A working ‘home away from home’

I had kept in contact with David Streeton when he moved from UNIVAC to Control Data Corporation (CDC), and when our families holidayed together during the summer of 1968 David asked me to join him at CDC. At the time, UNIVAC was not the fun it had once been, partly because of the organisational changes that were realigning the company. I also believed that the specialisation we had acquired in the real-time group would be dissipated and lost.

Before I could represent CDC, it was necessary for me to attend an induction course at CDC headquarters in Minneapolis–Saint Paul, Minnesota. I was excused the first week of the four-week course, as I already had a background in computer sales, and joined the class of 25 presentable young men at the start of the second week. We were housed in serviced apartments along Interstate Highway 494, and I called into CDC on Saturday evening to pick up a key and was in bed asleep before my roommate came in from his night out. He woke me. Jerry, who was from South Carolina, and I stayed up half the night talking. As David had recommended that I hire a car, Jerry and I had a Ford Mustang to play in.

The general format of the remaining days of the induction course was for a senior CDC manager to tell us about his role and for us to get to know him and new aspects of the company. CDC was small enough that the company would encourage dialogue from the field to head office, and it
helped that we would have already met. It worked. I had been told that CDC was an extension of UNIVAC, but it was a surprise to learn how much of an extension it was.

The first 36-bit word machine designed by UNIVAC was its 13th project. Rather than designate it with that number, the binary form for 13 was used: 1101. General manager of the UNIVAC division of Remington Rand, William D. (Chuck) Norris, and designer Seymour Cray had the principal say in the design of UNIVAC processors until that time. Seymour Cray’s interest was in extending the word size of the processor to expand the instruction set repertoire and build more powerful processors. We learned that Messrs Norris and Cray had approached UNIVAC management with the plans and design for a 60-bit word machine — this would have been the 1103. But their proposal was rejected by UNIVAC, so they left and set up CDC.

Was it a coincidence that by taking the designator of the new system from the old company (1103) and adding it to the street number of its Park Avenue address (501) you came up with a total of 1604? The CDC 1604 was the first processor sold by the new company.

A number of the senior CDC managers we met also had UNIVAC backgrounds.

To this day, I am surprised that the most interesting of the specialist presentations was on pricing policy, followed by the talk by the corporate lawyer. We were addressed by and met Chuck Norris, Seymour Cray and Jim Thornton, Mr Cray’s second-in-command on the CDC (flagship and largest mainframe) 6600 and the major research project the String Array Processor (STAR).

We had great fun socially and met for many beers most evenings in the Holiday Inn on 494. It was a good group of people and we worked to make it successful — especially the older Swiss man who was the general manager designate for his country, who was initially concerned that the class would be too technical for him. He just about coped, but he did not enjoy the course.
We enjoyed an Indian summer until the third week of the class, when the first winter blast of the US Midwest lowered the temperature from a pleasant 70°F to freezing. My roommate, a few classmates and I were back in our apartment quite early with a pizza and an American football game on the television. One of the class had played college football and he was explaining the niceties of the game. We had a few beers and finished the bottle of duty free whisky I had brought in for whoever put his hand up. I was in bed when the telephone rang. It was another classmate. He had spent the evening with a United Airlines hostess who had thrown him out of her apartment, and asked if I would pick him up, as he had no money for a taxi and the young lady was not prepared to call one on his behalf. I dressed and set off on the highway to meet him. It was bitterly cold. I was driving determinedly when a car, perhaps 100 yards in front of me, put on its brakes. My reflex was to do the same. Big mistake. The roads were covered in black ice and the Mustang pirouetted along the highway until it fell off the embankment into a field. The highway patrolmen who found me were, fortunately, intrigued to find an Englishman in a field and not too concerned that I was full of Scotch. They had chains on their wheels and a tow rope, and I was soon back on my mission. Dan McHarg was suitably pleased when I eventually picked him up and drove him, very carefully, back to the apartments.
On the last Friday, the class had an election for class president and vice president, and I learned one of the most important lessons of working with a US multinational. I knew David Streeton had been elected class vice president of his induction group, and it had immediately stood him in good stead with CDC. I was nominated for class president, but lost by one vote to an ex-IBM salesman, who was very smooth and deserved the accolade. However, I was publicly castigated by the class leader for not voting for myself, which would have meant my winning.

Back home, I had to buy my own car and it was fortunate that I bought a Mini — if the car had been any larger I should not have been able to park it in an unused corner of the underground car park of the St James’s Square office. It was nice office, close to St James’s Park and Whitehall, with good restaurants around us.

Frank Boyle was the managing director. I found Frank to be a bit reclusive at CDC, although I had met him previously at the Corporation for Economic and Industrial Research, a consultancy with a good reputation for understanding data processing. David Streeton had a very good relationship with Frank and his yellow accountant’s lined pad. The pad came out whenever prices were being discussed, and the jottings were treasured as a reminder to Frank of the prices we might get away with. David Streeton was the commercial sales manager, and would eventually entice nine of his former UNIVAC colleagues to CDC. Dr Keith Corless was the government sales manager. He had tasted success with large installations at London University and at the Meteorological Office.

The existing salesmen were initially a bit put out when I was given the sales responsibility for the Société Information Automatique computer bureau, located by the side of Victoria Railway Station. Société Information Automatique was the UK subsidiary of a French parent which operated a CDC 6600, at the time the most powerful computer commercially available. The two UK joint managing directors were John Wootton and Peter Hutton. I knew John Wootton. He had been a lecturer in the second and third years of my civil engineering course at the University of Leeds and had taught me highway engineering. He was small, fair and very precise. John had a certain immediate notoriety at the university, having taken his wife on honeymoon to a practical two week university surveying exercise held in Whitby on the Yorkshire Coast. John and his wife were teased unmercifully. Perhaps I would have been less of a leader in that activity had I known John might one day be a customer. In the event, he was fine about our previous history. Peter Hooper was tall,
dark, and wore heavy spectacles, and was the more obvious salesman of Société Information Automatique management. The Société Information Automatique customers were the petroleum companies David Streeton and I already knew. Shell and BP ran their really big linear programs on the CDC 6600 rather than the Sperry 1100s, which were being used for commercial projects. Obviously, the pricing algorithm also made sense.

The CDC 6600 was not a particularly sensitive hardware system but we did have a few interesting hardware experiences.

The petroleum companies used the CDC 6600 for linear programming — the resolution of multiple simultaneous equations — the results of which would influence the flow of raw material through the exploration, acquisition, and processing process to its ultimate destination: the petrol pump. The programs ran for several hours. Occasionally, we would have a problem. An electrical fault or spike was often diagnosed as a possible cause to bring the hardware down. But Société Information Automatique had incorporated the latest smoothing equipment into the motor alternator set-up, and we were at a loss to discover the cause of a problem that had stalled the operation. This happened more than once. The computer was attended by full operations staff when these programs were running and they were not able to shed any light on the cause. We even had building consultants investigate. We knew we were above the London Underground, the tube, because of an occasional mild tremor, hearing the train, and knowing our proximity to Victoria Station. Then, somehow, the reason and solution became clear: if individual tube trains did not cause any problems for us, what was the effect of two trains passing directly under us travelling in different directions? The consultants did the calculations and confirmed this as a probable cause. A constant electrical charge was put across the basement and the fault disappeared.

More obvious, and embarrassing, was an engineering field change order from CDC head office which instructed the on-site engineers to change the lubricating oil associated with the main drum storage as a matter of urgency. It was done, but with the wrong oil, which brought the system to a crashing halt. The Société Information Automatique Paris CDC 6600 was out of action for the same reason, as well as other systems that had been recognised as potential back-up systems in the event that the London machine failed. The London University installed CDC 6600 also failed.
A back-up computer was found and jobs were taken overseas to run, but it was an expensive mistake. The correct oil was provided probably no more than three days later, but it was a salutary experience.

British Petroleum (BP) was a prospective customer for CDC. BP made extensive use of the SIA 6600, in addition to the Sperry 1108 we had sold them while representing UNIVAC. Seymour Cray, the hardware genius of CDC, had encouraged Jim Thornton to design and build a new system called the String Array Processor, the STAR system. It carried a starting price tag of US$10 million and was represented in the sales and marketing brochures as a mahogany and glass structure with a high central core, surrounded by cabinetry, and eventually what looked like a continuous leather seat around the structure. It was an ultra-modern design concept for its day. The compute power was enormous. Each sub-system was controlled by an IBM Series 360/40 processor to provide enough data to keep the STAR busy. CDC did not have time to design its own input/output processors for the STAR; the IBM 360/40 was a machine in common use and was available.

The CDC STAR support team from the Minneapolis–Saint Paul headquarters came to London and we spent two full days discussing the STAR potential with BP, who agreed to visit Minneapolis–Saint Paul. On my way to the US, a couple of days before the BP team arrived, I called in for an overnight stop in Chicago to catch up with Dan McHarg from the induction class. I was supposed to stay with Dan and his wife, but we never made it home and I arrived in Saint Paul very much the worse for wear. The senior BP representative was head of the operations research department, Colin Williamson, a large impressive businessman who exuded confidence and could have been taken for a politician or lawyer. We stayed for a few days at the Holiday Inn opposite the CDC office and enjoyed the best hospitality.

Our sales strategy was to demonstrate the raw power of the hardware, discuss the potential of STAR for a multi-thread operating system, and invite BP to determine if and how it could use such a system. Eventually, on the last morning of the trip, CDC laid its cards on the table. CDC would give BP a STAR system if, in return, BP would provide the linear programming expertise and software know-how that would optimise the hardware and operating system. I do not think that Colin Williamson had
any warning that we were about to make such an offer. He was superb. He got up from the conference table and went to the blackboard. There he drew a normal curve.

‘You will recognise a normal curve.

‘This curve represents the intellect of the 230 systems engineers in the BP operations research department.

‘We are proud of our recruitment techniques. So if the right tail of the curve represents the “genius” end of the curve, the normal axis of our curve will be biased towards the left. We have more clever people than not.

‘We can recognise that five or six people in my department are absolutely outstanding. Five or six people upon whom the core of the real software development would depend.

‘Now, this is a normal curve. Let’s say that three people have the genius we believe they have. What about the three people at the other end of the curve? These engineers, through no fault of their own, will thwart any successful software build.

‘We are flattered to be asked, but we are not software writers, we are an operational research house. I shall make representations to my management but I do not think this is a commitment we can take on.’

It was a telling argument, simply and effectively presented. It left CDC management, and me, without an immediate logical response.

Figure 3.2: Colin Williamson’s argument.
Source: Author’s recollection.
* operations research.
Colin was as good as his word, and we were aware that he made a strong case to his management that BP should be involved in some capacity to produce software for the STAR, but approval was not forthcoming.

At the other end of the computing scale, CDC also sold process control computer systems. My lay definition of process control, at the time, was that a system was monitoring a continuous flow situation, and measurements were made within that flow that prompted changes to the course and/or speed of the flow. Our immediate prospect was Shell Petroleum and the flow was petroleum refinery distillation. I visited the Shell refinery at Stanlow, in Cheshire, to see early CDC analogue instruments used in a semi-automatic solution in operation. It was fascinating. I climbed up and over a distillation plant and ended the day filthy, but with an appreciation of what Shell wanted to control with as much automation as we could introduce. Shell was the expert in this field, and its request for proposal was extremely detailed and had been written with an understanding of CDC specifications and capabilities.

I travelled to Shell headquarters in Holland to meet with Shell engineers and was accompanied by and teamed with a most personable young Dutch CDC engineer, Henk Isselt, who held my hand through the learning curve and guided me through Shell politics. For six weeks we were based on the Dutch coast at the offices of Bataafse Internationale Petroleum Maatschappij NV Company, the Dutch Shell refinery arm. I commuted from Kent every week and enjoyed temporarily living in Holland. We played hard, but also worked long hours to get the job done.

An interesting facet of the proposal was the requirement for the electrical contacts on the printed circuit boards (that would constitute the SC-1700 central processing unit and peripherals) to be gold, as any other metal would corrode in the refinery environment. The CDC system controller was an 18-bit word machine acquired whilst CDC was in that mode.

The system we designed to meet the Carrington (Cheshire) refinery needs was a two processor configuration with the larger (32K memory) processor monitoring the 1440 digital input control points and the 560 digital outputs. The smaller (28K memory) system was to take over the monitoring function during times when the larger was unavailable (broken), or being tested during a period of preventative maintenance. In normal operation, the small system would run the Shell-authored linear program that examined the state of the refining process every five
minutes and advised when changes to flows, temperatures, etc. were required for optimum performance of the plant and the crude oil input. Henk and I worked through almost every word of the proposal with the Dutch Shell engineers. We also fully argued and agreed an acceptance test criteria for the unit components and the complete system at their request. The acceptance test procedures became a standard for both companies.

At the end of the day, the final document was not as professional as I would have liked when we started, but logistics became difficult, with me in The Hague all week and typing support in St James’s Square back in London. But we were successful, and our tender was accepted. Better still, it was accepted as the basis for 13 process systems through Shell’s European refining operation. This was the most technical proposal for which I had responsibility, and it needed a steep learning curve. That experience, and that of the negotiation of the acceptance test criteria, have proved invaluable over the years.

After winning the Shell business, I started having problems with walking and was diagnosed with gout back in the UK. ‘Overly good living’ was the traditional cause of this complaint, and I did have to admit to the doctor that I had been eating very rich food three meals a day for the past few weeks. We were also in the habit of slipping out of the office mid-morning and -afternoon to enjoy soused herrings, the local delicacy, which were sold on the seafront, whatever the weather. And at home were pottery bottles of Dutch gin and port, courtesy of the duty-free entitlements at Schiphol Airport. Never again! As you can imagine, I took some ribbing from my colleagues as I hobbled round the office once I got back.

One interesting anomaly within CDC was the fact that employees — even salesmen — were issued with 35 pence ‘luncheon vouchers’ to help with the cost of lunch in this expensive part of town. We were not that often in St James’s Square, and should not have been if we were doing our jobs. It became tradition that we saved our luncheon vouchers and periodically went out as a group to an expensive restaurant. We would splurge on an expensive boozy meal, payment for which would be a whole stack of the unopened books of vouchers. We took it in turns to have to negotiate with the restaurant management, who were somewhat taken aback by our effrontery.
Buoyed by the impending success with Shell, I sought permission from David Streeton to bid for a traffic-flow control system for the City of Liverpool. The idyllic situation that the city wished to implement would have all the traffic lights on arterial roads through the centre of the city at green for an ideal driver maintaining the legal speed limits. I believed I understood the mathematics from what I had learned in answering the Shell refinery request and the work we had done for EMI systems at UNIVAC. That was not enough. As with most advanced projects, the city did not want to be a first-time user of a CDC kit in an unproven application, and our solution would have been in that category. We lost that order to Nixdorf of Germany, who had automated several German towns and was very professional in its approach to Liverpool. It was the first time I had met Nixdorf as a competitor.

Working with CDC as an ex-UNIVAC employee was almost like being at a home away from home. Many of the CDC managers were ex-UNIVAC, and while I was working with David Streeton, John Ware and Brian Lawrence had also come to CDC. The company had almost the same real-time team as UNIVAC during 1966–1967. It almost felt the same, but something was different. In my case, I think it was a growing awareness that there had to be a different style of living that did not involve a difficult two-hour drive to get to and from work. Of course, that two-hour drive was a more manageable 40 minute trip leaving Farnborough at 6.30 am rather than 7.10 am, and a similar time saving could be made in the evening by working late or spending time in the pub at the close of work. My two boys were aged two and four, and were an engaging handful, but I was not seeing much of them, as I was also training two evenings a week at Blackheath Football Club and playing rugby every Saturday. It did not seem fair.

I knew that Ted Jones (by this time established as northern region director of the UNIVAC division of Sperry Rand) had offered John Ware the job of northern region sales manager. John turned Ted down. When Ted asked me, I took the opportunity to go to Altrincham in Cheshire, during one of my trips to see Shell, and talk to Ted and Roger Notman-Watt, both of whom had been good friends at Remington House. I liked what I saw. Ted was very relaxed. Roger was off to Brazil to work and had a house for sale, which would suit my family very well, being only a seven-minute drive from the office.
Telling David Streeton that I was going to leave CDC was probably the most difficult thing I have ever had to do in business. We are still friends, and I was saddened that David commented that the UNIVAC days were his happiest and most successful days in business: ‘everything we touched turned to gold’. I had to admit to him that I have enjoyed all of my career; UNIVAC and CDC were only highlights.

A short while after I left CDC, I was advised by Brian Lawrence that Shell had ordered 11 refinery control systems based upon the proposal I had submitted to the Carrington Refinery — a total order worth some US$6 million. Brian was pleased, as Shell had been allocated to him and he collected a fat commission cheque.
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