

Helmut Satz at 80

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1 Family History

Isaac Solomon Satz (1843-1929) and Mathilde Henrietta Dorothea Satz (1854-1923), shown in Fig. 1, are the great grandparents of Helmut Satz. Isaac converted from Judaism to marry Mathilde. They had 11 children. Isaac was the founder and long time owner of the Strandhotel Glucksberg shown in Fig. 2. At this time and place, there was much intermixing between Jewish and Christian people. Isaac made strong positive contributions to his community. Later when the Nazis came to power, the local community protected him by “misplacing” documents proving his descendant’s Jewish ancestry.

Helmut’s grandparents were Helmuth Satz and Maria Lowenfeld. He was Lutheran and she Catholic, both descendants of converted Jewish fathers. Helmuth was a merchant in Posen, He was killed in Margabowa, East Prussia while a lieutenant in the German army at the age of 37. Maria was at that time estranged from Helmuth. His unmarried great aunt, Bertha Satz and his great uncle, Johannes Satz, took over the raising the essentially orphaned children.

Helmut’s father Gerhard William Satz had a brother Harald Helmut and a sister Karola-Maria Klara. Gerhard was trained as a carpenter, and achieved a construction engineering degree, which in modern days is the equivalent of an architect. While Gerhard was in college, there were dances in Buxtehude. Helmut’s mother Anna Katherina Koch, remembers that the ladies could “have their pick” of the young men, and she chose Gerhard.



Figure 1: Isaac Salomon Satz and Mathilde Henrietta Dorothea Satz



Figure 2: The Strandhotel Glucksberg

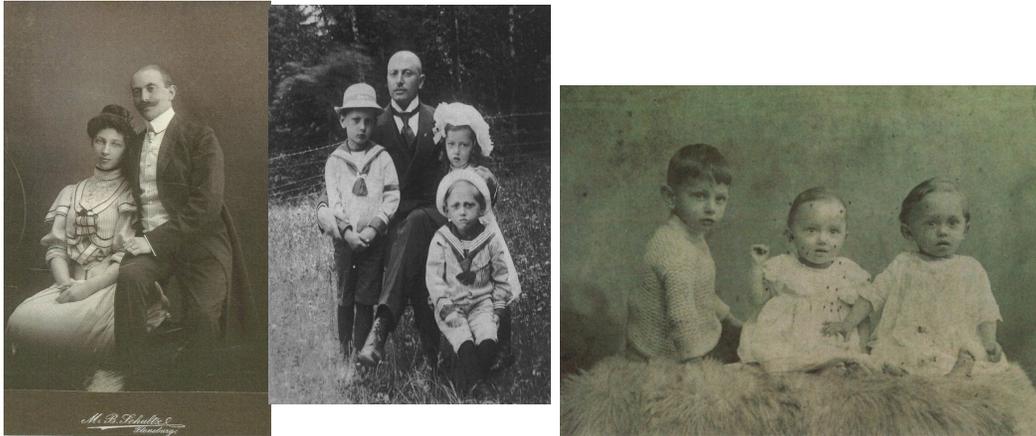


Figure 3: The picture on the left is of Helmut's grandparents: Helmuth Satz and Maria Lowenfeld. The middle picture is of his uncle, Johannes Satz. The picture on the right is of his father, Harald Helmut, his aunt Karola-Maria Klara and his uncle Gerhard William.



Figure 4: Gerhard William Satz (1910-1947) and Anna Katherina Koch

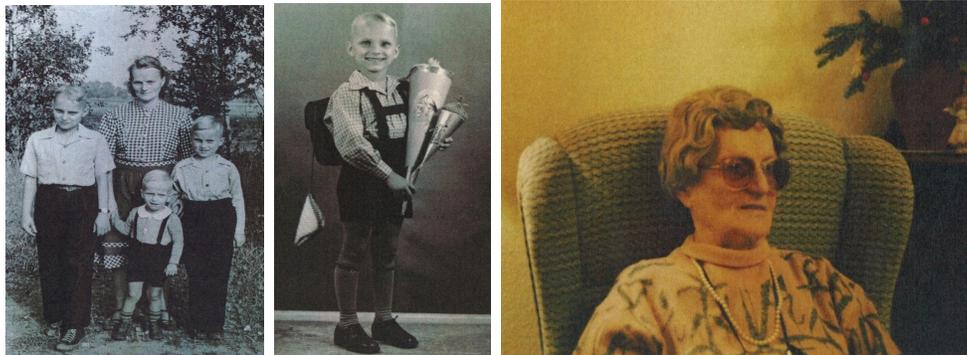


Figure 5: On the left, Helmut and his siblings Dieter Walter Siegfried and Michael Harald Karl with mother; Helmut as a young boy; Helmut's mother "Mutti" in later years.

During the Nazi era, the Gluckberg town administration prevented Nazi authorities from proving Gerhard's roots. Conversely, without documents, he could not prove himself to be Aryan. He was excluded from the professional organizations for architects, and as the war approached he was sent off to Yugoslavia and later to Russia.

In 1935, the Satz's moved to Berlin. Helmut was born at home, April 11, 1936. He has two brothers, Dieter Walter Siegfried and Michael Harald Karl. During the war, they were evacuated to Posen, but Gerhard found about this, knew something of what happened when armies invaded, and moved them west outside of the path of the Red Army.

Near the end of the war, Gerhard's unit escaped the encircling Red Army, and fought his way to southern Germany, and surrendered to the Americans. The Americans later turned over all German prisoners from the Eastern Front to the Russians. Two returning German prisoners of war in late 1947 brought news that Gerhard had died in a camp near Kirovobad, Azerbaijan.

Wars are largely remembered for the death of the human spirit and body, and the randomness of destiny. There was a poem written about an American soldier in the Vietnam War which is appropriate for the cruel and ironic fate of Gerhard

But You Didn't

By Merrill Glass

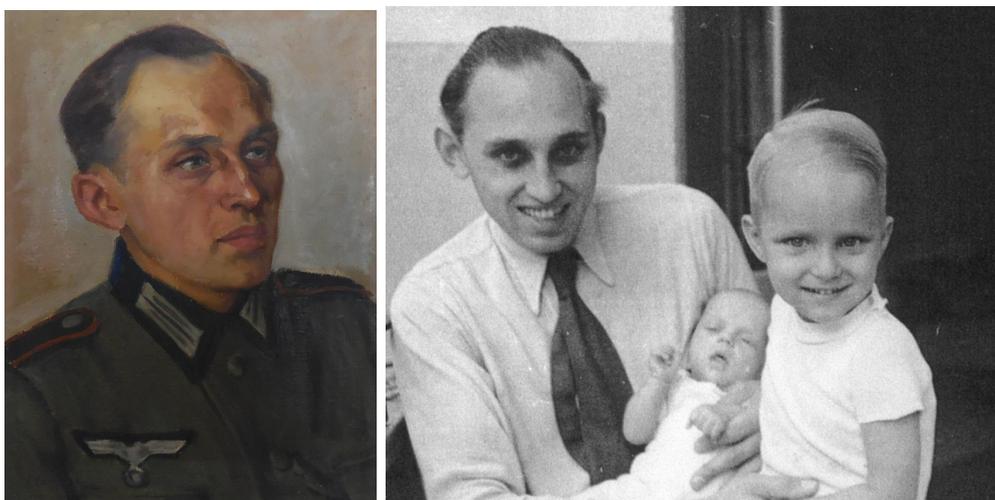


Figure 6: A painting of Gerhard as a soldier, and a photo of him as a father.

Remember the time you lent me your car and I dented it?
I thought you'd kill me...
But you didn't.

Remember the time I forgot to tell you the dance was
formal, and you came in jeans?
I thought you'd hate me...
But you didn't.

Remember the times I'd flirt with
other boys just to make you jealous, and you were?
I thought you'd drop me...
But you didn't.

There were plenty of things you did to put up with me,
to keep me happy, to love me, and there are
so many things I wanted to tell
you when you returned from Vietnam...
But you didn't.

In postwar Germany, it was very hard for a single mom with three children. Help came from a "second cousin", Fred Meyer, in the United States. Fred Meyer invited the family to move in with them in Madison, Wisconsin.



Figure 7: Fred Meyer’s home in Madison, Wisconsin and Helmut on Stardust.

sin. Helmut attended High School in Madison, and received his PhD and BS degrees from Michigan State University. He learned to ride a horse, and remains an avid equestrian. He also learned his perfect American English. When I first met Helmut, I was surprised by the clarity of his speech and understanding of American colloquialism. I think he speaks more properly and with more precision than any of my American colleagues, except perhaps for my wife Alice.

While Helmut was at Michigan State University, he was supposed to be required to be a member of the Reserve Officers Candidate Program. This program trained young men who would eventually end up in the US Armed Forces. Helmut recalls:

“From my MSU days (then still MSC), Fall 1956. At that time, all able-bodied males had to join ROTC and they took me as well. After about half a year I knew how to take apart an M1 and do an about-face, and they had found out that I was a German citizen. They proposed to ask the German government for permission to keep me, but I suggested to just drop the matter and set me free. Which they did”

I recall a quote from Clint Eastwood that perhaps reflects Helmut’s feelings about this:

*I tried being reasonable,
I didn’t like it.*



Figure 8: Helmut as a ROTC guy.



Figure 9: The Satz Family.

Helmut's wife Karin is known and much appreciated by Helmut's friends. Creative scientists are difficult people to manage, and judging by the results, Karin has done a wonderful job. In Helmut's own words:

"I met Karin when I returned from the Schladming Winter School 1963 by train to Hamburg; she was returning from a skiing vacation in Switzerland. We ended up at the same table in the dining car."

As a newly married couple, Helmut and Karin went to DESY, UCLA and Helsinki where he had postdoctoral fellowships. In 1971, he came to the recently established Bielefeld University. After Geneva, Hamburg, Los Angeles and Helsinki, perhaps Bielefeld was a little bit of a disappointment. This was before the Bielefeld Movement which argued that Bielefeld does not even really exist. At that time one could have doubts about the location of a city advertised as the biggest in Ost-Westphalia. In this spirit, I give you a slightly modified version of Antigonish due to William Hughes Mearns:

WAR ES BIELEFELD:

*Yesterday, looking down the stairs
I saw a town that wasn't there*



Figure 10: On the left, Helmut Satz, Johann Rafelski, Tatiana Faberge and Rolf Hagedorn; On the right "Papa" Migdal, Gordon Baym (in background), T. D. Lee, the Mayor of Bielefeld and Helmut Satz at "Statistical Mechanics of Quarks and Hadrons"

*It wasn't there again today
I wish, I wish, it would go away*

*When I went out for beer at three,
The mayor was waiting there for me
But when I looked around the hall,
I couldn't see him there at all,
Run away, run away, don't you come back no more
Run away, run away, and please don't slam the door*

*Yesterday, looking down the stairs
I saw a town that wasn't there
It wasn't there again today
I wish, I wish, it would go away*

2 Science

Helmut's early work concerned multi-particle production and was much influenced by Rolf Hagedorn's work on a possible limiting temperature for strong interactions. This limiting temperature turned out to be an idea appropriate for the large number of colors limit generalization of our theory of strong interactions. For the accepted theory, Quantum Chromodynamics, the number of colors is three, and the limiting temperatures is replaced by a phase

transition temperature of hadrons into a Quark Gluon Plasma.

In 1980, Helmut organized the meeting "Statistical Mechanics of Quarks and Hadrons". This was the meeting where the theoretical foundations of the search for the Quark Gluon Plasma were laid. Many of those of us in this field of research met there for the first time. The first results on lattice thermodynamics were presented, and many problems in the theory of strongly interacting matter at high temperature and density were discussed. This is the meeting where I met Helmut. A number of very well known people were there such as T. D. Lee, Papa Migdal, Andrei Linde, Gordon Baym, Keijo Kajantie and even the young student Frithjof Karsch. It was a time when there were many easy ideas to work out that turned out to have great importance.

To celebrate this historic meeting, we will all sing the "Big Rock Candy Mountain". In an abstract way, this song reflects my feelings about this seminal meeting. There were so many ideas which were free for the asking, and were the starting point of many people careers. This was at the beginning of a new field of physics. It also reflects the enthusiasm one has at the beginning of a scientific endeavor which is later tempered by nature.

Big Rock Candy Mountain
by Harry McClintock

One evening as the sun went down
And the jungle fires were burning,
Down the track came a hobo hiking,
And he said, "Boys, I'm not turning"
I'm headed for a land that's far away
Beside the crystal fountains
So come with me, we'll go and see
The Big Rock Candy Mountains

In the Big Rock Candy Mountains,
There's a land that's fair and bright,
Where the handouts grow on bushes
And you sleep out every night.
Where the boxcars all are empty
And the sun shines every day
On the birds and the bees
And the cigarette trees

The lemonade springs
Where the bluebird sings
In the Big Rock Candy Mountains.

In the Big Rock Candy Mountains
All the cops have wooden legs
And the bulldogs all have rubber teeth
And the hens lay soft-boiled eggs
The farmers' trees are full of fruit
And the barns are full of hay
Oh I'm bound to go
Where there ain't no snow
Where the rain don't fall
The winds don't blow
In the Big Rock Candy Mountains

In the Big Rock Candy Mountains
You never change your socks
And the little streams of alcohol
Come trickling down the rocks
The brakemen have to tip their hats
And the railway bulls are blind
There's a lake of stew
And of whiskey too
You can paddle all around them
In a big canoe
In the Big Rock Candy Mountains.

In the Big Rock Candy Mountains,
The jails are made of tin.
And you can walk right out again,
As soon as you are in.
There ain't no short-handled shovels,
No axes, saws nor picks,
I'm bound to stay
Where you sleep all day,
Where they hung the jerk
That invented work
In the Big Rock Candy Mountains.



Figure 11: On the left, Helmut Satz lecturing at ZIF. On the right, Helmut and Frithjof Karsch

I think one of the strongest impacts of the meeting in Bielefeld was the development of lattice gauge theory for thermodynamics. Helmut brought together a very strong group at Bielefeld, which continues now under the leadership of Frithjof Karsch. This group pioneered and improved these methods. They now provide our most reliable information on the properties of strongly interacting matter at high temperature [1]-[2].

Helmut's most famous work is that with Tetsuo Matsui [3]. It is the idea that heavy quark bound states will become unbound at high temperatures. This might provided a signature for de-confinement. The idea had to be amended later to include the effect of recombination of charm quarks into charmonium at hadronization. It was a clever and simple idea, that has had a major effect in the experimental study and theoretical understanding of the Quark Gluon Plasma,

Helmut has had a very flat wavefunction over many years: He had equal probability to be anywhere in the world. He particularly liked India. He worked much with Rajiv Gvai, and enjoyed the company of friends such as Bikash Sinha and Dinesh Srivastava. He was very influential in the heavy ion communities of the US and CERN, and played an essential role in establishing experimental programs.

Helmut played an essential role in the development of the heavy ion program at BNL and at CERN. It would be very difficult to imagine the development of such an effort without Helmut's scientific and oratory skills. From



Figure 12: Helmut, Testsuo Matsui and Dima Kharzeev



Figure 13: From Left to right: Helmut and Juergen Schukraft and Johanna Stachel; Helmut and Bikash Sinha; Helmut and Rajiv Gavai



Figure 14: Helmut Satz at Brookhaven National Laboratory with Claudio Rebbe, Ken Wilson, Mike Creutz and Sid Kahana

1985-1989 he was a tenured Senior Scientist at BNL Eventually, the RHIC accelerator turned on with collisions of gold nuclei.

To quote Jarod Kintz in "This Book is Not **For Sale**":

"Gold is liquid sunlight frozen in time, and that's why I love the way ice melts in vodka."

From 1989-1995 he was a senior staff member at CERN where he pushed the heavy ion program which is now at the LHC. To quote from Wyoming Red by Tamara Hilman:

*In spring, the foals would join the herd,
upon sweet grass their births occurred*

*But none was greater born to mare,
with golden mane and reddish hair*

*Wyoming Red, his given name,
wild horse of legends claim to fame*

*Broad of shoulder, strong proud head,
coat that glowed like molten lead.*

In 2005, Helmut Satz was honored for his scientific achievements with a Doctoris Honoris Causa from the University of Wroclaw. This university has a long and honored academic tradition and it's noble prize winners include Max Born, Otto Stern, and Phillip Lenard. The ceremony granting the PhD is ancient, elegant and formal. It is a ceremony to honor achievements that have impact over centuries. Our good friend Krzysztof, who Helmut and I both met at Bielefeld presided over part of the ceremony. The text of the award for Helmut, in Latin is given below:

Doctoránde clarssime!

Qui ómnibus víribus omníque acúmíne in id incubuísti, ut matériae structúra / elementáque eius, quarca scílicet et gluónes, / própius inspiceréntur, ego, promótor legítimè constitútus, te, Helmódum Satz, rerum natuálium doctórem habilitátum, phýsicae theoréticae professórem ordinárium eméritum,



Figure 15: Helmut Satz discussing with Maurice Jacob of CERN

*Facultátis Phýsicae in Universitaté Bilefeldiénsi cónditae / olim decánum,
Centri Studiórú Interdisciplinárium Bilefeldiénsis / unum quondam ex mod-
eratóribus, rerum et in Laboratório Público Rivoportuénsi scrutatárum / et
in Institúto illo Studiórú Nucleárium Europaeo, quod acrónyimo Gállico
CERN notátur, / per multos annos partícipem sociúmque,*

*qui interactiónum firmárum theóriam / exemplariáque phaenomenológica
adhíbendo // statum matérie nuper repértum, cui plásmatis quarco-gluonális
est nomen, / qualitatésque eius phýsicas / peculiári ratióne excogitata /
sagáciter definivísti,*

*qui inter paucos fuísti, qui particulárum fírmiter interagéntium matériam
/ structurámque eius ad phases spectántem / cum investigárent, inquirere
sunt conáti, quátenus structúra illa ad particulárum natúram / colórem velut
in víncula condéndi / symmetriámque, quam chirálem dicunt, frangéndi /
reférri debéret,*

*qui máximis, quae adhuc phýsici factitábant, experiméntis (eis vidélicet,
quibus ionta grávia / lucis fere velocitáte curréntia / inter se collidúntur) //
fundaménta theoreética iacuísti,*

*qui acutíssimo ingénio dotátus / ea étiam, quae ultra doctrínae velut
horizóntem pósita sunt, conspícere valuísti / physicaeque et leges et phaenómena
animadvertísti, ex quibus fortásse / totíus disciplínae quaedam únitas / oríri
aliquándo póterit,*

*qui per ámplius trigínta annos / commércia studiórú nobíscum exercéndo
// et disputatiónes haud paucas una cum Wratislaviénsibus conscripsísti / et
Universitátis nostrae res ac ratiónes enxe adiuvísti,*

*decréto Facultátis Phýsicae et Astronómiae / amplissimíque Senátus Uni-
versitátis Wratislaviénsis // scientiarum doctórem honóris causa creó, créátum
renúntio / atque doctóris honóres, iura et privilégia ómnia in te cónfero, in
eiúsque rei fidem / hoc diplóma Universitátis sigílo munítum*

tibi in manus trado.

Helmut remains an active member of our scientific community. He is also an avid equestrian. Happy 80'th birthday!

3 Acknowledgements

L. McLerran was supported under Department of Energy contract number Contract No. DE-SC0012704 at Brookhaven National Laboratory when this



Figure 16: On the left, Krzysztof Redlich reading the formal documents for the PhD Honoris Causa. On the right, Helmut in the seat of honor



Figure 17: Helmut and his horse

talk was given in Bielefeld, Germany, and L. McLerran is now supported under Department of Energy under grant number DOE grant No. DE-FG02-00ER41132. L. McLerran thanks Helmut Satz for his careful reading of this manuscript and for giving him access to “SATZ: Party of Three” which documents was composed by Helmut is 2013 and documents Helmut’s family history

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