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Mill Valley, California

DAVID HARKER

An Interview Conducted By

Carl Mosher

DAVID HARKER

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David Harker, Ph.D.

Born October 19, 1906 in San Francisco.

Resident of Mill Valley from 1906 to 1930.

Interviewed February 1978 in the David Allison home at 44 Ralston Avenue, Mill Valley.

Introduction

The 39th Edition of "Who's Who in America" states that Dr. David Harker, internationally honored scientist and educator, was born in San Francisco on October 19, 1906. They might have added, but didn't, that the Harker name was well known in the pretty town of Mill Valley, just north of San Francisco, and that young David Harker spent much of his youth there.

Dr. Harker has made his scientific mark largely in the speciality of crystallology, although he has always been in demand as a lecturer and teacher in the related fields of physics and chemistry. These pursuits have led him to many places and institutions over the years. A partial list includes: Johns Hopkins University; the Atmospheric Nitrogen Corporation (research chemist); General Electric Company; the Carborendum Company; Polytechnic Institute of Brooklyn; University of Rochester; Niagara University; Centre National de la Recherche Scientifique, Bellevue, France (lecturer); University of Bordeaux, Talence, France; the Brookhaven Laboratory; the Roswell Park Memorial Institute, Buffalo, New York; and the Medical Foundation of Buffalo, where he is presently engaged in advanced research.

Dr. Harker's first wife, a Russian emigrée who died in the early 1970s, was the mother of two daughters, Ludmilla and Tania. His wife of three years, Deborah Harker (née Deborah Maxwell), whose pleasant, cultivated voice is heard on this tape, also spent part of her early years in Mill Valley. So we have the great good fortune in this interview to record some of the reminiscences of not one but two outstanding early residents. C.M.

DAVID HARKER

Carl Mosher

This is Carl Mosher, talking to Dr. David Harker and his wife Deborah at 44 Ralston Avenue, Mill Valley, the old Harker home. This is February 13, 1978.

Where and when were you born, Dr. Harker?

David Harker

I'm told that I was born in San Francisco October 19, 1906, just after the earthquake. I don't remember anything about San Francisco; my first memories are of living in Mill Valley. We didn't live in this house, by the way, but in a house on Summit Avenue, where Summit and Ralston meet. Our house was on that hilltop, with a view of the bay and a view of the mountain through a huge window on each side. That house was put up by my mother and father. I guess it was built by Japanese carpenters; there were a good many of them around in those days.

Mr. Mosher

Do you happen to know the year it was built?

Dr. Harker

I guess it was built just about the time I was born. My parents lived previous to that in a little cabin where my Aunt Katherine (who owned this house at 44 Ralston) had typhoid. They called it Typhoid Cottage. There was another house on the same lot, over toward Magee Avenue, which my father and mother built with their own hands. It was very charming, but you could tell that the carpentering wasn't professional. That was called Bird-Alone, after some house in English poetry. When I was a boy I thought it was all one word -- Birdalone -- and I hadn't the slightest idea what it meant.

Mr. Mosher

What was your father's occupation?

Dr. Harker

He was an M.D. As I understand, he was the first to fit copper plates to people's feet to correct flatfoot. An early memory I have is sitting on the porch watching him take a cast of the feet of a very elegantly dressed lady in a baking pan of plaster of paris. She sat there with her feet in the plaster until it hardened. When it did, he carefully extricated her feet and washed them off. Then they all had a tea party.

Later I found him with the casts of her feet, and he was carving them with his pocketknife into the shape he thought they ought to be. Later he beat a copper plate into the shape of each foot, lined it with leather, and riveted them together. She was to wear those inside her shoes. Apparently he was quite successful with this. I am told that he was among the first to do this kind of thing.

Mr. Mosher

I suppose in those days they had chiropodists?

Dr. Harker

Oh yes, but he was a regular M.D. I guess they call it nowadays orthopedics.

I can remember he had a horse stabled down on Summit and Marguerite, up on that little promontory. We had a horse named Dick. The previous horse was called Bildad, after the biblical character, and the one previous to that was a mare called Semiann. I understand she was named Semiannual Convention of Women's Clubs, either by my mother or my Aunt Katherine.

My mother told me (before I can remember) that he had a wire from the house to the stable which he could pull and which would tilt a measure of oats into the manger and pour water into a bucket. The horse could eat and drink while he was dressing -- in case he was called early in the morning to go somewhere and help someone medically.

He drove what was called a gig. Maybe it wasn't truly a gig; it had four wheels, but the four wheels were very close together. It had a seat across, like half a wagon, with a tiny little "rumble seat" in which he could carry groceries and whatever else. It had a hood that could be raised over it, and it had curtains that could be put all around in case of rain. The whole business was called a rig -- the horse plus the harness plus the buggy. I can remember my mother saying, "George, you'd better get the rig out."

Mr. Mosher

What were the roads like in those days?

Dr. Harker

They were dust in summer and mud in winter, with some gravel. Of course there were big ruts at the wheel widths. In the center was a path where all the hoofmarks were.

My Aunt Katherine had a machine called, I think, a Motorette, which had three wheels, two in front and one in back. It was built by some English firm -- Morris, maybe? The two wheels in front were used to steer; the rear wheel was to drive, something like a motorcycle. She took me riding when I was five or six, and that is one of my early memories. The principle characteristic of this machine was that the rear wheel went up and down in the hoofprints of the horses on the center path. It was terribly uncomfortable and a really dangerous thing to drive.

Mr. Mosher

Did it have a tiller or a steering wheel?

Dr. Harker

It had a tiller. Not a fore and aft tiller -- I guess you'd call it thwartships. My aunt didn't really understand machinery that well, and we had some pretty exciting times. She took off for Santa Barbara in it and got about a couple of miles before she hit. That story is in one of Aunt Katherine's diaries that Charlotte has.[1]

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[1]Charlotte (Mrs. David) Allison, grandniece of Katherine Harker, lives in Miss Harker's former home at 44 Ralston Avenue.

Mr. Mosher

Was this one of Mill Valley's first cars?

Dr. Harker

Oh, I don't think so. In fact, there is a picture of me at the age of approximately one sitting in a huge car called a Mora. My mother told me it had a Packard engine. I'm sitting at the wheel in a baby outfit, and I guess everybody was photographing me. That must have been around 1907.

I don't remember much of my father. He went east in the winter of 1911-12 to a medical convention of some kind. He wrote back saying he'd never been so cold in his life. Central heating was rare in New York City in those days; everything was fireplaces. He said he wore two suits of pajamas under his suit. But he caught pneumonia. As soon as he was convalescent at all, he took the train home, a trip which then took six days. He spent several days in bed, then felt so healthy he got up and scythed a field. He had a heart attack and died several days later.

Mr. Mosher

Too bad! You say this was in 1912?

Dr. Harker

February 1912. I just barely remember him, but you can find pictures of him in Charlotte's collection. His name was George Asa Harker. He was in the Philippines with the army.[1] He had been teaching school in Hawaii when a transport came through, and he signed up on the transport to go to the Philippines. He tells of being in Hilo Hilo Bay for several months doing nothing -- in the heat and in almost breathless air. Every day somebody would jump overboard and drown. I didn't hear this from him, of course, but from my mother. Then they were ordered, all of a sudden, to take the beach. They hadn't heard a shot this whole time. They got into boats, and they went onto the beach -- no opposition. They were told that Philippine irregulars were back in the jungle armed with

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[1] Spanish-American War.

long, heavy knives -- bolos -- and could chop off your head. They were told to be very careful.

My father told the story that he was sentry one night from eight to twelve. For those four hours he had to go from the beach back to a certain palm tree in the jungle and return. Every time he got out to that palm tree he was terrified. He was on his last trip when they killed him. He felt this blow on his neck and he died, he said. After a while he woke up. It was a coconut that had hit him on the head.

I can remember when he was in bed after his heart attack. He had a toy monkey on a monocycle, with a weight underneath, riding on a string tied to the foot of the bed. He could raise or lower the other end of the string with his hand so the monkey would ride back and forth. He told me this was Mr. Monkito, that he had made his acquaintance in the Philippines, and that he would not introduce him to me. That's about all I remember of him.

Mr. Mosher

According to my arithmetic, you were six years old when he died. He was obviously no ordinary fellow.

Dr. Harker

My mother was a powerful personality, too. She brought us up at home, up to about the fourth grade.

Mr. Mosher

Where was "home" then?

Dr. Harker

This was the house on Summit Avenue, before you get to the turnoff of Ralston. As you go downhill, it's on the right, up on that knoll. It's all grown up now. You can see some stone pines back in there. The house was perched on the summit of that knoll, with the view.

We commuted to various schools that were considered to be very educational and original. We didn't go to public schools because, my mother said, my father had gone to a standard boarding school and was very unhappy there. He

had made her promise never to send us to a school where we would be unhappy, and that's the way she interpreted it. We went to a thing called the Outdoor School in the Ingleside District near Twentieth Avenue and Sloat Boulevard in San Francisco. We rented a house there to stay during the week and came back to Mill Valley on the weekends. I went right into the fourth grade. I knew lots of things the other children didn't know, and I didn't know lots of things I was supposed to, so it was very complex.

But I'm ahead of myself a little bit. It must have been around 1913 when we started going to a German kindergarten down at the foot of Summit Avenue. There was a lady called Fräulein Anna Hartmann. She taught us and several other boys and girls. There were some Hamburger girls, and John Forbes for a little bit -- I forget the names of the others. She taught very well, entirely in German, starting with words that are common to English and German and working from there. She wrote little verses, illustrated with pictures that she cut from magazines. She was a good and devoted teacher. My German accent is still perfect, but of course I've lost my grammar and vocabulary. When I go to Germany, the first few words I speak they think I'm German, so they start talking rapidly -- and I'm lost. She taught us how to read and some arithmetic. We played Lotto in German, things like that.

Mr. Mosher

Do you remember who your fellow students were?

Dr. Harker

My brother, and the family called Hamburger -- two very pretty girls, as I now look back on it -- glossy, black, curly hair and Jewish features, very handsome. Then there was John Forbes and two or three others, but I can't remember who the others were.

Mr. Mosher

I was going to ask whether Helen Thompson Dreyfus was in that school.

Deborah (Mrs. David) Harker

Yes, she must have been there also.

Dr. Harker

At that age, of course, she was to me just a girl and a nuisance!

Mrs. Harker

Girls at that age don't know they're a nuisance, thank heaven.

Dr. Harker

Came 1914 and the war. Fräulein Hartmann was very pro-German, of course. She had a terrible, fat fox terrier. She was always cuddling it, and she kept feeding it sugar and cake until you could hardly see its legs it was so fat. It waddled along. His name was Princey; he was named for the Crown Prince. She once told my mother, "There are only two people I want to see when I die and go to heaven: the Kaiser and Princey."

In 1917 the huge submarine Deutschland ran the blockade. Fräulein Hartmann came marching up the hill toward our house, an old red, white, and black flag waving. "Deutschland über alles," she was yelling at the top of her voice. "We have run the blockade, and your President Wilson, I shit on him." She wasn't very popular by then, and I guess the school was dissolved. My mother was among the last to have her to tea. I don't know what became of her.

Mr. Mosher

She was extremely outspoken for those days, when Germans were all personna non grata.

I don't seem to recall the submarine episode.

Dr. Harker

There was a large, cargo-carrying submarine (large for those days), not armed, which carried from Germany to New York a supply of dye stocks, which we could not manufacture at that time. It made a lot of money for Germany, for the trading companies, and was very important for our dye industry and drug industry. After that episode, as soon as war was declared between Germany and the United States,

the assets of the big company that manufactured these dyes and had factories in the United States were seized. The Atmospheric Nitrogen Corporation and the Allied Chemical Corporation were formed from these seized properties. We proceeded to use their records and facilities to manufacture our own dyes and our own nitrogen. After the war Germany never recovered its pre-eminence. So it was an important incident.

Mr. Mosher

And little known.

Dr. Harker

At that time, anything good that Germany did was played down, but it was, of course, a great technical accomplishment.

Well, to get out of Germany, my mother ran a little science kindergarten at Bird-Alone. We'd pour a test tube half full of alcohol and half full of water, put our thumb over it and shake it. It sucks your thumb in because it shrinks. That kind of thing. We put a magnet under glass and a piece of paper on the glass and sprinkled iron filings on it so we could see the lines of force made visible.

Mr. Mosher

Was this just for the family?

Dr. Harker

It was the same group that went to Fräulein Hartmann's kindergarten. We grew up in this very attenuated educational atmosphere. After a while my mother heard of a school -- let's see, it was first the state normal school in San Francisco. I went there a couple of years, until the seventh grade. Then she heard that University High in Oakland was the thing, so we commuted to Oakland for a while. I went there for one year.

Mr. Mosher

Did you experience any commute problems?

Dr. Harker

I spoke perfect English, I had very good manners, I

was pretty well dressed, and so I was considered effeminate. I was teased until I was absolutely miserable.

Mr. Mosher

By whom?

Dr. Harker

By the other schoolboys. They called me Percy, and they made up insulting verses about how effeminate I was.

Mr. Mosher

The early macho approach?

Dr. Harker

Yes, and of course I had never heard a sexy story in my life until then. All the rest of the boys were well educated that way, and it shocked me. It was about time! I didn't understand what was going on at all.

I don't know whether it was fortunate or unfortunate, but I got scarlet fever and was taken out of school. The next fall I went to a different kind of advanced school, the Cora Williams Institute in Berkeley. You may have heard of that. Miss Williams had ideas on what she called "creative involution." This meant that the activity of a group was much more than the sum of the activity of the individuals in it if they were being creative. To some extent there is truth in that, if you can get that kind of cooperation -- and good leadership, which she herself could do. I think the tuition for me and my brother was paid by my mother's teaching science there. She gave the chemistry and physics courses and geometry. Miss Williams gave the other mathematics. I had very good courses in English and Latin and pretty good preparation in things I got interested in. But they didn't teach us to do anything we didn't want to do. John Dewey!

I was in a very strange state of education and upbringing by the time I went to college.

Mr. Mosher

What do you think of the John Dewey approach in retrospect?

Dr. Harker

It has certain things to recommend it. I have things in my education that few people have. But it probably set me back ten years because I had to learn to carry through jobs I didn't like to do. I had never had to do that until I went to college. I flunked out of college and had to get back in again.

Mr. Mosher

Before we leave the Cora Williams Institute, were you living in Mill Valley then?

Dr. Harker

We always came back on the weekends, but my mother would rent a house in Berkeley.

Mr. Mosher

Where did you go to college?

Dr. Harker

In Berkeley. I started in January 1923 and did pretty well the first semester. I was not quite seventeen, younger than most freshman. The next year (fall '23 spring '24) I started with some good momentum, but the second semester I petered out and flunked out. That made me very angry.

Mr. Mosher

Apparently you were taking courses that you didn't fancy.

Dr. Harker

That wasn't quite it. I was taking courses that had descriptions that I liked -- chemistry. I didn't like the philosophy course too much. But I got terribly interested in navigation. I used to go to the library and study navigation instead of the courses I was supposed to be studying. I think I could have done awfully well on an examination in navigation -- but not in chemistry. I had no discipline at all. I'm sure I had a pretty good mind, because I have now. I know this because of the various honors I've received, but I had no discipline.

Mrs. Harker

I'd like to say this. When I was a little kid, the Harkers and my family[1] had mutual friends, although we never had met. I was always hearing about the Harker boys and all the colorful things they did. And this was very spontaneous.

Mr. Mosher

I think this would be a good time for you to tell us about your entry into the Harker family. Isn't this about the right time chronologically?

Mrs. Harker

When I was fourteen or fifteen Mrs. Harker took the boys to Japan. She wanted someone to house-sit, and our family was asked to do this. I'll never forget going into that wonderful house, seeing all the artifacts that belonged to George Harker and all the toys and marvelous books, and thinking what keen boys they were.

One of my vivid memories of that summer were the bound volumes of St. Nicholas on a shelf going up the stairs under the eaves. I read them assiduously. Just a few months ago my husband and I were at a meeting in Michigan, and I discovered some of those same old bound issues of St. Nicholas in a bookstore and was able to buy them. We were both delighted.

Mr. Mosher

Everything you say makes me want to know more about your family. How did you happen to meet the Harkers?

Mrs. Harker

My mother and father were very good friends of Katherine Harker and of Alice and Alexis Rosenquist just across the street. We had never met Mrs. Harker, but she was kind enough to take us sight-unseen and let us take care of her house.

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[1]The Maxwells of Santa Barbara.

Mr. Mosher

Katherine Harker was George's sister?

Mrs. Harker

Yes. I think the most startling thing that happened to me that summer was meeting Colonel Rowan, the man who took the message to Garcia[1]. Every day I would see him take a walk from about 11:30 to 12:30. He lived on what is now Rowan Lane, off Marguerite. I don't know anything more about his background than the fact that he was the man who took the message to Garcia.

Mr. Mosher

This was an episode during the Spanish-American War.

Mrs. Harker

I had read about it not too long before I came to Mill Valley, and it impressed me very much. One day I saw this very erect, beak-nosed, military-looking man going by the house in a white tropical suit and a white pith helmet. He had a cane and a very elegant bearing. I was terribly impressed by his appearance, and I said to my friend, Wilhelmina Jones, "Willy, who is that man who goes by here every day?" She said, "Have you ever read 'A Message to Garcia'?" I said yes, and she said, "That's the man who carried the message to Garcia."

The next day I waited for him. When he came along I flew down the path and opened the gate, and I said, "Oh, Colonel Rowan. I understand you are the man who took the message to Garcia." He said, tipping his hat, "Yes, miss, I am." I said, "Oh, Colonel Rowan, would you mind telling me the story?" He said, "Why no, miss, I wouldn't mind. Would you like to take a walk with me?" I was quite thrilled.

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[1]Colonel Andrew Summers Rowan.

He offered me his arm, and we walked along the Pipple-Popple Road, which is something I think David should tell you about[1].

He told me about the message to Garcia, which was exactly the way it had appeared in the story.

Mr. Mosher

Can you give us the high spots on that? I've forgotten them.

Mrs. Harker

I've forgotten them, too.

Dr. Harker

It was during the Cuban invasion, led by Teddy Roosevelt and his Rough Riders. There was a guerilla band of anti-Spanish Cubans in the hills, led by this man Garcia. I don't know the military details, but it was necessary for the invasion force to coordinate with Garcia. Somebody had to take a message through Spanish lines. Volunteers were called for, and Rowan volunteered and was chosen. He went through the Spanish lines and got the message to Garcia. I think he stayed with the irregulars until they joined forces.

Mrs. Harker

The thing about the story that impressed me was that he took the message through the Spanish lines. It took him, I think, a couple of weeks, and it was very adventurous. He wasn't hurt, but he was in great danger all the time until he got the message to Garcia.

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[1]Dr. Harker explains that this expression is from an Edward Lear story about "The Adventures of the Seven Children of Each of the Seven Families" who lived near (and in) the Great Lake Pipple-Popple. When Dr. Harker was a youngster in Mill Valley there was a huge rain puddle each winter in the first turn of Tamalpais Avenue beyond its upper junction with Summit, so this became the Pipple-Popple Road. These were all dirt roads then, of course.

So -- Colonel Rowan escorted me back to the Harker gate, and I thanked him. He tipped his hat and said to me, "Now, miss, I'm going to ask a little favor." I said, "Yes, Colonel Rowan." He said, "I'm going to ask you for a little kiss." I said, "Why yes, Colonel Rowan," and I stood up and kissed him. As I kissed him, I heard the Dutch door of the Harker house open, and my mother, who was also a very strong-minded woman, said, "Deborah, come up here immediately." I said good-bye to Colonel Rowan and raced into the house. Willy Jones was with me. Mother said, "What were you doing?" I said, "Mother, I just kissed the man who took the message to Garcia." She said to Wilhelmina, "Is that true?" Willy said, "Yes, Mrs. Maxwell, it's absolutely true." Mother had no other recourse but to walk away.

That was the most exciting thing that happened to me that summer. Except for one thing -- I did kill one of Mrs. Dowd's black horses, because I didn't know much about horseback riding. Wilhelmina Jones and Helen Stein and I went riding.

Mr. Mosher

You mean these were rental horses from the Dowd stable?

Mrs. Harker

Yes. Willy and Helen were wonderful horsewomen, but I was not. We stopped to water the horses, and then I galloped the horse. I could hear the water rocking around in the horse's stomach. When we got back to the stable, the poor horse fell to the floor. I can remember the whites of her eyes and her heaving her last. Judge Dornin and Jimmy Campbell called me "horse killer," for the rest of the summer.

That one month in Mill Valley changed my whole slant on life, because of all the wonderful things in the Harker house. I was never the same.

Mr. Mosher

That's quite apparent, since you're now Mrs. David Harker. It did have far-reaching effects.

Mrs. Harker

It really did.

Dr. Harker

To get back to Colonel Rowan: When you go to Buffalo, one of the things you see in the Niagara Frontier[1] is the Roycrofters,[2] started by Elbert Hubbard. Hubbard is the man who wrote the essay about carrying the message to Garcia.

Mr. Mosher

Oh, yes, Elbert Hubbard, the sage of East Aurora.

Dr. Harker

The essay is based on the notion that Rowan was not one of the new generation of American boys. This man took the responsibility of carrying the message. He didn't say, "How am I going to do it, sir?" He just took it...

Mrs. Harker

...and did it!

Dr. Harker

That's how the whole story got to be so famous.

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[1] "The Niagara River, which tumbles over Niagara Falls between Niagara Falls, New York, and Niagara Falls, Ontario, is the frontier between the United States and Canada. The region of New York from Lake Ontario at Youngstown to about Lackawanna on Lake Erie (and reaching inland about twenty miles) is called the Niagara Frontier by most New York state inhabitants." David Harker.

[2] The Roycrofters were members of a commune led by Elbert Hubbard, who wrote the famous essay, "A Message to Garcia." Roycroft furniture was made by this group in East Aurora, which is southeast of Buffalo and in the Niagara Frontier.

Mr. Mosher

You say that's in Buffalo?

Dr. Harker

East Aurora is a suburb of Buffalo, about twenty miles away. There were lots of goings-on around there, like Chautauqua and so on.

Mr. Mosher

That's right, the movement started in that area, didn't it?

Dr. Harker

Lake Chautauqua is about fifty miles away. The area was a hotbed of idealistic intellectualism for a while.

To get back to California. What kind of thing do you want to know?

Mr. Mosher

Just the sort of thing you've been telling.

Dr. Harker

I used to come back to Mill Valley for the weekends from Berkeley, where I finally did well in chemistry and graduated with honors from the College of Chemistry under G. N. Lewis.

Mr. Mosher

Under what circumstances were you readmitted to the university?

Dr. Harker

I went to the dean of men and asked what I had to do to get back in. He gave me several assignments to complete, which I did. I was admitted on probation and did very well, and from then on I did well. I graduated with honors in chemistry in 1928 and started graduate school. I think I was on a dead-end problem; I never saw anything about it published later. It became more and more discouraging,

and at the same time I was more and more interested in a girl in the White Russian colony, Katherine de Savich. Finally, in 1930, I ran off with her to Syracuse, New York. But another thing happened...

Mr. Mosher

You're moving pretty fast!

Dr. Harker

Well, I was a teaching fellow in freshman chemistry in my first year of graduate work, for $800 a year.

Mr. Mosher

That was quite a bit then.

Dr. Harker

In my course were several members of the White Russian colony, the group that was forced eastward out of Russia, through Siberia, through Manchuria, to Japan and the United States. They were youngish army officers who were trying to get an education that would fit them for professional jobs. They were, of course, older than the rest of the freshmen. They were twenty-five or thirty years old rather than seventeen or eighteen. One of them took a shine to me and asked me if I would like to go to a Russian ball on St. Tatiana's Day. She was the patron saint of students. I said, "Sure." So I went over there and had a very good time. We drank a lot of vodka, and I was elected an honorary member of the White Guard. All kinds of things happened. Among other things, I met Katherine. I was invited to the house where she was staying with her married sister, and we got very interested in one another. Eventually we took off for the east.

Also, there was the great Mill Valley fire. I was in Berkeley in the summer of 1929, doing some graduate work and working in a summer boardinghouse as a waiter, when the big fire happened in Mill Valley. By the time I was alerted and got over here with some of my graduate student friends (one of them was Aaron Wachter), our house over here was completely gone. That was, of course, a terrible shock to me.

Mr. Mosher

Was your mother living here at the time?

Dr. Harker

She was up at Lake Tahoe. I telegraphed to her. Robert was off on some job, too.

Mr. Mosher

Is this your brother?

Dr. Harker

Yes, my brother Robert, two years younger.

Life, of course, was never the same after that.

Mr. Mosher

Was the home a total loss?

Dr. Harker

Nothing that was in the house was undamaged. We had a lump of silver, the remains of the table service which had melted. I don't think we have anything that was actually in the house that survived.

Mrs. Harker

That was one reason we were so happy to find the volumes of St. Nicholas magazine. They had meant so much to the Harkers, and it had meant so much to me to find them.

Dr. Harker

We had some pretty nice stuff -- all twelve volumes of the Century Dictionary, a Steinway piano. We had all kinds of things -- completely destroyed.

Mr. Mosher

That changed a lot of lives. It was such a drastic thing to happen.

Mrs. Harker

Yes, it was quite shocking.

Dr. Harker

You can censor this if you want, but this is the story I got from my mother -- and from several other people.

The day of the fire there was a north wind. It was very dry. The Ralston White estate on the mountain was, of course, endangered. The story is that he called members of the volunteer fire department and said, "I'll give each of you $20 a day if you'll come and protect my house." This was a lot of money then. According to the story, that's what they did. Being around the shoulder of the mountain, they couldn't see what was happening to Mill Valley. They stopped the branch of the fire that was coming down that way toward his place. Meantime, the rest of Mill Valley had no fire protection.

They got the San Francisco Fire Department out, and their hoses wouldn't fit our hydrants. Finally they were pumping water out of Blithedale Creek[1] and Mill Creek through the San Francisco Fire Department's hoses all the way up the hill. This was, in the first place, inefficient and, secondly, much too late for most of the homes. A hundred-and-something houses burned, without protection.

I haven't seen that story around, but that's the story I got.

Mr. Mosher

I've heard the story of the fire from many, many people, but I haven't heard this.

Mrs. Harker

I've heard it from other sources. Mrs. Katherine David was the last person to tell me. I'd heard about it from a couple of other people.

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[1]Corte Madera Creek in Blithedale Canyon.

Dr. Harker

It certainly is true about the San Francisco hoses not fitting our hydrants.

By the time I arrived in Mill Valley, something like five or six o'clock, daylight was fading and a huge flame was blowing down the canyon above Mill Creek. It was terribly dry, and all the aromatic bushes and eucalyptus trees contributed to one huge flame that blew downwards and caught everything ahead of it.

I don't remember much more than that. I was very confused; I think I went into hysterics.

Mr. Mosher

Did they put you to work fighting the fire?

Dr. Harker

There was nothing to fight by that time.

Mr. Mosher

You came up to look at your destroyed house?

Dr. Harker

Yes. I think to get back down we went out Ralston and down to Blithedale. Summit was in a terrible state. We then went back to Berkeley by the old ferry between San Quentin and Richmond, the Charles van Damme.

Mr. Mosher

Commuting was very different in those days. I think people would be interested in hearing how it was then.

Dr. Harker

My first year after I returned to college (having been readmitted), I commuted from Mill Valley to an 8 o'clock class in Berkeley. I used to take the 5:45 train from Mill Valley to Sausalito. That ferry put me in San Francisco about 6:45. I got the Key Route ferry about 7:20 which put me on a train to Berkeley and got me to the campus just in time for my 8 o'clock class.

It's a wonderful way to go to school. You had those two long ferryboat rides with nothing to do but study. I did all my studying on the ferryboats.

Mr. Mosher

Lots of people remember the ferryboats for eating and drinking coffee.

Mrs. Harker

And playing bridge!

Dr. Harker

I didn't do much of that, although those snails[1] that they used to have in those days -- coffee and snails...

Mrs. Harker

Those were delicious!

Dr. Harker

I remember one time saying to Mr. Walter Stein, "What wonderful walnuts they have on top of those snails." He said, "Yes, they are wonderful. They wholesale at 55¢ a pound, shelled." That was his business, wholesale food. He imported Oriental spices and things.

We commuted that way for a year, and then my mother rented a house in Berkeley. The big Berkeley fire was in 1925 or '26 -- probably in September?[2] I was a sophomore. It was very dry. Again there was a north wind. The houses north of the Berkeley campus were almost completely burned out, right down to the border of the campus. I remember the eucalyptus leaves would fly burning and catch the shingle roofs. The burning shingles would fly to the next roof, and so on. The fire department did what it could, but again hundreds of houses burned.

I remember we lost everything we had over there. I

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[1] A sweet roll baked in a spiral like the protective shell found on the backs of garden snails -- a pastry much favored by confirmed coffee drinkers.

[2] September 17, 1923. (Reference Room, Berkeley Public Library)

lost my textbooks, my ROTC uniform, and some other clothes. The Red Cross paid for my uniform and gave me money to replace some of my textbooks. I've always had a soft spot for the Red Cross, in spite of various criticisms that people make against it -- high overhead, and so on. In an emergency they come right through; no red tape.

Mr. Mosher

You spoke earlier of a Russian lady by the name of Katherine. Was she about your age?

Dr. Harker

She was a student but half a year older. She was a student in library science. She had been through Mills College on a scholarship.

Mr. Mosher

Was she born and raised in Russia?

Dr. Harker

She was born in January 1906 according to our calendar -- December 1905 according to the old-style. In fact, she was born prematurely because of the attempted revolution and strikes in 1905, after Russia was defeated by the Japanese.

She had tutors and went to school in Russia, an aristocratic school. She said there were always Romanoffs hanging around in the corridor. Then she was admitted to the famous Smolny Institute, which, according to the prospectus, was supposed to produce a new species of the human race. But she never got there. The Smolny Institute became the headquarters of Lenin. They seized the school and locked the faculty in the washrooms -- they had a hard time. From there the revolution was organized and was run successfully.

Katherine remembered that in 1914 they were at an estate their family had in Poland. They had trouble getting out of Poland ahead of the advancing German armies in their successful push of 1914. When the Russian army came through, her mother let them eat all the fruit in the orchard -- until they tore the trees down -- and all the preserves and whatever else was in the cellars, because they had lost their supplies.

The family finally got out on a train back to St. Petersburg. She remembered being pushed through the train window from the outside to the inside because they couldn't take a little girl through the crush at the doors.

They lived at Tsarskoe Selo, and apparently things were more or less normal. This is a suburb of St. Petersburg, where a good many of the government officials stayed. Her father was the Imperial Prosecutor; I guess that's like our Attorney General.

Finally, in 1917, her mother took her and her brother and sister on the train through Siberia to Vladivostok, until the strike should be over. That took thirty days. Sometimes they would stop in the middle of nowhere for hours and hours. Once, she remembered, a gang of tough-looking men in officers' uniforms came through the train and poured hot water out of the teakettles onto the officers that were on the train.

Mr. Mosher

What, pray tell, was the purpose of that?

Dr. Harker

They were, of course, part of the revolution, and they were just being mean to the people who were loyal to the imperial regime.

The train somehow got through to Vladivostok, which at that time was still loyal to the central government. They left Russia on their imperial passports for Japan. There they stayed for about six months -- in great luxury, I guess. Katherine told me they had their money in a Japanese bank. One day a very polite Japanese came with a suitcase, put it on the table, and opened it. It was full of rubles. He said, "Madame, here is your money. It is of no value to us, and I'm afraid it is of no value to you. It might be useful for starting a fire."

They had been living in tremendous luxury, with maids and other servants, so they didn't know much what to do. It shows the quality that is in some people -- they got down to work and made a living by teaching and proofreading and whatever they could find.

Everybody did something. Various armies went to Siberia to try to recapture it, and the brother went with one of them. Some of his memoirs about that are very gruesome. They ran short of ammunition. They had to shoot some prisoners, and they were so low on ammunition they would stack the prisoners four deep and shoot them all with one bullet.

I guess the family had a very rough time. They decided, then, that there was no future for them in Japan. The mother sold everything she had in the way of jewelry and books and got them the cheapest possible passage on one of the old President Line boats to Seattle. They were met by a letter from the brother, who had been there first, saying he couldn't get to Seattle and they must go down to San Francisco. They went on a mail boat to San Francisco.

In Seattle they had to pass immigration, and in order to do this they had to have a certain amount of money. A Russian priest and some of his friends in Seattle were doing the following: They would visit the people on the boat who had not yet been admitted and provide them with jewelry which they could display and thus be admitted. They would then return the jewelry to the priest, who would visit another family and get them in, and so on. Apparently he got most of those absolutely penniless people through immigration that way.

Katherine first worked, she said, in a factory where they made some kind of cloaks. She described very powerful sewing machines at which these young women were working. One of the women got her hair caught in the sewing machine and was scalped before they could stop it. They didn't have individual controls; the machines had to be stopped from a central control on the wall. She never worked in a factory again. She worked at The Emporium, operating an elevator. She came to the conclusion there was no future in this, so she went to Munson's secretarial school in the evenings and became a secretary. After she became a secretary she studied for scholarship examinations for entrance to Mills College and finally was admitted to Mills on a scholarship.

She lived in the Convent of the Holy Names, which was then in Oakland, and taught French in exchange for room and board. She worked her way through Mills and graduated with a first prize in French. They were pretty

tough people, those Russian aristocrats, when you peeled off the luxury.

She went then to library school at UC Berkeley. That's where I met her. Well, I met her at the party, but it was easy to meet her often because she was in library school and I was in the chemistry department. We were both sort of fed up with life as it was, and we ran off to Syracuse.

The rest of my life has essentially been spent away from California. I worked at the Atmospheric Nitrogen Corporation, one of the companies that resulted from the seizure of German patents.

Mr. Mosher

Just to finish the Katherine story, you were married and had children?

Dr. Harker

Yes, we were married and had two daughters. They live in the neighborhood of Buffalo, and they each have two daughters. My whole life, you might say, except for my brother, has been spent with female relatives.

Mr. Mosher

And did you say you two have been married for three years?

Mrs. Harker

We've been married for three and a half years, yes.

Mr. Mosher

Can you tell us, Deborah, what you were doing during this period?

Mrs. Harker

I ended up at the Pasadena Playhouse School of the Theatre. My father was a college professor in Santa Barbara. At very early ages my brother and sister knew they wanted to get Ph.D.s, but I didn't want that. In

fact, I didn't know what I wanted to do. There was a lot of family discussion about what Deborah was going to do, and finally we selected the Pasadena Playhouse. I felt that I had to have some discipline and carry through on something, so I went there for three years. I heard that Kate and David Harker were down at Cal Tech, where David was getting his Ph.D. I got in touch with them, and they invited me for banana waffles. Kate was working for a very small amount, wasn't she?

Dr. Harker

She gave French lessons for about $1.00 an hour. She washed windows for about 25¢ an hour. She worked in a hamburger late-night restaurant for about 50¢ an hour.

Mrs. Harker

I think their whole income was about $15 a month. I went down to have brunch with them, and I was terribly impressed by the way they served these banana waffles -- to the manner born.

The three of us became friendly. I used to invite them to Santa Barbara for the weekend, and I would give them tickets to the Playhouse. We were friends for about three years, I think, and then I lost track of them until much, much later when I saw them with their daughters, who were then grown.

Mr. Mosher

How did you happen to leave New York and come back here for your Ph.D., Dr. Harker?

Dr. Harker

I was fired in 1933 -- not for incompetence, I think, but because they had a huge cutback, and I was one of the more recent people taken on. So we all piled into a second-rate bus and came back to California. The trip took about ten days, and it was miserable. We were stacked together. We slept on the bus. Little Tania was two, and she kept getting on and off my knees until they were blistered.

We arrived at this house at 44 Ralston Avenue. I

had telegraphed saying we were coming on the bus. I gave the correct name of the bus, but everyone assumed it was Greyhound. Beth Livermore and my mother went to meet us at the Greyhound station, and of course we didn't arrive there. We arrived by Great Western, and nobody was there. I knew only one place to go, and that was this house. Our own house had burned, and my mother had erected a garage there in which she was living. It certainly wouldn't have held Katherine and Baby Tania and me in addition to her.

My Aunt Katherine, whom we called Kantan, took us in. We spent a couple of months in San Francisco looking for some kind of job. Finally I went around to John Franklin Forbes, John Douglas Forbes's father. He was a certified accountant. I said, "Can you lend me $1,000? I will go to Cal Tech and try to make a new career as a Ph.D."

Mr. Mosher

Still in chemistry?

Dr. Harker

Yes. I was admitted to Cal Tech, but I didn't get a scholarship. Mr. Forbes loaned me $500 and promised me another $500 the next year if I were successful. It turned out that I was. I received a teaching fellowship for the next year, and he loaned me another $500. I did pretty well, studying under Linus Pauling.

I got a job at Johns Hopkins, so we went there from Southern California, staying a couple of weeks at Lake Tahoe with my mother. Out of her little salary, Kate had saved $50, which she used to buy a car, and we went east in it.

Mr. Mosher

This was about 1936?

Dr. Harker

Yes, in three years she had saved $50. The car was a 1926 Chrysler, and we got to Baltimore in it. It was a fine car, but of course I didn't know anything about freezing weather, being a Californian. The first frost

cracked the radiator, so we never had a car for years after that.

When I said that after 1930 I hadn't been back to California, I don't count Los Angeles as a part of California in my mind.

Mr. Mosher

I'm afraid lots of people feel that way -- particularly those of us in Northern California.

Deborah, it would be interesting to know about your acting career. How did that go?

Mrs. Harker

Fairly well, actually. I was in New York for three years, and I traveled with a road company of "Dead End." A lot of my time was spent in job-hunting. There was a place called the Cherry Lane Theatre, where I think every penniless actor and actress has appeared. I finally went to Hedgerow Theatre, which was the only self-supporting, cooperative theatre in the United States, run by a man named Jasper Deeter.

Mr. Mosher

Where was this?

Mrs. Harker

This was in Rose Valley, Pennsylvania. I was there for a year, learning how to direct a play, how to produce it -- all parts of technical work in the theatre, as well as acting. He believed this is what you should do in order to be a well-rounded theatre person, and I absolutely agreed with him.

Then a group of friends and I wanted to start our own theatre, so we went to Dayton, Ohio, and founded the Dayton Civic Theatre, on the basis of a repertory theatre. We had a new play every two weeks. The professional company would act for two weeks, and then the lay people in Dayton who belonged to the group would have their own play for two weeks. This went on very well for a little more than a year, and then my brother was seriously in-

jured in an auto accident. Someone had to come home, and I went back to Santa Barbara, and that was the end of that.

Mr. Mosher

Your father was still a professor?

Mrs. Harker

Yes, he was still a professor at Santa Barbara State. This was before the University of California took over the school.

Mr. Mosher

Are we talking now about the late thirties?

Mrs. Harker

Yes, around 1937 and '38.

Mr. Mosher

Was the theatre getting any federal financing?

Mrs. Harker

No, no, not at all.

Mr. Mosher

You were doing commercial plays at the same time you were doing schooling?

Mrs. Harker

Yes. It was awfully hard work. People always think the theatre is such fun. I never really thought it was such fun. It was just an awful lot of hard work. The thing I liked about it was the discipline. I always felt that I had great need of that. I think that's one of the reasons I liked it.

Mr. Mosher

Have you continued your dramatic career?

Mrs. Harker

My first husband died after we had been married for thirty years. I hadn't done anything in the theatre for the thirty years, and one day I met a friend, Mariam Wornum, who was a very good friend of Dan Totheroh. This was about seven or eight years ago. They were doing "Tamalpa," and they needed a witch. I was the witch.[1]

I hadn't seen Dan Totheroh in many years. I used to know him in Pasadena when he was young and handsome, having original scripts produced there. We resumed our old friendship during the rehearsals for "Tamalpa." It was very exciting. I'd never been in a big outdoor amphitheatre before. I was working during the day, and at night we rehearsed. It was very demanding. I was much older, and I realized that my memory had had strange things happen to it.

After that I was in some plays in San Francisco. I treated the whole experience as though I were back in the professional theatre and needed a lot of technical training along with my actual acting. It was a wonderful, wonderful experience. Difficult, but very worthwhile.

Mr. Mosher

Are you continuing that in Buffalo?

Mrs. Harker

No, and I'll tell you why. We've been married for three and a half years. We don't have twenty or thirty years together the way young people would have, and David is too nice a man to leave alone. I like to be with him as much as possible.

Mr. Mosher

A very wholesome attitude. How fortunate you are!

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[1]On May 17 and 24, 1970, the Mountain play Association presented Dan Totheroh's "Tamalpa." The part of Ah-Shawn-Nee was played by Deborah Maxwell.

Dr. Harker

I am lucky.

Mrs. Harker

I am the lucky one.

Dr. Harker

It might be of some interest to tell them about our apartment in Buffalo.

Mrs. Harker

Ah, yes. You do that.

Dr. Harker

Ever since being brought up in Mill Valley, I like to be on a high place and look down at water. For the ten years that I was in Brooklyn we had a penthouse and looked out over the New York harbor from Brooklyn Heights. After that I went to Buffalo, where I was head of biophysics in the Roswell Park Memorial Institute, which is a cancer research institute. I was there for seventeen years.

The first couple of years I wasn't happy because I wasn't on top of something looking down on water. One day an acquaintance came along, an insurance agent, and said, "I know the place you want." It turned out to be a huge building abandoned in the twenties by a brewery that went broke during prohibition. This had been a laboratory and office building, and on top of it was a very fancy restaurant. The restaurant had been used as an apartment, first by an artist for about twenty-five years and then by two families who made up the rent between them and were really pretty low-grade. It was an awful mess, and they were kicked out.

It's on the thirteenth story, about fifty feet by thirty feet, on top of the highest-elevation in downtown Buffalo. It gives us a view over Lake Erie, the Niagara River, Canada (toward Niagara Falls, but you can't see them because they fall away from you), some Alleghenies -- a really beautiful panoramic view. Around the top of

this huge room, which had been the restaurant dining room, was a lighting trough. It contained dust a couple of inches thick. Nobody had cleaned it, apparently, since restaurant days. We found in it a collection of coins (pennies, nickels, dimes, quarters, fifty-cent pieces) some crusts of bread and rolls, a couple of chop bones, the inside of a lady's wristwatch, and a lady's garter. I heard later from some of Buffalo's old-timers that this restaurant was a notorious place for wild parties among high society blades and their lady friends.

The original building had a tar-and-gravel roof with a parapet around it. The dining room had been an afterthought, built over the roof and covering about two-thirds of it, leaving a third of it to collect rain. The roof sloped toward the apartment, and the downdrain was on the other side. They left an opening under the dining room so the water would run through and out the other side and down the spout. Well, pigeons found out about this. The whole space under the dining room was a vast pigeon nest, when we arrived. The noise they made, cooing and cheeping!

Mrs. Harker

They throbbed!

Dr. Harker

Then you could hear the baby ones that turned up every six weeks. It was really spectacular -- and unnerving.

Mr. Mosher

This was right in the middle of a metropolitan area, which is a little incongruous.

Dr. Harker

I called the pigeon control... Is this boring you?

Mr. Mosher

Not in the least.

Dr. Harker

...and they said, "Why don't you put a grid over the hole?" I was afraid to do that because I might catch some pigeons inside, and then what?

So I got myself an air pistol, which is not considered a firearm in Buffalo. You're allowed to have it and shoot it inside the city limits. Whenever the pigeons lit on the parapet I would fire at them. I guess I killed twenty or thirty, and the others got the idea and left. They sat down on the Baptist Church four blocks away. When I was quite certain there were no more pigeons inside, I did put a grid on the hole. We've never been troubled since.

Mr. Mosher

There were no recriminations on the part of the Baptist congregation?

Dr. Harker

They don't know where they came from, as far as I know!

Mr. Mosher

What is your position in Buffalo now?

Dr. Harker

Perhaps I'd better outline my career. I've told you about my position at Atmospheric Nitrogen. I was a bench chemist. I came back to San Francisco and went to Cal Tech as a graduate student in chemistry under Linus Pauling. I graduated in 1936 with my Ph.D.

Mr. Mosher

It might be interesting to hear a little about your association with Pauling before you go on.

Dr. Harker

He was interested in the structure of crystals, so I became what is called a structural crystallographer. Crystals contain molecules arranged in orderly array in

rows, the rows in layers, the layers in stacks, so that small groups of molecules are parallel. When you shoot x-rays at them, the effect is something like the scattering from a single molecule multiplied by billions. If you have a simple structure (like a few atoms arranged into a molecule) from the scattering pattern of x-rays you can work out the structure. If you have a crystal you can still work out the structure. If you had an amorphous mass without this regularity, it would be too complicated. But by having crystals of things we can work out molecular structure.

Mr. Mosher

This is all pretty much over my head. What's the definition of a crystal?

Dr. Harker

A crystal, from the point of view of Pauling, is an orderly, three-dimensional, repeating array of molecular units. A model of a crystal is the pile of cannonballs that they often have at military monuments. You have horizontal rows in two directions, and these horizontal arrays are stacked one above the other in an orderly way. That comes under the definition of a crystal, I guess -- except that a cannonball has far too many atoms!

I've spent my life finding the structures of molecules by shooting x-rays at crystals and examining the scattered x-rays.

Mr. Mosher

Where does this lead one?

Dr. Harker

To a knowledge of the principles by which molecules are hooked together out of atoms. Why is salt like salt? Why is gasoline like gasoline? Why is biological tissue the way it is? And so on. Why are some of them elastic and some hard? Some easily melted-and some not? It's the relationship between the intimate atomic arrangement inside materials and the properties they seem to have as you meet them in ordinary life.

This started developing in the twenties, and I got into it in the thirties. When I got my Ph.D. at Cal Tech they wanted a chemist with this knowledge at Johns Hopkins. I went to Johns Hopkins, and I taught freshman chemistry and did some crystal structure. Langmuir,[1] the Nobel Prize winner, was on the board of visitors, I guess they call it, of Johns Hopkins. He got interested in my work, and he invited me to the General Electric Research Laboratory for the summer. I went there, and two years later I joined the laboratory permanently. By 1950 I had a division of the laboratory to myself and was called head of the Crystallography Division.

Then I had the opportunity to embark on a pioneering venture to find the structure of a protein. It was discovered that proteins could be crystallized. Proteins, you know, are apparently necessary to the life processes of every living cell; they are thus fundamentally important substances to each one of them. I was financed at the Polytechnic Institute of Brooklyn for ten years, from 1950 to '60.

Around 1958 the president of Brooklyn Poly died, and the new president thought biological research was out of place in an engineering school. He said he would be delighted to have me as a professor of electrical engineering but that I must stop working on proteins. I felt devoted to the problem, so I put in a grant application for more funds to support the work. He refused to sign it, and I had to find a new place. Fortunately, Roswell Park Memorial Institute in Buffalo needed a head of biophysics and would accept this research program, so I went there in 1960. I was there until I was retired in 1976. Now there's a little foundation, the Medical Foundation of Buffalo, next door to Roswell Park, where I am able to earn some salary on a grant without having it subtracted from my pension. If I had a salary from Roswell Park, that would be subtracted from my pension.

Mr. Mosher

You're continuing research?

Dr. Harker

I don't think of myself as retired. I think of my-

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[1] Irving Langmuir, who won the Nobel Prize in chemistry in 1932.

self as having lost my salary! I like the scientific community in Buffalo, and I think the cultural environment is quite terrific for a small city.

Mrs. Harker

Yes, it's wonderful. There's a very fine museum, the Albright Knox Museum, which is probably the best museum in western New York.

Dr. Harker

For a modern art collection, it's said to be one of the best in the country.

Mr. Mosher

These are things that most of us don't associate with the name Buffalo, New York.

Mrs. Harker

No, they think Buffalo's in the Arctic Circle.

Dr. Harker

Of course there's Niagara Falls.

Mrs. Harker

Buffalo isn't the kind of place you go out of your way to visit. It has a great many good things about it.

Dr. Harker

It has a pretty good symphony of its own. It has a pretty good theatre -- along the same general lines as the Dayton theatre Deborah was talking about.

Mrs. Harker

Yes, they try out New York plays there.

Mr. Mosher

How large a city is it?

Dr. Harker

Half a million inside the city limits. A million and a half in what you'd call the metropolitan area. It's part of a megalopolis that stretches from Cleveland to Toronto. You are never out of sight of something urban.

Mrs. Harker

There's one thing about Buffalo that I do like very much, and that is the public-spiritedness of the citizens. They are all so extremely kind to each other. You wouldn't expect this in an industrial city, a large city, but I notice the people are very kind.

Mr. Mosher

In other words, it has the feeling of a smaller community.

Mrs. Harker

Exactly.

Dr. Harker

San Francisco, for instance, and Philadelphia and New York and Baltimore are very satisfied with their images. I used to be like that, as a Californian. Nothing was any good unless it had something to do with California, but I've lost that. Cities like Buffalo, like Cleveland, that have a feeling they must produce something in order to be in the big league, seem to produce a nice population.

Mrs. Harker

We had thought maybe we would like to come back here, but we find we're anxious to get back to Buffalo -- as beautiful as all this is.

Dr. Harker

Physically, this is one of the nicest places in the world. Buffalo isn't so good -- although, compared to most climates in the east, it's pretty good.

Mrs. Harker

I think when you judge Buffalo by California's scenic

standards it doesn't come up to what we have here. It's really quite tempting to want to come back here where the scenery is so beautiful.

Mr. Mosher

You may yet, sometime. You're lecturing here now -- to what sort of bodies?

Dr. Harker

I've been lecturing mostly to chemistry departments. On this trip I lectured at Oakridge, the big atomic energy installation, in the chemistry department of their research laboratory. I lectured in Tulane to a chemistry department. I lectured at Texas A&M to a biophysics department. I lectured at the University of Texas in Austin to a chemistry department. I lectured at Arizona State to a materials science division. I lectured at Cal Tech in chemistry. I gave a talk at Stanford in biophysics, and I'm going into chemistry tomorrow at Berkeley. I'm going to lecture in materials science at IBM Research in San Jose. That's as far as I've gone. It helps finance the trip.

Mr. Mosher

I'm curious to know how you feel about the direction science is taking now. This is a very generalized question. There's always some sort of debate within the scientific community, as you well know, about its role in society. As a lifelong scientist of your caliber, your comments on the subject would be appropriate, I think.

Dr. Harker

That's a very complex question! I believe that, as scientists, our responsibility is to find out how things work. To involve ourselves in questions about whether or not the results are going to be used beneficially, is a realm for which our training doesn't prepare us. I don't think we are competent.

Nobel, who was a chemical engineer I suppose, invented dynamite and then felt conscious-stricken about it and established the Nobel Prize. However, the constructive and destructive uses of that kind of explosive are not

the concern of science at all. What we are concerned with is, "Why does it explode?"

Atomic energy is exactly parallel.

Mr. Mosher

It's hard for the layman to realize that anyone capable of understanding anything so complex is not also capable of figuring out the course of life that should be taken. Great philosophical and social questions should be easy for them, we think.

Dr. Harker

That gets us into the realm of right and wrong, which I have tackled as an exercise in scientific method. I have come up with something that always provokes controversy. "What experiment could one do," I said to myself, "that will determine whether a certain action is right or wrong?" The only experiment I have been able to devise is to perform this action in public and collect opinions. If a majority of people (it has to be a good majority) think it's an action which is right, then it's right. If a majority think it's wrong, then it's wrong.

It immediately follows then, that right and wrong are not absolute but depend on the society with which you're dealing at the time.

Mr. Mosher

And at that particular moment, too.

Dr. Harker

When I press people for a more precise or more usable definition, I haven't got one yet!

This is entirely different, it seems to me, from another pair, which is good and bad. Experimentally this is an engineering term, I think, not an ethical term. If a pencil will write, it's a good pencil. It's a bad pencil if it doesn't. That's the way you would use the term. So it's perfectly possible for an atomic explosion to be wrong and good under these definitions.

There is still a third one (among others), and that is true and false. It is only with true and false that a scientist is competent to deal. A thing is true if it is demonstrated by logic or by experiment -- and if the logic or experiment is repeated by several independent investigators. It has nothing to do with the two other properties. True and false refers not to an abstract, objective phenomenon but to somebody's mental picture of it. Is the idea true in that it corresponds with the behavior of nature? That's where science is, and scientists are good at this.

I can name two great scientists who are equally competent. One is Pauling and the other is Teller.[1] They're both great scientists. When they emerge from science into the realm of politics, morals, ethics, and economics, they are at opposite poles. This ought to demonstrate to the general public automatically that scientists are not very competent in these fields.

Mr. Mosher

Or at least there's enormous diversity. They may agree on scientific matters because they're provable things.

Dr. Harker

Sure they would.

Mr. Mosher

But when you get into metaphysics and so on, they...

Dr. Harker

You know Pauling and the Stockholm Declaration.

In the early fifties he wanted the United States (and anybody else who would sign) to promise never to be involved in the production of an atomic weapon -- unilaterally, without guarantees from anybody else. This was exactly the opposite position from Teller, who thought the United States should put every effort into becoming

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[1] Edward Teller, nuclear physicist.

the dominant military power, based on atomic energy.

I think scientists have the same rights as anybody else to talk about these things, but they should not use their scientific reputations as arguments proving that their opinions should be given more weight than anybody else's.

Mr. Mosher

We have another situation that's being discussed now -- the business of creating life, genes.

Dr. Harker

Oh yes, recombinant DNA.

Mr. Mosher

There is a school of thought which feels this is an unbelievably dangerous area. How do you feel about that?

Dr. Harker

It's unbelievably dangerous not to understand it. We must work on it!

Mr. Mosher

What do you do with it after you understand it?

Dr. Harker

Well, destroying life is easy. We have terribly dangerous microorganisms already, that we know how to control, which have arisen spontaneously. There's no proof at all -- only a faint possibility -- that the new microorganisms which would result from the work in splicing DNA and creating new types of hereditary material by human intervention might not be very beneficial. It's just a chance that some of them might be dangerous. If they are we can deal with them, as we have dealt with other dangerous microorganisms. I see no problem, and as a scientist I must object to preventing their investigation. Everything we learn gives us more power in dealing with the physical universe.

Mr. Mosher

What of the analogy of using the knowledge to create, say, the hydrogen bomb? And the fact that it has already been used to annihilate two cities?

Dr. Harker

Not the hydrogen bomb.

Mr. Mosher

But the same principle.

Dr. Harker

As a scientist, no. It's the opposite principle.

Mr. Mosher

Let us say in terms of destruction they were similar.

Dr. Harker

All right, but the two bombs dropped on Japan were fission bombs and very dirty, in the sense that they produced a lot of radioactive by-products. The hydrogen bombs, which have been exploded only experimentally, are fusion bombs. You force hydrogen atoms together, they react to form helium, and there are almost no radioactive by-products, so they are clean -- but they are much more powerful as explosives.

Mr. Mosher

And now we have a new type, the neutron bomb.

Dr. Harker

I haven't really gone into how it works. What I hear is that it is a very good explosive and also very lethal. It will kill people involved in the explosion but is not dirty. It will not produce radioactive by-products which would ruin the territory afterwards.

Mr. Mosher

It's your feeling, then, that if a group of scientists

got together, a world group, and said, "There are certain areas in the future that we will never touch because of abuses which might possibly flow from them," this would be a wrong-headed position to take?

Dr. Harker

It certainly is not a group I would join!

Now that I'm a member of the National Academy of Sciences I'm being bombarded by letters to join this, that, or the other advocacy group. I have resisted all of these.

Mr. Mosher

What's involved in becoming a member of the National Academy?

Dr. Harker

It's all described by the secretary in a recent issue of Science. You must be proposed to the secretary by somebody. The secretary, in turn, must pass this on to the membership. The membership may or may not get interested. If a certain number of members get interested, they can nominate. There are many stages in this, but essentially it amounts to being elected by a majority of the members of the relevant scientists. For instance, as a chemist I would have to be elected by a majority of the physical scientists. That would be physics, chemistry, mathematics -- the so-called pure sciences. If I had been proposed by people interested in applied science (engineering or computer science), I would have to be voted in by them.

Mr. Mosher

That's sort of the ultimate honor, I should think.

Dr. Harker

In the United States. The only thing beyond is the Nobel Prize. They've decided to limit the number of members to around two thousand. With life expectancy what it is, they elect about sixty a year.

Mr. Mosher

Can you think of anything else concerning the general scientific posture that I haven't brought up and that's dear to your heart?

Dr. Harker

Oh, I have certain notions.

Mr. Mosher

What are those notions?

Dr. Harker

Science is something people do who don't do anything else, so they must be supported. I think, therefore, scientists should work so as to have public support. If they do something that doesn't get public support, then they must be content to work without it. This is not unjust. It's exactly the situation of artists or writers or musicians. They do not have the right to support; they must please the people who have the money. I object to forced government support of science -- or, for that matter, of literature or music or art. I think it has to be pleasant to the people who are paying for it.

In the old days, when we had great concentrations of wealth, you pleased the patrons. I think that must have been much easier than trying to please the general population.

Mr. Mosher

How do you transmit to the general population what you're doing, in a meaningful form?

Dr. Harker

That's our responsibility, I guess. The way it's done at the moment works pretty well. If you're any good in your line, the Scientific American or something similar will usually commission you to write an article. Once you're in there, the newspapers pick it up. The various science writers are pretty good, and they distribute the information -- although sometimes they garble it!

If we spent our time doing our own publicity, I

don't think we'd accomplish much science. It is a dilemma -- probably just as it is in all other lines.

I asked a group of people the other day if they could think of some individual who had contributed significantly to peace. The name of Einstein came up. Yet it was Einstein who wrote to President Roosevelt begging him to support research on atomic explosives, because he felt sure that this work was going forward in Germany and that if we didn't do it and do it better than the Germans, we were doomed. So there's the great pacifist!

Mr. Mosher

The answers are obviously not simple to come by, or we would have worked it out long ago.

This has been an extraordinarily fine experience and interview. I have really enjoyed it immensely.

Dr. Harker

I have, too. If there's one thing I love, it's to hear myself talk!

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