Computer Operations at CERN 1962 -1970

This note was prepared for a presentation at the 50th Anniversary of CERN Computer Operations, held near Geneva on 27th April 2013. It attempts to give an overall picture of the operations as they changed over the exciting initial years

'The only time I lose control of my experiment is when I give my data to the computer operators'
Carlo Rubbia c.1964

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What I would like to do is to paint a picture of life at CERN in the 60's, when I was employed there. I did look on the Internet for help but although there are articles of CERN Computing in the 70's.80's and 90's there is nothing for the 50's and 60's. There is an article by Paolo Zanella, which covers all the computers at CERN, but it is very technical and focuses much more on the hardware as opposed to the people involved. I would like to talk about the people involved and in particular the operators.

It was a long time ago:

- *De Gaulle in Evian*
- *Algeria becomes independent*
- *Kennedy still alive until 1963*
- *Winston Churchill still alive*
- *Harold McMillan in Downing Street*
- *Tinguely Bus: the only transport to CERN*
- *Beatles record their first single*
- *First James Bond film*

But firstly there is a little pre-history. It was Dr Lew Kowarski as head of the Data Handling Division who was the main force for CERN to acquire its first 'number cruncher' a Ferranti Mercury computer in 1958. He foresaw more than anyone else that the future of High Energy Physics would be interwoven with the development of computing.

In the same year the Theory Division employed a human calculator Wim Klein to help them with their calculations. He was found by Leon Van Hove in a circus amusing the audience, and for several years he was a mainstay of the Theory Division. Only later was he surpassed by a computer but he was unable to programme effectively as his logic bore no relation to that required for programming. Who can forget his walking style!!!

In 1961 a second large computer arrived, the IBM 709. Both these machines were placed in the Computer Section of DD Division under Dr Lipps. The use at this stage was for the analysis of data coming from measurements of bubble chamber photos, but a large amount of their use was also for software development, engineering maintenance, and breakdowns.

There was no structure to the Section as everyone seemed to report to Dr Lipps. I joined in January 1962 to help any physicists who wished to use the Mercury computer initially. My interview was weird as I found that as a physicist I was being interviewed to write programmes for track chamber analysis, rather than the interface role, for which I had applied. On the panel were Rudi Böck, Detmar Wiskott, Lew Kowarski, Stephan Garlinski from Personnel, and Dr Lipps. Eventually I interrupted to suggest that I was not

being interviewed for the right job, and it was then that Kowarski growled at Lipps to say, *'would you object to having a physicist in your group*?' He rather reluctantly said *'no'* and that was my first understanding that the whole of his section were mathematicians. So it was a great surprise when I was offered a job, but the title was mathematician…probably the worst person ever to hold that title!!!

After some six months of working with Mary Downie in the Enquiry Office it was clear that there was little organisation or management of those who did some operating of the Mercury. Names which come to mind are Peggy Minor, Ursula Rabe (later Franceschi), Mercedes Escribano, Gilles Aufret, and those punching paper tape, Mesdames Tritter, Gaechter, and Agnosini, and of course the engineers of Henk Slettenhaar, Gianni Affaticati, and Les Marshall, and an administrator, the most risk averse man I have ever met, M de Dumomt. At this stage there was no faith in the mathematicians that any user (physicist) could be trusted with the handling of their own paper tape, so they wrote their programme on paper, submitted it to the office to be put on tape, and then this would be put into the computer. Some time later, which could be several days, a printout of their programme would be given back to them, with any result if it had worked! It probably hadn't, so if they could not find the error, they would come to the Enquiry Office and ask for our help. Then their written amendments would be submitted once again, and the punch girls would amend the paper tape and run it again. Days could easily pass.

In the Autumn of 1962 Dr Lipps wrote a note to all his professional staff asking them to tell him what they were doing and how the Section could be improved. It was probably typed by Barbara Trenel, his secretary. There were many reporting to him and to mention just a few, Derek Ball, Rex Lorkin, Peter Marcer, George Erskine, John Hornby, Terry Westrup, Mary and myself, and others. I wrote entirely about the lack of organisation of the service and the result was that I was asked to organise the operations of the Enquiry Office plus the operators and the punch girls; the last giving me more headaches than all the rest put together!!

In January 1963 I was called to Dr Kowarski's Office and asked to manage the operations of the IBM 709 as well and to report directly to him. I agreed with one request: as Dr Lipps was away skiing I think, and by this move a large part of his responsibility was being taken away, could Dr Kowarski make sure that it was not my job to tell Dr Lipps of the decision. He agreed!!

So yet again we had a visionary decision of Dr Kowarski, to place an independent operations group between the computer development specialists, and the users. Thus emerged a new title 'Computer Manager'. So I moved from being a mathematician which I was not, to being a manager for which I had no experience!! I now also got a secretary, Huguette Thomasset, and some new operators, Hans Klein, Eric Swoboda, Jeanmairet, and Milan.

So Computer Operations as an independent entity came about in 1963, fifty years ago. But now let me talk a little about what it was like to work at CERN in those days. It would take far too long to say what we have now, that we didn't have then, so let me tell you what was in my office. A pencil, a pad of paper and a shared telephone and a single page telephone list. In the drawer was a slide rule, a ruler and an eraser. That was it!

Services? There were no copiers, fax, telex, etc. Copies were made by secretaries like Monique Jaquet, with wax stencils for more than four copies, or carbon copy on flimsy paper for less.

How did anything get done? It was predominantly by meeting people and so every day at 10:30 hrs or so, the professional staff would go and have a coffee in the coffee lounge next to the cafeteria in Main Building. There you would meet users, as well as close colleagues, and find solutions to current difficulties. We also all met for lunch as well on the long canteen tables. There were still some formalities as Dr Lipps and Dr Erskine were never referred to by their first names. I had arrived on the same day as Dick Keyser and we hatched a plot to bring them in line with everyone else. So on one particular day, we called out 'George, can you pass the salt?' There was a brief silence around the table but and with a smile he did so. But we agreed to challenge Dr Lipps next but the first time we lost our courage, but eventually we did the same 'Herbert, can you pass the salt?' It worked and we felt comfortable from then on to use their first names.

But back to Operations. It was quite a physical job, in that the operators on the 709 were loading and unloading magnetic tapes, heaving heavy boxes of paper around as well as heavy boxes of cards. A far cry from just sitting at a screen!!

Also there was a constant change in the computers that they actually had to operate. During the first 10 years of computing at CERN we either installed or removed a Mercury, IBM 709, 7090, 1401, CDC 6600, 3400, 3600, 3800, 6400, 6500, and an IBM 360/30. Each one necessitated extra training, understanding compatibility and dealing with the consequential frustrations of the physicists.

We were also ordering paper sheets and cards by the millions, and magnetic tapes by the thousand.

Our overall responsibility was emphasised one day when Carlo Rubbia was in my office, as he often was, and pointed out that the only time he lost control of his experiments was when he handed over his data to us for processing. And he was seeking a Nobel Prize!!

The CDC 6600 that was ordered in 1964, was serial no 3, a preproduction model and the largest computer in the world when it was delivered. Confidence was high that it would work, and the earlier IBM machines were removed when it was installed. A big mistake, for it took several years before all was well with its operating system and the hardware itself. When it was taken down for two months we convinced Control Data to give us another machine and a 3400 came. Fortunately almost all machines at this time accepted cards and ran the Fortran language so work could be relatively easily transferred. But it was not enough even when it was upgraded to a 3600 and then a 3800.

So work was transferred out and our team of operators were sent off to other computer centres in Europe to run the CERN production work, to Saclay in Paris, to Imperial College in London, ISPRA in Italy, Darmstadt in Germany and possibly elsewhere.

But who were these operators now? It had become clear that the small team mentioned above was inadequate for 24/7 operations. By chance Ross Macleod, who had replaced Dr Kowarski following his retirement, had been chatting to Bill Gamble who ran site operations and said he had a bunch of security guards who were bored and he felt that maybe changing to computer operations might be a new career for them. He had recruited most of them from the Paris fire service after they had finished their three year conscription rather than be sent to Algeria for two years. He spoke very highly of them and so some 8-10 of them came to work for me and Hans Klein, now the senior operator. They were trained, for operations and I taught many of them the basics of Fortran programming. They proved to be excellent and perhaps their fire service made them very good at dealing with irate users when everything was going wrong.

The operators were sent all over the place with large boxes of magnetic tapes and cards and returned with the same tapes but with masses of paper output. I went with Eric Swoboda to Darmstadt, working a full shift over night. We went by train, no problem, but returning at Basle we were arrested. We were taken off the train, with all our boxes, marched with a police escort and a large trolley, past all the passengers peering from the train. We were tired, dirty, and angry, but to no avail. They released us after 3 hours, but confiscated all our boxes and our personal luggage, and said we could go. Our belongings would be sent to Geneva and we could argue about them there. The next day we got a CERN car to pick everything up without a question.

We also had difficulties going by car to ISPRA and so did some physicists. The Douanes on one occasion decided that 10,000 cards was too much and started picking odd ones out to see what was on them. That just ruined the programmes. Another took lunch on a very hot day and cooked his magnetic tapes in the car boot, making them useless.

But London was special. We were going to Imperial College and I guessed we would have trouble. The team was entirely of operators, and they were given lots of papers to explain who they were and what they were carrying, but it did not work. On arrival at Heathrow Airport they were arrested and taken to a special room with all their luggage, with a strong indication that they were smuggling. No one really understood magnetic tape. '*It was data, of no value*' …. '*Then why bring it with you??*' And so on.

However it had been arranged that if they were blocked they should call me, then I would call a Professor Peter Astbury at Imperial, he would then call the Foreign Office, and ask for their help. He got their assurance of help so he called the operators and told them that help was on the way. One of the operators then told their guard who was looking after them '*Shortly you are going to get a call to release us Ha Ha!!*'. The phone rang and much to the Guard's disgust that is what happened. Then I got a call from the Foreign Office and the official ask what we were doing and when I explained that it seemed impossible get advice on the right papers and so we try and find out by arriving. He said that you do not invade England like that, '*give me a call before the next visit and I'll make arrangements for you*' And sure to his word he did and the next time a FO car met them at the plane and took my lovely operators into London like royalty!!

Eventually we had the 6600 and the 3800 working better but we needed more operators. By this time, 1966, the Group had grown with the addition of Charlie Symons as my

operations deputy, and Horst von Eicken in charge of the programming services. I'll always remember explaining my job to Charlie, by simply going through all the papers on my desk. Everything was there.

By then we had Dave Stungo and John Ferguson with Charlie, and Horst had Manfred Fleischman, Frances Lowe etc. However CERN is international and Charlie and I decided that it was wrong to have computer operations almost entirely French. We had to convince Personnel that we would like to break up the monopoly but with a large group of another nationality, and we chose to recruit 8-10 male operators from the UK. Women could not apply as shift work for women was banned in Switzerland. Adverts were placed, and we had about 400 applicants. We thought we should see about 30 over two days in London, but how do you select them? Of course you look at each application form with great care seeking those who see appropriate, but 400 down to 30…that is difficult. Fortunately the CERN application form demanded a photo, and I confess eventually you become biased by the photo!!! We do not like moustaches, long hair, freckles, in fact anything except the most handsome. We were asked to find some footballers though!! Charlie and I with Garlinski and Hans Klein did the interviewing in London, and chose the required number and all accepted. Some months later we realised what we had done to this group. We had changed their social habits from beer to wine, from football to skiing, from pubs to restaurants, from living at home to well equipped apartments… that is true social engineering!! We did lose one or two but as Charlie and I felt proud of how they developed new skills and progressed at CERN and elsewhere. Subsequently we had two groups, divided by their mother tongue so the next round of recruiting was totally international.

As an aside Horst was also recruiting one or two programmers and with a European wide advert. Male or Female. And of course the photos also had their appeal. One photo was of a lovely young lady, with good qualifications, so how could we not see her? She proved to be as lovely as we had seen in the photo and she came. Yes she is here today, Sabine Kurjo. I guess photos are now illegal!!

The operators had to contend with many forms of users. Some were bullies, some kind, some just a pain in the arse, and other just scheming monsters. All wanted fast turnaround and many would do anything to jump the queues. This was the period of batch processing so until we had multiprogramming and multiprocessors each programme was put in each time, and blocked the machine until it finished when the next one went in. A whole system of Dexion roller racking called PIS (Programme Input System) was installed to allow some order in the queues. This added to the Tape Unit Reel Display System called TURDS which had also been developed by Jack Sharp, an engineer, and it added a new word to the local French vocabulary. Operators had to deal with each user equally whether like Carlo Rubbia, Simon van der Meer, and Georges Charpak that they were contenders for Nobel prizes or not. We had the weird like Claude Lovelace who never cut his finger or toe nails, the mischievous like Tini Veltman, who demanded the right to write programs which we believed could upset the operating system. We refused and he fought his argument to the DG who agreed with him. He then came to my office to say that he never had any intention of so doing but he just wanted to make it clear who were the kings in CERN!! One Japanese guy was causing problems and he came to my office very upset. He said he was losing his hair and he had been to the doctor and he had told

him to lower his stress levels so he had to have a faster turnaround for his jobs! Then there were the couple who came from East Germany every summer, and one often wondered what they were doing as they consumed enormous amounts of computer time.

There was one category that did get preferential treatment and that was when PS experiments were running and data was put on mag tape at the experiment and need to be analysed quickly. Normally someone would cycle over with the jobs and a card marked BOL was inserted into the pack of cards of the programme. It stood for Bicycle on Line!!

In 1968 the CDC 3800 was removed and sold to the Canton of Geneva for administrative use. This was disputed by many who insisted that it was a scientific machine and of no use for administration. But by then the COBOL language had been developed for such use and was available on the 3800. But to prove a point CERN were asked to demonstrate that it could do something more useful than physics and we were asked to run the local elections. So votes were cast and transported to us and a special group of operators input the data to produce the election results. If my memory is correct we did miss out two villages at first but that got corrected. The Canton was convinced and agreed to take the machine. However it first had to be weighed so it was taken on trucks to the local weighing machine at the Douane near the CERN gates and weighed. Why? Because duty was payable on its weight. Fine, but it was exempt from duty for its intended purpose, but nevertheless it had to be weighed. It was successfully installed and Jean Babel then Minister of finance for the Canton offered a celebratory lunch to all those who had participated in the project. It was held at the Relais de Chambesy, and several top officials from the Canton were there plus Mervyn Hine, a CERN Director, Ross Macleod, myself, Charlie, and a group of operators, J-C Ceccato, Pierre Bénassi perhaps, and others. To me it was an enlightening occasion. Here we had a group who sat together with no organised seating and from the outside, as we ate our roast ham and gratin, no one could have guessed who was who. The conversation ranged across skiing, walking, CERN and so on. At that time I could not imagine such a meeting of bosses and workers in the UK with such familiarity.

Now let me enlighten all of you further before I finish. Did Charlie and Horst and I know what we were doing? Were we trained for our responsibilities? Were we following good practice? To all of those questions the answer is No!!! And why? Because we were as much pioneers as those on the physics experiments. No one had run large computer services before, so no one had much to tell us. We were using our common sense, learning as we went along.

In 1966 Ross Macleod sent me to the USA to sit at the feet of the know-alls of Brookhaven. MIT, Berkeley, and Argonne. Surely they had things to tell me to make me a better manager. However it rapidly turned out to be the other way round and all they wanted to know was how we ran our centre. This was a massive boost to my confidence, as it seemed we had a really good reputation.

But there were always doubts. The pressures at CERN with failing computers, new machines, rising demands were high and we, including the operators had to be alert at all times, and be creative and inventive. But you will not know that Ross Macleod constantly had his concerns about me and Charlie. For example, he would always insist on censoring

the Computer Newsletter that was first issued in 1996.We both were threatened for talking to the Press when in fact it had been fully authorised by Roger Anthoine of Public Relations. He even called in a manager from Berkeley to give us advice and to report to him, but he knew far less than we did. Finally when we had won the design for the new building 513 he insisted that someone else should go all through the calculations again!! Despite all his misgivings we had in him a real supporter and he said to me over lunch when I announced my departure that he loved me because I seemed to be able to survive the animosity, and anger, of the users when we were having the most difficult times.

Finally, I want to honour one man known to many operators, and who supported us all throughout. That was Mervyn Hine. He was one of the greatest architects of the PS and was a Director of CERN: a genuine mentor to Charlie and I, and his support was invaluable.

There are many other stories to tell, and events to remember, like Operator Annual dinners; the amazing range of visitors we endured; the CERN Open days when we were highly praised. But I ought to finish.

Towards the end of the sixties there were indications of the future role of operators, even though perhaps we did not see them at the time. Smaller computers were being developed and by 1979 there were some 50 computers in CERN. Communications were being thought about to remove the bicycle. Elsewhere people were attaching typewriters to computers to let the user have 'on-line' access. All of these developments would inevitably push the operator further away from the user, a relationship that we had both enjoyed, and perhaps hated at times, during the sixties. Bit by bit the operator would become remote from the user until a machine took over their job, as it now has happened.

I am proud to be associated with the work of all my group in those exciting sixties and I hope that I never lose my memory of those days.

Thank you very much for listening.

Neil Spoonley
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