LEO COMPUTERS SOCIETY

Newsletter and Review ISSUE Winter 2016 Vol. 3

65 Years

Computers in Education and Memories of Earlier Times

Editor: Bernard Behr

1951—Leo I Operational

LEO I Cadby Hall, London. Circa 1955

This Issue

Message from our Chairman Peter Byford

I hope you enjoy this latest edition of the LEO newsletter. Thank you to all the contributors to this edition and to our editor.

The original plan for this newsletter was to have a theme of education and training, for a variety of reasons only a minority of the articles now relate to that. We have articles about LEO training by Mike Storey and Chris Date's memories of his time with LEO mainly in the training department.

More memories of their time at LEO come from John Godwin of LEO South Africa and Tony (A B) Morgan of his time installing LEO III/2 in Johannesburg..

Professor Colin William of Warwick University and Professor Martin Loomes of Middlesex University have provided notes from their talks at the Reunion.

Rounding the newsletter off is a contribution from two of our guests at the last Reunion, Professor Alan Eardley and his colleague Denise Ashe of Stafford University. He has done a review of it for us, which I hope will encourage those who didn't come last time to come to the next one. They have also information about the DEUCE computer which Alan and his University have personal experience.

As you should know, from both the website and messages we have sent to you, this has again been a busy year for the Society. We continue to interview LEO people for the Oral History project. Mike Tyzack is doing a good job in organising this. Please let us know if you or someone you know would like to be interviewed and have not heard from us.

We are getting much more recognition, various people and organisations are beginning realise just how significant LEO's achievements were. The fact that a Catering company managed to design and build the World's first business computer is attracting a lot of interest. The BBC4 programme "joy of Data", shown in August, included some LEO video clips and interviews with pioneers carried out at April's reunion. A company in California asked us recently for permission to use the LEO "film" in one of their productions for MSNBC – one of USA's top broadcasters. So USA is beginning to hear about us and even appreciate LEO's significance.

We will be adding more to the website, we have already introduced a "memories" section. Please let us have any memories you may have that we can add to this section. The "members only" section is available for messages or queries that you might have and contains a list of members and brief detail of their LEO interest. No personal information is shown.

Finally we have just confirmed the arrangement next Reunion to be held at the magnificent Honourable Artillery Company (HAC). Many may recollect that this was a venue used in 80's and 90's and whilst expensive we have managed to secure sponsorship from Google for which we are deeply grateful.

NEWS

We anticipate holding a small conference devoted to protecting and archiving LEO history. Likely to be held at York racecourse towards end of May and planned in conjunction with Colin Williams and Warwick University.

We are putting together a book LEO nostalgia, called LEO Remembered. We hope to have this available in the next few weeks at around £5.

We have instituted an annual lecture series to be known as the "*LEO Lectures"* and be run in conjunction with the LSE. The inaugural lecture was held at the Old Theatre of the LSE on 14th October and given by Eric Schmidt (Executive Chairman of Alphabet—parent company of Google). It was a great success and bodes well for the future.

Plans are well under way for the installation of a plaque to commemorate LEO I in Lyons Way Hammersmith. We are hoping that a significant figure in the IT World will carry out the unveiling of the plaque. The tentative date is 29th November 2016.

Notes on Peter Byford

Peter Byford needs little or no introduction. He has been Chairman of our Society since the early 80's and his unceasing efforts and commitment have ensured that the Society has both grown and flourished under his direction.

He has singularly brought LEO to the forefront of public awareness, and has made certain that the immense intellectual contribution of our early pioneers and innovators have been duly recognised by both the industry and the wider community.

A night at Consolidated Glass By John Godwin

The bureau in Johannesburg ran Leo III/2. Often when the load was heavy we took work at night to LEO III/40 at Consolidated Glass in Germiston, about 20 kilometres to the East.

In order to save time in the event of a call-out a programmer would accompany with the operator. The programmer could help load and unload the car and do other menial jobs.

Thus it was one Friday evening I went to Cons Glass with John Coring. We were to run the Leyland Stock Control job. By the standards of the time this was a large job. There were 80,000 stock items on the record that went onto four magnetic tape reels. From start to finish it took over five hours. Most of this time was taken by the main update run.

John Coring had a beard and wore intimidating glasses. He looked fierce and he was fierce. In his spare time he was a rugby referee. He did not approve of programmers being in the computer room.

But I'd been to Cons Glass with him several times so he allowed me to help, I had even been elevated to working on the tape drives.

A short digression -- LEO III cognoscenti will know that when the drive reaches the end sentinel of a tape it pauses, the tape dithers back and forth for a second or two, and then the tape rewinds. On a multi-reel file and if you have a spare tape drive you can mount the next tape in a sequence on the spare drive. When the previous tape rewinds you can toggle the drive off line and toggle the spare drive on line. The run goes on with the next tape -- end of digression.

At around midnight things were going well. The machine was singing its song, the tapes were going round and I noticed a trace of a smile on John Coring's face. It looked as if we might have an early night.

We were nearing the end of the third output tape. I had mounted the fourth tape on the spare drive waiting for the rewind.

It was then that my thumbs got out of sync with my brain. In my enthusiasm I toggled the drive during the dither and before the rewind.

The machine stopped singing and everything ground to a halt. I heard John Coring's voice. "What did you just do?"

"...Er, well, I might have..." He cut me off. "Why don't you go somewhere and read a book, I'll sort it out in here". His tone was that of a father speaking to a naughty son.

He must have forgiven me though as I was allowed to help with de-collating the printing.

We left Cons Glass as the sun came up.

Notes on John Godwin

John Godwin was born on the fourth of May 1937, in Epsom UK. He attended school in Cheltenham and Newcastle on Tyne and later at St Georges College in the then Salisbury, Southern Rhodesia. He graduated with a B.Sc. (Aero Engineering) from Imperial College in 1959.

John was married to Denise (née Chalmers) who became Chairman of the Department of French at the Randse Afrikaanse Universiteit in Johannesburg. Denise died in 2014.

Upon graduating John returned to Southern Rhodesia (now Zimbabwe) and worked as a teacher in the Federal Government of Rhodesia and Nyasaland.

Leo Fantl recruited John as a programmer for the Johannesburg Bureau when the Federation broke up. He joined the Bureau in February 1965.

John worked at the Bureau until 1986. During this time the company went though several changes in shareholders ending up as a part of the Sage Group of financial services.

In 1986 John transferred from the Bureau to become Head of IT at Sage Life. He retired in 2002. In his spare time John is a keen aero-modeler and was for twenty years the web editor for the South African Model Aircraft Association.

Notes from Ed.: John was my immediate head whilst a junior programmer at LEO, Anderson St., Jo'burg.

My Time at LEO—A Personal Memoir

By Chris Date

Events that seem comparatively minor at the time can have far reaching consequences. I joined LEO in September 1962 as a trainee programmer. To be quite honest, the main reason I chose LEO and not one of the other computer companies in the U.K. at the time was that the job offer from LEO wasn't contingent on my getting my degree[1] ... well, that, plus a certain engaging air of informality that seemed to attach to LEO rather more than it did to other companies. I shall never forget the letter inviting me to come to an interview, which said, and I quote, "We're quite easy to find. We're opposite Sketchley's the cleaners."

Another reason I was attracted to LEO was the interview process itself. As I recall, we were given a tutorial lecture on elementary programming, followed by a simple programming test, followed by a few conventional face to face personal meetings. I found this scheme both sensible and interesting. (There were no college computing courses in those days, so I don't think I was alone in having absolutely no prior knowledge of programming or computers. I also don't think I was alone in applying for a programming job simply because most of the other "jobs that mathematicians can do" sounded so ... well, perhaps unappealing is the mot juste. I do recall that time and motion study was one.)

Anyway, as I say, I joined LEO as a programmer. These were the early days of LEO III. After the usual five-week basic training course—I recall being impressed by the fact that 13 of the 24 people on that course were women, a favourable ratio that, sadly, I never encountered again in my computing career—I was sent to Minerva Road to work in the mathematical programming department under John Caldwell. It was that appalling winter of 1962-1963; I remember icicles that reached from gutters to the street, and freezing fog, and pavements so lumpy from melted and refrozen ice and snow that a broken ankle was a serious possibility. I also remember how, all through that winter, Pete Wharton and I struggled to get our program—we were trying to develop an Intercode solution to something called "the transportation problem"—to work. (I don't think we ever succeeded.) And I also remember a rather horrid commute! I lived in Wendover, Bucks., at the time, and my commute consisted of a hike across fields (mostly frozen), then train to Marylebone, then another hike round the corner to Paddington, then Tube to Harlesden, then hike to the LEO factory—all to be repeated in reverse, of course, at the end of the day. You won't be surprised to hear that those days seemed very long to me.

My memory is a little hazy at this point, but I recall that after a few months at Minerva Road some if not all of us mathematical programmers were transferred back to Hartree House in Queensway (a simpler, though still lengthy, commute), and life became a little more plausible. But I should explain our modus operandi at Hartree House. The only computer available to us was the LEO III Service Bureau machine, most of whose time was, reasonably enough, dedicated to customer jobs. Our programmes—[sic; at the time we still rejected the American spelling]—were typically run at the weekend. So we'd get our results back on Monday morning, debug them [I seem to remember we didn't use the term "debug" in those days, either], resubmit the job, and then twiddle our thumbs for the rest of the week. Well, I exaggerate slightly, but not a lot. I do recall that some of us became quite adept at the Listener crossword.

Then someone, I don't know who, decided that the training department needed more programming instructors, and I was one of those transferred there (this must have been in May 1963 or so). And then, after a little while, I was told to prepare and deliver a series of lectures—eight or nine of them, I think—on the next basic training course. The subject was CLEO.[2]

Needless to say I was petrified. It's one of the universal great fears, isn't it—speaking in public. Anyway, I did as I was told. My first lecture was on what we would now call the assignment statement (SET, in CLEO). Two things happened. First, I quickly discovered that public speaking wasn't as terrifying as all that (not if you're properly prepared, at any rate); in fact, I soon began to enjoy it. Second, something was obviously very wrong!—I had been given an hour for the lecture, and it was all over in less than 30 minutes. Naturally I thought it was my fault—I mean, I thought I must have been taking it much too fast—but later I came to realize it was a 30 minute topic. Whoever had allocated an hour for the session had wildly overestimated.

Anyway, that was my introduction to the lecturing racket. Now, if you had told me at that time that I'd go on to spend a large part of my professional career teaching classes, doing conference talks, giving keynote presentations, and so on, I would have thought you were crazy. And yet that's exactly what happened.

But I'm getting ahead of myself. Let me get back to the LEO training department and my time there. I remember those years with great fondness; in fact I made several friends during that period who have remained good friends ever since. Here are some of the people I remember well:

- John Smythson, training department manager, and Bob Gibson, John's manager
- Fred Fielding, who acted as my technical writing mentor and caused me to realize that explaining technical matters in writing as well as in live classes was something I really enjoyed doing
- Joan Longhurst, our department secretary, who not only corrected my grammar when typing out the manuals I worked on but was known on occasion to correct my coding examples too (Fred and Joan later married)
- Dave Wilkinson, Colin Hanmore, and Mike Gross, all of whom were instructors on the training course I attended when I first joined
- Helen Garsed (now Clews) and Anne Crisfield (now Fowler), both of whom attended that same training course—Anne joined the training department immediately while Helen, like me, spent some time in the mathematical programming department first

Of course there were many others as well, too many to mention individually here. Hartree House was a great place to work for social reasons, intellectual reasons, and (last but not least) for its location in one of the most culturally diverse parts of London. Something else I acquired at that time was a great love of curries! I also remember, in the summer months, how pleasant it was to be able to walk across the park after work to attend prom concerts in the Albert Hall.

Somewhere during this period LEO embarked on that rather dizzying series of business partnerships and mergers and relationships that (for a while, at least) seemed to come too thick and fast to keep up with. First, LEO merged with English Electric to become English Electric LEO (unfortunate acronym); then Marconi came on board, and we became English Electric Leo Marconi (EELM); then, presumably because the EELM name was such a mouthful—as Leslie Trott once said to me, if you wanted to put it on the side of a building, you'd have to type it—we became just English Electric. After the first of these mergers, I was sent to Kidsgrove on a KDF9 course, where I first encountered Algol[3], and then came back to London to teach KDF9 to LEO people. Partly as a result of that experience, I was then seconded for a while to a group led by Mike Joseph that was trying to design a new computer, codename KLX as I recall, that was to combine the best features of LEO III (business computing) and KDF9 (scientific computing). However, that project was cancelled when a deal was done with RCA to develop what became the System 4 series, based on RCA's Spectra 70 family.

Somewhere in there too—1964? 1965?—the training department moved to a building of its own, Radley House in South Ealing (and my commute got worse again, though by this time I was living rather closer by, in Greenford near Harrow). I was put in charge of programmer training and training manuals for System 4, and we began to hire a lot of new people, some of whom became good friends. Among the latter I'd particularly like to mention Paddy (Robert) Christie, Pete Downes (sadly no longer with us), Roger Foott, and Ian Silversides. I wish I could tell you some of the stories arising from the hiring process! We used to get applicants to deliver a test lecture, based on a scenario dreamt up by John Smythson and involving the selling of the idea of riding a bicycle to people who had never previously encountered such a thing. Some of those test lectures were hilarious, but space unfortunately prohibits further details here. By the way, my own personal interview technique consisted of taking the applicant down to the pub for a beer, to get away from the constraints of a formal interview and talk about the job in a more friendly setting. I don't know if we missed any good applicants that way, but I do know we didn't hire any bad ones.

Well, the process of putting this memoir together has certainly brought back a lot of memories! Perhaps I'll get down to putting more of them in writing in the fullness of time. However, I don't think this is the time or place to do it; I think I'm already beginning to outstay my welcome. So let me wind this up. To conclude, then: I indicated earlier that, back in 1962, I'd applied to several other U.K. computing companies as well as LEO. Indeed I did (and I'm glad to say LEO wasn't the only one to offer me a job)—but one that I did interview with, and got turned down by, was (roll of drums) English Electric ... And so here I was, a few years later, working for a company that hadn't wanted me in the first place. Time to leave, I thought; so I did.

Well, that's not quite the way it was, of course. What really happened was that I wanted to get away from the London suburbs; I'm a country boy at heart, so when in 1967 the opportunity came to join IBM Hursley as an instructor, and so to live and work in the Hampshire countryside (near Winchester), I jumped at the chance. And then at IBM I encountered this new thing called databases, and one thing led to another, and databases became the focus of the rest of my professional life.

But it was all because of Sketchley's the cleaners.

Endnotes [1] *As it turned out I got my degree after all, but at the time I wasn't at all sure I was going to. It was pretty much touch and go.*

[2] *CLEO was LEO's proprietary high level language. The name was an acronym—it stood for Clear Language for Expressing Orders. Very clever that it rhymed with LEO ... though I do remember one student on a later course whose notes consistently spelled it "CLOE" (Chloe?).*

[3] *I still regard Algol as a beautiful language. As Dijkstra says somewhere (quoting Tony Hoare, I believe), Algol 60 was a major improvement on most of its successors. But that trip ... well, it was my very first business trip, and I still recall the fact that my hotel window looked out on to the Potteries Wholesale Tripe Works.*

Acknowledgments

I'd like to thank Helen Clews and Anne Fowler for helping me out with their own memories of those far off days, also for their helpful comments on an early draft of this article. I'd also like to thank everyone at LEO who helped in one way or another in launching me on a career that I've enjoyed immensely now for many years and have never found less than fulfilling. It's impossible to name you all individually here, however, and for that I apologize.

Notes on Chris Date

Chris Date was educated at High Wycombe Royal Grammar School (1951-1958) and Cambridge University (1959-1962), where he read mathematics.

He was employed by LEO from 1962 to 1967; by IBM U.K. from 1967 to 1974 and IBM U.S. from 1974 to 1983; and has been self-employed ever since, working as an independent author, lecturer, researcher, and consultant, specializing in relational database technology (a field he helped pioneer).

He is best known for his books on database technology, including in particular An Introduction to Database Systems (8th edition published in 2004), the standard text on the subject, which has sold some 900,000 copies (not including translations) and is used by several hundred colleges and universities worldwide.

Chris lives in Northern California.

Radley House — "An up and coming industry". By Mike Storey

In the mid 1960's EELM, as LEO had then become, were presumably anticipating a shortage of Customer Site Engineers to maintain their 3rd generation of LEO Computers, the LEO III's. An advertisement duly appeared in the daily press, seeking ex-service personnel with radar engineering experience, to be retrained for a civilian career in computer engineering.

I no longer have a copy of the original advertisement, but it must have also contained something to the effect of "or a similar background".

Without much (or any) of a similar background, but certainly with a little engineering experience, my application resulted in this seventeen year old being interviewed. The interview was held at Minerva Road and was for a two year training course, on a small wage.

The inducement was that if you were selected, then a job offer as a salaried Computer Engineer would be forthcoming, in what I was assured, was a young up and coming industry.

The interview itself, as I recollect, was only the second that I had attended, and I was asked at one point to explain how a 4 cylinder motor cars' coil ignition system worked.

With a combination of still recent school boy's physics, and the almost constant tinkering with a motor cycles' magneto ignition, I proffered my answer accompanied with sketches.

Somewhat relieved that even the basics of radar hadn't come up in the interview, I went home; partly to continue looking at job adverts, and partly to assure my mother (who had pushed the EELM advert in front of me) that yes, maybe there was a world outside of motorcycles.

The induced current as shown on my interview sketches must have had some influence because I soon after received a letter from the company offering me a place on the training course.

Day 1, Radley House, Ealing.

There were at least 20, and possibly 30 of attendees, most, I think of a similar age. Certain-

The LEO website
www.leo-computers.org.uk

further interesting details about visits and visitors to the site.

By Bob Stevenson

Some more LEO website stats from Google Analytics.

Comparing the first 5 months of this year (Jan to May incl.) to the same period in 2015, we arrive at the following stats.

The number of users was up by circa 19% at 1775 v. 1491.

The number of sessions was up similarly at 2280 v. 1928
There were visits from 85 different countries in this period, although only 53 were online long enough to be measurable. –
The top 10 countries were:

1.	UK	1599 Visits
2.	USA	257
3.	Brazil	85
4.	Australia	73
5.	Germany	50
6.	Italy	49
7.	Canada	43
8.	Spain	29
9.	India	28
10.	China	20

The 10 cities with most visits were:

1.	London	421 Visits
2.	Hemel Hempstead	61
3.	Stoke-on-Trent	38
4.	Princes Risborough	36
5.	Bristol	28
6.	Melbourne	27
7.	Sydney	26
8.	Guildford	20
9.	Norwich	20
10.	Bournemouth	16

Interestingly, no. 48 in the list was the city of Belo Horizonte, (6 sessions); which I am sure you all know is the 6th largest city in Brazil.

Bob continues to maintain our excellent website. Ed.

Notes on Bob Stevenson
Bob was LEO II/5 operator and LEO III/1 Operations Manager at the LEO London Computer Bureau. Stayed with Leo through to Baric and 1900 and 70-45 operations at Newman Street; then left to continue in Operations and later Systems Analysis for various other organisations.

ly I don't remember anyone who appeared to be ex. service. Radar was obviously not going to be a major discussion topic.

With thankfully no radar, we were about to embark upon a comprehensive revision of physics, an introduction to Boolean algebra, the theory of circuits designed to provide a Schmidt trigger, mono-stable and bi-stable latches, binary counters and much more. We also learnt that flip flops would now conjure up more than just thoughts of a young lady, walking along the beach, in a bikini.

The main lecturer was Derek Royle, a man of great patience. Very dapper, brown suits with waistcoats; we soon discovered that he was ex-service, with a wealth of radar experience. Did he write that advertisement? Quite possibly!

The course was divided into 3 main segments, and my memory fails on the precise length of them.

It was however, in the order of 9 months classroom theory, at Radley House; followed by 6 months site experience, at a LEO customer site, and then the last 9 months back in the classroom.

There was also a day trip to Kidsgrove, I think during the second year, to walk through a computer assembly line.

I distinctly remember being shown, amongst a degree of secrecy, an R&D form of data storage. It took the form of a fairly large cabinet, with a tripod and hoist, surrounding and towering over it. Suspended on the hoist was a large disc.

Magnetic disc storage, long before it became the norm.

The 1st segment of this course was very theoretical.

As mentioned earlier, mainly class room theory, but interspersed with some practical some aspects; soldering was one. We also had what was probably a precursor to Health & Safety. A Polish engineer conducted this section, the name of whom escapes me.

The 2nd segment was an assignment, to the then new world of computing.

I was assigned to LEO 111 / 33, Phoenix Assurance, Norbury, once in the county of Surrey. This was the first time I actually saw, and touched a machine. Previously, it had been photographs and drawings.

An air lock into the machine room, a tacky mat, and a white warehouse coat.

Did the first segment prepare me for the site assignment? I didn't think so at the time, but in hindsight, probably yes.

The site operated on a 5 day, 2 shift rotas, day and night. One engineer and a site manager were on each shift. I shadowed the day shift engineer, and loved every minute of it.

Then it was back to the class room.

The third segment was the most difficult.

With circuit diagrams on the desk, a theoretical fault was described to us, and the lecturer acted as a walking oscilloscope. What test points were high or low (active or passive) and under what conditions, we had to ask. The answers would then enable us to identify a faulty circuit card. That was the theory.

Having been on site, I had by now learnt how to operate (at basic level) an oscilloscope.

We also analysed how a programme instruction worked, at machine code level. The flow diagrams were drawn on thick drafting paper, probably 30 inches by 18 inches. Complex instructions were spread out over 2 or more such sheets. We worked in pairs, no choice.

I would grade myself as having struggled with the first segment, possibly coped with the second segment, and now desperate to pass the third and last segment.

I was somewhat encouraged by the fact that I was at least back at Radley House. Half a dozen or so were not.

Suffice to say that the LEO 111/33 site manager (Bob Hare) subsequently offered me a permanent position, and that this training course was (for me) the beginning of just over 40 years in the computer industry. The first 20 being in Customer Engineering.

If any reader was either on this course, it's second intake a year later; or involved in any other way with these two courses, I would be delighted to hear from them.

Notes on Mike Storey

Mike Storey was a Site Engineer at LEO III/33 at Phoenix Assurance. Mike spent 14 years as a Computer Field Engineer and Area Manager and thereafter 22 years as an IT Sales Manager.

Preserving LEO's place in history—An academic view.

By Colin Williams

I first encountered LEO as, literally, a footnote. A glancing reference to an oddity, a quaint and somewhat typically English curiosity which need not detain the reader nor divert their attention away from the authors' far more worthwhile consideration of the serious business of the history of proper computers.

After all, it was suggested by the worthy tome, what real significance could there be in a machine built by a high street tea shop to manage the mundane business of payroll and inventory? The real story of computers and computing was surely to be found elsewhere, in the caverns of the Cold War bunkers and at the secret heart of the military-industrial complex.

Nonetheless, despite the cursory condemnation with faint praise, and notwithstanding my interest in precisely the computer as a Cold War phenomenon, the cursory quip ignited a spark of curiosity.

Following the path signposted, however unwittingly, by that scholarly smirk, has led me to the judgement that LEO occupies a position of some significance in the wider history of computing and to the view that this position warrants a great deal more research and scholarship.

This is far more than the expression of the sentiment, however worthy, that those plucky English pioneers, now veterans, of the early days of computing, hitherto forgotten, deserve their share of the recognition thus far garnered almost exclusively by their American counterparts. This sentiment is indeed both worthy and necessary because it is also expressive of a truth; the Lyons' pioneers and their creation do deserve far greater recognition than they have been accorded hitherto.

Their technological accomplishments were as remarkable for their radical ingenuity as they were for their bold development outside of what was even then becoming the American computing hegemony. Lyons and the LEO pioneers demonstrated a capacity for foresight, innovation and courage that many in business today could, and should, seek to match. LEO should stand as a beacon to us all that the disruptions and dissonances of change are a necessary precondition of the ability to adapt and evolve.

Although the technological accomplishments of the LEO pioneers were ground breaking and are sorely neglected by most commentaries, the deeper historical significance of LEO lies as much, if not more, in the way it was used as in how it worked. LEO was not merely the first purpose built business computer, it was also the almost singular means through which computers and computing shrugged free of the shroud of Cold War ultra-secrecy. LEO brought computers and computing in to the business mainstream. Even government agencies that might have had access to the machines of the Cold War used LEO.

To use LEO, either on a bureau basis or as an on-site installation was to have important, if not critical, facets of what you did as a business computerised. So, computing became about a set of relationships between people, processes and information; not simply about the processing of mathematical calculations or the management of the abstract technicalities of the operation of complex machines. To use LEO was to have your business systems redesigned and to have new and old systems integrated. LEO came with a cohort of analysts equipped with logic and clipboards.

To commercialise LEO, Lyons developed a phalanx of processes and procedures which we still recognise today in the enterprise model of computing. The systems management and integration models to which LEO gave rise are still to be found at the core of the offerings of today's managed service providers and systems integrators, on both sides of the Atlantic. Lyons' occupied a pivotal role in what became, first the British standards, and then the international standards movement. LEO informed the agency of Lyons' in the development of business and quality management. The echoes of LEO's roar are still to be heard in ISO 27001. The familiarity of the orthodoxies of today should not disguise the radical nature and the vast accomplishments of the work of the LEO pioneers. They wrote the book we still read and follow today.

To enable the necessary research and scholarship around LEO it is now essential to co-ordinate, catalogue and preserve the currently disparate records under formal archive conditions. The window of opportunity to do this will not remain open indefinitely. If the window closes in the absence of action, then our capacity to comprehend the history of a vital stand of the history of computing will be severely impaired if not damaged beyond recovery.

Notes on Colin Williams

As both a businessman and as an academic, Colin Williams is a prominent figure in the international cyber security community with twenty years of experience in enterprise IT, Information Assurance and cyber security.

As a director of SBL, he develops and leads the business development strategy of a wholly UK owned and controlled market leading provider of vendor independent cyber security solutions to central government, blue light services and the wider public sector.

Colin was a member of the founding cohort of CLAS consultants. He has been involved in initiating and delivering some of the largest software volume licence public sector procurement projects in the world.

As an academic, he is developing a body of work around the human, intellectual, cultural, societal and historical context of computing which he is delivering across a series of lectures, seminars and papers.

Colin consults and speaks on cyber, cyber security and strategic enterprise IT procurement in the UK and internationally. He is editor in chief of "CyberTalk" and new journal for the promotion and development of fresh and interdisciplinary thinking about cyber and the human relationships with computers.

Additionally Colin an Honorary Fellow of the University of Warwick and Visiting Professor at De Montfort University

The Experiences of Two DEUCE Fans at the LEO Computer Society Reunion.

By Alan Eardley & Denise Ashe

Before we begin, let us 'nail our colours to the mast' by saying that by provenance we are both English Electric (EE) DEUCE people through and through. Alan worked for years in the same Nelson Research Laboratories (NRL) building in Stafford where the first DEUCE were 'productionized'. He learned his trade as an academic from people such as David Leigh, John Wilcock and Rudolpho Zambardino who, as young men, had worked for NRL on the development of DEUCE. As a PhD student at Staffordshire University, Denise is one of the inheritors of this proud tradition and has recently curated an exhibition of DEUCE literature and artefacts. Having said that, we both have enormous respect and affection for LEO computers and for the people who developed and worked on them.

It was interesting to the pair from Staffordshire to hear discussions of the engraved stone (purchased with a generous donation by Tony Morgan) commemorating the development of LEO 1 (indisputably the first business computer) to be placed in Lyons Walk near to Cadby Hall. The site where DEUCE was developed is now the student common room of the Faculty of Health of Staffordshire University. It is still recognisable as a part of NRL, but there is no commemorative marker of DEUCE on the premises. Maybe there should be, as DEUCE and those who developed it undoubtedly contributed much to the development of British computing, albeit initially in a different market to LEO. DEUCE machines had a particular niche in education as well as scientific research, as notable users included the universities of Glasgow, Liverpool and New South Wales, as well as Staffordshire College of Technology (SCOT).

Certainly the conclusion to which Alan and Denise came was that research and preservation initiatives relating to LEO are much more advanced than those of DEUCE. This is in spite of the close links between the DEUCE, EELM and Staffordshire University as an academic institution that led the field in computing education. The University is one of five educational institutions that celebrated fifty years of teaching computing to undergraduates in 2015, a fact that is directly attributable to the close association between EE, NRL and the original SCOT. These links are worth exploring further in the context of this article.

EE set up training facilities for its apprentices at Stafford College of Further Education (now Stafford College) in the late 1950s. In early 1963 the company supported the formation of SCOT on a site next to NRL at Beaconside under its first Principal Mr R.S. Paradise. To form the new faculty, some science, engineering and mathematics lecturers transferred from the Stafford College of Further Education (such as Dr David Sartain, later Head of Information Systems at Staffordshire Polytechnic and Alan's boss), while others (for example were recruited from the English Electric factories at Stafford and Kidsgrove and Newcastle-under-Lyme (for example John Wilcock and Rudolpho Zambardino). Several of the original SCOT Governors were from English Electric, for example Mr J.R. Sully, General Manager, of the Stafford and Kidsgrove Works and Mr W.E. Scott, Managing Director of English Electric-Leo Computers Ltd. Others, such as David Leigh and (later Professor) Don Conway came from NRL. History suggests that it was Don Conway who later provided the drive for computing courses to be developed at SCOT (Davies 1964).

The original Department of Mathematics and Science, headed by Dr H.L.W. Jackson, soon became the Department of Mathematics, Statistics and Computing, embracing the emerging discipline of Computing Science. In 1965 the BSc Computing Science was developed by a small team of college staff and industrialists, many of whom came from EELM (formed from EE LEO Computers and Marconi in December 1964). The first intake consisted of just eleven students, many of whom were sponsored by EELM, including one Roy Newton (later Professor Newton, Dean of the School of Computing). The first DEUCE (obtained second-hand from Liverpool University) was delivered by crane through a second floor window - Alan compared this with photographs at the reunion of a LEO computer being lifted by crane into the J. Lyons Minerva Road site. After a spell at Beaconside, the Department moved to the Blackheath Lane site of NRL, which had previously been used in WW2 for secret testing of the revolutionary and problematic Sabre engine that powered the Typhoon strike fighter. As Dr John Wilcock erstwhile Reader in Computing) relates it. Development was rapid as computing education became established. Between 1963 and 1993 computing at Staffordshire grew from nine lecturers, one technician and eleven students to more than 100 lecturers and 1800 students, which was the largest teaching facility for computing in Britain, and possibly in Europe. This story was recently told by Alan in his Inaugural Professorial Lecture, 'Fifty Glorious Years – Staffordshire's Role in the Development of Computing'.

Alan and Denise were involved in researching the history of LEO computers for Alan's Inaugural Lecture and had the pleasure of

filming a long and interesting interview with Professor Frank Land at his Devon home, being made very welcome by Emeritus Professors Ailsa and Frank. It was therefore a pleasure and a privilege for us both to be invited to attend the LEO Computers Society reunion on 10th April at the Middle Temple Hall. The event was marked as 'something different' when we were inadvertently involved in the filming of a World War Two drama outside. Alan was pleased to give one of the cast an expert lecture on the use of the Small Box Respirator Mark 6. He knows stuff like that.

Having been 'smuggled in', the venue revealed itself as immensely impressive and the air of excitement was palpable with many of the attendees renewing old friendships and exchanging news. As 'strangers' we were immediately made welcome and during the excellent buffet we were entertained by fascinating conversations with Mary Coombs, Linda and Mike Forbes, Frank and Ralph Land and Neville Lyons to name but a few. Without exception, their memories were undimmed and the different perspectives they provided on this interesting and unrepeatable period in British computing were riveting. The video booth staffed by Middlesex University was 'doing a roaring trade' recording the reminiscences of these computing pioneers and the display of memorabilia was the subject of constant attention. Denise was particularly interested in this as her PhD research concerns virtual exhibitions and she is keen to learn from 'the real thing'. Alan felt privileged to be allowed to speak briefly about the relative contributions of LEO Computers and EE to British Computing and the unrealised potential of EELM.

We were quite jealous to hear about the research doctorate programme at Middlesex University funded by the Association of IT Trust. It is a worthy addition to the research into the early days of the British computer industry and marks the enormous contribution made by David Caminer, in whose honour it is named. It was a pleasure to meet Rabia Arif, who is currently holding a Master's degree scholarship in business computing, who was helping to run the video booth. Alan felt more than privileged to have his photograph taken with Hilary Caminer –as an ex-business systems analyst and a developer of academic programmes in business computing her father is one of his all-time heroes. Altogether, the LEO reunion was unforgettable.

References:

Davies, H.N. (Ed.), (1964. "University of the future?), English Electric and its people 19 (June 1964), Pp. 8–9.

Notes on Alan Eardley

Professor W. Alan Eardley was born in Stoke-on-Trent, England in 1949. Through part-time study as a mature student, he obtained a B.A. in Business Studies with first class honours in 1984 and a Master's Degree in Computer Science from Aston University in the U.K. in 1989. His PhD, in Strategic Information Systems from Southampton University in the U.K., supervised by Professor David Avison was awarded in 2001. Alan is Professor of Enterprise Computing in the School of Computing at Staffordshire University in the U.K. and is an Adjunct Professor at Asia Pacific University of Technology and Innovation in Kuala Lumpur. He researches, publishes and supervises PhD students in knowledge management and IT strategy and teaches research methods. Recently, Alan's interests have embraced the history of computing industry and education in Britain with a particular emphasis on DEUCE and the Nelson Research Laboratories of English Electric. He is privileged to have known and learned from some of the pioneers 'who were there'.

Notes on Denise Ashe

Ms. Denise E. Ashe was born in Stroud, Gloucestershire in the U.K. She has a B.Sc. in Computing from Wolverhampton University in the U.K. awarded in 1996. Denise has a Master's degree with Distinction in Computer Science from Staffordshire University in the U.K. and was awarded the Faculty Prize. She is now a PhD student in the Faculty of Creative Arts and Technologies at Staffordshire University and is studying the potential of gamification and semiotics for optimising user profiling and personalization of gallery and museum virtual interfaces. Denise has recently curated several 'real' exhibitions about the history of British computers.

Memories of my time in South Africa

By Tony (A.B.) Morgan

Tony with gold ingot at visit to Harmony Mine in 1962 whilst installing LEO III/2

Steve Farrow and I had just finished expanding the LEO III pilot to full word configuration by adding an extra cabinet with twenty bits of adders and main registers and the boards for the other half of the store. George Manley and Frank Walker had been commissioning the magnetic tape and Vic Kleiner the printer, both off-line, and we started moving the whole configuration into its proposed layout for Hartree House. George had started III/2 which it was proposed that he take out and stay with for

three years. Peter Mann, the Commissioning Manager, left for Honeywell (the start on an exodus) and George was promoted. I took over III/2 and Lou Weatherill, an ex-RAF technical officer, was employed to become the resident engineer. III/2 was the only machine to receive its full cladding in the factory. (see photo 43 in Peter Bird's book. George is facing the Engineers' Control Desk. Bob Elmer, the Chief Commissioning Operator, is in front of the tape decks and Bill Toner an inspector, in the white coat, is in the far left corner)

Arthur Clements went with me to South Africa. He ran the Model Shop (that fabricated prototype metal components for the computers) and his team would normally do the physical installation of the computers. They had their own fork lift and trailer which they used at Minerva Road and at the site to handle the cabinets on and off the contractors lorries (normally three). It was towed it behind the Arthur's own Land Rover. It was originally intended we would fly out in the Douglas DC7F freighter aircraft in jump seats but fortunately in the end there wasn't enough room. We flew to Johannesburg from what was then the International Terminal at Heathrow. That evening I had a taxi to the airport with my father, stepmother and half sister and my best friend Robin came down with his parents and aunt in their new Mini to see me off. While waiting in the departure hall out from behind a pillar popped Tony Barnes, the LEO production Director and my immediate boss, to wish me the best of luck.

We were flying in a South African Airways (SAA) Boeing 707, then relatively new to airline service. One notable thing about the 707 was the way the wings flexed. After refuelling and passenger pick-ups in Paris and Rome the next leg for essential refuelling was to Brazzaville in the French Congo, the only place that allowed SAA to land on the African continent. We had flown overnight and as the aircraft was not very full the stewardesses removed seat dividers and issued blankets so we could get our heads down across three seats. At six o'clock in the morning we were circling over the River Congo waiting for the mist burn off. I imagined the crocodiles hoping for us for breakfast! The airport at Brazzaville was no more than a concrete strip and the terminal building no bigger than my local pub or Centaurs RFC's clubhouse. We flew on south on a clear day over the highveld and landed at Jan Smuts airport at around midday and there were met by Leo Fantl who had gone out to South Africa to set up the joint Rand Mines/Leo Computers operation and some of his UK staff. Joe Crouch a consultant and Graham Limpkin were two I remember. They took us to a small hotel which was conveniently next to the 36 Anderson Street building, just south of Commissioner Street which is the main East/West road, where the computer was to be installed.

We viewed the arrangements in computer room, which was on the second floor, in the afternoon. Robert Ferguson who advised Sales and customers about installations in the UK had previously been out there to make the arrangements for LEO III/2 and Arthur was not pleased about what had been done, particularly the electrical arrangements. Arthur wrote a strong airmail to Tony Barnes about it. In the evening our welcoming party treated us to dinner in a very fine Chinese restaurant complete with a Lazy Jane in the middle of the table. We had booked tea and an early call and the next morning in the half-light a shadowy figure burst into our rooms and plonked a mug of something hot and steamy by our beds. That evening Lou Weatherill who already flown out with his wife and two young children invited us over to their hotel up on the Ridge on the north side of the city. It was called the Casa Mia. We took a Mercedes taxi with an Afrikaans driver up there. Johannesburg was built on a grid pattern and the North/South roads were started from each end. The surveyors got it wrong and every one has like a chicane on it. Going through the kink on the way there was a native was crossing the road. The taxi driver gave him a hefty nudge shouting something out in Afrikaans. When we had paid the taxi off we both said "Did you see that?" Our first experience of Apartheid. The hotel was pretty luxurious. I enquired about the and breakfast price and it was very reasonable. We booked in for the next night and booked out of the Anderson Street hotel which we reckoned was little better than a doss house. Another evening we went to the main cinema to see 'West Side Story' which had not yet premiered in the UK. Later on I did a couple of visits to open air drive-in cinemas. One was built on top of one of the mine dumps in the middle of the city. At the first one I lined up three abreast. You could the screen go off and the car headlights came on and the cinema was cleared. Then we all started up and moved in. Once inside it turned out to be a race for the best spots. You had a stand with a loudspeaker which hung over the car door at handle height. The Volkswagen Beetles didn't care. They didn't go along the rows. They went bouncing diagonally up over humps to get those best spots.

Now we had settled in and while we were awaiting the freight flight we had time to spare. I only had a motorcycle licence and I had been to the AA HQ which was then nearby in Stanmore to get an international driving license so I could hire a scooter. The charming you lady in issuing it said "Oh, for a motorcycle. Would you like it for a car?" I said nothing and with a smile she stamped it for a car as well. I told Arthur. He was going to get a Rand Mines pool car while we out there and told me he'd let me have a go driving it. It was a two and a half litre Ford Zephyr Mark II. We did a trip to Pretoria sixty miles to the north. We went via the Voortrekker Monument which commemorates the massacre of Dutch settlers at Blood River. It has a circular wall round the outside and in inner walls are engraved like a wild west wagon train circled up to resist the native American Indians. Inside there is an altar and at midday on the anniversary of the massacre the sun shines through an aperture in the domed roof casting a beam of sunlight onto the altar. We then visited the colonnaded Government Building. There is a similar building in Cape Town which shares the seat of Government in South Africa. We had lunch in the atrium of a hotel in the main street in Pretoria where there were palm trees and the local waiters wore fez. Afterwards north of the city, where the roads were almost deserted and we were getting close the longer distance dust roads, Arthur pulled over and gave me a go. Big engine, bench seats and column change. I must have done quite well because I began to share the driving. To the west of Pretoria we saw the Hartebeestpoort Dam, part of a massive irrigation project. Another place we visit-

ed was the Sterkfontein Caves in an area known as The Cradle of Humankind. On the guided tour with our own native guide we wore helmets with candles on and the guide had a powerful torch to point out the stalactite and stalagmite formations which had appropriate names. On one trip on a very hot afternoon we saw a sign to a hotel and decided to find a cold drink. It was set in an orange grove by a babbling river. They said they bring the freshly pressed orange juice to us on the veranda. We sat there and at another table was an elderly gentleman, white suit, white hat, white goatee beard. He got up and using a white stick tapped his way up to us and spoke to us in a guttural language. We explained we only spoke English. He stamped his stick and Said "So you refuse to speak Afrikaans.", turned on his heel and tapped his way back to his table.

The freighter duly arrived and we watched the unloading from the tarmac. The cabinets went up in the lift. The main problem was the two printer bases which were very heavy and only just fitted. They were man-handled in and out by an eight-man native team with an Afrikaans foreman who shouted out in some language and they lifted, sweat pouring out of their brows and eyes nearly popping out their sockets. They didn't dare drop it. When Arthur had completed the physical installation I switched on and started the recommissioning. Before Arthur returned home we decided to visit the Kruger National Park three hundred miles away and the size of Wales. En route we stopped overnight in Nelspruit, more recently a venue for the Football World Cup. Sitting the lounge after dinner looking around it was like a time warp back to he early Boer years. Families sitting around, the wives and daughters in cotton bonnets. Into the Kruger and sharing driving we were able to capture the wildlife, Arthur with a cine camera and me with a 35mm camera. Zebra well disguised by the trees, giraffe with their heads sticking out above the short trees, elephants just standing in the trees looking out at the road. We hoped they wouldn't charge. At times when I was driving the dust roads we were on were up and down narrow defiles in the bush and impala were jumping across the corners of the bonnet. At one road junction we stopped to work out the way and an orangutan came bounding across and sat on the bonnet right in front of the windscreen. I won't begin to describe the photo I got. There is one place where we did get out and that was The Hippo Pool. You shouldn't get of the car apart from at the overnight ranch-style camps where the accommodation is in rondavels. We stopped for lunch at the Lower Sabie Camp and while there people suddenly started leaving their lunch behind and rushing out to their cars. The cry went out there were lions on the Lower Sabie Road. We joined the end of the fast convoy, me driving, Arthur with the cine. He just caught the last lion disappearing into the bush. When we got to Johannesburg people immediately asked did we see any lions. Some had been several times and never seen a lion. We were in a hurry to get out of the Park that evening, the sun was setting and I was driving faster than the official limit. I saw a giraffe's head sticking out above the trees. Screaming round a bend I braked to a halt. The giraffe was standing in the middle of the road. We found a hotel late at night and went on as we planned to visit Swaziland.

The only way we knew we were in Swaziland is we saw a Union Flag flying above the trees. Northern Swaziland is mountainous, there are asbestos mines and the dust roads wind around on the edge of precipices. We arrived at midday in Piggs Peak where gold was first discovered. It was like a wild-west town, low wooden buildings and raised, covered, wooden side-walks and we saw a sign to the Piggs Peak Hotel. There we asked what time lunch was and were told it started in half an hour and the bar was along the veranda. We went along and ordered a drink. Three men playing darts stopped immediately and came over. Three drunken Scotsmen in deepest Africa at lunchtime! In the afternoon we came down a steep dust road and turned left across a bridge over the Komati River and right steeply up the other side. Just off the bridge on the opposite side was the wreckage of lorry in which twenty people had recently been killed when the lorry plunged into the river after the brakes failed. We booked into the Swazi Inn which has been developed as a major resort and golf course. It looks out over the southern plain with two hills side-by-side in the distance. These are known as Sheba's breasts and are mentioned in Rider Haggard's 'King Solomon's Mines'. In the evening in the bar all races mixed freely. In the dining room the native waiter greeted us and explained that on Sunday evening it was a cold buffet and would mind serving ourselves. We thanked him and said that was fine with us. No sooner had we got to the buffet he was there plates in hand serving what we selected. He probably was on occasion used to abuse not thanks. There were rooms in rondavels. Our rooms were in a thatched block of four and the next morning we noticed some particularly luscious honeysuckle outside. That day we visited the Dance of the Swazi Maidens down towards the capital Mbabane where the Chiefs selected extra brides. It consisted of the bare breasted hopefuls shuffling round in a dust enclosure chanting and waving what seemed to be the main status symbol. These were different sized chromium plated torches, the bigger the better. The Chiefs stood ogling and making their choices. On our way back along the only piece of tarmacked road in Swaziland we were passed by a large black limousine. On enquiry we found out it was the King who had been to the Dance. After Swaziland, Rand Mines flew us a hundred and sixty miles down to Harmony mine in the Orange Free State in their private de Havilland Heron four-engine feeder liner. An exciting and bumpy flight at two thousand feet. They had worked out that parabola of the seam on the Reef came up there. It was a very modern facility with hospital, training school, canteens and accommodation. The miners came from many parts of Africa, everything was found for them and their wages were sent back to their families. This is where I first saw men holding hands. After a tour to the training school where we climbed around a re-creation of an underground working on the surface we were taken round the ore processing plant, a modern crushing and chemical extraction process. In the furnace room we saw large ingots of gold being poured, unrefined gold. We were shown an example on a table and told if we could pick it up with one hand we could have it. Even Arthur, a big man with huge hands couldn't do it. If you turned the ingot upside it did have a taper to it get your thumb and fingers round but it was not only very heavy but very smooth. I did point out to Arthur within earshot of our guide that if he caused a diversion I'd take a runner with the wheelbarrow-

load of ingots in the corner. One interesting fact we were told was that it had been found that it was worthwhile using the new process on the older mine dumps up on the original Reef through Johannesburg.

On returning to Johannesburg I continued with the recommissioning. We saw Arthur off back to the UK. After a couple days of relying on being transported to and from the hotel by staff or using taxis. I went in to Leo Fantl and asked if there was any possibility of having the car that Arthur had used. I would pay for any personal mileage. He phoned the pool garage which was opposite our Anderson Street building and told them Mr. Morgan would be over this evening to pick up the car that Mr. Clements had used. My first problem was getting the large car down the narrow winding concrete-walled access ramp from one of the upper floors. This gave me the freedom for both the job in hand and personal use. I never paid for it.

The Rand Daily Mail came for a press call and published an article and a photo of me sitting at the Engineers Control Desk. One Sunday afternoon I was in the computer room by myself sitting on the floor replacing faulty indicator bulbs. There was a rumble, the building shook and I had the feeling that the cabinets were about to topple over. Lou and the local engineers who were checking spares in the basement came rushing up. They explained it was mine collapse not an earthquake. The old gold mines under the city went down twelve thousand feet before seam ran out and they stopped mining. The earliest levels had wooden pit props. In the press the next morning it showed a picture of a large hole in the ground a few blocks away. South of the city is a huge dam on the Vaal river with an artificial lake created by it and I went out to have a look at it.

Meanwhile on the computer we only really had two major problems. On the Master Routine operating system recompiling it to change the allocation of the tape decks between the two channels didn't work. The problem had to be sorted out by telex six thousand miles from the team in London. With the multiprogramming acceptance test suite called Home Grown Fruits, based on a live application run for a company in Kent, the background store test which used any space not used by the rest of the software, failed. It was very intermittent and didn't fail in solo testing of the whole store both under the Master Routine or as free-standing test. I was at my wits end. It had been agreed that I could come home for a weekend to be best man at my closest friend's wedding. I had to telex Graham, now unfortunately longer with us, "Can't be best man. Get Ernie". Fortunately another friend of ours recorded the music at the reception provided by the fabulous Banjo George, Lois Lane, a lady friend of mine who became a top singer with the BBC big band and her father on guitars. Jazz influenced and very danceable. When I got home sat round with the rest of our friends over coffee one evening and I heard what I'd missed. One day the fault persisted long enough for me to set a program loop running and get an oscilloscope on it. It was a transistor that had varying characteristics. It was in a set of twelve new power amplifiers fitted late in the commissioning period which actually solved something which would have been a major problem on full length word production machines. On the halfword length pilot machine it would never have been a problem. Some time later Lou found out that the marginal connections had not been specified by the designer in the modification. Marginal testing was key on LEO IIs for finding deteriorating valves. On LEO III we only ever found wiring problems using it. However marginal testing may well have found this fault. The transistor like the one I found was the only one I ever experienced. While out there I was airmailing George Manley weekly progress reports. I didn't get any response from him. When I did receive an airmail from him about slow progress it arrived in a parcel of spares sent by sea. His secretary had put it in to save money. I quickly telexed him having found the problem. Formal acceptance trials were then able to start.

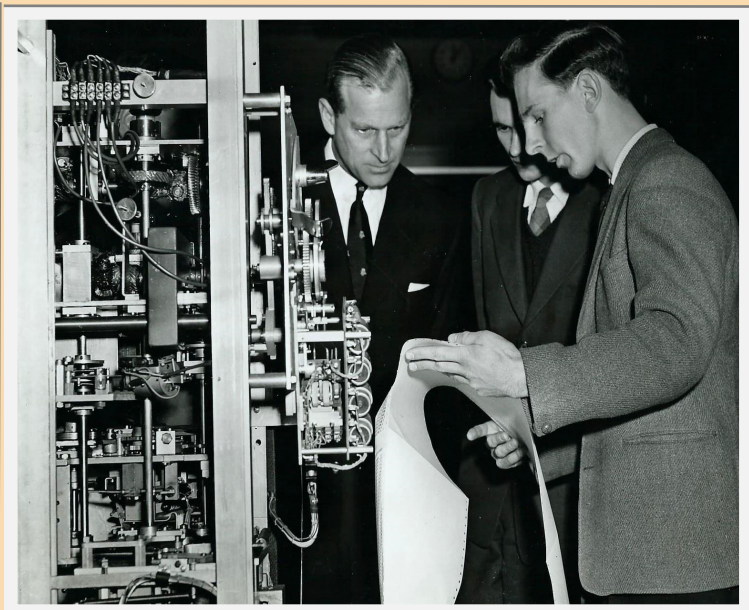
My twenty-fifth birthday occurred when I was there. By then Lou and his family had moved to a bungalow, complete with small concrete building and servant at the bottom of the garden, on the north-west edge of the city with the veldt coming up to the back fence. They threw a barbecue for me with all the local staff present. In way of thanks I bought a small rugby ball for the young boy and a small pram with a doll in it for his younger sister. When the men got hold of the ball the poor lad couldn't get a look in until I got it and brought him to the game. They presented me with three books of local interest. In the small club-like bar in the hotel I met Peter Firmani who played association football for one of the teams along the Reef. (Germiston, Boksburg, Benoni ?) and I went watch him some Saturday afternoons. His brother, Eddie, was in the UK playing for Charlton Athletic. One evening I got back to find the South African rugby team in residence. They were to have a warm up game before playing the British Lions in the First Test who were on tour that year. A couple of weeks later they were back and held a reception for the Lions. I could easily have joined in and as a rugby player for Lyons I'm sure I would have been made welcome. Rugby is like that. I could see Richard Sharpe with his distinctive fair hair. He was out of the Tests, his cheekbone having been broken by the winger who went on to equalise the score in the First Test. In the office they had two tickets for that match and I went with their rugby player, Bob Day. When Kenny Jones the Welsh winger and Olympic sprinter was running in for the first try I was jumping up and down shouting "Go Kenny, go!". I then realised that apart from two hundred natives in a dusty enclosure behind one goal the stadium was silent. The natives went on for five minutes, dust and hats in the air. Mannetjies Roux scored the equaliser and that was the best result the Lions got on that tour. The Lions were already losing in the Second Test in Durban which we were listening to on the radio at the airport on my return home. I did take my playing kit but on seeing the rock hard ground I decided against looking for a game. I had been taken out to the Wanderers Club by Mike Nethersole, a local engineer we had trained in the UK. It is a major sports facility and Empire-type members' club. The club also includes the cricket test match ground. One thing I found that with Johannesburg being about six thousand feet above sea level running up two flights of stairs made you breathless until you became acclimatised and I was reasonably fit just having come off a rugby season. The following weekend there was a motor race meeting out at the Kyalami circuit which

subsequently hosted the South African Grand Prix on many occasions. There were both car and motorcycle races. The cars were a mainly older European cars and some local special driven by local people like John Love who later drove several grand prix.

Mike Nethersole introduced me to a friend he was at school with, Guy, and I was invited to Guy's house for dinner. It was very formal, table service by servants. I was then invited by Guy and Mike to visit Swaziland to stay with another school friend who was the GP at Mbabane. We drove there through the mountains in fog, heads out window checking rock walls and precipices. Guy's car was a Wolseley Six-Eighty, very popular as a police vehicle in the UK at the time and I shared the driving. It was a lovely property and had it's own hydroelectric station the other side of the valley. It also had battery chicken farm. We stayed in a guest house in the grounds. The next morning we went out to a field where there was a JCB digger and a surveyor. We helped by holding surveying poles. Then the digger began on the foundations for the new Mbabane General Hospital. On the way back I drove the last leg back to the city in the dark. The other two were in the back asleep. I decided to open up the car. At eighty the there was a horrible noise, the steering was difficult. I pulled over onto the dust. The others were awake by then. We got out and the front right tyre was smoking and you could put your hand inside it the tread. Guy said he had retreads on. I wish I'd known, maximum speed sixty. I invited Mike and Guy to the hotel for dinner on my final night and said goodbye on the doorstep. The next morning I asked Mike if I'd compensated Guy for the tyre. I'd apparently given him ten Rand. One thing I realised in the hotel was that when we had wine it was very good but of course they were unable to export it then.

After ten weeks I returned in a Comet IV of BOAC via the old Empire Route. Salisbury, Nairobi, Khartoum at three o'clock in the morning where the heat and humidity almost knocked you flat, Rome and home. I had thought about a stopover via Athens. When I unpacked I found the lock on my hold all broken. I realised the last thing I'd put in was my Burton suit jacket. It was missing. Somewhere in Africa… Arthur and I put on a cine and slide presentation about the trip for the factory. Years later we had a telegram from LEO Fantl. It said "III/2 down for a week. Weatherill on knees. Send Morgan" I was booked to fly from Heathrow and my life was insured for three times my salary. I was ten yards out of George's office to go home and pack a bag and get to the airport when the phone went. They had fixed it. I got a lovely letter from Leo Fantl thanking me for our response and saying how much they had been looking forward to seeing me again.

In the more recent past at a Science Museum LEO event David Caminer told me he thought my South African achievement was under-appreciated. The first LEO III installation in the World.



Tony in 1960 showing the Duke of Edinburgh the printout from Powers Samastronic printer on LEO II/8 which was being set up. The person in the middle is Stan Holwill who was conducting that phase of his tour of the factory at Minerva Road.

Notes on Tony (A.B.) Morgan

Tony Morgan joined LEO in 1957 from National Service in RAF an air radar fitter and trained on LEO II as an engineer. After a year as a shift engineer on II/1 he helped commission first magnetic tape on for II/5. Commissioned II/8 (see photo of Duke's visit) with first core store. With Steve Farrow commissioned LEO III pilot. Commissioned III/2 and spent 10 weeks in South Africa installing it (see photo with gold ingot). Returned to do III/5 and III9. With Frank Wroe did crash course on KDF9 and spent four months at Kidsgrove sorting out major problems before being sucked back to London to do III/90, the first machine for the Post Office. Took over as Commissioning Manager (see photo of III/93 support team[1]) to the end of main production run of LEO III. Started management of System 4 commissioning but then trained as a System Consultant and spent a year in Sales during period of merger with ICT. Took over System 4 Product Planning and did final 1900 enhancement planning, some of 2903, and then 2970 and 2980 and 2900 Operating Control Desk. Joined Government Sales Support and seconded for six months to sort major problems on 4 IIIFs at Post Office, Charles House. Joined Post Office Sales Region supporting their many LEOs System 4s and 2900s. When Customer Service founded joined IT Department and did Customer Service and Product Performance statistics for Company until retirement in 1995. In spare time played rugby, jazzed and jived. Now have Star Trek and Grand Prix websites and follow all things Formula One, New Orleans jazz, London Underground and Star Trek.

[1]*Photo 64 in Peter J Bird's Book "LEO: The First Business Computer". In the background Tony is on the right on crutches having broken a leg playing for Lyons RFC. Derek Bensted, the commissioning engineer, is facing and Frank Wroe who commissioned III/10 — Board of Trade, Eastcote, is on the left.*

Memories of a LEO cub - now Secretary of the LEO Computers Society.

By Hilary Caminer, daughter of David Tresman Caminer

Members and friends may perhaps wonder why a person who never worked on a LEO machine, who has no background in IT and who spent her career in education teaching English should emerge as the society's secretary.

This is why.....

As a very young child, I lived a (good) stone's throw from Cadby Hall where my father, David, worked as manager of the Systems Research Office leading the software aspect of LEO's development. Not surprisingly, many of my very earliest memories are Lyons-based. We visited the Swiss roll production line – huge and impressive and noisy – and the bakery. We always called in at a Lyons tea shop when I was out with my mother and grandmother 'in town'. We 'instinctively' knew that Lyons ice cream was far and away the best – and would never have contemplated buying Walls. At Christmas, we had a Dundee cake in a 'golden' tin and a Lyons Christmas pudding. The James Hayes laundry van – part of the Lyons empire - used to come by every week to collect and deliver sheets and tablecloths stiffly starched and with that little red laundry tag.

And then there were the Lyons sports. My father had played rugby for Lyons before he lost a leg in the war and, according to the club notes, had been a 'dynamic wing forward.' As a child I remember Summer days at Sudbury, the Lyons Sports ground, watching cricket, having a swim - and once seeing a truly fearsome tug-of-war . In November the Sudbury firework displays and bonfires were spectacular – much better than any of our local ones.

Naturally, my siblings and I were taken to see LEO I in all its glory – I was 5 when it first became operational. The area where LEO was housed seemed vast and I particularly remember the huge punched tape spools (we had some of the 'confetti 'to play with at home) and, of course, that amazing set of noises. In the school playground, we played at 'Journey into Space', then a very popular radio serial, and the accompanying sounds in my head were the bleeps of LEO. I grew up getting to meet an amazing array of my father's LEO colleagues, many of whom became lifelong family friends. They showed enormous dedication to their pioneering project, often working quite extraordinary hours.

As children, we collected the stamps from letters sent from foreign postings to LEOs and prospective LEO companies around the world. We met overseas clients who came to our home for hospitality (and they, I am afraid to say, had to listen to us playing our latest piano pieces by way of pre-dinner 'entertainment')

Later LEO, of course morphed into sundry other creatures – and my father stayed with them, though it was never the same. It was a LEO descendant that wended its way on trucks from the Kidsgrove factory across Europe to Luxembourg City to become an important part of the EEC infrastructure. In 1980, I went with my mother and sister to Buckingham Palace for my father to receive his OBE from the Queen – ostensibly for his part in this Luxembourg project, but I like to think it was also in some way recognition for all that magnificent early LEO work. When he was 91, I went to see the late Professor Colin Tully of Middlesex University present him for the conferment of an honorary doctorate. He was absolutely thrilled – he had never gone to university (where would he get now, one wonders, at an initial job interview for his kind of work with no degree?) so it was a particular pleasure for him.

He would, I am absolutely certain, have been excited and honoured that the AIT has already generously endowed four Masters degree scholarships at Middlesex University in his name and has just this summer chosen Elisabetta Mori to undertake a David Tresman Caminer doctorate looking at LEO's role in the early days of British Computing. David's great grandchildren have visited the LEO exhibit at the Science Museum in South Kensington – it's great to see the LEO story being celebrated there.

LEO has run as an underlying thread throughout my life and I want to play my part in preserving its legacy - which is to me more than 'just' past history. It represents a whole philosophy of working. When my father and colleagues Peter Hermon, Frank Land and the late John Aris in their retirement co-wrote 'User-driven Innovation – the World's First Business Computer' a retrospective survey of LEO's development and work – I was puzzled by the first part of the title. I thought it not very catchy and a bit technical. Now, though, I appreciate the value of that approach – the machine and its applications were custom designed to meet customer needs.

My father David's dedication written into my copy of User-driven Innovation' reads

'To Hilary – Now you will know what I was up to, all those late nights and absent week-ends!'

So, there you have it – a LEO cub, now a grandmother herself - on your committee and trying to help preserve LEO's ongoing heritage.

News Roundup

2016 David Tresman Caminer Postgraduate Scholarship Award.

- **Elisabetta Mori** has been selected as the doctoral researcher to investigate the social, political and business circumstances that contributed to the success and later decline of LEO Computers, as well as the technical developments and hardware design.
- The Ph.D. Scholarship at Middlesex University is in the name of David Tresman Caminer and is funded by the AITT (Association for Information Technology Trust).

2016 Reunion at Middle Temple Hall.

- A successful and inspired reunion was held at Middle Temple Hall and much enjoyed by all who attended.
- A video booth was provided by Middlesex University which conducted interviews with most of the attendees. Unfortunately the sound recorder was defective, resulting in several of the interviews not being up to archival quality. Hopefully, the video booth will rerun at the next event (see below).

LEO Lecture—"From LEO to DeepMind: Britain's Computing Pioneers"

- The inaugural LEO Lecture in conjunction with the Department of Management at the LSE ,was given by Eric Schmidt (Chairman of Alphabet, parent company of Google). It is envisaged this will be an annual event replacing the previous Pinkerton Lecture—now held in India.
- The theatre was packed to capacity and the lecture itself was stimulating and thought provoking and portends well for the future.
- For those who were unable to attend, the lecture is available in an audio podcast provided by the LSE at: *http://www.lse.ac.uk/newsAndMedia/videoAndAudio/channels/publicLecturesAndEvents/player.aspx?id=3612*

Unveiling of a plaque commemorating LEO

- On the 29th November Dame Stephanie (Steve) Shirley will be unveiling a plaque commemorating LEO – the World's First Business Computer on the 65th anniversary of its first routine run.
- It will take place at Lyons Walk, Olympia, London W14 0QH which is close to Cadby Hall, LEO's first home.
- Tony (A B) Morgan on whom LEO, like many of us, had a profound effect has undertaken to sponsor the plaque for which the Society is most appreciative.

2017 Reunion at the HAC (Honourable Artillery Company)

- The 2017 Reunion is scheduled for 15th October, 2017 at the Honourable Artillery Company, Armoury House, City Road, London. EC1Y 2BQ.
- This is magnificent venue and was on occasion used by the Society in 80's. We are indebted to Google for sponsoring this venue which would otherwise have not been possible.
- Invitations will be sent out shortly and we envisage a stimulating and interesting day.

Committee

Peter Byford	Chairman
Frank Land	Chair History sub-committee
Bernard Behr	Treasurer
Hilary Caminer	Secretary
Cyril Platman	
Gloria Guy	
John Daines	
John Paschoud	
Mike Storey	
Ralph Land	
Ray Hennessy	
Tony Morgan	Technical Consultant, membership data-base manager and history sub-committee.
Bob Stevenson	Website Manager

In addition we have a number of volunteers who are helping with the history projects. Our recruitment of new members is mainly by way of our website. We now have over 750 members around the globe.

www.leo-computers.org.uk

newsletter@leo-computers.org.uk

Editor: Bernard Behr

Published by LEO Computers Society

- A particularly interesting and well preserved film titled "***LEO, The Automatic Office"*** has come to light—although it has already been documented in Frank Land's LEO bibliography (see Parting Observations below).
- The film is viewable on the website of the Computer History Museum, which is located in Mountain View, California.
- Hyperlink to view this film: *http://www.computerhistory.org/revolution/early-computer-companies/5/110/2260*

Parting Observations

Knowledge about LEO is spreading.

By Frank Land

Only a few years ago histories of computing carried little more than a footnote about the role LEO played in the establishment of computers in both business and administrative tasks. Often chronologies did not mention LEO at all. The work of the LEO Foundation and the LEO Computers Society has changed all of that and now there is a much wider appreciation of the Lyons initiative and its place in computer history. Additionally this has assisted by a number of authors such as Georgina Ferry, Mike Hally and others who have all been fascinated by the LEO story.

Three new initiatives are worth noting:

- In the USA Professor Nik Hassan, editor of the history section of the Communications of the AIS, has just written a chapter in a book on Information systems to be published by Routledge The chapter is intended for academics and others interested in computer history. It reviews the many approaches to writing history, but inter alia uses the LEO story as an example for his thesis. His chapter makes a valuable contribution to historical studies of ICT. He wants to go on to do more research on LEO and its historical role very much complementing the PhD research commencing at Middlesex University. There is no question that at least in academic circles his work will receive a lot of attention.

- The second initiative has already been noted by the LEO Computers Society. It is the funding by the AITT of a PhD scholarship named after David Tresman Caminer, to study, as mentioned above, the role of LEO in establishing business computing in the context of other initiatives taking place at that time.

- The third initiative is that of Colin Williams, software entrepreneur and visiting academic at the universities of Warwick and Loughborough. Colin discovered the story of LEO role almost by accident via his studies of the evolution of computing in the UK. He recognized the importance of the LEO role and is actively involved in establishing a LEO archive at Warwick Universities Modern Records Centre as well as setting up conference workshops for further studies of the LEO contribution to ICT.

Notes on Frank Land

Frank Land is a graduate of the LSE and is one of our early pioneers having joined LEO, together with his twin brother Ralph, soon after graduating. Frank is presently Emeritus Professor of Information Technology at the LSE and it is through his effort and direction that our Society has transformed itself from a disparate group of former employees and colleagues into an organisation with a more intense historical and academic remit. The Society has benefited greatly from the high esteem in which he is held by both his peers and the many institutions to which he is connected and held high office. The resulting impetus has enabled LEO Computers' Society to establish close bonds with both Universities— LSE, Middlesex, Warwick and Manchester to name a few, professional bodies— such as the AITT, various Museums and historical societies.

As Chairman of our Oral History Project, his guiding hand, enthusiasm and discipline have been behind our successful and on-going project to record and archive the memories and milestones achieved in those exciting eureka years, in which many of us played a very small part. Frank's Leo Computers Bibliography must stand out as a tribute to his commitment and tenacity; almost every conceivable reference to LEO is contained therein and it is a primary source for all researchers. Frank has published widely and he is author and co-author of numerous books, articles and periodicals—far too many to list individually.

Link to Frank Land's LEO Bibliography: *http://www.leo-computers.org.uk/images/Comp-biblio-051116.pdf*