ASHRAE Leadership Recall (formerly Leadership Recalled)

Transcription

Interview of: Hans Steinfeld

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Interviewed by: Bernard Nagengast

Note: The original tape recording of this interview no longer exists.

Bernard Nagengast
Hans, when and where did you receive your engineering education?

Hans Steinfeld
My engineering education was basically received in my home town of Hamburg, Germany, the Polytechnic Institute of Hamburg. I am a graduate of the class of 1926.

B.N.
And what was your first job after graduating?

H.S.
My first job after graduation was with a company of George Neimeyer in Harborough in Germany, which is a neighbor town of Hamburg. They were building at that time carbon dioxide compressors for shipboard refrigeration and one particular ocean liner I should mention was the unfortunately late line Europa, which was built during the year or 1927 and 1928.

B.N.
Why did you choose refrigeration and air conditioning engineering as a profession?

H.S.
It was strictly by accident. I just simply happened to hit my professional interview with a refrigeration engineer who was in charge of the shipboard refrigeration at the shipyard in Hamburg. Therefore, it developed quite naturally that I stayed with it and I came to this country.

B.N.
When did you come to this country? And for what reason?

H.S.
1928 in August. Well, my reason was that I more or less anticipated some development in Germany which politically was not to my liking and I thought maybe if I would disappear for a while and broaden my horizons, so to speak, in the United States, that I would avoid some of that stuff. The political situation, of course, developed regardless of my presence or not, but I was glad that I did make that decision at that time.

B.N.
After you arrived in the United States then, who did you go to work for?

H.S.

My first job was with the York Ice Machinery Corporation in Brooklyn, New York. They were busy at that time installing freezer cabinets for the Atlantic and Pacific Tea Company. For a short while I became acquainted with a gentlemen who worked for the existing Carrier Engineering Corporation in Newark, New Jersey, and an interview with that company brought me over to Newark in December 1929.

B.N.

And what were your duties at Carrier?

H.S.

My duties at Carrier were not actually clearly defined, but I happened to get into the development of what they used to call the unitary equipment division. They were building, of course, the original small air conditioner, which had spray-type air conditioning equipment in it. Afterward, I became acquainted with Mr. Oren Ragsdale, a gentleman who has completely disappeared, but he had been quite active in the beginning of railway air conditioning. As a matter of fact, we designed one of those famous front end air conditioning systems where the compressor would be carried in a separate car and the refrigerant would be distributed from that point on. This had never been successful before. It resulted in some valueless patents, but it was never really developed. But this Ragsdale, then after having established good connections with the railway industry, had this contact with the Baltimore and Ohio Railroad, which at that time brought me in contact with this work to air condition the diner Martha Washington the Baltimore and Ohio Railroad in its very primitive state, that is the compressor was a three cylinder Brunswick driven by a gasoline engine and cooling water in a cooling tower which was located on one of those vestibules of the car. The condensers were water cooled and were located on the outside of the roof of the railway car. And so, this railway air conditioning was actually instrumental that when Carrier terminated my employment with them, that Mr. Charles Neeson got hold of me. We originally wanted to go into the railway car air conditioning with the newly formed DeLa vergne Refrigeration Company of Baldwin Locomotive Works. Ad so the railway car air conditioning received not too much of a priority because Charlie Neeson's compressor just invited us to develop the domestic air conditioning unit, which was one of the first ones, it not the first one in the field.

B.N.

So really you did not start out to develop this domestic air conditioning unit?

H.S.

Correct. The original scheme of Baldwin's was to develop railway car air conditioning systems, and well you probably remember that some railway cars were equipped with ice bunkers where they put the bunkers full of ice and they had to replace that every station stop they had. But the compressors Charlie Neeson developed for them was considered to be increased from the original two horsepower into the five horsepower job to be used for a self-contained railway car air conditioning system. I still have some photographs, as well as some drawings which I made at that time, but which were later on used for the multiple unit cars that the Pennsylvania ran over their suburban system, the Payolee local and the other locals that had these multiple electric driven unit cars, and there were some of these units installed. But later, not immediately. The first priority later on became the domestic air-conditioning unit.

B.N.

Well, when you started to work on the domestic air-conditioning unit, why did you decide to do a real heat pump with heating and cooling capabilities?

H.S.

That, again was one of the accidents that every once in awhile happens in the industrial development. It seemed to be quite natural to utilize this heat which we pumped outside through this window duct. Why not try to reverse this and pump it to the inside? And we did it at that time in a rather primitive way, I would say, with some kind of a cock arrangement, a three-way cock that sort of by just simply twisting or rather the position of these cocks would either put the refrigerant into the condenser first, then into the evaporator to do its duty as cooling unit and then, by just simply reversing the position put it into the evaporator which would then work as a condenser and the evaporator becoming a condenser, it would then discharge the air into the room, with the condenser and compressor heat discharged on that proper side.

B.N.

Well, when I think of a cock, I think of the type that are used in plumbing work, which is a ground key type of…

H.S.

Indeed, and you are right. It was a troublesome deal.

B.N.

How did you shield it? How did you keep the refrigerant from leaking around it?

H.S.

It had to be a precision made piece of equipment, but it always, as long as that unit existed, that was a source of trouble. And as long as this unit existed, until along about 1936 that particular part has never really been solved to satisfaction.

B.N.

When did you and the rest of the engineers start to develop that unit?

H.S.

1932, in April, actually in 1932.

B.N.

Who else was involved in the development besides yourself and Charlie Neeson?

H.S.

Charlie Neeson brought with him his assistant, Emil Heller, who is also in my age group, about 83, and is living in Ellensville, where he worked with Coldspot, the outfit that made Coldspot refrigerators. He has been there quite a number of years. And Henry L. Galson, who is not alive anymore, but he developed his own consulting engineering firm in Syracuse, where his sons, Olin and Edgar are continuing that business he founded and are quite successful.

B.N.

Ok. Who else?

H.S.

No, just the four of us.

B.N.

Did you divide up the responsibility for different areas? Were you each responsible for certain developments?

H.S.

Well, in the beginning we sort of did not divide anything, but simply worked on this system as a cooperative effort. To assemble available parts in the most proprietary form to create the smallest unit

possible at that time with the available equipment, and that equipment in those days was very big. I remember a capacitor for a two-horsepower motor being almost as big as a compressor, and of course, now all this stuff is miniaturized to such a form that you can hardly see it. In those days, it looked like a gigantic piece of equipment. Also, there were assignments, for instance, to get rid of the condensate. It was one of the main problems of that time for that particular unit and still is actually because the unit in order to be self-contained, should not have to have a connection to any sewer to dissipate or to get rid of that condensate. And so we have a multitude of systems to get rid of that, but it finally ended up with installing a pump, a small pump like you find in a washer actually that the condensate would be collected in a drip pan, and this condensation would then be transported on top of the surface of the condenser, where it would actually aid the condensation process by having more or less an evaporative condense and back into its collecting tank, and that has been a rather successful way to get rid of that stuff. But we have other systems which are almost impossible to make work at all. Sometimes the doggone stuff would collect into the fans and it would just look like a water wheel in there sometimes.

B.N.

Would this be collecting by the evaporator fans?

H.S.

Yes, it would, because of the condensation we had two drip pans because we anticipated the heat pump operation for that condensate would collect on either side, whichever side was activated, and it would drift down because it just could not be dissipated in any other way. But the fan would sort of pick up part of it but never adequate quantities to really get rid of all of it.

B.N.

How did you rate the capacity of that unit?

H.S.

Well, the capacity of that unit was in the beginning rated at one and a half tons of refrigeration as a suction temperature between 35 to 40 pounds per square inch.

B.N.

And how did you arrive at the rating? Now, of course they actually do tests and then supply rating on the basis of actually tests.

H.S.

We really did not have much of a set-up to test anything. In other words, there was not a set-up at Baldwin Locomotive Works to really test these units the way they should have been done, so that the rating was more or less established by cooling a room to certain temperatures. In other words, not a procedure which they would have on a standard of ASHRAE you know. The company was just not equipped to do extensive testing at all. That is why Baldwin's actually got out of that business because they did not want to spend any particular money to set up this equipment. Later on, by the way, Baldwin became active in locomotives again, which was their basic business and they were not interested in continuing that business at all.

B.N.

When you were doing the engineering for this, how did you select the evaporator and condenser coils?

H.S.

Also a method which you would not subscribe to right now. It was an available set of coils made, at that time, by the Trane Company. They sort of designed two coils, the evaporator coil and the condenser

coil. We gave them the conditions that we wanted to maintain and the amount of air we wanted to move - the Trane Company they developed, at that time, or developed for us some plate-fin coils that would do this job satisfactorily. That too was not a very basic way of establishing capacities, but it just did not have the methods available at that time to really scientifically test all those things.

B.N.

Were there any other big challenges that you saw in design of this unit that created big difficulties for the design team?

H.S.

The design of this unit was primarily one of reducing volume and weight really. Miniaturize the equipment which had been used for that particular unit. That, of course, became the fact very much later. Another thing that made, for instance, the electric motor particularly big was because we were still using the old-fashioned cotton winding protection insulation. I should mention that it was one of the greatest troublemakers because it absorbed moisture. Talking about moisture, the dehydration process which we had at Baldwin's at that time was very primitive so we never really could dehydrate it to a point where we could say we had so many parts per million of moisture remaining in that system. So systems were developed later on in the domestic refrigerator manufacturing where every doggone unit, every tenth I guess is tested for moisture content. The parts per million were very, very low and had to be really maintained because moisture in the system always has been a troublemaker.

B.N.

When you designed this unit in the beginning of 1932, Freon 12 had just been placed on the market, commercially available in any kind of quantity. Of course, you used that in your design. If that had not been available do you think you would have been able to design the unit?

H.S.

We could have designed the unit but I don't think it would have been satisfactory because we could not have put this unit with the available refrigerant in a room. So Freon was the key to that entire development. A breakthrough which must have been considered basic. It was revolutionary at that time.

B.N.

How much did that unit sell for on the market? Do you remember?

H.S.

I don't even remember what they sold it for. I just remember that built about 100 during the first year of that production, and I know that there are still some in existence. One is still in existence at the university of Princeton, who at that time, we donated that and we sort of liquidated our inventory in 1936. That fellow was very happy with the performance. Other units are still restored in some of the offices of the Baldwin Locomotive Works in Philadelphia.

B.N.

Do they still work?

H.S.

That I don't know. I know that the unit at Princeton University was still active just about 10 years ago. Of course then years is a long time.

B.N.

How long did they continue to manufacture that unit?

H.S.

1936 was about the last time we tried to manufacture and improved model of this unit that I have sent you photographs of. I did not include that particular type because it has actually never been manufactured in any quantity. It was a model which we made and which was considerably reduced in volume. Instead of complicated members of structural steel we sort of had steel, I mean steel work that was formed in thin units. It was much lighter, thin sheet metal unit is what I wanted to say. Those units were actually pressed out on presses and I can, if you are interested in that show you some pictured of it because I did not include it in my thesis or my presentation.

B.N.

After De La Vergne? Baldwin liquidated the refrigeration area in 1936 then what did you do after that?

H.S.

After that I went back to Carrier because with that background I had official entry into the Carrier Corporation and stayed there, not very long because World War II sort of came in between and that phase was put on the back burner at that time.

B.N.

When you went to work for Carrier after 1936 did you continue to work in the area of small air conditioning equipment?

H.S.

In the beginning compressors particularly, designing small compressors and that too was relegated to a second position at that time. The War just simply did not permit to continue work on that basis. Also Freon was not available during the War years. So that oil compressors, methyl chloride.

B.N.

During World War II did you continue to work in the design or did you work on wartime projects?

H.S.

No, I did not work for Carrier at all. I went back to Philadelphia at that time and worked on refrigeration systems for a chemical company, the American Viscose Company. I was a section engineer in their refrigeration department, at that time.

B.N.

That company was American Viscose?

H.S.

American Viscose, that is an artificial silk, rayon. They needed a great deal of refrigeration. Most of the refrigeration systems are based on a brine cooling system. A run around brine cooling system. But I was never out of refrigeration business whether it was commercial like in the chemical industry. Of course, they air conditioned their offices and they were also based on the circulation of brine.

B.N.

What did you do after that?

H.S.

When the War was over, I finished up my career at Carrier. Specifically the design of the reciprocal water chilling units which were coming into, well between the 1950s and the 1960s. those units were designed in great quantities and at that time I was promoting the multiple compressor installation of those water chillers which were step started. In other words, two, three, and four compressors so that

you could not only have a nice capacity control that way, but also a starting procedure that would not overload your system.

B.N.

When did you retire from Carrier?

H.S.

1968.

B.N.

With your long engineering career, what do you feel was your most important engineering accomplishment?

H.S.

The most important that I think was made the most marked position is actually the development of this De La Vergne room cooler air-conditioner of which I am personally quite proud that I have been part of it.

B.N.

What is different about engineering when you retired versus when you first began work?

H.S.

When I first began work, engineers still used slide rules. We did not have computers at that time. Our work had to be done strictly with our own memory disk, our brain, instead of having it in a machine where you push a button to bring out the data that in the olden days you had to develop yourself, which I think is a better way of doing it really. I would say that the present engineers haven't got the satisfaction of really going into these details by himself in depth. Nowadays, you have tapes that you have available and you have pushbuttons that will bring those data, at his fingertips really, without him actually doing any thinking how these data were originally developed.

B.N.

How has ASHRAE changed in the last 50 years?

H.S.

ASHRAE, of course, has grown beyond all expectations really. When I first became a member of ASHRAE, then it was ASRE, and our chapter meetings were also perhaps rather primitive by comparison. There was also prohibition at that time and we did not have a happy hour before the meeting started. But I remember starting those meeting with a little song fest. They would sing, "ASRE will shine tonight, ASRE will shine till the moon goes down and the sun goes up, ASRE will shine." And the people had a little song around and were quite happy to continue their professional discussion in a very pleasant atmosphere. Nowadays, you don't do that anymore. Before the meeting you have sort of a seminar, everything is really right on the professional level and the happy hour is really the happy hour. In those days we had "near beer" which was not a very happy solution. Although sometimes I wonder, now they call near beer rather "light" and I think this is the same as the near beer in prohibition days.

B.N.

When you first joined ASRE did you attend any of the national meeting back then in the 1930s? what were they like?

H.S.

Well, it wasn't as long as these meetings. It was probably at weekend. Nowadays it is what, four days and we have committees that, well consume about two type written pages in small print. Those

committees, in those days, they weren't in existence. They were just formed during that time. All the technical details were developed during that time and so these committees had to be formed to bring those into line with professional perfection, you know, so that you had a guideline and that is where ASHRAE has been ground-breaking. We have these committees now to supervise these designs that are being put out.

B.N.

Back 50 years ago when you first involved in refrigeration work what did you see as the future of the industry back at that time? What did you see that would happen in the next 50 years?

H.S.

I really must refer to a statement that a very good friend of mine, Dr. Rudolph Plank from Karlsruhe in Germany, who help a speech at the 50th anniversary of the Lindley Ice Machinery Corporation. He said at that time that refrigeration really had not been utilized to its fullest extent. He could not quite see why people could not fight summer's heat the way they fight winter's cold, and that the great future of refrigeration would be the air-conditioning industry. That it would be a field which would far exceed everything that had been done before.

B.N.

How true that turned out to be. Some of the engineers that you met in your career, who were some of the ones that really impressed you and why did they impress you?

H.S.

I would say that my friend, the late Charlie Neeson was one of those engineers who was really an engineer's engineer. Another one was the chief engineer of Carrier, Logan Lewis, who impressed me as an engineer the way they should be.

B.N.

What was it about people like Neeson and Lewis that impressed you so much?

H.S.

There humanity more or less. In other words, they were not just engineers from a mechanical standpoint, but they were human beings. That is, by the way, one thing I always admired at Carrier. Carrier and its personnel, Carrier and its people, that was formed the background, the way a company should actually be conducted because the company is people and if those people are real nice people then the company is prospering.

B.N.

Is the engineering approach different in Germany that it is in the United States?

H.S.

No not at all. I think it is more or less a rubber stamp. I don't know which one has been there first, whether the German engineer has been bringing some of that stuff over here or whether the American industry has been sort of implanted its training method, its teaching method to Germany. I am not quite sure. I did not spend too much time in this field in Germany to really make a proper judgment. But I always have ground here that engineering is really conducted in a beautiful fashion. That again, has something to do with the mean that are engineers. They are real people.

B.N.

What advice do you have for young engineers today?

H.S.

Not to be discouraged really, I mean engineering right now, the feeling right now is if there is not much to be done anymore. Let's say, for instance air conditioning. The basic air conditioning principle has not changed really since Dr. Carrier developed them in the 1920s. and that basically the units to be used in air conditioning are still the same. But there are methods to produce those units and they better pray that they can do a better job in a more efficient way, the way it was done in the olden days.

B.N.

So there is just as much opportunity today?

H.S.

Yes, indeed there is, not to be discouraged but continue working and to really sink your teeth into it because the goals are still there and they just have to be reached by some means.

B.N.

Is there anything else that you would like to add to this historical tape?

H.S.

Well, let's say that I am quite happy to have lived during this time, that my engineering education and engineering experience has been during this particular century or half century which has been full of challenges and that really is something that I feel happy about. I have been part of that. Also, of course, to have worked for companies that I really enjoyed working for. Every moment of my work, in my professional life, I have enjoyed.

B.N.

Thank you very much.

H.S.

This is for me to say thank you to ASHRAE for this opportunity.