. Trevor died on 31 January 2015.

Gift to the Livery: A leather folder for the Court minutes.



Rear Admiral John M T Hilton

2000-2001



John Millard Thomas Hilton was born on 24 December 1934 in Peterborough, Cambridgeshire. In 1949 he joined the Royal Navy He joined HMS BIRMINGHAM in 1957 in the Mediterranean as the Ordnance Engineer officer, then he joined the Royal Naval College, Greenwich. He stood by the building of HMS MOHAWK as the Weapon and Electrical Officer and was with her in the Persian Gulf. He then

moved to the Weapon and Electrical School at HMS Collingwood in 1965. He gained an MSc from City University in 1978.

He stood by the building of one of the first of the Royal Navy's Guided Missile Destroyers, HMS NORFOLK. He was promoted Commander and joined the staff of the Commander-in-Chief as Deputy Fleet Weapon and Electrical Engineer Officer. In 1972 he was awarded one of the first Defence Fellowships, which he spent at Imperial College on simulation techniques, for which he was awarded a DIC.

He and his family then enjoyed three years in Hong Kong where he was the Base Engineer Officer in HMS TAMAR. On his return he was appointed Director of Naval Engineering at the RNEC, with responsibility for all post-degree training.

As a Captain, from 1983-85 (which included the Falklands War), he was Assistant Director (Naval Operational Requirements) and Deputy Chief Naval Signal Officer. His last appointment, in the rank of Rear Admiral, was as President of the Ordnance Board, the MOD Tri-Service Safety Authority for all explosives, including nuclear.

On retirement from the Service in 1990, he was retained by Cray Electronics Plc (now Anite Group) and P-E International. He was appointed a Visiting Senior Fellow at City University for Safety Engineering policy issues in 1993.

He received the Freedom of the City of London in 1988, became a Liveryman of the Worshipful Company of Scientific Instrument Makers in 1989 and Master in 2000-01. He was awarded an Honorary Doctor of Science Degree by City University in 2002.

He died in 2009 at his home in Petersfield and leaves a son and daughter and three grandchildren from his first marriage, all who live in the United States, and his wife Caroline who has one daughter and two grandchildren.

Gift to the Livery: A new set of computer equipment for the Clerk and Assistant Clerk.



Derek C Cornish

2001-2002



Derek Charles Cornish was born on 30 December 1929. After leaving Latymer School, Edmonton, he did National Service in the RAF as an aircraft radar assistant. Subsequently, whilst working in laboratories in the Royal Mint Refinery and later in the food industry, he studied part-time for a BSc in Special Chemistry at Birkbeck College, University of London. This was followed by full time research for a PhD in Electrochemistry, studying charge transfer processes at mercury electrodes.

He joined the British Scientific Instrument Research Association (Sira), where he investigated the mechanism of glass polishing for a consortium of UK optical and ophthalmic companies. Subsequently, he worked on a range of instrument R&D projects for government and industry. He was principal author of a reference book *Sampling Systems for Process Analysers*, which was later re-published. Over the years he also served on various DTI committees awarding funding for instrument developments within UK industry.

He became an Executive Director of Sira Ltd and later its Deputy Managing Director. On retirement he became an independent consultant, remaining Non-Executive Director of some of Sira's subsidiary companies for a period.

He continued as Chairman of the Safety Impartiality Committee of Sira Certification Service. He was Company Secretary of The International Instrument Users' Association and Chairman of the editorial committee of the Journal of Measurement + Control. He was a Life Senior Member of the Instrument Society of America, a Chartered Chemist, a Fellow of the Royal Society of Chemistry, a Chartered Engineer, and an Honorary Fellow of the Institute of Measurement and Control, of which he was President in 1989.

He became a Liveryman in 1987 and Master in October 2001, and was a Director of Glaziers' Hall Ltd.

He was on his local Parochial Church Council and was Chairman of the Friends of St Leonard's. He was also Director and Company Secretary of a local charity, the East Surrey Dial-A-Ride. He spent his remaining spare time gardening, on photography, mediocre golf and on tracing his family trees (his Cornish forebears as far back as 1555 were Freemen of the Watermen's Company). He also liked to travel widely.

He had met and married Kathleen who had graduated in English with him at Birkbeck College. They had three children, a daughter and two sons. He became widowed in 1985 and later married Susan, gaining a stepson and a stepdaughter. Derek died on 17 December 2013.

Gift to the Livery: A silver timepiece with livery crest on scroll end for the Master's place at dinners. Designer Karen Emmersen. Model maker Salina Preece, Laneford & Co. London.



Professor Raymond C Hills

2002-2003



Raymond Clement Hills was brought up in Welwyn Garden City where he attended the local Grammar School. He graduated with Honours in Electrical Engineering from the University of Bristol in 1954. He then joined the BBC in the transmitter capital works department where he specialised in antenna systems from MW radio through to UHF TV.

In 1967 he joined the Independent Television Authority as Head of Masts and Aerials Section, subsequently becoming Head of Department in 1969, Chief Engineer (Transmitters) in 1972 and Assistant Director of Engineering of the then Independent Broadcasting Authority in 1978. On retirement, he established Ray Hills Associates as a consultant in broadcast engineering, providing services to a range of international clients, particularly in the Far East. He finally retired in 1998.

He served on a number of committees of the Institution of Electronic and Radio Engineers, becoming President in 1985-86. He also served on and chaired many boards and committees of the Institution of Electrical Engineers, becoming a Vice President in 1986. He was elected a Senior Member of the Institute of Electrical and Electronic Engineers (USA) in 1991 and a Fellow of the Society of Motion Picture and Television Engineers (USA) in 1994.

He was appointed a Visiting Professor at De Montfort University in 1994 and received the Honorary Degree of Doctor of Technology in 2004.

Gift to the Livery: A set of 24 napkin rings with beaded decoration and parcel gilt armorial in a velvet-lined case.



Newrick Kenneth Reay

2003-2004



Newrick Kenneth (Ken) Reay was born of coal mining stock at Washington, Co Durham, on 13 April 1943. He graduated in Physics from Hull University in 1964 and was awarded a PhD for work on astronomical instrumentation in 1968. For a year he worked as a research assistant in the Astronomy Group of the Physics Department, Imperial College, before spending two years working on a range of UV

rocket and satellite projects in the Astrophysics Research Unit at the Culham Laboratory.

In 1971 he returned to Imperial College as a lecturer in Physics, spending the next 15 years working on the structure of Planetary Nebulae. He was promoted Reader in Physics in 1985 and was awarded a DSc for his work in astronomy and instrumentation in 1986.

In 1979 he was a leading co-founder of Queensgate Instruments Ltd., a company which pioneered the development of servo-stabilised Fabry-Perot Interferometers for astronomy. The company prospered and expanded into the then new markets of nano-positioning for the semiconductor industry and, in the mid-1980s, into fibre-optic communications. Ken left Imperial in 1986 to become Chief Executive of Queensgate. The company grew rapidly

in the fibre-optic network management market and, in early 2000, was acquired by SDL Inc., a San Jose based manufacturer of laser diodes for fibre communications. Ken resigned from SDL-Queensgate in 2001 and took on a number of non-executive directorships with technology companies before co-founding Queensgate Corporation Ltd, a residential property investment and development company.

In 1990 Ken was awarded an MBA by Henley Management College, and in 1995 was named British Venture Capital Association 'Venturer of the Year' in the research-based category. He has served on the international advisory board of the Singapore-based GINTIC Institute of Technology and was a member of the 3i plc Independent Directors Program. Clubs include Wentworth and the MCC. He is a past member of the East India Club and a Liveryman of Worshipful Company of Clockmakers. He is married to Eileen.

Gift to the Livery: A silver plinth supporting the Millennium Measure surrounded by depictions of Newton, Faraday and Atlas. The plinth symbolises the classical architecture of the Thames. Atlas is included carrying the celestial sphere, which recognises Ken's career and appears in the Reay family grant of Arms.



Professor Richard W Hartley

2004-2005



Richard William Hartley was born on 12 May 1944. He attended the King Edward VII grammar school in Lytham St Annes, Lancashire, before entering into a student apprenticeship with the British Aircraft Corporation at Warton and studying for the Grad. Inst Physics qualification at the Harris College in Preston. Immediately upon qualifying, he accepted the position of Research Assistant in Electronic Engineering applied

to Neurophysiology at the University of Bristol. At the conclusion of the grant he joined an artificial intelligence group within Queen Mary College, London.

Thereafter he took up employment in Edinburgh as a physicist investigating energy sources for powering the prosthetic limbs of Thalidomide children. At the conclusion of that grant, in 1972, he took up employment with Allen and Hanburys pharmaceutical company in Ware, Hertfordshire. Richard spent the rest of his working career running an instrumentation support group on behalf of Research and Development. When he retired, from the company now titled GlaxoSmithKline, at the end of 2004, his position was that of Director of Worldwide Applied Technology.

During his time within 'Glaxo', Richard was the sole author of some 15 or

so scientific papers, was co-named on several patents, completed an M. Phil at the then Polytechnic of Central London and, in 1989, was awarded his PhD by the University of Technology at Loughborough. He is a Chartered Engineer, a Chartered Physicist and a Fellow of the Institute of Physics. In 2001 he was appointed an Honorary Visiting Professor within the School of Engineering at City University. He was a member of the EPSRC Control and Instrumentation review college. He is a member of the committee of his past master's association The Trafalgar 200. In his spare time he indulges his passion for 'inventing', motorcycling, 20th century poetry, red wine and thinking. He used to enjoy aviating too! He is married to Xiaowei Cao.

Gift to the Livery: A pair of silver plated three light candelabra in the early 19th century style.



Carl Saunders-Singer

2005-2006



Carl was born on 20 December 1945. As the eldest of four children, he was born into the family laboratory furnishing and scientific instrument making business in Reading. He attended Henley Grammar School and then Stoneham School. In 1968 he started an apprenticeship at Singer Instruments and attended the South Oxfordshire and Reading Technical Colleges where he gained distinctions in CGLI MECP 1 & 2 and tool making. In 1973 he co-founded Carl Singer Engineering with his brother, Kim, and then re-joined the family business in 1978 as production director.

The company moved to Somerset in 1979 and in the early 80s Carl became Managing Director. He changed the course of the business in the direction of micromanipulation in yeast genetics in which he became a leading expert. His tools revolutionised experimental procedures that have helped accelerate our understanding of genetics and diseases like cancer. He was invited to teach micromanipulation techniques in laboratories worldwide and the company's products, which now include robots, can be found on benches in laboratories in the top research institutions in the world, including the top 20 Universities, NASA, and laboratories of Nobel Laureates such as Sir Paul Nurse.

He was Governor of a number of local schools, an Adviser to Somerset FE colleges and the local authority, a Director of Business Link and Alternate Director of Glaziers' Hall. He was Chairman of West Somerset Squash Rackets Club and Past-Chairman of WCSIM Government Liaison Group for the Instrumentation Industry and a director of Minerva House Management Ltd.

During his Master's year he organised 'Beautiful Measurement' at the British Museum, a celebration of scientific instruments in their social contexts from early Islamic times to the modern day. The meeting was open to the public. He was also responsible for 'SIMposium', where SIM Scholars competed for a prize for the best paper explaining their research.

Carl died on 8 March 2013. He was married to Liz and they have two sons. Harry, now a Liveryman of WCSIM, who succeeded Carl as Managing Director of Singer Instruments and George, now a Freeman of WCSIM, who is a chandelier designer and maker.

A charity, The Carl Singer Foundation, was set up in honour of Carl. It is dedicated to supporting scientific education in the field of yeast genetics, with the enthusiastic and humorous character in which Carl was so well known among the scientific community.

Gift to the Livery: A set of framed astrolabes.



Captain Guy P Brocklebank RN

2006-2007



Guy Philip Brocklebank was born on 24 August 1954 in Worcestershire. After education locally at Elmfield School and then at Millfield School in Somerset, he joined the Royal Naval College Dartmouth in 1973. From here he was selected for the City University Nomination Scheme and graduated in 1979 with BSc (Hons) in Systems & Management.

Sea time as a Midshipman was spent in HMS LONDONDERRY in the Far East. After graduating he qualified as an Officer of the Watch and joined HMS RHYL, followed by other appointments, including service in the Falklands Campaign. He attained the rank of Commander in 1989 and served in Gibraltar, and was on exchange to the United States Navy at the Pentagon during the attack of September 11, 2001. He subsequently served on military operations in the Middle East, for which he was awarded a United States Navy Meritorious Service Medal. In October 2003 he returned to the staff of Commander-in-Chief Fleet in the post of Deputy Assistant Chief of Staff as an Acting Captain. Following selection for substantive promotion to Captain in 2005, he moved to the Ministry of Defence.

Hobbies and interests include reading, walking and rowing and sailing. He is a Fellow of the Royal Society of Arts, Member of the Chartered Institute of

Management, Communication Managers Association, and the Royal United Services Institute. Being Trustee to two charities for special needs education and a Liveryman of the Worshipful Company of Scientific Instrument Makers fills the remaining hours.

Gift to the Livery: A silver statuette of Admiral Lord Nelson.



David W Smith

2007-2008



David was born on 14 November 1943 in Ryde, Isle of Wight.

He was a Director of Nortel Networks, responsible for Global Technical Supply Management. European Director of Quality for Bell Northern Research. General Manager of ITT Components Quartz Crystal Division and STC's Test House Services business.

David is immediate past Chairman of the International Electrotechnical Commission's (IEC's) Conformity Assessment System for Electronic Components, Processes and Materials (IECQ). He was chairman for 10 years from 2004 to 2013, and chairman of the European equivalent organisation, CECC, for 11 years from 1993 to 2003. He has received the IEC's Thomas A Edison Award for meritorious service to International Certification and Standardisation, and a Distinguished Service Certificate from the British Standards Institute for long and valued contributions to the development of British, European and International Standards.

Member of Rotary International, the Scientific Instrument Society. Mayor of Bishop's Stortford 1976-1978. Past Chairman of the Government Liaison Working Group (GLWG) of WCSIM and its successor the Instrumentation Industry Liaison Group (IILG), Chairman of the Livery Protocol Committee

and past Livery Schools Link and Wet 10 representative.

During his year as Master, David arranged a lecture on Robert Hooke and, during his Master's weekend on the Isle of Wight, arranged a curated tour of the Hooke Museum at Fort Victoria, in Freshwater. Hooke made significant contributions to the understanding of science and also constructed many significant scientific instruments. See Appendix 4.

Married to Maureen with three children and six grandchildren. Other interests include Education (Primary School Governor for over 40 years, Pre-school Trustee, past Secondary school Governor for 12 years), football (Spurs season ticket holder for over 25 years), cricket (Essex and Hampshire), travelling; good food and wine, reading, petanque, cards and enjoying the countryside.

Member of the 25 Club and the Dynamicables Club.

Gift to the Livery: Fitting out the first ever WCSIM Thames Cutter.



Brian J Lowings

2008-2009



Brian is married, with two sons. He was educated at technical school and college at the end of WWII. He was employed as a technician in the chemical industry whilst studying part-time for a degree in chemistry. After graduating, Brian gained employment as an analytical chemist rising to Chief Analyst developing analytical equipment particularly in gas/liquid chromatography and spectroscopy applications.

Brian was employed by a number of scientific instrument companies, including Willkens Instrument and Research Inc., Varian Associates Inc., Technotron Pty., Bausch and Lomb Applied Research Laboratories, in development and marketing in senior management positions. Much of this work involved worldwide travel. In the 1970s he was a founding Director of Applied Chromatography Systems Ltd until 1982, when he formed his own company, Biotech Instruments Ltd. He was Chairman/Managing Director and developed and manufactured DNA peptide synthesisers and electrophoresis equipment. He retired in 1997.

He is a Liveryman of the Farriers Company, a member of the Royal Institution and a Freemason. Other interests include history, DIY, reading, aviation (he has a private pilots' certificate), swimming, wreck diving, marine biology, archaeology, and all shooting disciplines.

Gift to the Livery: A candelabra representing the structure of DNA.



Henry L Tee CBE

2009-2010



Henry (known as Harry) Leonard Tee was born in 1945 in Kilsyth. Harry was educated in the Scottish State Schools system at Kilsyth Academy and the Graeme High School, Falkirk.

Harry was sponsored by the National Coal Board and attended Strathclyde University graduating with a BSc in Electrical Engineering. He then went into industry designing electrical and then electronic systems for mining and petro-chemical applications with Anderson Strathclyde Group. He joined ITT as Sales Manager for their Component businesses in Scotland followed by a move south to become Product Manager within the ITT Electronic Services business.

In 1978 he joined Schlumberger as Managing Director of a metrology company in the UK, then developed a defence simulation business Schlumberger had acquired. This grew into a much bigger role and he became head of an international group of companies in 1985. He was then asked to take on the role of Managing Director of the Schlumberger Sensors and Instrumentation business worldwide. He later joined Cambridge Electronic Industries as Divisional Managing Director of their Components Division.

Two years later he led a management buyout of the Division and formed the Roxboro Group plc, now known as Dialight plc, then went on to acquire a

number of other companies, including the metrology company he had first led 15 years before. He retired in 2005 as CEO and as Chairman in 2012 of the Roxboro Group. He also became Chairman of a number of other technology companies and Chairman of the Electronics Leadership Council, a body established to interface between the industry and the Government.

During all this time Harry had held a number of distinguished roles within the industry. He was a Board Member and Vice President of the FEI and Intellect, President of GAMBICA, President of EECA, the European Electronic Components Trade Association in Brussels.

Harry is a Fellow of the Institution of Engineering and Technology, a Fellow of the Royal Society of Arts, Commerce and Manufactures, Fellow of the Royal Institution and a Companion of the Chartered Institute of management.

He was honoured with a CBE by Her Majesty the Queen in 2008 for his services to the electronics industry.

Gift to the Livery: A silver statuette of Michael Faraday.



Brian D Fishwick

2010-2011



Brian Douglas Fishwick was born in west London on 26 May 1947. He began his career in scientific instrumentation in 1969 working for Joyce, Lobel & Co. In 1992 he joined Beckman Instruments, working in various positions including, product management, sales and marketing management for a wide range of instruments, from Ultra Centrifuges, Electroencephalographs, to Automated Clinical Chemistry

Analysers. When Beckman acquired Coulter Instruments he was appointed Managing Director of Beckman Coulter responsible for UK, Ireland, Netherlands and Scandinavia. He was Director of the Diagnostic Club, a technology transfer operation set up with funds from the Department of Trade & Industry.

Taking early retirement in 2003, he worked as a management consultant, represented the UK Clinical Diagnostic industry on several overseas Government Trade and Investment programmes.

During his career he was an active member of trade associations; Chairman of the British Laboratory Ware Association, (BLWA), later Chairman of British In vitro Diagnostic Association (BIVDA). In 2003 elected President of BIVDA and worked closely with Government bodies representing the

diagnostic industry on the Healthcare Industry Taskforce (HITF) a review aimed to increase the early uptake of innovation into the NHS.

He became a Liveryman of WCSIM in May 1997, and Honorary Treasurer and Court Assistant in October 2004. Brian is married to Jane Fishwick who is also a Liveryman.

Gift to the Livery: A chair for the Senior Warden made in oak and bog oak by students at the Building Crafts College, Stratford, London.



Keith F Etherington

2011-2012



Keith Etherington was born in Tottenham, London in 1948. He is a graduate in Applied Physics from the University of Wales Institute of Science and Technology (now Cardiff University).

In 1972 he joined Mullard Ltd, the UK electronic components division of Philips, the Dutch electronics company. He was initially involved in the commercial activity supporting the development and sales of military night vision components. In 1977 he moved to Eindhoven in the Netherlands to manage the global commercial activity for these components. Returning to the UK three years later he then had a number of increasingly more challenging roles, ending with his appointment in 1993 as Managing Director of Philips Components UK (Mullard changed names in 1987).

From 1994 until 2001 Keith was Chairman of the DTI funded trade association PREBA (later APEBA). PREBA provided guidance and support to small and medium sized UK companies in developing close relationships with the major Asian electronics companies who were investing in the UK at that time. The proportion of UK made components and subassemblies used by these inward investors was increased. Whilst initially focused on UK production sites of these inward investors, PREBA support was extended to enable members to grow business in the investor's home countries.

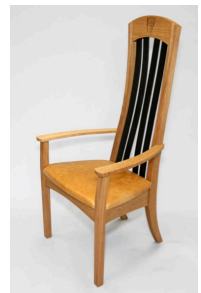
In 1998 he again moved to Eindhoven, initially to oversee the deployment of a global sales office and accounting system (SAP) for Philips Components. He then became Vice President for Marketing Communications for Philips Semiconductors, and finally VP for Marketing Programs. He returned to the UK in 2003.

Keith was admitted as a Liveryman of the Worshipful Company of Scientific Instrument Makers in 1999. He joined the Court of Assistants in 2006. He is a member of the Bridge Ward Club.

Keith has a son, Bruce (who became a Liveryman in 2011) and a daughter, Karen. He lives in Wimbledon with his wife Ann Redfearn (Liveryman of the Worshipful Company of Musicians). Their hobbies include opera, theatre, music, walking in the hills and skiing.

Keith's year as Master coincided with London 2012 Olympics and Queen's Diamond Jubilee. He and Ann were delighted to be on board our cutters during the Diamond Jubilee Flotilla. They were also on board our cutter, which took part in the last segment of the Olympic Torch relay from Hampton Court to the Olympic Stadium. The Livery companies sponsored a lunch for the Queen at Westminster Hall and Keith and The Clerk invited representatives from our apprentices and scholars and our local Sea Cadets, Scouts and Help for Heroes.

Gift to the Livery: A chair for the Junior Warden made in oak and bog oak by students at the Building Crafts College, Stratford, London.



Eur Ing David W Kent

2012-2013 & 2013-2014



Born in Walthamstow on 12 February 1940 and educated locally, David moved straight from the William Morris School to industry as a student apprentice of Short & Mason Ltd, the meteorological instrument makers, having become intrigued by the manufacturer's demonstration of its sun recorder in a physics lesson – not the obvious necessity for the East End of London.

The National College of Horology/Northampton College of Advanced Technology/City University was the font of knowledge for solutions to meet the company's new manufacturing challenges, as well as the academic development of its students. It was his good fortune that his arrival coincided with that of Ludwig Finkelstein (later a Liveryman of the Company), then a lecturer, from whose profound influence he was to benefit throughout his career.

He designed and commissioned measurement and control systems at plants throughout the UK, as well as in Europe and America. Short & Mason became wholly owned by the global Taylor Instrument Company of Rochester, NY and soon he moved to the US helping to define their first distributed digital control system. On return to the UK, he became a director with responsibilities extending to subsidiary companies in Germany, France, Italy and Belgium.

When the Kent Instrument Company merged with Taylor to become ABB

Kent-Taylor, he became the director responsible for advising on technology, research directions and university collaboration.

In 1992 he established his own engineering consultancy with contracts won at home and in the USA. For the UK government's DTI and EPSRC he managed collaborative research programmes matching SMEs and universities across the UK. They were subsequently awarded a contract to investigate and report on the dynamics of the measurement and control industry.

As a student apprentice, David was strongly encouraged to become a student member of the then new Society of Instrument Technology which subsequently matured into the Institute of Measurement and Control. He became President of the Institute in 1992 and served as its Honorary Secretary. In 2016 City University of London awarded him an Honorary Fellowship 'for his outstanding contribution to the field of measurement and control'.

He is married to Freda and they have a son in historic building research and protection and a daughter in large animal veterinary surgery. His hobbies include vintage car preservation and driving, sheep breeding and church bell ringing.

When Senior Warden Seton Bennett was unable to take his position as Master, David volunteered to be Master for a second term.

Gift to the Livery: A chair for the Clerk in the Court, made in oak by students at the Building Crafts College, Stratford, London.





Other significant roles



2. Senior Past Masters

The Past Master who has served the most years as Past Master is invited to hold the post of Senior Past Master. This office not available to Past Masters Emeriti or those Past Masters who are unable to attend regularly due to ill health.



Charles Cridland 1955 - 1983 Founding Master

John Bailey CBE 1983 - 2000

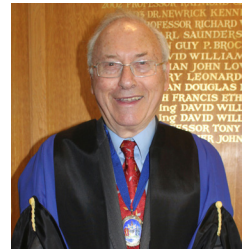
Stephen Barrett 2001 - 2004

Denys Randolph 2005 - 2007

Ron Howard 2007 - 2011

Donald Coleman 2011 - 2012

Sir Ivor Cohen CBE TD 2012 - to date



3. Warden Emeritus Seton John Bennett CBE *2013-2015*



Seton Bennett was due to be Master in October 2014. Unfortunately he had to withdraw due to his illness (MND) becoming limiting. Seton passed away in September 2015, aged 70. Seton played a significant role in National Physical Laboratory (NPL) and the measurement community.

Seton arrived at NPL straight from the University of Oxford in 1967, and spent the first 18 years of his working life at NPL, also completing his PhD at Imperial College London in 1972. Having a strong interest in optics and spectroscopy, Seton enjoyed working in a number of areas of measurement science, in particular optical metrology. He developed a number of instruments and published 35 scientific papers and articles.

After a period working as branch head, responsible for mechanical metrology, Seton left NPL to become Deputy Director at the National Weights and Measures Laboratory (NWML), now the National Measurement and Regulation Office. Seton became Director and Chief Executive of NWML in 1990, leading it through a period of performance improvements, and overseeing changes to the Weights and Measures Act.

Seton was Chairman of the European Legal Metrology Cooperation, WELMEC, for 11 years, overseeing the negotiation of the Measuring Instruments Directive, and setting the future legislative agenda. He also represented the UK on the International Committee of Legal Metrology and was a member of the International Organisation of Legal Metrology's Presidential Council.

Following a return to NPL as Deputy Director in 2001, Seton was awarded a CBE in The Queen's Birthday Honours List in 2006. He took responsibility for NPL's international partners and stakeholders and was Chairman of the European Association of National Metrology Institutes from 2004 to 2006. Seton retired from NPL on 31 July 2009, 42 years to the day after first joining.

Upon retirement, Seton continued to be a member of the International Committee for Weights and Measures and chair the United Kingdom Accreditation Service Policy Advisory Committee, as well as being a member of the Court of the Worshipful Company of Scientific Instrument Makers.

4. Apprentice Wardens 2007-2014

Guy Brocklebank RN 2007-2013

Ken Sanders 2013-to date

5. Barge Masters 2006-2014

Guy Brocklebank RN

6. Clerks 1989-2014

George Everard 1988-2000. George died on 28 April 2011

Neville Watson 2000-to date



7. Assistant Clerk

Carole Hands Assistant Clerk 1989-2000.

Carole died on 14 June 2016

8. Chaplains 1989-2014

Tom Farrell 1989-2000

Jeremy Crossley 2000-to date



Jeremy Crossley is a Lancastrian who was educated there before going up to St John's College, Durham in 1973 to read History and Politics. After graduation he worked as a Civil Servant in the Ministry of Defence both in London and Northern Ireland before returning to Durham to train for the priesthood. He was ordained in 1984 and served his first curacy in the Medway Towns where he was also the Chaplain to the local hospital and 1039 Air Cadets Squadron.

He returned to London in 1987 to a post at St Michael's Chester Square and in 1991 he became Vicar of St James the Less, Westminster where he was given the task of setting up a church for the 16-30 age group in South Westminster. He became Rector of St Margaret Lothbury, the Company Church, in 2000 and has been Chaplain to the Lord Mayor of London twice and to the High Sheriff of East Sussex once. He has also been Area Dean of the City of London & Area Director of Ordinands and Post ordination Training for the Anglican Church in Central London. He enjoys seeing friends, opera, reading political biography, visiting Italy and drinking wine.

9. Honorary Solicitor

Roger Seaton *1991-to date*

Roger hails originally from Wolverhampton, (which in his day had a great football team, all of whom came from the locality!). He was educated at Clifton College, Bristol and then went to Trinity College, Cambridge where he read History and Law and played for university teams at both Squash and Royal Tennis, before settling in London and commencing his Articles to become a Solicitor.

He spent time in the City doing major new issues and merger and acquisition work before joining Howard Kennedy where he has been since 1973 and where he now acts as a Consultant. His main interests over the years have been in relation to companies, partnerships, employment law and also in the specialised fields of estate planning, tax and trusts. He has a non-executive role with a major literary agency.

He also pursues his interests in History and Film and now spends more time travelling with his wife, Arlene, who after a lifetime in the publishing industry now sits on the research ethics committee at the Royal Free Hospital.

10. Honorary Director of Music

Dr Richard Townend *2008-to date*

Richard has been the resident recitalist at St Margaret Lothbury in the City of London for 45 years. A Colles Prize winner at the Royal College of Music in London, he travels all over Europe giving recitals and has had the pleasure of playing on some of the finest organs. He has recorded historic organs for BBC radio and television, Belgian radio, EMI and other commercial labels

both in England and the USA.

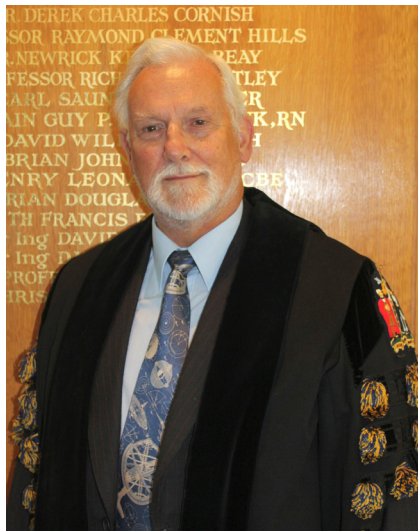
As a specialist in the music of the Renaissance and Baroque, he is particularly proud that, in 1975, he became the first English organist to be invited to play in the International Organ Festival in Sion Switzerland, performing on the oldest playable organ in the world in the Cathedrale de Valère.

He was Master of the Worshipful Company of Parish Clerks of the City of London in 2007-2008 and is an Honorary Freeman and Director of Music of the Worshipful Company of Tylers and Bricklayers, Honorary Director of Music of the Worshipful Company of Scientific Instrument Makers, Organist to the Worshipful Company of Armourers and Brasiers, the Glovers Company and to the Ward Clubs of Coleman Street and Broad Street.

11. Beadles

Senior Steward WH Metcalf 1989-1991 *acting*

Anthony Parker 1991-*to date*



12. Roll of Honour

The Worshipful Company of Scientific Instrument Makers is enabled to maintain a lasting memorial to all former members of the Livery through a generous bequest of a beautifully bound book embossed with the Arms of the Company, presented by Assistant Bernard Fisher, 1926–1991 (entries to this book began in 1959). Names of the Liverymen who have died in the previous 12 months are read by the Senior Past Master at the annual Church Service.

**The following Liverymen died in the period
October 1989 to October 2014:**

1989

James Dixon Carter
Charles Cory Hanrott
William Henry Jaye

1990

Sydney Jones, CBE
Peter Douglas Scott Maxwell, CBE
Vernon Arthur Sheridan (founder freeman)
Joseph Spencer, MBE
Robert Alexander Villiers, CBE

1991

Sir Raymond Frederick Brown, OBE

Bernard Buckman

Bernard Fisher

Marcus Lionel Joseph, OBE

John Teasdale Shepherd

Victor George John Upton

1992

Robert Henry Falconer

William Leslie Frank Johnston, MBE, JP

Alan Lister Kidd

John Thomas Miller

John Henry Mitchell

Frederick Stanley Banes Murrells

Geoffrey Charles Ottway, JP

David Nethercliffe Truscott, OBE

1993

Derrick Arnold Patient

Francis Kenneth Chorley, CBE

Bert Thomas Dyett

John Anthony Stafford, OBE

John Buckingham Stafford Savage, TD

Wilfred Henry Medcalf

Charles Walter Miller

Roger Herbert Rowell

1994

Ian Wedderburn Clunie Robertson

Alec Ennever William Hibbitt

Maurice Henry Willis Gall

Sydney Rutherford Wilkins

Frank William Bates

Arthur John Garratt, MBE

1995

Robert Harding Davies

Cecil Ramsay Rimmer

John Denis Ramshall

1996

Colin Cruickshank Bates

Gerald Herbert Clements

Douglas Wellesley Morrell

Kenneth Graham Smith

1997

David Russell Bailey, Lord Glanusk

Ronald Willis

Alfred Frederick Bowman

Geoffrey Roland Rimmer

Eric Digby Tempest Vane

Ronald Arthur Woodage

1998

Frank Walter Dawe
Carl Sigmund den Brinker
Charles Robert Jennings
Alistair Michael Plight
Eric Edwin Arthur Pratt
James Tait

1999

Raymond Barrington Brock, MBE
Frank Hubert Cornelius
Philip Ronald Eastwood
Harold Charles Edward Mayer
Henry Mott, MBE (Clerk 1958-1976)
Jack Bernard Race
Reginald David Hood
John Parkin Jeffcock, OBE

2000

Frank Gordon Cossor
Clifford Edwin Harris
Brian Gilbert Ward
Neville Ripley, MBE
John Leslie Harold Langham Thompson
William Norman Wheat, MBE
John Everett Creighton Bailey, CBE

2001

Kenneth Murray Walton, CBE
Samuel John Henry Stevens
Andrew Ivor Abdy Ray
Allan Robert Pike

2002

John Dixon Walker
John Christian George Dawnay, Viscount Downe
Ralph Gordon Dodds
Alfred Joseph Harrison, MBE
Percy Albert Allaway, CBE
George Alfred Victor Sowter
Robert Oscar Lightfoot
William John Goldfinch, OBE
Derek William Jackson-Feilden
Bernard William Watson
Ernest George Thompson, OBE

2003

Sinclair Melville Davidson, CBE
Rolf Schild, OBE
John Edward Herrin, CBE

2004

Harold James Smith
Bernard Samuel Gold

2005

Erasmus Darwin Barlow
Peter Eugene Trier, CBE
Norman Benjamin Balaam
John Charles Simmonds
Arthur Stephen Dennis Barrett
John Martin Wiseman, MC

2006

Richard Henry Tizard
William John Dalziel, CBE
David Blythe Foster
John Stuart White, CBE
Geoffrey Michael Simon

2007

Harry Houchen Scholefield
Arnold Raphael Horwell
Peter Ridgway-Watt
Peter Allen Bennett
Gerald Maxwell Brandon Selous, OBE,VRD
Arthur William Alfred Rundle, OBE

2008

William Clifford Morgan
Gilbert Arthur Richard Tomes
George Gunter Zahler, OBE
Jack Reginald Moore McNally, MBE, JP

Charles Peter Sandbank
Denis Riley
Henry Louis Schuster

2009

Samuel Skipton Carlisle
John Millard Thomas Hilton
Wilfred John Fry
Ernest Geoffrey Bell
Ernest Frederick Soanes

2010

Maria Ludwinka Watkins
John Arthur Holroyd
Harry William Lovatt
Robert Claude Spragg
Sir Maurice Vincent Wilkes (Honorary Freeman)

2011

Brian Godfrey Atherton
Garnet Montague Eveleigh Williams
Frank George Everard Clerk 1988-2000
Gordon Cecil Pope
Henry Justus Kroch, CBE
Graham Geoffrey Woodhead
Ronald John Frederick Howard
Ludwick Finkelstein, OBE

2012

Robert Edward Chapman
Fred Bertram Elliott
Alan Baxter Evans
George Henry Doust
Douglas Melville Read
Donald Raymond Coleman
Gerard L'Estrange Turner
Samuel Lee

2013

Carl Saunders Singer
Terence Patrick Flanagan
Eric John Younson, OBE Clerk 1976-87
Derek Charles Cornish

2014

Anthony Kenric Stapleton (Roly) Franks, OBE
John Hugh Westcott
Denis Cyril Dalton
Peter Alfred Max Curry
Michael John Gutteridge



13. The Charitable and Educational Trust

Since its establishment in 1959, the Trust has grown both through regular donations from Livery members and by several large bequests. A very large bequest from Senior Past Master Ron Howard (See Chapter 14) has given the Charity opportunities to expand the educational work of the Trust. Other bequests and donations have also helped with this.

Every year the Trust awards a number of scholarships and the Beloe Fellowship. (See Chapter 14). The Trust has, for the last few years, focused on bringing young people into engineering and science.

One of the greatest challenges facing our craft is the diminishing number of young people showing an interest, and choosing to pursue a career in, science or engineering. Scientific instrumentation, in the digital age of the 21st century, will be increasingly challenged by the application of new technologies. It is vitally important to inspire young people to pursue a career in the application of these new and developing technologies in the world of instrumentation.

The Trust now focuses the majority of its charitable spend on growing the number of scholars and students who become apprenticed to the company. It does this by tying the Livery much closer to their education, all the way from passing GCSEs through to graduation and doctoral studies. It is hoped that, over time, the number of those apprenticed to the Company will increase and that as they graduate they will become Freemen and ultimately Liverymen of the Company.

Arkwright Scholarships

The Trust contributes to the Arkwright Scholarship, one of the most prestigious engineering scholarship schemes in the UK. The Arkwright Scholarship chooses high-calibre candidates from participating schools and colleges and helps them achieve their dreams.

Each year Arkwright offers WCSIM four outstanding scholars for us to take under our wing. Arkwright awards these scholars £300 a year for their two A-Level years. In addition to this, we also offer these high-flyers the chance to be mentored by experienced and well-connected Liverymen by becoming 'apprenticed' to them for four years.

Young Engineers Programme

In 2008 the then Master, Harry Tee, encouraged the Livery to sponsor the Young Engineers, a charity that aims to engage young people with the world of engineering. The major element of this sponsorship is the funding of two annual prizes for the Young Engineer of the Year. The WCSIM prizes are awarded at the Big Bang Fair. WCSIM provides judges for the competition and selects the WCSIM Young Engineers of the Year.

The winners receive a trophy and are sponsored by WCSIM to participate in the International Science and Engineering Fair (ISEF) in the USA. All the prize winners who have taken part in the ISEF competition have done well and several of them have received ISEF Awards.

Our involvement with Young Engineers has now deepened and, with the great assistance of Liveryman Professor Simon Hall, the National Physical Laboratory provides facilities and staff to help regional Young Engineer

prize winners to develop their projects and presentations to a high level. The participants are also given briefings on marketing, business planning and patents.

WCSIM Young Engineer Prize Winners are shown with an * in Appendix 2.

WCSIM Apprentices

Young Engineer for Britain prize winners and our Arkwright Scholars are invited to become WCSIM Company apprentices. Serving Liverymen also sponsor apprentices who have shown a strong interest in STEM subjects. Apprentices are usually at school or college and are about to embark on their A Levels (or equivalent).

Each WCSIM Apprentice is linked to an experienced, senior Liveryman – an Apprentice Master – who is there to support and mentor the Apprentice during A level years and right through to university graduation.

Apprentices attend an inrolement ceremony in Guildhall, and then are bound as WCSIM Apprentices at the Court. As well as having a WCSIM Liveryman as a mentor, Apprentices can attend livery functions at reduced prices. Apprentices receive a WCSIM scholarship worth £500 for each year of their undergraduate course for a maximum of four years. At the successful completion of their four-year apprenticeship they are invited to become a Freeman of the Company and a Freeman of the City of London. If they are continuing their studies and taking a PhD, we may award an additional scholarship of £500 per year for the first three years of their studies.

Postgraduate Awards

The other major part of the Trust's educational support is Postgraduate awards. We make eight awards of £2,000 each year to Postgraduate students. We partner with the following universities who nominate potential award winners. Our partner universities are:

- City University London
- Glasgow Caledonian University
- Imperial College London
- University College London
- University of Edinburgh
- University of Huddersfield
- University of Oxford
- University of Manchester

SIM Beloe Fellowship

The SIM Beloe Fellowship is our highest award. It supports a single, outstanding postdoctoral researcher with £5,000 per year for up to three years. It is an award based on past achievement and continuing excellence.

Applicants are expected to be involved in the design of instrumentation, rather than its use, and to remain in the practice of scientific instrumentation in the United Kingdom over a period of time. The successful candidate will usually work in one of our partner universities and be involved in the development of leading edge scientific instrumentation.

The Fellow will be expected to become a SIM Freeman and to attend appropriate Livery functions. At the end of the Fellowship, it is usual for the Fellow to apply to be clothed in the Livery.

Women in Engineering Day

In 2012, at the instigation of the then Master, Keith Etherington, the Company organised a day of engineering experiences for schoolgirls aged 13-14. This is now a biennial event, bringing up to 150 schoolgirls into our hall to spend the day being encouraged by inspiring speakers and by hands-on engineering task. Liveryman Jane Fishwick now coordinates the event.

Edwards' Lectures

Past Master FD Edwards was a Founder Member of the first Court of the Company of Scientific Instrument Makers elected by ballot on 16 November 1955. He was a great benefactor to the instrument industry and inaugurated the WCSIM Charitable and Educational Trust.

Educated at the Northampton Polytechnic (established in 1965 as the City University), he served in the Physics Department. His own business later developed into the Edwards High Vacuum International Group of which he was a Director and President.

On his death in 1966, an Edwards Memorial Trust was established which arranges lectures at the City University as a tribute to his work. These prestigious lectures in Science and Engineering are given annually at City University in co-operation with the Worshipful Company of Scientific Instrument Makers with support from the Edwards Foundation at the BOC Group (on behalf of BOC Edwards). This is the longest-running lecture series at City University London.

Past lecturers have addressed topics and explored ideas at the forefront of

their professions and many have been honoured in their own field of work as Fellows of the Royal Society and Nobel Laureates. The Livery is normally well represented at this event where the Master proposes the vote of thanks and presents a commemorative medallion to the speaker. The speakers since 1989 have been:

1989 Dr A Ledwith OBE

1991 Professor C Hilsum

1992 Professors R A Brook, K TV Grattan* & L Finkelstein OBE

1993 Professor A N Schofield

1994 Dr J R Forrest FREng

1995 Professor J O'Sullivan

1996 Dr B W Manley CBE

1997 Dr A Troup*

1998 Professor DV McCaughan

1999 Dr J Rae*

2000 Professor Sir Harry Kroto Nobel Laureate

2001 Professor W Sibbett CBE

2002 Professor Lord Hunt

2003 Professor Sir Chris Llewellyn Smith

2004 Professor J B Heywood

2005 Professor Sir Peter Mansfield Nobel Laureate

2006 Sir Peter Williams CBE

2007 Lord Oxburgh

2008 Professor B E Launder

2009 Professor Sir Michael Brady,

2010 Lord Broers

2011 Professor Neville Jackson

2012 Professor David Stupples

2013 Sir Paul Nurse Nobel Laureate*

2014 Professor Sir John Pendry

*WCSIM Liverymen

The Achievement Award

Instituted in 1965, this award was made annually for outstanding British or Commonwealth achievement in the Scientific Instrument Field, with the intention to bring added recognition and prestige to the British scientific instrument industry. For many years the Award focused on a product but it was occasionally been made to recognise the career of an individual and to concentrate on the person behind the product – a British engineer or scientist of great distinction, international standing and outstanding merit whose contribution to the advancement of engineering, science and technology has led to significant benefit to the nation.

In identifying the winners, recommendations are sought not only from within the Livery but from the trade associations, research and learned bodies that make up the UK instrument community. The Award takes the form of a trophy held by the recipient for one year, and since 1983, a monetary award. The trophy (designed and presented to the Company by Past Master Frank Dawe) comprises a frame of stainless steel holding a glass tablet engraved with the arms of the Worshipful Company of Scientific Instrument Makers, mounted on a block of polished green marble slate. It bears the names of all the recipients on its frame. The award winners also receive a suitably inscribed memento in the form of a miniature head of Minerva in bronze on an onyx base to retain permanently.

The following is a list of Achievement Award Recipients from 1989.

1989 Dr M J DOWNS - NPL - Nanometric Interferometry

1990 CHELSEA INSTRUMENTS - FT 500 Fourier Transform Spectrometer

1991 CITY UNIVERSITY - Mathematical Modelling of Elastic Deformation of Pressure Measuring Elements

1992 CRANFIELD PRECISION ENGINEERING - Precision Machining of Brittle Materials with no Sub-Surface Micro-Cracking

1993 OMETRON LTD - VPI Sensor/Rapid Scan Instruments for Remote Vibration Measurements

1994 RENISHAW PLC & LEEDS UNIVERSITY - Ultra-fast 2-Dimensional Imaging Raman Microscope for Spectral Analysis

1995 LUMONICS LTD & HERIOT - WATT UNIVERSITY - RF Slab Laser Coding Device

1996 BIRD & TOLE LTD - Development of Monochromator Grating Units and Slit Mechanisms

1997 ARUN TECHNOLOGY LTD - For the development and market penetration of their Metalscan 2000 Desktop Metals Analyser

1998 VG GAS ANALYSIS SYSTEMS - In recognition of the innovative design of their Prima 600S Mass Spectrometer, in particular the Rapid Multistream Sampling (RMS) System and Laminated Magnetic Sector Analyser

1999 MILLBROOK INSTRUMENTS LTD - For the innovative design and development of the Chemical Imaging Microscope based upon Secondary Ion Mass Spectrometry

2000 Dr A J WALLARD - NPL - For his eminent contribution to National and International Metrology

2001 SOLARTRON ISA - Dualstream II Intelligent Wet Gas Meter

2002 AMGas LTD - LEDPOINT PRS Gas Sensor

2003 RENISHAW PLC - RESR Angular Encoder System

2004 MALCOLM C LEACH - Reconstruction of Harrison's H2 Clock

2005 TWI LTD - Crackfirst Sensor System

2006 LASER OPTICAL ENGINEERING LTD - Electronic Speckle Pattern Shearing Interferometer

2007 SINGER INSTRUMENT CO LTD - RoToR HDA a novel Laboratory Robot

2008 TOMOFLOW LTD - Tomographic Multiphase Flow Imaging and Analysis System

2009 SIR JAMES DYSON - for services to science and engineering

The Achievement Award has not been awarded since 2009. It had become increasingly more difficult to identify suitable candidates for this award due to the changing face of the scientific instrument industry in recent times. The perceived crisis in numbers of young scientists and engineers in the UK led to a decision by the Court to discontinue this Award and to focus instead in encouraging and supporting young scientists and engineers through our Freeman, Scholars and Apprentices, in line with the Company's current policy.

Minerva and the Award

In 1985 the Education Committee recommended that a Scientific Instrument Lecture should be established open to Liverymen, their friends, the industry and the press. Initiated as SIM Lectures in 1986, the first three lectures were :-

- 1986** My Kind of Instrument - Sir Kenneth Corfield
- 1987** Industry Year, of particular significance to a technological Livery - Sir Geoffrey Chandler
- 1988** Progression through Management by Innovation and Leadership - Professor Dr Ing H K Meier of Carl Zeiss

The Master at that time, Douglas M Read, suggested that future lectures should be known as the Minerva Lecture and be sponsored by industry. This was agreed, the Minerva Lectures were born, and since that time the lectures have been given annually. Since 2000 they have been:

- 2000** The Story of Time - Dr Kristen Lippincott, Director of the Royal Observatory
- 2001** Scientific Instruments and their Evolution from the 17th to the 19th Century Mr Howard A L Dawes
- 2002** Art & The Eye Professor Robert Weale
- 2003** The Changing Face of Aircraft Instruments - Mr Peter Allsopp, Smiths Industries
- 2004** The Millennium and the Bridge - Joanna Migdal and Professor David Newland
- 2005** Construction of a Replica of Harrison's H2 Clock - Mr Malcolm Leach
- 2006** The Meaning of Mutants - Dr Armand Leroi
- 2007** The Charts of War - Lt Cdr John Blake
- 2008** SIMposium
- 2009** The Antikythera Mechanism, Where did it all begin? - Mr Michael Wright
- 2010** Microprocessors and all that - Dr Hermann Hauser CBE

- 2011** Raman's Legacy - Spectroscopy in the Cause of Art and Archaeology
- Professor Robin Clark
- 2012** How to Mend a Broken Heart - Professor Ron Summers
- 2013** Bras to Bridges - How do you Measure Something Without Touching
It? - Professor John R Tyrer

Four Liveries Lecture

One year in every four, the Minerva Lecture is given to an audience of liverymen from the Worshipful Companies of Spectacle Makers, Clockmakers and Lightmongers as well as our own Livery. Each year one of the Companies provides the speaker and administers the event, which normally takes place in our Hall. The lectures tend to be on topics of common interest to all four liveries.

The Millennium Measure



The Millennium Measure is the gift of the Court and Livery of the Worshipful Company of Scientific Instrument Makers to the City of London in commemoration of the millennium. It comprises a three-sided two-metre rule depicting 2,000 years of history of the city, the church and the craft of scientific instrument making. The initials 'MM' stand for 'Millennium Measure' 'Millimetre' and 'Two Thousand' (in Roman numerals). It was presented on 16 September 2002 by the Master Derek Cornish and accepted on behalf of the City by the Rt Hon The Lord Mayor Alderman Michael Oliver.

Past Master Trevor Dixon and the Court commissioned the measure during his year. It was designed by the sundial designer, Liveryman Joanna Migdal (Lady White), Scientific Instrument Maker and Clockmaker. The measure is located under the north end of the Millennium Bridge in the City of London.

14. Major Benefactors to the Charity

We have been very fortunate to have received two very significant bequests. Reginald Beloe and Ron Howard both made donations which have changed the way in which the Trustees can support the growth of the scientific instrument making trade. Backgrounds of these two most generous people are given below:-

Reginald Gowan Beloe (1902-1987) born at Hyde, Winchester, died in Munsted Heath, Surrey.

He became a member of the Guild known as the Company of Scientific Instrument Makers, in July 1959, becoming a Liveryman of the Worshipful Company of Scientific Instrument Makers of the City of London, after grant of Letters Patent by the Lord Mayor on behalf of the Court of Aldermen to become a Livery Company, in March 1964. He was a Senior Partner in Laurence Prust & Co, of Basildon House, London, EC2R (a finance company), being a Stockbroker admitted to the stock exchange in 1929.

He was also a Liveryman of the Worshipful Companies of Pattenmakers (Renter Warden 1976), Musicians (described in the Musicians Company Book to have been known as a chivalrous, incorrigibly eccentric Hon Secretary of their Musicians Livery Club from 1967-1984) and the Clockmakers (Master of the Clockmakers in 1977, a noted horologist).

Long service in the Territorial Army earned him the Territorial Decoration (TD) before he joined the Company in 1959. At the outbreak of the war in 1939, he was a Lieutenant in the Middlesex Regiment becoming a Major at the time of his first marriage in 1943. He had one daughter, Rosemary.

I knew Reginald Beloe from 1981 until 1986, meeting during WCSIM events and as his guest at the Carlton Club. He was interested in my development of micromanipulation and microsurgery of single cells and high resolution light photometric microscopy instruments to advance my biomedical / genetical diagnostic work.

He was a shrewd knowledgeable investor in projects and companies, involving clockmaking, scientific instrument making, music making and recording, and pattenmaking, interests covered by his four Livery Companies, for the benefit of these areas and the commercial profit of his stockbroking profession. He had an intelligent broad grasp of the utility of art and science, appreciating his access to expert advice, recognising commercial opportunities for development.

In his will he bequeathed generous legacies to each of his three Livery Companies: Scientific Instrument Makers, Musicians, and Clockmakers. It is not known whether he also benefited the Pattenmakers (includes industrial overshoes and galoshes) because the Company has lost its records from mid to the end of the 20th century.

In his own way, he used his commercial skills to make a significant contribution to the advancement of the objectives of his London Livery Companies. His bequest of £500,000 to the Company currently funds our Beloe Fellowship, worth £5,000 per annum for up to three years for postdoctoral research in the development of 'leading-edge' scientific instrumentation.

Past Master David Townsley-Hughes

Senior Past Master Ron Howard

Ronald John Frederick Howard was born on 1 September 1921 within the sound of Bow bells.

He held many senior roles and directorships, too many to list here, but they included Phicom, Silver Chalice Productions, Buckhurst Igranic, Chiltern Radio, Synoptics (later to become Scientific Digital Imaging) in Cambridge, Kratos, and Spectros International to name but a few. He chaired many of the Boards of these companies.

Ron was a talented and successful businessman, and managed his personal finances shrewdly and with skill. He became a Lloyd's Name, and a member of the High Premium Group and also managed a large portfolio of investments. Although he had professional advisors, he was very much 'in control' at all times.

Thus he had all the necessary skills to be able to assist the Livery so effectively both financially and with the benefit of his wisdom and integrity. He became pivotal in its development over many years as an esteemed Liveryman.

He was a dedicated member of the Livery, joining in 1976 and becoming Master ten years later, a year before scheduled. He later became Chairman of his Master's Year (PMA). He became Senior Past Master in 2007, a role which he took very seriously and with pride. He was an ideal member, being so passionate about, and in the forefront of, technology and innovation and was particularly interested in the education of young people into the sciences and was a Trustee of the Charitable Education Trust. In this he showed great foresight.

He was at the forefront of setting up the restructuring of SIM Hall Ltd and used his vast knowledge to help set up the Loan Notes arrangements for its

re-financing and would work tirelessly on the Finance and General Purposes Committee to find the best solutions. His wisdom here was invaluable and he was also an active member of the Court and its various committees.

Another area in the Livery that Ron felt strongly about was protocol. He fought vigorously to keep to tradition and correct practice and worked tirelessly on the updates of the protocol manual. As a great food lover, he enjoyed his membership of La Chaine des Rôtisseurs. He was renowned for his hospitality, attending Royal Ascot on a regular annual basis, and hosting many a dinner and party, and often inviting friends and business colleagues to one or other of his Clubs – The City of London Club, The Saville Club or the Royal Thames Yacht Club in Knightsbridge.

In his younger years he had been a competitive and successful sailor, racing Flying Fifteens, and had been involved in the 1947 Olympics. He was an early member (no. 39 in seniority) of the Royal Thames Yacht Club, frequently attending their Double Figures dinners; a member of the Royal Yachting Association; and the first Commodore of Grafham Water Sailing Club in Cambridgeshire where he played an instrumental part in the building of its Club House in the 1950s. A boat for novices has now been named after him together with a trophy. He also belonged to the Burton Sailing Club.

Ron was a member of the Institute of Directors for 55 years, and was one of its longest-serving members. He was also a member of the Chartered Institute of Marketing for 49 years and a member of the Chartered Management Institute for many years. He had a long association with the Royal Institution.

Ron always looked forward. At the time of his death he was still running and chairing his own company, Technology Management Services Limited, and was actively and financially involved in setting up a virtual art gallery website business. He had only recently resigned his chairmanship of Scientific Digital Imaging Ltd (SDI) and his involvement with the Kratos Group of which he

had been a director since 1986.

But his significant legacy to the Charitable and Educational Trust and a specific bequest enabling the Livery to host an annual dinner for Past Masters in his honour, has enabled his memory to live on in the Livery.

Ron's ashes rest in the beautiful gardens of St Margaret Lothbury, near the Bank of England and within the sound of Bow bells.

Georgina Kynaston

15. How the Company is Managed

The Court of Assistants manages the Company. The Master chairs the Court assisted by the Senior and Junior Wardens. The Assistants below the chair and the Past Masters have voting rights at the Court. Those Past Masters who have elected to become Emeritus are not allowed to vote. There are a number of committees that support the work of the Court:

- The Finance and General Purposes Committee is responsible for making commendations and recommendations to the Court about the running of the company and its finances.
- The Charity and Educational Trust board looks after the monies of the charity and recommends investment and expenditure in line with the ordinances of the Trust
- The Education Committee deals with the process around Apprenticeships, and awards to Scholars and Fellows.
- The Professional Committee was established in 2014 in order to enhance the work of the Livery within the sphere of instrumentation and control and to build a name within the scientific industry. It is also responsible for recruiting new members to the Company.
- The day-to-day management of the Company is undertaken by the Clerk.

16. The Future Masters Meeting

The officers and all Assistants below the chair attend the Future Masters Meeting. The FMM was started in Donald Coleman's year when the Court agreed to set up a permanent Master's advisory group. This group advises on long-term policies and, by being part of the decision-making process, ensures continuity. An ongoing subject has been the need to attract more Liverymen. An important element of this is how the livery relates to the Institute of Measurement and Control and the trade associations. A consequence of this was the establishment of the Government Liaison Working Group (now known as the Instrumentation Industry Liaison Group) – see item 15 below. More recently, surveys of members have been carried out and this led to the creation of the Professional Committee and the Technical Liaison Group.

17. The Instrumentation Industry Liaison Group (IILG)

In 1993 the Department of Trade and Industry decided to review the ownership status of its laboratories with a view to selling them off. The instrumentation industry was deeply concerned at this, especially with regard to National Physical Laboratory. The Department advised that the industry could convey its concern best if it spoke with one voice. In January 1994 WCSIM prepared a position paper. In March a meeting took place to set up the Government Liaison Working Group. This met in July with representatives of WCSIM, BMTA, GAMBICA, GTMA and InstMC. The chairmanship of the group was provided by WCSIM and we also provided the secretary. After the contractorisation of NPL in 1995 the GLWG continued to meet,

becoming less of a lobbying group and more of an information exchange. WCSIM Masters or Past Masters took the chair. Joint meetings with the Department were also held.

Over the years the GLWG has provided a valuable forum for the exchange of views between government, the national measurement institutes, and the trade and academic organisations and individual members on matters as varied as the National Measurement System strategy, funding and programmes, knowledge transfer and technical education. In November 2002 the group changed its name to the Instrumentation Industry Liaison Group, meeting twice a year to exchange information and offer advice to the Department and the laboratories. The UK Weighing Federation joined the group. After 2010 representatives of the measurement laboratories and the Knowledge Transfer Network attended. The Department attends a part of each meeting to make progress reports and answer questions.

In 2011-2012, IILG considered the continuous erosion of the Department's funding for metrology research. WCSIM, InstMC and the trade associations co-ordinated their lobbying efforts through IILG. Meetings of the IILG are convened and chaired by WCSIM with the official side (previously DTI, then BIS, currently NPL) providing the secretariat. Fourteen Liverymen are members, eight of whom have no other affiliation. While members drawn from government, trade associations and laboratories attend as representatives; those from WCSIM and InstMC attend as independent persons.

In 2015 a further lobbying effort was orchestrated through IILG on the question of funding and the Master wrote on behalf of the industry to the Secretary of State, with some success. The group is also actively engaged in joint studies with NPL of the impact of metrology on the economy. It continues in its original purpose of presenting the industry's views with one voice. There is more background to this in Appendix 3.

18. The Technical Liaison Group (TLG)

Following a questionnaire which was circulated amongst members, one of the comments to come back was the feeling that there could be more technical visits over and above those organised by the Master during his year. It was suggested that a Technical Liaison Group (TLG) be formed to take care of this and the Court agreed to the proposal.

A Committee was set up in February 2011, reporting to the Education Committee on a quarterly basis, and tasked with liaising with the Master of each year to discuss the TLG's visit plans for the year and agree dates so as not to clash with his calendar.

The TLG is a self-funding group and the first outing to be arranged was a visit to Blythe House, the home of overflows from the major London Museums and the Aviation Museum at Farnborough, a repository of every conceivable piece of scientific instrument from across the world. The Group, led by Liveryman John Caunt, established a working protocol with the Master and the Clerk with many interesting visits in the pipeline.

19. Beautiful Measurement

The Guild of Scientific Instrument Makers was founded in October 1955. In celebration of the 50th anniversary of this founding, the Worshipful Company of Scientific Instrument Makers and the British Museum joined forces to present a unique view of an exceptional craft in the form of a study day on scientific instruments.

On 24 November 2005 the Beautiful Measurement day was held within the lecture theatre and environs of the Clore Education Centre of the British Museum. It was the intention that this study day should appeal to both the general public and to the specialist since from the jewel-like beauty of Islamic astrolabes to modern medical body-scanners, the elegance, sophisticated craftsmanship, and practicality of scientific instruments has touched human lives for centuries.

Sir Paul Nurse, Nobel Laureate, delivered the keynote address, entitled Great Ideas of Biology: Technology Begets Discovery.

Four Technical Papers followed:

Dr Silke Ackermann, Curator of Scientific Instruments at the British Museum ‘Sun, moon and stars: early scientific instruments at the British Museum’.

Dr Gloria Clifton, Head of the Royal Observatory, Greenwich ‘Where it all started: instrument makers in the London Livery Companies’.

Dr Susan La Niece, metallurgist and archaeologist, British Museum ‘How did they do it? The craft of the early astrolabe makers’.

Liveryman Dr Seton Bennett, Deputy Director, National Physical ‘Laboratory - Beautiful and Clever: modern scientific instruments’.

20. Instrumenting the Future

To celebrate the 50th anniversary of the Grant of Livery, a symposium was organised on 11 February 2014 in our Hall. Named Instrumenting the Future, it positioned WCSIM as a vital part of the development of future technology. The symposium showed how instrumentation is supporting the technological growth of our economy with world leading measurement techniques. The programme covered three key areas and leading experts gave their views on the importance of instrumentation.

Energy

Professor William Nuttall (Open University)

Dr Malcolm McCulloch (University of Oxford)

Dr Paul Wright (National Physical Laboratory)

Professor Philip Thomas (City University)

Health

Professor Ron Summers (Loughborough University)

Professor Stuart Green (University Hospital Birmingham)

Professor Steve Davies (University of Oxford)

Professor Alison Noble (University of Oxford)

Transport

Professor Roderick Smith (Chief Scientific Advisor, Department for Transport)

Mr Alan Bond (Reaction Engines Ltd)

Professor Dave Rugg (Rolls-Royce)

Dr Alex Mouzakis (Jaguar Land Rover)

21. Our Cutters



The tradition of a livery barge or cutter dates back to Elizabethan times when water transport was the main means of movement about London. Exclusive use of a Thames Watermen's cutter and crew would have been the equivalent of the Chairman's car today. The wealthier companies had the larger shallops, with ten oarsmen. Today only the Drapers Company maintains a shallop.

The active representation on the river in a cutter by the Scientific Instrument Makers started in 2007. With support from the rowing club at National Physical Laboratory, and funding from The Trustees of the Livery to pay an annual charitable donation to the Richmond Sea Scouts youth programme, it was agreed that WCSIM use their cutter, Arthur Alcock, for all Thames Traditional Rowing Association (TRRA) events and the Great River Race. WCSIM joined the Thames Traditional Rowing Association, funded by the Company, and appointed a Bargemaster, Captain Guy Brocklebank RN, to represent WCSIM and administer the arrangements.

In December 2007, the cutter Arthur Alcock was provided with livery regalia to participate as a Master's Barge for the Worshipful Company of Scientific Instrument Makers. This was a generous gift to the Company from the Master, David Smith, comprising a canopy, in blue with gold trimming, topped by the head of Minerva with Faraday coils on each post. Lute boards to the stern, supporting the arms of the livery and benches under the canopy. The cutters can either be in full livery regalia, with four rowers and up to three passengers, this is the ceremonial rig or for races such as the Great River race they can be rowed without regalia and with six oars. The first outing was the Frost Fair in December 2007, with the cutter race as part of the wider Frost Fair events on the South Bank between London Bridge and the Globe Theatre.

In 2009 our cutter, George Williams, was sunk whilst being used by a non-livery crew. Happily for the Livery, the Richmond Sea Scouts had already commissioned two new Thames Watermen's cutters, being built by Mark Edwards at Richmond. It was agreed that WCSIM would take over the two new cutters, a matched pair named Gordon Hall and George Williams II, and surrender use of the Arthur Alcock.

The TTRA calendar consists of:

The Tudor Pull: 10 boats from Hampton Court Palace to the Tower of London escorting Jubilant carrying the 'Stele', a gift from the King to the Constable of the Tower.

Admiral of the Port: Two divisions, three ladies' crews followed by eight men's crews. Started in person by The Admiral of the Port, the Lord Mayor of London.

Port of London Challenge: Four ladies'/mixed crews set off first followed by seven men's crews.

Great River Race: Ham to Greenwich, a marvellous event with over 300 rowed participants. In 2008 Arthur Alcock won the Watermen's prize for the Livery. Gordon Hall won in 2009 and also 2010 in 2h 28m (the race was rowed from Greenwich due to tides).

2009 opened with a new event, a group of six cutters, under TTRA organisation, with a race one hour before the Oxbridge race. This became a race for the Thames Waterman's Oxbridge Cup, provided by the Tallow Chandlers. Happily WCSIM men's crew in Arthur Alcock won. Gordon Hall won in 2010. Gordon Hall also set the fastest time in 2011. We also won in 2012.

In June 2009 there was a great ceremonial event: the Tudor Pageant, an enhancement of the usual Tudor Pull. It is a celebratory event in celebration of the 500th anniversary of King Henry VIII, from the Tower of London up to Hampton Court.

In 2011 TTRA was asked to provide a flotilla of boats for a row past for the Lord Mayor's Show in November. On the day 20 cutters, including Gordon Hall and George Williams II, rowed past HQS Wellington as the new Lord Mayor, David Wootton, a keen oarsman, on the ship's bridge took the salute by raised oars from the flotilla.

In 2012 both cutters were in the vanguard of the Queen's Diamond Jubilee Pageant on the Thames and Gordon Hall took part in ceremonial rowing of the Olympic Flame from Hampton Court to the Pool of London on the Opening Day of the 2012 Olympics.



22. Appendices

Appendix 1 - The Court and Officers for the Livery Year 2013-2014

Master Eur Ing D W Kent

Deputy Master Mr K F Etherington

Senior Warden Professor T Wilson

Junior Warden Mr C J Sawyer

Warden Emeritus Dr S J Bennett, CBE

Senior Past Master Sir Ivor Cohen, CBE, TD

Past Masters

Dr D Townsley-Hughes

Mr D A Wallis

Mr M T Dixon

Dr D C Cornish (deceased Dec 2013)

Dr N K Reay

Captain G P Brocklebank, Royal Navy

Mr D W Smith

Mr B J Lowings

Mr H L Tee, CBE

Mr B D Fishwick

Assistants

Miss S A Marchant

Mr J F Caunt

Professor K T V Grattan

Mr M E Wheatley

Professor R Summers

Honorary Assistants

Mr D Randolph, Past Master Emeritus
Mr C G R Hall, Past Master Emeritus
Mr W Lyons, Past Master Emeritus
Professor R C Hills, Past Master Emeritus
Professor R W Hartley, Past Master Emeritus

The Clerk Mr N J Watson

Honorary Chaplain Rev Prebendary W J H Crossley

Honorary Director of Music Mr R Townend

Honorary Almoner Miss D Howse

Honorary Treasurer Mr B D Fishwick

Honorary Solicitor Mr D R Seaton

The Beadle Mr A W Parker

Stewards

Dr S Pollitt, Master’s Steward
Dr I J Lewis, Senior Warden’s Steward
Mr S Hall, Junior Warden’s Steward



Appendix 2 - Apprentices and their Masters since 2007

Bound 2006-2007

Teddy Szemberg O’CONNOR to Liveryman Elisabeth COHEN

Bound 2007-2008

Christopher BRIDGE to Past Master Carl SAUNDERS SINGER
Matthew ORFORD to Steward Christopher John SAWYER

Bound 2008-2009

Adam John Clifton HOLLIDAY to Liveryman Bruce Martyn
ETHERINGTON

Matthew LEVER to Past Master Guy Philip BROCKLEBANK

Mark Alexander SALMON to Freeman Robert Mark Roy SEAMAN

Bound 2009-2010

*Philippa Catherine Joanna CLARK to Senior Warden Brian Douglas
FISHWICK

Daniel Thomas ORFORD to Assistant James Fergus PRAIN

Biranavan SIRAPURATHARASU to Past Master Guy Philip
BROCKLEBANK

James Alexander WHITTICK to Liveryman Alexander Martyn PETERS

Bound 2010-2011

*James Sinclair POPPER to Liveryman Harry Edward SAUNDERS
SINGER

Michael Alexander KNOTT to Liveryman Neil William GAMMON

Alexander LAMA-NOUJAIM to Liveryman Susan Ann MARCHANT

*Roxanne Adele POLLARD to Liveryman James Fergus PRAIN

Bound 2011-2012

Joshua Ian ABRAHAMS to Liveryman Kenneth Victor Thomas
GRATTAN

Thomas William Philip HEYWOOD to Liveryman Jane Elizabeth
FISHWICK

Nicholas James SLACK to Past Master Carl SAUNDERS SINGER

Following the untimely death of Past Master Carl Saunders Singer in
March 2013 Nicholas James Slack was bound to Assistant Susan Ann
Marchant for the remaining term of his Apprenticeship.

Thomas Edward FORSEY to Liveryman Roy MOFFATT
subsequently bound to Liveryman Stuart POLLITT

James Roger FORSEY to Liveryman Elisabeth COHEN
Jessica Leigh JONES to Liveryman Bruce Martyn ETHERINGTON

Bound 2012-2013

Andrew James COOPER to Liveryman Aubrey DUNFORD
James Edward BRANDRETH to Liveryman Ian LEWIS
Barney DOWNING to Liveryman Keith GUY
*Samuel WHEELHOUSE to Liveryman Sanowar Hussain KHAN

Bound 2013-2014

Adam Matthew STAGG to Past Master Guy BROCKLEBANK
Theo HEYMANN to Liveryman John COMER
Joe WARREN to Liveryman Alexander PETERS
Henry GILL to Liveryman Jonathan WILLIAMS
Lucy Margaret HOGARTH to Liveryman Charles HOLROYD
*Dominic John BLYTHE to Liveryman Raul ABREU
*Daniel James SAUL to Apprentice Warden Ken SANDERS
Emma CALDAS to Liveryman Joan HALL
Owen Vincent HEWIT to Past Master Brian FISHWICK
Nathan Ben CATER to Liveryman Professor Ron SUMMERS
Lewis Christopher BRAND to Liveryman Alan TROUP
Jennifer Kate WILLIAMSON to Senior Warden Christopher SAWYER

*WCSIM Young Engineer of the Year



Appendix 3 - Extract from the privately published memoirs of Sir Ivor Cohen

These extracts are included to give particular insight into the development of the Livery in the early 1990s. They are produced by kind permission of Sir Ivor.

Future Masters' meeting

Each Master has a year only to produce and introduce new ideas or actions, which is a very short time. When Donald Coleman was elected Master in 1993, he, encouraged by a number of Court members, proposed that he would set up a permanent Master's advisory group which he decided to call the Future Masters' Meeting, consisting of himself, the two Wardens and the next two Assistants in order of seniority. This group would advise on the setting up of long-term policies and, by being part of the decision-making process, would ensure continuity. It was made clear that there would be no usurpation of the role of the official committees but the Group would concentrate on strategy, which the Master would then present to the Court.

The first meeting took place in August 1993 when the group consisted of Donald Coleman, Bill Goldfinch, David Wallis, Bill Lyons and Sir Ivor Cohen. At the meeting it was agreed that the profile of the Livery had to be raised to attract new Liverymen and incidentally improve the finances of the Company. The skill base of the Livery was discussed and the ways in which it could relate to the InstMC and the trade associations. One way was to associate WCSIM with the industry which was one of the most successful in the UK in terms of export balance and growth and to establish links with the City financial institutions. Ways in which WCSIM could increase its prestige were covered and it was agreed to have a series of Master's Luncheons where a group of influential people were invited to have a good meal and a good discussion on a pre-decided subject related to the Craft. It also considered

employing a PR consultant but this turned out to be too expensive for the Court to accept.

The consequences of that first meeting included the positioning of the Livery as convenor of meetings between the industry trade associations, the Institute of Measurement and Control and the Government, the part played by Liverymen in the National Measurement System, the attempt to help small companies to obtain finance and the raising of the Livery's profile in the City. Some of these are described below.

The Future Masters' Meetings provided, as planned, the means of providing continuity in the Livery's policies and have been supported by all Masters since its inception.

Links with Government

As the programme of work was being planned, there was a stroke of luck. A liveryman, Hugh Berridge, alerted the Master to problems emerging about the future of the National Physical Laboratory (NPL) at Teddington. The Government was proposing to privatise it. Alarm bells rang throughout the industry and the instrumentation community. NPL plays an important role as one of the three major measurement laboratories in the world, alongside those in the USA and Germany. Its programme of work provided guidance for a lot of small and large British companies in the design of measurement equipment and it was felt that a purely commercial lab would reduce the scope for innovation. Also, the Government proposed to reduce the funding it provided for NPL, which had reached £42m. All the trade associations and the InstMC as well as individual companies were protesting. Berridge suggested that the Livery should also express its objections.

It was agreed that the Master should arrange a meeting with the DTI at which Liverymen with an interest could express a view on the issues. A

position paper, which was drafted for the meeting which was held on 19 January 1994 with 11 Liverymen present. There was a fruitful discussion out of which came the idea from the DTI that the Livery should convene a regular meeting of all the trade associations and the InstMC with officials of the National Measurement System Policy Unit. It was also suggested that the Master wrote to the President of the Board of Trade, Michael Heseltine, to express its concerns over NPL; this Donald Coleman did.

The upshot of all this was that the trade associations and the InstMC agreed to join a meeting which was convened by another Liveryman, Lyndon Davies, and chaired by the Master. In due course, the Government relented and decided not to privatise NPL but to ‘contractorise’ it – to ask for tenders from a number of organisations to manage the laboratory using the assets, which would remain in public ownership. The funding was cut to £32m but was guaranteed to stay at that level for five years. A new committee to oversee the programme, the Measurement Advisory Committee (MAC) was set up in 1994 with a commercial bias in the membership. Sir Ivor Cohen was asked to chair it. Half of the committee members were Liverymen which showed the calibre of WCSIM. The Measurement Advisory Committee was chaired successively by two Liverymen, Sir Ivor Cohen and William Goldfinch until the latter’s sad death in 2002. It was a reflection of the standing of the Livery and its membership that Liverymen accounted for half the Committee.

The first liaison meeting with NMSPU was a success and it was agreed to hold such meetings regularly with the Master of the day in the chair and Lyndon Davies, a liveryman, doing the secretarial work and the liaison with NMSPU. Over the years, there was always some doubt that there would not be enough material to fill a meeting but there always was. At later meetings the group concerned itself with such topics as the measurement content in the schools’ curriculum, the amount of funding which would go to the National Measurement System after the five year £32m programme was finished. The then Master, Ivor Cohen, orchestrated a series of letters to

the Secretary of State at the DTI, which was started by him as Master and followed by all the trade associations. The letter pointed out the significance of having a strong national laboratory to foster a strong industry, showing that those countries like Germany, USA and UK with such a lab had the strongest industries in the world while the Japanese for example did not. The liaison meeting still takes place, chaired now not by the Master but a designated Liveryman to provide continuity.

The Master's luncheon

One of the steps to improve WCSIM's profile was to set up the Master's Luncheon programme. It was agreed to have two a year at which topics of concern about instrumentation would be discussed. The first would be held in April and the aim was to have each year the last Lord Mayor, as the main guest. Each Lord Mayor went into 'purdah' for six months after stepping down to avoid cramping the style of his successor. It was calculated that if he could be approached to join us as guest of honour, the response would be positive. This proved to be the case from the first luncheon in April 1994.

Having the past Lord Mayor (Sir Francis McWilliams) was a draw for our other guests. For the first lunch it was decided that the issue to be discussed would be access to funds for small instrumentation companies and we invited a number of Liverymen with experience in the field and some outside people. From the City came Anthony Fry from Rothschild and Christopher McCann from Nat West Ventures to cover merchant banking and venture capital. From industry came Jack Leonard, the Chairman of Eurotherm and three other industrialists (one, John Wheaton, was a Liveryman). The meeting went well and, as expected, the City people assured us that there was no shortage of money for good ideas well presented but too often industrialists did not provide the information the financial institutions wanted and there was no meeting of minds.

The next Master's Luncheon was held in the autumn and the principal guests were Derek Roberts, the Provost of UCL and Raoul Franklin, the Vice Chancellor of City University. The subject was how the Livery could work with academia. An opportunity to work with UCL arose. Roberts wanted to set up a kind of hybrid business school where managers in their forties could undertake their studies but also act as advisors to the units UCL was setting up to exploit the technology developed in the College. He had mentioned this to Ivor Cohen who told him about the ideas WCSIM was developing for the Instrument Industry Exchange which prompted him to talk about the Centre for Advanced Instrumentation Systems (CAIS) set up at UCL as a Faraday Centre with Sira Ltd to provide solutions to special measurement problems by exploiting ideas from UCL's laboratories. It would be possible for the Livery and CAIS to work together.

The Master's Luncheons went on for several years using the same format and on several occasions Ministers attended. However, after some time the cost proved too high and the programme was abandoned but not before a potentially significant initiative emerged.

The Instrumentation Industry Exchange

This came from the third of the Master's Luncheons in 1995 (again with the late Lord Mayor, Sir Paul Newall) was attended by Dr Summers, a Director of 3i, then the biggest venture capitalist in Britain, when the idea of the Livery being a clearing house for the City and small instrumentation companies was discussed.

It was decided that, given that small companies claimed that the City did not understand them and that the City said that small companies did not provide them with credible plans on which to judge whether they should be backed, the Livery could help. The Livery consisted of people who were, or had been, active in running instrumentation companies and some had been

involved in such activities as management buyouts. Many were no longer fully employed but still had active minds and would be interested in helping small companies, either for money or gratuitously. The Livery could set up the means whereby small companies could get their plans vetted and perhaps find advisors or even non-executive directors. It was also known that venture capitalists often needed assessors who could advise on the viability of plans.

From this came the concept of the Instrumentation Industry Exchange or IIE, namely a place where buyers and sellers could meet and do business. It also followed that the Livery with its limited resources could not accept any financial responsibility but could put people in touch with each other. There was some opposition in the Livery on the grounds that the IIE was making us too commercial and also that some Liverymen were consultants who might be bypassed by the scheme. In the end, it was agreed to go ahead. As the Livery was not well off, it needed some commercial support and that was where 3i came in.

The IIE would be finding venture capitalists potential investments but it was clear that most of them would not wish to undertake such speculative activities. 3i was the biggest and the most institutionalised with offices around the country and, at that time they were prepared to take quite a long view. The Livery therefore approached Summers, the 3i director at the Master's Luncheon, about supporting it. He agreed in principle. What WCSIM needed was public relations support and he offered to get the 3i PR team to help. The aim was to make small companies aware of what we were trying to do.

Initially, all went well. 3i hosted a meeting for interested Liverymen to explain their interest in non-executive directors, which aroused great expectations – unfortunately few of them were realised. There was initial success when a small company was found which needed finance and 3i put £250,000 in as an investment. It was a bonus that the owner of the company decided to join the Livery. Also, a Liveryman, Bill Goldfinch, found a small company,

which needed start-up finance and he provided it. Then things started to go wrong. The only press coverage provided by the 3i PR department was a couple of column inches in the Daily Telegraph and there was change in the management of 3i. It became evident, after contact was made with the Chairman, Sir George Russell, that his organisation was not interested. 3i, on becoming a public company, could not afford apparently to spend effort which was not supported by its branch managers and they were probably too incentivised for good performance to spend any time or money on a long shot like the IIE.

Attempts were made to interest other venture capitalists without success – such firms saw better pickings from management buy-outs. It was suggested by one venture capitalist that WCSIM should approach the British Venture Capital Association (BVCA) who had an activity supporting ‘business angels’. This was done but without a positive response.

Still WCSIM not give up. There had been regular contacts with the relevant part of the DTI and they remained supportive. A Master’s Luncheon in autumn 1995 included the Minister for Small Business, Richard Page and Prince Michael of Kent who was an Honorary Assistant of the Court. The lunch was not very productive. When Labour came into power, the Technology Minister, Barbara Roche, was a guest at the Master’s Lunch in the autumn of 1997. She turned out to be enthusiastic, but could offer little. Government support was not going to be very tangible – it was industry and City support we needed.

WCSIM therefore also made contact with an organisation set up to support business angels, the National Business Angels Network (NBAN). Initially there was some interest from that organisation but there was a change in its leadership and some of impetus was lost.

This was sad because there quite a number of Liverymen who would have

liked to become involved. Ivor Cohen was asked by his two successors to continue to lead the attempt to make the IEE work and he did make one final effort. The DTI gave WCSIM some money to produce a leaflet for small companies to highlight the help the Livery could offer. The writer who produced it was very good and the result was very attractive but despite extensive distribution no one came forward for help. So, sadly, the Livery had to give up.

Appendix 4 Robert Hooke (1635 – 1703)

Robert Hooke, Natural Philosopher, England's Leonardo, Horologist, Astronomer, Microscopist, Geologist, Physiologist, Surveyor and Architect, Engineer, Mechanic, Instrument Maker par excellence, pioneer Palaeontologist and Experimenter, was born in Freshwater, Isle of Wight on 28 July 1635 to John Hooke, curate of the Church of All Saints, and Cecily Gyles. He was the youngest of four children, having a brother and two sisters.

Hooke had poor health as a child, developed a hunchback stoop and was pale, thin and a hypochondriac. He attended Westminster School under the legendary Headmaster, Dr Richard Busby, before entering Christ Church, Oxford as a chorister in 1653. Robert soon became part of the circle of experimental philosophers brought together by John Wilkins, Warden of Wadham College. Here he met, and in 1658 became assistant to, Robert Boyle. The work they did together, using an air pump designed and built by Hooke, proved important and highly influential.

In 1662 Boyle allowed Hooke to take up the post of curator of experiments for the newly founded Royal Society of London. Hooke's brief was not only to perform experiments suggested by the Fellows, but also to bring three or four 'Considerable Experiments' to each meeting. Few could have coped with this demand, but Hooke made an astonishing success of it, and was quite literally the mainstay of the Society for well over a decade.

In 1666 Hooke was appointed by the City of London as one of the surveyors on the rebuilding committee established after the Great Fire of London. His friend Sir Christopher Wren was appointed as chairman by the King. Like Wren, Hooke did not confine his activities to surveying but also proved to be a highly gifted architect, although he never achieved the recognition accorded to Wren.

In the early 1670s Hooke became embroiled in bitter priority disputes, first with Newton and then with the leading Dutch mathematician, Christian Huygens, and also with the secretary of the Royal Society, Henry Oldenburg. Even though the Fellows tended to support Oldenburg, after his death in 1677 they still appointed Hooke to succeed him as secretary. However, taking on this role seems to have marked the beginning of Hooke's intellectual decline.

He was dismissed from the post after five years and received scant consideration in 1686 when he tried (with some justification) to claim priority for the planetary dynamics expounded in Newton's soon-to-be-published *Principia Mathematica* (1687). In 1687 his niece and mistress, Grace, died and left Hooke emotionally devastated and reclusive. He produced no more significant work after this, and died on 3rd March 1703, embittered and alone even though he left over £9,000 in his estate.

Hooke's scientific achievements were considerable and significant. He developed, but never fully expounded, a unique system of mechanical philosophy that depended upon supposed incessant vibrations of matter. Ingeniously explaining solidity, for example, in terms of particles vibrating so rapidly that they could beat off any intruding body; and chemical reactions in terms of vibrations of two substances in harmony (in cases of combination) or in discord (in cases of separation). Hooke's main problem was to explain such vibrations. Although he never succeeded in this, this theory led to many

experiments to explore the nature of vibrations and what he called 'simple harmonic motions'. His theory and practice was closely linked not only to the first statement of what is now known as Hooke's Law (stress is proportional to strain), and his awareness of the dynamic equivalence of vibrating springs and pendulums, but also to his discovery in 1658 that a clock could be driven by a spring instead of a pendulum – an idea that was first made to work in practice by Huygens in 1674 but that Hooke believed should have been acknowledged as his invention.

The influence of his vibratory physics can even be seen in Hooke's recognition that light was a periodic phenomenon, as demonstrated in his analysis of colours produced in soap bubbles and other thin films. Hooke was inspired by his optical theories to develop the idea that planetary motions could be explained in terms of a single attractive force from the sun bending the straight-line motion of a planet into an elliptical orbit. Furthermore he guessed that this force would vary in inverse proportion to the square of the distance between the sun and the planet.

He published this theory in 1666 and drew it to Newton's attention in correspondence in 1679. Hooke couldn't prove it mathematically, but when Newton subsequently proved it, at the request of Edmund Halley in 1684, he did not correct Halley's assumption that Newton had hit on the idea himself. This proof, of course, was to be the centrepiece of Newton's *Principia Mathematica*, which Halley now persuaded him to write. It was small wonder that Hooke was outraged when he heard that his original idea was not acknowledged by Newton in the *Principia*.

Hooke was a man of great insight and an ingenious theoretician of great influence, even though he never always succeeded in verifying mathematically many of his theoretical ideas. His industry, ability and ingenuity nevertheless ensured his position in the history of science. He invented the universal joint, the iris diaphragm, a calibrated screw adjustment for telescopes, and the

wheel barometer. He was also one of the first to take seriously the idea that fossils represented the genuine remains of ancient creatures (previously it was assumed they were simply features in the rocks which accidentally mimicked living forms), and was led by his knowledge of them to conclude that the surfaces of the earth could change, land giving way to sea and vice versa, and that the number and kinds of species of plants and animals were not fixed.

Perhaps his most lasting monument, however, is his one major book, *Micrographia* (1665), the first major work of microscopy. Although justly famous for its meticulous and genuinely surprising descriptions of microscopic phenomena, and for its superb illustrations, *Micrographia* also includes some of Hooke's most fruitful theoretical speculations and his most profound comments upon good practice in natural philosophy.

Robert Hooke's scientific eminence was eventually recognised by the unveiling, by the Dean Of Westminster, the Very Reverend Dr Wesley Carr on 3 March 2005 – the 302nd anniversary of Hooke's death – of a simple Memorial Tablet 'Robert Hooke 1703' located to the left hand side at the foot of the steps to the Sacarium in Westminster Abbey. Another memorial paving stone in Caithness stone was unveiled in the recreated Monument Yard development at the base of the Monument, which Hooke designed, by the Lord Mayor, Alderman, later Sir, John Stuttard on 31 January 2007.

David W Smith, Past Master

Derived from an article by Charles Davidson





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