This is Interview TC-43 in the IBM Oral History of Computer Technology, Larry Saphire interviewing M. Jacques Maison-Rouge in New York City on January 15, 1968.

S. You were telling me that you first started working for IBM as an engineer and that you worked on the SSEC in 1948.

M. It was in September of 1948 and the first contact with a largescale computer which was unfortunately somewhat short since I spent only five weeks in the department and had just begun to understand programming when I was assigned to another job.

S. The SSEC had been installed then?

M. It was installed at 590 at that time and it was quite new in terms of programming ability. It was really in my opinion, the basis of future work.

S. In programming?

M. In programming, yes and also in terms of electronic circuits which were quite new at that time in handling computations.

S. Do you recall anything specific in your learing of programming at the time about how difficult it was or how the learning procedure went on?

M. Well I don't have very vivid memory of this period and I was.... there were no classes in programming at that time really and I was learning

with a set of books and trying to go through the maze of circuits to understand at the same time the technology and the programming of the computer.

S. The programmers who did start work on that, kind of just felt their way along as I've heard it. They didn't quite know, either, what they were doing.

M. There was no theory of programming at that time. It was a method of successive iterations and you would test a program and redo it and there was generally a lot of time spent in trying to optimize the programs and there were no basic languages as we have today. It was programming in machine language which was very awkward and heavy to manipulate.

S. Did they have a symbolic language for the SSEC?

M. As far as I remember there was no symbolic language at that time. It was machine instructions that you had to code.

S. You said that then after that brief stay with the SSEC you went and you worked in Poughkeepsie on the 604.

M. Well that was a little bit later but I was in the first Custom r Engineering Class on the 604 and then worked in the Testing Department in the Poughkeepsie plant which was I think in March and April of 49. Then

when the first 604 ~~came~~ went to Europe, I was in charge of teaching the 604 to the customer engineers and also to organize courses for our engineers. I must say that one thing which has been extremely important as far as Europe is concerned in the history of computers is that we made extremely bad forecasts. I remember that when the 604 came, we thought that we could sell about twelve on the European market. When you consider that today there are about ten thousand computers installed in Europe, it shows the error we made in the forecast.

S. Your error was world-wide.

M. Yes it was world-wide.

S. Nobody in the U. S. thought that too many computers were going to be sold either.

M. That's right. Yes.

S. Well what was the kind of installations that the 604 went to?

M. Well the first installations were in the area of scientific computing because we thought at the beginning that was the field where calculators, because I wouldn't even use the word computer for the 604, would be used. Then we found that there were very special applications in the European market which required a high computing speed associated with printing of

results. One of the cases in point is the banking field where in Europe there is a system of computing interest on a daily basis in function of the transactions which happen every day. It is called the scale method of interest computation. And so until that time we had always done this operation by having cards punched with the transactions and processed through a calculator, relay type calculator. Then you had to take the result card and match them with name and address cards and printed statements of account which in some countries was done on a daily basis. When we had the 604 we had a very powerful means to make this computation. But we still had the same number of runs through different types of machines such as sorters, then calculator, then sorter, then collator and printer.

S. This was semi-manual?

M. Well you know you would take the batches of cards and process them from one machine to the other. And at that time we built up very great pressure to have a hook-up between a 604 and an accounting machine in order to have really a programmed tabulator/computer group. And it is interesting to note that it is in Europe, because of this pressure from the banking field in particular, and also a little bit from public utilities, that the concept of a calculating accounting machine was born.

S. That's interesting because I was going to ask you about a hook-up like that that would be similar to the Card Programmed Calculator.

M. It was in some ways very similar to the Card Programmed Calculator. But the Card Programmed Calculator when it was designed, was designed for scientific applications and also had a limited memory capacity. So we did a lot of things to the 604, including increasing its storage capacity and hooking it to an accounting machine. And this in fact was the first computer let us say, that was used in Europe.

S. What did you call it?

M. Oh we called it ..... there was no special name. It was called in French Un Group Calculateur.

S. Un G.uop.....

M. Computing tabulator or something like that.

S. How was the accounting machine used?

M. Well the accounting mach ne was going to do two things. It was reading the cards, feeding the information to the computer, having all the computations made and then having the results printed immediately. So you had then only one run. You would put all your cards in order in the accounting machine, have all the computations made, print the results and have summary cards for the next run. But this saved a tremendous amount of manipulation.

S. And you used the 604 which you had modified, to have a very large memory.

M. Yes and it was the computing unit of the group.

S. How did you enlarge the memory of the 604?

M. Well we added relay storage memory in a special frame which was mounted inside the 604 which increased the positions of storage.

S. I see.

M. With wire contact relays.

S. So you kind of increased the power of the electronic calculator by putting electro-mechanical devices in there.

M. Not very elegant technical solution but it worked. It allowed us to change considerably the scope of some applications.

S. Which model of the accounting machine was hooked into this?

M. Well the accounting machine which was used was an accounting machine called the 421 which had been developed earlier in the French laboratory of IBM with in mind again the banking applications. It was before the time of the 414 or 443 and this accounting machine had a greater number of counter wheels than the old 405 or the 402 even that we had and also a larger print span and again this was for this type of application.

S. Was the scale method of banking of daily interest computation the motivating factor for making these modifications?

M. It was the main application, yes. And also in public utilities we began to use it for billing the same way, having all the meter reading cards follow the address cards in the accounting mach ne and then the computations made on the computer and the results printed in one run.

S. What year was this, do you recall that?

M. Well the 421 ... the first installations were in February, 1952. I remember well because the two first ones went to one of my customers. I was a salesman at that time. Then the hook-up must have been installed in '54, that was quite a bit later.

S. Well how did this group calculator, (is that what you called it?) how did th s compare with similar accounting equipment that was in use in the United States?

M. Well the only thing which could have been compared in the States in terms of IBM products was the CPC.

S. Was the hook-up used for anything except banks as commercial computers?

M. Well as I mentioned before, we had it for public utilities and there have been other applications. But these were the two main ones.

S. Well the CPC got developed because the people at Northrop Aircraft had been dreaming up the idea about why not put an accounting machine together with a 604 and so forth. Were there any similar ideas floating around the French scientific community at the time?

M. Well scientific applications or scientific users of punched card equipment came ~~was a little~~ bit later in Europe than in the United States. In fact we started to do some work on old electro-mechanical calculators back in .... at the end of '48 and we saw that the CPC was a good machine for that, so we imported CPC's from the United States. In fact, we opened the Data Center in Paris with a CPC. I don't remember the exact year. I think it was in 1951 maybe.

S. Was that for scientific computations.

M. Yes only for scientific computations.

S. What kind of business did you do?

M. Oh I think the first customers we had .... the first customer I remember was a department in the Sorbourne dealing with crystalography where they had to compute ..... Fourrier Series ~~theories~~. Then we did a lot of optical ray tracing, simultaneous linear equations and in fact I remember

that one of the first big jobs of the CPC was to solve the problem of the French budget which had been put into a set of 33 equations with 33 unknowns .... that we could solve for the first time. Because prior to that time solving a set of 33 equations was pretty much impossible.

S. And it was done in fact on the CPC.

M. It was done on the CPC, yes.

S. Well was the CPC in frequent use?

M. Oh yes, after a few months it was working two shifts and was quite busy.

S. Well at that time the English had built the EDVAC I think it was.

M. Well I must say that at that time I worked in the French company and I was not very familiar with what was going on outside because our network of information was generally not as good as it is now.

S. There was no cross-current between Britain and France?

M. No.

S. Well we were talking about the 421 set-up at the time. Was there anything else that was developing as a need beyond the 421/604 configuration?

M. Well you know, as more of these systems were installed, the requirement for a more powerful, faster type of similar system became more

and more obvious. I must say that when the 650 was announced in the United States which was, I must say, in fact, the first, well we would call it medium-sized now, but at that time it was a big computer, came, we immediately found the need for 650's in Europe.

S. Well let me ask you this question. In the United States things like the 701 and certainly the CPC and the 701 after it and so forth, and even the SSEC and the Mark I before that, had been built because there was a feeling that some scientific users could use it and because they felt that there wasn't a very big market because there weren't very many big scientific users, in the European universities was there any work going on that would require big computers like the 701 at the time that is?

M. Well you know in this period of time, back in '55, Europe was still in the reconstruction period and the funds which were available for research and development, whether in industry or at the universities, were rather limited. So that our equipment was not always satisfactory and people had not yet really bought the idea of using computers for scientific work. It started on a Service Bureau basis, but as soon as the machines were announced in the States, the need became more obvious in Europe but it generally started on a Data Center basis, people were using one hour, two hours, three hours.

S. I see. It was something that IBM or Machine Bull or something like that introduced rather than in the universities.

M. Well you know, when something is happening you never know if it is the market that has really pushed it or if it is the technological advance which has made the market aware of the need. So it has been a gradual process of people realizing that to go further in their research work they needed computers but it took a lot of time.

S. Let me ask you this general question about development. In the United States, of course the computers were developed out of wartime needs and ballistics computations and the various code type of thing. This gave it an impetus and when guys got back to the universities they knew about it and therefore at MIT and Illinois and so forth, people said we ought to build a computer and they started, having read the Von Neuman-Goldstine papers, they then proceeded to make computers more or less derived on what Von Neuman had outlined. Do you know if they were reading the Von Neuman-Goldstine papers in Europe?

XXX M. Well they were reading the papers but the structure of the European universities is very different and they are much poorer than the U. S. universities and building a computer is an expensive venture. Well UK

..... UK had done it and some of the pioneering efforts were made ; in England. But on the Continent the two major countries are still today France and Germany. Now Germany was in a complete reconstruction phase and was not thinking too much about this kind of a future at the time. And in France the universities were extremely poor.

S. I see so there was no money at all.

M. There was lack of funds.

S. But did you find that there were many university clients once the Data Centers came in?

M. Oh yes. In fact we had in France the first 704 Computing Center in Europe and it was closely associated with the universities. Then when we had the 650 in Europe, among the first 650's was one in the Tulouse University which was the first university in Europe, except for UK again, to use a computer.

S. Do you recall what they used it for at Tulouse?

M. I don't remember the application but basically it was in the field of applied physics and applied mathematics.

S. What was the feeling let's say in the French company about the question of developing them in France or importing them from Poughkeepsie?

M. Well the feeling has always been that products had to be manufactured locally for several reasons and one of them was that at this time and

for many years after, the European countries had very strict controls on imports and exports. So we had to manufacture the 650 and then the 705 in Europe, in order to be able to put them in the market place. Had we imported them from the United States we would have imported maybe one-tenth of what we could when the market needed them and there is no question that if we had not manufactured in Europe at that time, the market would be maybe one-third of what it is today.

S. When you set up manufacturing plants these were in France and Germany I take it?

M. And UK and Sweden and Italy.

S. Was this based on the Poughkeepsie and Endicott operat ons?

M. Oh yes there had always been a very close association and when we started for instance the 650 production, it was closely related to Endicott and when we started the 705 it was closely associated with Poughkeepsie with an interchange of people and so forth.

S. Well what was the feeling let's say in France about the development of big machines like the 701 or the 704 or the 705?

M. Well you see these machines were really introduced in '55 on the European market and the feeling was that there was a gap between the 604-42/

hook-up and these big computers and what we needed was in fact a more sophisticated, more powerful 604/421 hook-up for the general public..... while we thought that the 700 series and even the 650 were only for a small group of customers. So we made a lot of studies which culminated in a meeting that we had in Germany in July of 1955, where we discussed with our American friends and a group of German and French engineers and product planners the need for an intermediate type of computer. And this is basically at this meeting that the 1401 was born. When it was first started it was called the WWAM, the World-Wide Accounting Machine. And you see in this name itself what was the occupation at the time. It was still called an accounting machine although what we wanted was very good computing facilities. For instance it is on this occasion that a concept like the variable word length logic was invented by two French engineers.

S. That was Estrems and Papoff?

M. Yes. We had several projects going on at that time and what we were trying to do was to have a machine that would satisfy the requirements of the U. S. and the European markets at the same time rather than have parallel developments going on in the U. S. and in Europe. But there was a very strong European input in this machine.

S. What were the basic specifications that you had in mind for the WWAM?

When you say it was intermediate between the 705 and the 421/604 hook-up, is that it?

M. I would say that the basic requirements were to have a faster printer. I remember we had concluded that the optimum speed was 230 lines per minute at that time while the hook-up had a maximum speed of 100 at [illegible], 100 lines per minute printing. We had a requirement for a much larger storage capacity than was provided by the 604-421 hook-up. We had a requirement for easy formatting of information which led to the variable word logic.

S. Was that what was called the print-editing?

M. Well it means that in a certain storage size, you don't have to identify words as you did for instance on the 650. The fields are defined by characters but you can have a word of ten characters, one of twenty and so forth. You don't have to reserve a specific spot for words which gives you in fact a much greater capacity for the same amount of storage positions because in a machine with ten character words for instance, if you have a lot of words with only three or four characters, you lose a word each time. When you have variable words, you utilize the total capacity of the machine.

S. And this was specified for what reason? Was it economy?

M. Well the problem was that we found that in many applications we were handicapped by the word size and by the memory size of the machine.

So we tried to find a compromise between extensive storage but with enough capacity and the best way was to utilize the storage to its best.

S. When you were thinking of the specifications for the WWAM, what was it that made you feel that .... of course obviously in retrospect you were absolutely right in making this market precise. But what was your objection at the time to something like the 705?

M. Well the basic objection was that the 705 was at that time anyway, too powerful for the European market which had many less big companies than the U. S. market.

S. As measured by the rental?

M. That's right. The displacable cost was much lower. Customers could not afford or at least few customers could afford the very largescale machines.

S. Well then I guess you should briefly tell me the story of the WWAM.

M. Well I have already described part of it. It was due to the requirement of the market for a great number of small, powerful, calculating accounting machines but less big than the 705. And the same requirement existed in fact in the United States. So basically it started with this meeting in Germany and then we continued to refine the specifications. I remember having spent

six weeks at the end of '55 in the United States working on this, redefining the specifications, trying some programs. We had selected them from the United States and from Europe, the most frequent important applications of medium-size and of-size customers to try to come up with the best possible applications. Our specifications. And then there was a lot of discussion. There were discussions between engineering groups on the different concepts to be chosen.

S. This was between both U. S. and French engineering?

M. Well German, French and U. S. engineering. It evolved to what was called later the 1401.

S. Well what in your opinion was the reason that such a machine wasn't thought of in the United States?

M. Well I could not say it was not thought of in the United States because there were projects in the States which were very comparable. But I think the pressure of the market was a little bit less here than it was in Europe for this kind of equipment.

S. I get the feeling from what you've been telling me that the French or the European IBM companies were very oriented toward a kind of medium-sized market and basically a commercial market.

M. Well I guess that the market, wherever you worked, the market sets the priorities on what you are going to do and there was a much stronger need for powerful computers in the United States than there was in Europe. So obviously feeling the pressure of this market, the U. S. company had a tendency to give a higher priority to the largescale computers than we did in Europe. On the other hand, we were very much interested by the medium-sized market where we saw at that time a bigger potential. The structure of the industry is very different. As you know, there are very few big companies in Europe and at that time it was still more true than it is today. So the big users were very few.

S. That's a very significant situation because of course eventually generating the 1401 was a very important .....

M. I think that in a major technical development it is always very hard to say who had the idea and what was the market that was pushing more than the other. You try to rationalize it after the facts. But I don't want to give the impression that these concepts were only needed in Europe. It was also needed in the United States. It was a matter of priority.

S. Well it's funny also that the 650 which was a much smaller machine than the 701, kind of got developed by mistake you might say. Not by mistake

one of those things that nobody expected anything from and yet it proved to be quite a great financial success we know as well as practical.

M. Here again you see when you look at the evolution of the 650, you find that the people who initially thought of the 650 and thought of it as a calculator, not as an EDP shall we say, because it was just a card input/output machine at the beginning. There was no printer attached and it was only later that printers and then tapes came in.