

**Interviews of the Margaret MacVicar Memorial AMITA Oral History Project, MC 356**  
Massachusetts Institute of Technology, Institute Archives and Distinctive Collections

**Almitra Sidhwa Patel** – class of 1958

Interviewed by Kira Buttrey, class of 2023

June 16, 2021

## Margaret MacVicar Memorial AMITA Oral History Project

Almitra P. Sidhwa (SB General Engineering 1958, SM Materials Science and Engineering 1959) was interviewed on June 16, 2021 by Kira Buttrey (SB Bioengineering 2023) via a video conferencing app. She was at her home in Bangalore, India, and Ms. Buttrey was at her apartment in Cambridge, Massachusetts.

Almitra Sidhwa (later, Almitra Patel) grew up in Devlali, India, with her parents and younger sister. She was drawn to nature at an early age, enjoying walking along the nearby beaches and observing insects.

Almitra received two bachelor's degrees—the first, in chemistry and botany at Bombay University—to indulge her love of biology. Her second bachelor's degree, and subsequent master's degree, were completed at MIT to fulfill her father's wish that she become a ceramics engineer in post-independence India. Almitra was both one of few Indian students and one of few women attending the Institute at the time. In fact, she holds the distinction of being the first Indian woman to earn an engineering degree from MIT.

After graduating, Almitra returned to India and spent 31 years working in the abrasives and foundry refractory industries. Her focus on talking with the workers on shop floors led to a manual of institutional knowledge that was distributed by the Svenska Silika Company in 80 countries. She concurrently helped manage the Sarasvati Education Society, a rural school trust founded by her parents. It now serves 4,000 children from 18 villages.

Following her retirement from the manufacturing industry, Almitra was free to undertake what became a second career advocating for a longtime passion of hers: environmentalism. Her aim was to bring India's waste management practices closer to those in developed countries. Toward that end, she has visited 214 Indian cities to learn about their solid-waste management practices and to work toward developing a nationwide plan. Almitra is perhaps best known for prevailing before India's Supreme Court in 1998 in *Almitra H. Patel v. Union of India*, a landmark case she and another individual filed in opposition to the open dumping of municipal solid waste—a case that was a key impetus for the drafting of India's Municipal Solid Waste Management Rules.

For more about Almitra's life, and her experience as a student at MIT, see the MIT South Asians Alumni History Project:

[\[https://mitsaaa.alumgroup.mit.edu/s/1314/bp19/interior.aspx?sid=1314&gid=183&pgid=55729\]](https://mitsaaa.alumgroup.mit.edu/s/1314/bp19/interior.aspx?sid=1314&gid=183&pgid=55729)

BUTTREY: Once again, thank you for giving me the opportunity to interview you for the Margaret MacVicar Oral History project. I really enjoyed your recent interview with the MIT South Asian Alumni Oral History project, and I hope to follow up on some stories you told then.

To start us off, could you talk about where you grew up and what that was like?

PATEL: Yes. I think when I was perhaps three or four years old, my family moved to Devlali [also spelled Deolali], a military cantonment town near Nashik. It's just in the rain-shadow area of the Western Ghats and was considered to be an ideal dry climate for TB patients, tuberculosis patients, because there were no antibiotics then. My father was running a cement tile factory. We'll come to that later.

So he got, from the cement dust, I think, bronchiectasis. But it was 30 years before they diagnosed that it wasn't TB.

BUTTREY: He thought that he had TB?

PATEL: Yes. All those years he thought he had TB.

BUTTREY: Oh, my goodness.

PATEL: So he moved the whole family to Devlali, but the tile business was beside the sea, across the harbor from Bombay. So he would be with us for a week and at the factory for a week, and then come back to dry out his lungs for a week and go back.

BUTTREY: Wow.

PATEL: I had all my schooling in Barnes High School, which was an Anglican Christian Church schools branch in the Devlali. It was an incredibly beautiful campus, I think, something like 63 acres on a hilltop with widely spaced stone masonry buildings. And in the center the dining hall, and meeting halls, and everything, with sort of Grecian columns and a very grand looking school. You can Google it perhaps, Barnes High School [Barnes School is a co-educational, Anglican prep school established in 1925 in Devlali].

BUTTREY: I will.

PATEL: And so from the school playground on top, one could really get a 360-degree view of the Western Ghats, which means a mountain range of jagged, rocky spikes, to which the kids gave names like Squaretop, Sugarloaf, Lion Hill. One was called Surprise Hill, because you kept walking toward it, and you thought you were almost there, but you kept going and it kept receding.

BUTTREY: That sounds beautiful. What were the academics at the high school like?

PATEL: I was a Senior Cambridge student at the time.

BUTTREY: What does that mean?

PATEL: It's a UK board [the Senior Cambridge examinations were academic qualification exams for a General Certificate of Education (GCE)]. I went to school pre-independence. [Indian] independence was 1947. I was in that school from probably 1940 till 1952, from kindergarten till the Senior Cambridge, which was the ninth standard at that time. Now we have 10.

And mine was the last class which had Urdu as a second language, which the British Indians felt was useful for administration. In 1947, the Indian government decided to switch to Hindi, which is a Devanagari script. But they did that with standard five perhaps, or four. So I was the last to pass out [graduate] with Urdu as the second language.

BUTTREY: What languages did you know growing up?

PATEL: In India, every child knows the language spoken at home, their mother tongue. Which for Parsis-- I'm a Parsi, which is a very westernized, small minority community. So I spoke English to my parents, my husband, my children, my grandchildren. The only vernacular language I spoke was a Gujarati dialect to my father's mother and to my mother-in-law and father-in-law after I got married. And, of course, we grew up in the state of Maharashtra, so one would know Marathi.

And there is a kind of a cinema or military common language which is not the government broadcasting formal Hindi but what they call Bombaya Hindustani, or army Hindustani. So Marathi, Gujarati, Hindustani like that. And English is what we grew up with.

BUTTREY: That's a lot!

PATEL: Yes. And then I took German as another language for my Senior Cambridge. But that was an examination—reading, writing. I can speak it when I go to Germany. But if you suddenly say, “Say something” [in German], it doesn't come. You know what I mean.

BUTTREY: Yes. Wow, that's amazing.

PATEL: Then when I moved to South India, I learned Kannada, which is the language of the state where I'm living now.

And Urdu, of course, I can read, which is a bonus.

BUTTREY: Does that make six or seven languages?

PATEL: Six and a half.

[LAUGHTER]

BUTTREY: I think that rounds up to seven.

In your previous interview [with the South Asians Alumni Oral History project, <https://mitsaaa.alumgroup.mit.edu/s/1314/bp19/interior.aspx?sid=1314&gid=183&pgid=55729>], you mentioned a childhood interest in biology. Was there anything in particular that interested you?

PATEL: Well, my father had a very nice young friend, Mrs. Perin Tijoriwala, and she was a great lover of nature. And in those days, there was no TV or nothing. The entertainment was your parents would drag you to spend the day, morning to night, at some friend's house. You'd be there all day maybe, having breakfast at home, and then you'd be there for lunch, and tea, and go back home in the evening for your dinner.

The elders would enjoy themselves, but for my younger sister-- I have one sister. She's nine years younger than me, so I was sort of an only child for nine years. It was very boring to go on these spend-the-day things. But there was this lovely lady, Mrs. Perin Tijoriwala, who was so understanding of children. She'd take me by the hand and walk me through the garden, show me the butterflies, tell me the names of the birds and the flowers, and show me how a caterpillar would form a little hanging chrysalis, and all those. So I've had a lifelong love of insects.

BUTTREY: Oh, me too.

PATEL: That's nice.

Did you grow up in a town or in the country?

BUTTREY: I grew up outside of Washington, D.C., in a suburb called Herndon, Virginia.

My favorite insects growing up were cicadas. They're roughly this big [demonstrates a length of about one or two inches], and the species where I'm from lives underground as nymphs for 17 years. They emerge in waves and live for something like four weeks above ground. They look funky and make these really loud buzzing sounds. During a big year they're just crawling all over everything, and I've always been fascinated by them.

PATEL: What do they call them? Clutterbugs?

BUTTREY: Cicadas.

PATEL: Oh, cicadas. We used to have an insect that we would call a clutterbug, because they would click and flip and do all sorts of things.

BUTTREY: I've met many adults and students who are interested in both nature and environmentalism. It seems to me that these experiences as kids with clutterbugs, cicadas or other interesting creatures can motivate an interest in environmentalism later in life.

PATEL: When we were in school, it was a co-ed school, my Barnes school, and a boarding school, although I was one of the day scholars. The boarding boys would keep various pets. They would either keep squirrels inside their shirts, or in a matchbox they would collect and keep these delightful, fingernail-sized red velvet mites. It's gorgeously scarlet and soft-looking quilted. It was adorable, like a spider family. It was fun growing up in nature like that.

BUTTREY: At that school, how common was it for the girls to study STEM?

PATEL: To study what?

BUTTREY: Math and science subjects.

PATEL: Oh, that's a story in itself. My father had these two girls and decided early on for population reasons one should never have more than two children. He would have preferred none, but my mother loved kids. He read too much Malthus [Thomas Malthus, the English economist famous for his 1798 book proposing that human population growth would eventually outpace available food and lead to catastrophe].

But he felt girls are just as good as boys. This is a trait for Parsis anyway, but he, more than anyone, brought us up like that. "You can do anything, be anything. Gender doesn't count."

In our school, we had common subjects for everything, except we would divide up for housecraft, which would be sewing, cooking, baking for the girls, and the boys would get physics and chemistry. I was a left-hander, and our sewing teacher would never get the hang of showing me how to do hemming or anything with the left hand. She'd show me with the right hand, and I'd have to kind of do it very awkwardly. And cooking and baking I never liked or got the hang of.

So my father said, "Fine, you go and study physics and chemistry." And I said, "Oh, my God, how can I do that? No girls ever go there." So he said, "Well, time to start."

So, very reluctantly, I was pushed as the first girl in that school to be allowed to study physics and chemistry with the boys.

BUTTREY: How impressive!

PATEL: After me, a cousin who was one class above me, she was also put into the science stream. So I was the only girl in that class of—maybe the class size was 30 or 40. So there would be 15 or 20 boys and me.

I've been asked: Did I know about the gender disparity at MIT when I went? I didn't know, and I didn't care. And it didn't surprise me, because since I was the only girl in the room full of physics and chemistry boys, it just seemed natural. It didn't bother me. Many of the girls, they would comment about it. They would have grown up in the more balanced schools.

Of course, I had balanced classes for everything else [other than physics or chemistry, in high school].

BUTTREY: Before coming to MIT, how did you end up at Bombay University studying chemistry-botany, if I'm not mistaken.

PATEL: That's right. I had a wonderful science teacher, and I think we did physics, chemistry, biology with the boys. I loved that, and the family moved to Pune so that I could get a better college education, because Devlali didn't have a college. I enrolled in science there, and I had an absolutely fabulous zoology instructor. He gave me a love for insects and flowers and birds, a love for mitochondria and whatever. I helped him with the study of color vision in bees, rock bees, and so on. Wonderful experiences.

I would have liked to study medicine and be a doctor; I decided that I loved studying that subject, and it still interests me hugely. But I wouldn't want to be a practicing doctor, and it didn't seem fair to occupy a medical seat, a rare and precious medical seat, and deprive someone who would actually serve society with it. I could have done research, but anyway I preferred the natural sciences—botany, zoology.

And then, for family reasons, we had to move from Pune to Bombay, to the giant family home where I was born and grew up. It's so restrictive in India that you can only take this or that particular combination of subjects, so I could not get botany-zoology, or I could not get zoology-botany. The nearest thing I could get was chemistry-botany, so that's why I took it.

BUTTREY: How did you decide to then attend MIT? And did you receive an additional bachelor's degree?

PATEL: Yes. I got a BS in 9B, which is General Engineering. But I didn't decide to go to MIT. My father decided it for me. I think I went through all that in the earlier interview [with the South Asian Alumni Association Oral History Project] perhaps, but I can repeat it.

BUTTREY: Would you mind doing a little overview of how you ended up at MIT?

PATEL: My father was a great admirer of Gandhiji [Mahatma Gandhi] and the independence movement. His mentor was the then Parsi mayor of Karachi, Jamshed Mehta. He told my father, "When India becomes independent, we are going to need industrialists who can make all the things that we are importing from Europe and the UK now. So start making this, making that."

So my father ended up—long story—founding seven to eight independent, completely different manufacturing businesses.

One of the businesses started after the tile factory had to shut down because of World War II and requisitioning of all the cement for military barracks, and bunkers, and things. All civil construction was stopped during World War II in India. So there were no buildings, and no cement for tiles, and no buildings wanting tiles.

So two Czechoslovakian Jews who were caught outside the country, fortunately—their families were gassed—they offered to help my father set up an abrasives business, saying the British war effort would need that. So he started a company called Grindwell, which later tied up with Norton Company [grinding wheel company founded in 1885; diversified into industrial products throughout the 20<sup>th</sup> century] in Worcester, Massachusetts. And then that was taken over by Saint-Gobain, so now it is Grindwell Saint-Gobain.

But at that time, my father said, "In India, we can get mechanical, electrical, civil engineers. But we have no ceramic engineers who know how to make the ceramic bonds for grinding wheels. So I want you to go study ceramics." So I said, "I'll do that on the condition you allow me to indulge my love of biology first." So chemistry-botany was a trade-off promise.

Meanwhile, he went to the United States Information Service Library down the road, went through what would have been perhaps a Barron's Guide at that time, and looked up everything. He came back and said, "Well, the best for ceramics seems to be Alfred [Alfred University, in Alfred New York] and MIT. And, for some reason, he picked MIT. I don't know if he realized it was some outstanding university ranked much higher than Alfred or whatever.

So he came with a form and said, "Sign here," and it went off. No essay, no anything. And in my third year out of four in college, I got admission [to MIT], subject to my passing the fourth year. So that was that, and I was on my way.

BUTTREY: That's amazing.



PATEL: Not very willingly, but you did what your parents told you in those days. Or most of us did.

BUTTREY: Once you got to Boston and MIT, what communities were you a part of?

PATEL: All freshmen had to join the girls' dorm in Bexley Hall, in Boston, across the river. And from the second year onwards, there was a girl's tower just across the main entrance. I forget its name. I think it was known by the number of the building, street number. I can't remember. [McCormick Hall]. There, I moved in with another girl, a Norwegian-origin girl [Gwen Lytle]. A lovely person. I am still in touch with her. And in Bexley Hall, before I went to MIT when I was admitted, the administration sent me a letter saying, "Your Big Sister will be Martha Goodway [S.B. General Engineering, 1958; one of only 19 women to earn a degree at MIT that year; an acheometallurgist who became the first metallurgist to be employed full-time at a U.S. museum, in her 40+years with the Smithsonian Institution's Museum Conservation Institute; worked on an extraordinary range of artifacts, from the crankcase of the Wright brothers' first plane to Etruscan mirrors to European harpsichord wires], and this is her contact [information]. And you can write her all your questions about MIT."

She would write and ask, "Are you vegetarian?" And this and that. And she advised me, "Don't buy any warm clothes or anything in India. You won't know what's appropriate. You come here, and I'll take you shopping in the first week." She was a gem. I remember going to Filene's Basement and buying affordable, lovely stuff.

BUTTREY: From the interview she did for our project, it sounds like she really enjoyed having you as a 'younger sister' and friend.

[LAUGHTER]

Was there a social life with the other women of Bexley as well? I think that you mentioned that there was a dining hall. Did you have big communal dinners together?

PATEL: Yes. We would all sit down to dinner together. But the one I knew the closest was wonderful Joanna Mary Louise Larsen [SB in Mathematics, 1958; worked in aerospace as a software engineer], a tall 6-footer, lovely girl. I just lost track of her. I tried for years and years, through the Alumni Association, but I never could get her. Except I read an obit indicating that she was no more, and I felt so bad that I'd never connected again.

So I had three special friends. Martha was the Big Sister, and Gwen, who was my roommate, lovely person, she was the second. And Joanna, my best friend. I wasn't that close to any of the others. One would form smallish groups, you know?

BUTTREY: Yes. Did you get involved with the Indian community in Boston?

PATEL: My only and very close friend from MIT to date—I just spoke to him this morning—is Kishore Mariwala [SM Chemical Engineering Practice 1959; Chaired Hindustan Polyamides and Fibres Ltd.] from Chem Engineering. He was one year my senior, and he was telling me at the time that there's two kinds of Indians there. There were some which would only huddle with their own kind and not have any other friends, just an Indian group. And there were others who said we don't want to have anything to do with that and would associate only with the whites. And this Kishore's group was the only one which had Americans and Indians both, and it was a very enriching experience.

BUTTREY: That was your friend-group as well?

PATEL: Yes, yes.

A very nice friends group. Very nice. Seven to eight of them, girls and boys.

BUTTREY: Do any MIT classes still particularly stand out to you?

PATEL: You mean, which did I love?

BUTTREY: Yes.

PATEL: There was a fabulous English teacher, Professor Theodore Wood Jr.—Ted Wood. [MIT Professor of Literature and American Studies for over 45 years, beginning in 1941; known as a 'students' teacher' given his demonstrable commitment to his students]. Gem of a jovial, humorous guy. He became sort of more than a mentor, even like a best friend, across generations. One summer he even invited me out to join him for a week in Colorado. Imagine a professor inviting someone along.

BUTTREY: Did you go?

PATEL: Oh, I loved it. Loved it.

BUTTREY: What made his classes so good?

PATEL: I think warmth and love of language. And if you love your subject, it shows. He was a wonderful person.

And, of course, growing up in a family speaking English, and being a voracious bookworm, and in an English-medium school, and then college and everything, I probably spoke better English than American classmates. So maybe that's why he connected with me.

BUTTREY: I bet you spoke better Urdu and Hindi as well! What other humanities classes did you take? I know you mentioned in the previous interview that those were some of your favorite classes.

PATEL: The humanities classes?

BUTTREY: Yes, do you remember any in particular?

PATEL: I had Introduction to Western Classical Music, beginning with Bach and whatnot, which I still love the most. And American Folklore, and Japanese Haiku, and some others. The only one which was a little nod to my future career was one Sloan course in Labor Relations. The rest are all fun ones.

BUTTREY: But they sound enriching too. And it sounds like you maintained a lot of that interest and joy—

PATEL: What absolutely blew me away was the choice that American education offers. Apart from some core basics, you can always take one yummy thing of your choice every term and then branch out into whatever you like, more and more as you go up higher and higher. It's so different from having to take chemistry-botany and that's all you get. Otherwise, you take physics and geography or some weird combinations.

BUTTREY: I've really enjoyed that breadth too.

As I understand it, you returned to India to work at your father's company after graduating from MIT with a master's in ceramic engineering [SM in Materials Science and Engineering, 1959]. What was it like to be a woman engineer in India at that time [at the end of the 1950s]?

PATEL: Well, the thing is, my father didn't have the money to send me to MIT, so he got the company which he founded to pay for my education in return for my signing an employment bond for five years after I came back from the U.S. So, in a sense, I was there as the owner's daughter—not the boss's daughter, the owner's daughter—and the managing director's cousin. So there was a little bit of people tiptoeing around me, I guess. I couldn't be part of the gang, so to speak.

But I had a wonderful colleague Anwar Tungekar in the R&D department which I joined, and because I had come flaunting a foreign degree, I was perhaps technically his boss in the department. But he really hand-held me so lovingly. A chemist, he was, and also from the local community, salt farming in the fishing village and so on. He gave me a lot of insights into rural life and Muslim community life. My first close Muslim friend.

Now his son Dr Numan is my best friend. I probably knew the boy as a baby, though I don't remember him that way.

BUTTREY: It sounds like you're very good at making close connections no matter where you go.

PATEL: It wasn't always like that. When I grew up in high school, I was an absolute nerd. I had only one girl that I would talk to, and we went up from second, to third, to fourth, to fifth together. She was my only anchor. I wouldn't speak to anyone; no one would speak to me.

I would come first in every subject in every class. And, of course, if you go up with the same bunch, that's likely to happen. She failed two years before I graduated, so the last two years without my anchor and security blanket were very, very lonely. I was sort of labeled a nerd that wouldn't talk to anyone or wouldn't be talked to. So when I went to the Pune College [north of then-Bombay], I decided I'd make a break with it. I went into the ladies' common room and decided to be the first one open my mouth—my heart and my mouth—saying, "Hello, I'm Almitra." I became a little bit like a leader because I was the first one to have spoken. And from then my life flipped. Now, you can't stop me talking!

BUTTREY: I don't want to!

[LAUGHTER]

BUTTREY: Why did you decide to continue in ceramics engineering after the five-year bond agreement was over?

PATEL: Because that's what my father had sent me to the U.S. for. And what I was doing, in R&D in the company, was to develop and fine-tune the ceramic bonds to give different properties to the grinding wheels. The ceramic bonds were being made by a family ancillary firm. They wanted to keep the bond formula secret. It was a very key ingredient of a good grinding wheel.

My father was told by those Czechoslovakian co-founders that you have to keep the bonds secret, in a separate location. So that was started with some family members, and the factory was in a different location. After I finished the five-year bond, I just naturally moved to looking after that factory, which I had been hand-holding anyway during the five years, getting the ceramic bonds made over there.

It was just moving from the parent company to an ancillary, family-owned thing. And I was the managing partner there. But the important thing was we had one grinding wheel client, Kirloskar, who had induction furnaces for melting iron and casting their things. And they asked us, "Since you're making grinding wheels, can you help us get

an import substitute for silica ramming masses, monolithics, which we are importing from Sweden?”

I just worked on that and developed it. And over the years, that became a very main business, much more than the ceramic bonds, which, after 30-40 years, moved back into the main factory to be made there. And the ancillary made only the ramming masses, the silica monolithics.

BUTTREY: Could you talk more about these products? I'm not super familiar with ceramics.

PATEL: Monolithic is a mixture of coarse, medium, and fine silica, stone, gravel, and sand, which gets rammed into an annular space around an iron crucible former. When you induction-heat it, the metal former melts. And that refractory lining with boric acid binder solidifies in place, like a sugar-cubes consistency kind of thing, as a refractory liner in which the iron can be melted.

BUTTREY: Thank you.

You previously mentioned that your father believed that India needed ceramic engineers in order to prosper post-independence, and that this at least in part motivated his sending you to MIT for related studies. Were you motivated by a similar sense of patriotism?

PATEL: By a sense of duty?

BUTTREY: Yes.

PATEL: Yes, absolutely. You did what your father wanted. And that's what he expected—that's what you did.

BUTTREY: Did you feel a sense of duty to India post-independence as well?

PATEL: Oh, I couldn't wait to get back home.

Because I really love the fishing village where the tile factory, and later the grinding wheel factory, was located—across the Gateway of India [monument built in 1924, marking India's chief ports] from Bombay, four kilometers across the sea. I passionately loved that as a child, being able to roam the beaches, collect shells, and stones, and bones, and whatnot, and help the fisherwomen sort fish, and watch all the exotic things—the snakes and octopuses, and all the fish chucked back into the water.

BUTTREY: Wow. That sounds amazing, especially for someone interested in nature.

PATEL: Yes, absolutely. I was really homesick for that place and happy to come back.

And yes, I very much do feel that if one has an education and a talent, one owes it to the country to help it come up.

BUTTREY: What are the kinds of things you accomplished in the 31 years you spent in the abrasives, foundry refractories, and cement tile industries?

PATEL: Not so much in the tile industry. But in this refractory industry, developing an indigenous industry for these silica monolithics. And more than that, going to the customers' factory foundries and learning from the furnace operator on the shop floor what makes it work, what makes it fail, what gives it longer or shorter life, and then sharing that, and learning and sharing across customers. I ended up writing a troubleshooting manual, which the Svenska Silika Company from whom we were importing a little bit of the ingredients translated into five languages and distributed to their customers in 80 countries, I was told.

BUTTREY: That's amazing.

PATEL: Obviously, that was a very useful thing, getting all the shop floor tips and knowledge together in a composite manual of how to increase furnace lining life.

BUTTREY: Were you the first one to go to these workers who were actually operating the furnaces to ask for advice on their use?

PATEL: Probably. Because I think most of the other salesmen would visit the purchase manager or the general manager or the CEO.

BUTTREY: Yes.

PATEL: Those people knew how to run a company, but they didn't know how to run a furnace.

BUTTREY: Yes. It was really smart of you to approach the workers.

PATEL: Maybe because I was the owner's daughter and had the run of the main grinding wheel factory, I had no problem at all going to the mixing people and saying, "How do you improve the mixing? Why do you make it more or less wet, or this or that mixing time." Go to the pressmen: "What happens with more or less pressure?" I was very comfortable talking to the lowest-level person on the shop floor and realized how much knowledge was there, rather than higher up.

BUTTREY: That's incredible. If I'm not mistaken, since 1961 you've served as a trustee and executive committee member for the Sarasvati Education Society's four educational institutions at Devlali, which serves over 3,400 village students. How did you get involved in that project, and what does the work look like?

PATEL: That is a long story. We were living in Devlali, and I was going to Barnes School, this big Anglo-Indian school. Down the road was a smaller Zoroastrian boarding school which didn't have a proper lab and didn't have a good science teacher. The education department had given them two or three warnings, and then finally they were told, "We can't extend your recognition anymore. We're going to de-recognize your school. And then all your kids who are in the final year will get no leaving certificate." Without that, they could not go into any college for any higher education; it would be the end of those kids' educational career. So the teachers approached my parents, where we were living in Devlali—"Can you please go and appeal on our behalf to the education department, give us one more chance?" and so on.

So my mother, with much trepidation and much urging from my father, went alone to the education officer, a high government official. He said, "I can understand the plight of those students, and we don't want them to suffer either. But we've given three warnings to that school. We can't extend it anymore. But if you want to start a new education society, we'll give you, in a week, permission to operate and to take over that school. We can't excuse a defaulter for a fourth time, but we can certainly encourage a new school management." So they started that. They took over, I think, 40 students, who were in 8th, 9th and 10th standards.

BUTTREY: So your parents took over the educational responsibilities of these 40 students.

PATEL: During World War II, we were staying in a rented bungalow on the ground floor. And the upstairs and the side, you can say, servants' quarters or whatever, were all occupied by military officers and military lower ranks. After the war ended, that was all vacant. There were no tenants for that. So my parents asked the landlord, "Can we move the school upstairs? Forty kids, four rooms, not a big deal."

My parents decided that they would run this education society for the three years till the 8th, 9th, 10th graduated, and then close it down. And when the villagers in the next village—in whose limits our bungalow was,—they came to our parents and said, "You are running the school for those kids, but what about us? We have no high school in our village. We've only got a primary school. And there are no buses, and our children have to walk four kilometers to the high school in the cantonment town. So why don't you continue the school for our children?" So my parents said, "OK, why not." One thing led to another, and now we have 4,000 kids from 18 villages.

BUTTREY: That sounds like a huge amount of work for your parents to just pick up.

PATEL: When it's a trust, you have to have minimum seven members. So OK, somebody left or somebody died, and my name was stuck in as a committee member—and I wasn't really doing anything for or about the school. My mother was almost single-handedly

running the entire school as it grew and grew and grew till, at the age of 90, she died in four days, and my sister and I had to take over.

For the first eight years, my husband and I were managing trustees. When my husband died, my sister took over as President and me Vice President. And that's how we're going on to date.

BUTTREY: What kind of work do you do for the Society?

PATEL: I'll tell you the current situation, let's say, before COVID—two years ago. My sister and I— She lives and works in Bombay. She and her son are running the tile factory [Bharat Floorings and Tiles factory]. It will be 100 years old in 2023. So a third generation is running it. She would go to Devlali from Bombay, and I would go from Bangalore, and we would spend two days at the school and sit and have meetings, first with the CEO and the headmaster one on one, and then in a group with all the heads and supervisors, and have a long agenda. My sister's a great one for meetings—so 8:00 AM to 8:00 PM. And then there would be more meetings, a very intense two days.

BUTTREY: It sounds like it.

PATEL: So many issues. But we managed to buy first one, and then two, and then three plots of land adjoining the school so we have expanded it to about five acres now, including playgrounds and so on. I love the building part of it, so I do all the technical stuff. And my sister, who's an MBA from Ahmedabad, she was in the first batch of [graduates from] the Indian Institute of Management [a prestigious management school]. Also, I think, probably four girls out of 60 or something. She does all the admin/HR stuff.

BUTTREY: You have an incredible family.

PATEL: Yes.

There is always something or the other to be done, decisions to be taken, facilities to be added, plans to be made, ways for bringing up the educational standards, adding a technical stream. I think we are the only school in that county to have our children study technical subjects for their finals which is the Secondary School Certificate exam, giving a vocational subject exam. That gives them added marks and reserved seats in an ITI, an Indian Technical Institute, like a trade school.

So it's very beneficial for getting employment. Then we started, for the ones that couldn't get into the technical stream, about eight or nine different optional one-hour-a-week vocational subjects like mobile phone repair, or cooking and baking, and beautician and dressmaking courses.



BUTTREY: This all sounds very well thought out and supportive for your students.

PATEL: Yes. So it's challenging and satisfying, thinking of ways to improve things.

BUTTREY: Yes.

PATEL: We have a computer lab with 60 desktops, so each child can have one without sharing. We start them off in class 3 quite young and go on.

We seem to be always two or three years ahead of the curve. And then all our teachers say, "Oh, you know what you started? Now, the government is mandating it for next year, we have to teach computers! Oh, we have to think of vocational— We have to do something!"

BUTTREY: Another altruistic project of yours is your role as the Honorary Project Officer for an international effort to save the "Gir" lions—I don't know how to say it.

PATEL: "Gir" lions [pronounced gear].

BUTTREY: "Gir." Thank you. This seems like a very different role than your work in ceramic engineering. What inspired your shift to environmental activism, and how did you make that happen?

PATEL: Well, my sister Dilnavaz at IIM was approached by someone saying the Bombay Natural History Society is looking for someone to be an Honorary Project Officer. And they said, I see that you love the campus dogs so much, and you seem to be an animal lover, would you like to do that? She said no, but my sister would love it. And, oh boy, did I ever love it. They were the happiest three years of my life.

[LAUGHTER]

BUTTREY: What were you doing?

PATEL: Over those three years from 1969 to 1971, I think I made six or seven trips to the forest, staying with the scientific researchers about five, six days at a time, to get their various problems solved, get them their money on time, get them a Jeep, get the Jeep repaired, get them permissions from the government for this survey or that—all that liaison stuff. And then, ultimately, we came up with a recommendation for park management, which could save the lions.

What was happening at the time, it was one pocket of forest. So in a drought year, all the cattle from the entire district would feed off the grass and everything in that forest till the rains came and they could go back home to their villages. Imagine all the cattle in an entire U.S. state converging on one county. That totally degraded, and decimated, and crowded out the ungulates, you know the deer, and antelope,

and other things which the lions would feed on. And that would naturally invite the lions to feed on the buffalo, which had come in place of their natural prey.

Then there would be poaching, and poisoning, and threats by the outside cattle herders to protect their buffaloes from the lions. Not the resident population, but the drought migrants who had no affinity or connection with the lion or the ecosystem or anything. So we gave the Gujarat government a management plan for excluding this summer immigration. We said, "We'll export grass to those places. The animals should not come in—" The resident herdsmen were also moved out of the core area, to be designated a national Park for more effective eco-protection.

And it got a prize as the best managed national park for that year.

BUTTREY: Wow, congratulations.

That sounds like a great link between your interest in zoology and your skills in talking with people and problem solving. It sounds like a great role for you. What inspired your shift further into environmental activism, to the point that you became an expert on solid waste management?

PATEL: Well, it was part of the same thing: a love of nature. When we moved to Bangalore—my husband came here to set up a silicon carbide factory for Grindwell—we bought a village farm which was 12 kilometers and four villages outside the city limit. It was sort of rural suburban. You might say semi-rural, or rural life. And the kids were just half an hour from the town and school. It was the best of both worlds.

Over time, the city began dumping garbage all along this beautiful, pristine rural road and trashing it, so when my husband retired, I said, "I will also. Let me spend my time doing something about this." I began by tackling the local city hall—"What are you doing, what's your problem, how can I help?"—and one thing led to another.

Then I was joined by an ex-army man Capt J. S. Velu, working for a group called EXNORA—Excellent, Novel, Radical—in Chennai [Madras]. The founder M. B. Nirmal had gone to Hong Kong and been so impressed with its cleanliness. He saw that the waste is collected at the doorstep; nobody chucks it 24 hours a day on the road to be picked up at will. And they also segregated wet and dry [waste].

Capt Velu was in Bangalore for a year's project to set up a pilot EXNORA model. And then during the Surat plague [epidemic of pneumonic plague in 1994], the garbage choked the drains, and floods got the rats out, and India was sort of shunned and shamed before the whole world, so Velu said, "We are sitting on a time bomb. And if we're going to do one city at a time in a year, it'll take us 300 years to clean up our 300 largest cities. So we've got to hit the road and cover 30 cities in 30 days,

explaining to the municipalities how to manage their resources.” So that's what we did.

BUTTREY: And what recommendations did you give?

PATEL: We urged daily doorstep collection of unmixed wet (food) and dry (recyclable) wastes using tricycles with separate bins. Then there was a conference on fragile ecosystems. During the first five minutes, they said the definition of fragile ecosystem was where human interference will upset the ecology. I said, “What are you looking at, Sahara and Antarctica? Look outside every city limit, the garbage is trashing the environment. The stray dogs are breeding uncontrolled, becoming feral and wild, chasing the farm workers as they go home in the evenings, killing all the livestock around by day and by night, and terrorizing the neighborhood. I mean, these are our fragile ecosystems.”

There was a lady there who had spent 10 years fighting to get her town of Dahanu, a fruit orchard town, designated as an eco-sensitive zone, to protect it from pollution from a thermal power plant. It had been given permission to come up on the coast on condition they put up a Flue Gas Desulfurization unit, which they did not install for 10 years, stalling and saying, “Oh, we can't afford it. It's too expensive. Forget that that was the precondition for putting it up.”

So those people persuaded me. “You've worked for four years with your Bangalore City municipality and not gotten very far, and you've been all over the country, and you've seen it's the same situation all over. Go to the Supreme Court.” We had put a label on our red high-roof van: “Clean up and flourish or pile up and perish”. And as we drove along, Velu said, “India's highways are the garbage map of India, because the highways would connect one city to another.”

As we approached a city, five kilometers before the city limits the garbage would begin on the roadsides. And, as we left the city, after five kilometers, the [piled up] garbage would stop. That's why he said the highways are “the garbage map.”

So I went to the Supreme Court [of India] [*Almitra H. Patel v. Union of India* (1996)], saying that municipalities can't manage waste in the middle of their municipal limits, which is defined for dense habitation. They are not allowed to purchase, as a municipality, land outside the city limit to manage their waste. The state has to give them the land. I went to the court asking that every state should give land to its 300 major cities, so that the wet waste could be composted there, the dry waste sorted for recycling, and so on. Ultimately, the court ordered an expert committee to be formed, which I was expecting to backseat drive. But the government advocate himself said, “Why don't you include the petitioner, since she knows so much about

the subject.” So then I became part of the committee, and we developed a solid waste management plan for the country.

BUTTREY: How did you learn about solid waste management? Were you self-taught?

PATEL: Again, by learning from the people who are doing the collection at the door. And then we would go to a city, and we'd say, “What are you doing with your waste?” The city Commissioner would reply, “Nothing. Call number two officer: “What do we do with our waste?” He'd say, “Just a minute.” He'd call number three, who would say, “Let me call the driver of the truck. He knows where he's dumping it.” So the city manager, the commissioner, he hadn't a clue. I think the biggest advantage of the court case was that when they were asked to answer the court, a file was created. And instead of being a file at the bottom of the pile, it became a file at the top, and it became a visible subject to occupy their attention.

BUTTREY: So have you been appointed as a member of the Supreme Court of India's committee for class-one cities?

PATEL: No. Once we gave our recommendations and the Rules were framed, the committee sort of disbanded by itself without being ordered to stand down. It just went into a coma you could say.

And then in 2017 I was again appointed by the Supreme Court to a different Delhi solid waste management committee. That's a different story. That is a follow-up of, “Why aren't you doing what your Rules require you to do.”

BUTTREY: That's very interesting.

I've been wondering if you can comment on how much your MIT studies impacted your work. Also, were there things you were not able to learn at MIT, things you needed to find out as a result of working and doing?

PATEL: Well, when I went to MIT, I was given this faculty advisor who said, “You can get credits for this and credits for that. You can have one or two or three electives credit for your biology, but not great chunks of it.” So there was a course, 9B, called General Engineering, which was a godsend for me. It was a specific course for people like that, so they could take a little bit of everything to come up to speed with whatever the freshmen and sophomores had been studying.

I had to have two or four courses of calculus, which was hairy, and then strength of materials, and electricity, and crash physics, transfer physics, and so on. So whether I liked it or not, I became a sort of jack of all trades. I had to study one subject of everything, which I would have perhaps gone through in my first two years as a freshman and sophomore at MIT.

And then, when I came back to the Grindwell factory, I sort of felt, “Oh, my goodness, here is a problem, and MIT didn't teach me this particular answer to this particular problem.” I felt very insecure. But, over the years, what I understood was, comparing myself to what I saw around me and what made me successful, that MIT teaches you to think, which Indian education does not; it's all rote learning. So it was a great shock to me at MIT that except Ted Wood's English classes there wasn't a single exam where you had to write a sentence in English. You just had to solve problems.

There was no reproducing the first law of thermodynamics from memory without understanding. You just applied it. Also, this rigor of, “You've got two nights to finish this project. Go to the library, study all of this, and come up with something, and present it to the class.” This dreadful pressure cooker [at MIT], decision making at gunpoint, stood me in good stead.

BUTTREY: Would you mind speaking about the conversations you had with your daughter as she was deciding between attending MIT and Stanford?

PATEL: Yes. We were strictly hands-off with both our children. We let them absolutely take their own decisions, let them write their own essays. We wouldn't correct them. We wouldn't do anything. We wouldn't fill any forms. We wouldn't help them go to the bank and pay for things. We let that all be part of the learning curve. And except when my younger daughter Simonil got admission to Stanford, plus MIT and a couple of others (I forget which), and she was wondering which of the two [to choose], then I burst into tears and said, “Please, please don't go to my MIT. Please go to Stanford. It was just too traumatic an experience [at MIT].”

In hindsight, at the time, I was making Dean's List every year, except the first term, when I flunked the calculus—OK, I was a high achiever [as a student at MIT]. But the price was terrible.

BUTTREY: What was the price?

PATEL: I don't know what English word to use. Being ragraoed, rubbed and pressured to perform. Something like that.

BUTTREY: That makes sense.

PATEL: And, of course, this is all self-driven, you know? I could have gone through MIT with just passing classes. I could have comfortably sailed through if I chose.

BUTTREY: But did you feel like the environment at MIT pushed you to do more?

PATEL: Yes. Everyone has to push themselves. Yes.

BUTTREY: It's very easy to get sucked into that.

PATEL: Also, I had come there from being first in every subject in every class all through high school, and similarly shining in college. And, of course, those kinds of handpicked students come to MIT. All the others would have also been toppers in their class and so on. But I never felt I was competing with anyone else in the class. You were only competing against yourself, and your grade was at an A plus or an A or a B plus or what.

BUTTREY: Right.

You've mentioned a few different impactful mentors you've had throughout your life, including Martha Goodway and Ted Wood. I was wondering what made their mentorship so impactful.

PATEL: No. With Ted Wood, I was just able to de-stress from the academic pressure, having someone interesting to talk Shakespeare or Longfellow with or whatever.

BUTTREY: OK.

PATEL: And just general things. What a huge joke for him it was that I decided to wear a green sari on St. Patrick's Day! Things like that. We had a funny relationship, and he always remembered me for that.

And Martha, of course, hand-holding through—"What do you do about this? How do you cope with that?" She was just a go-to person.

And Gun Hovik, Gwen Lytle now, Gwen was just a charming, lovable, wonderful roommate. You know, such a pleasure to be with. Yeah.

BUTTREY: You mentioned earlier that as a student, you didn't know that you would become the first Indian woman to earn an engineering degree at MIT—and that knowing might have only added to the stress you felt. Looking back now, what does it mean to you to have been the first? And is it meaningful to your daughters or others in your family?

PATEL: Of course my family and friends are pleased to know I was the first female engineering student from India at MIT and it also seems important enough to creep into a few formal introductions of me. But my eternal regret is that my father who sent me to MIT died before knowing this. He would have been inordinately proud of me, as I am of him for his progressive attitude to women's education.

BUTTREY: I'm sorry to hear that he never knew. From what you've said it sounds like he was already incredibly proud of you.

Would you mind talking about how you met your husband, and what your story together is?

PATEL: I lived in the Grindwell factory quarters for two years after my return from USA and had no interest in dating. So I asked my parents to find me a U.S.-educated boy who enjoyed America and loved Americans as much as I did but also returned to India as gladly as I did. They found me Hoshang Patel, a BS Metallurgy '55 and MS Chem Eng '57 from Michigan U at Ann Arbor. We met with his and my parents and their common introducing-couple friends for dinner on the lawns of Willingdon Club, Bombay. Hoshang and I chatted exclusively nonstop about our U.S. experiences, completing each others sentences in a rare meeting of minds. We married a year later and were lifelong best friends till his death of stroke in 2008. We shared a love of hiking, all-India and global travel and beach or Himalayan holidays with our two nature-loving daughters, starting with birthday hikes instead of parties. Our younger one, Simonil, is now a triathlete in California along with her own two daughters.

BUTTREY: Thank you, it's lovely to hear about your relationship. I'm very sorry to hear about Hoshang's stroke.

Were you working when your two daughters were born, and where were you and your husband living then? How did you manage both children and work?

PATEL: Hoshang was an only child so it was natural to opt for living with his loving parents, 2 km away from my parental home in Bombay. So I could work all along and happily leave my two girls with them and a devoted ayah (nanny) Sita, who brought up my sister, then my kids and then Simonil's kids too, as Sita moved to Bangalore with us 50 years ago. In fact, Hoshang and I went on a month-long car tour of South India with 2 friends while Simonil turned a year old in my in-laws' care.

BUTTREY: As we wrap up, I just wanted to recognize that we're doing this Zoom call during the COVID-19 pandemic. I hope that you and your family have been all right throughout this very difficult time. If you don't mind my asking, how have you spent your last year in quarantine?

PATEL: Wishing there were 30 hours in every day.

BUTTREY: Really?

PATEL: [I've been] madly, madly busy.

BUTTREY: What have you been doing?

PATEL: You know, I realize that from 1966, when I moved from the Grindwell factory to the ancillary, the ramming mass facility, and I was visiting foundries every month

somewhere or the other, from '66 till 2019, there was not a month in my life that I was home for 30 days.

BUTTREY: Wow.

PATEL: I have had one or two trips every single month. First it was for the refractory business, and then it was traveling for waste management. I took it upon myself to visit 214 cities to date, and their dump sites and dumping grounds, and address them on ways they can improve. Whether they listen or not. And then, during first month of lockdown, in March 2020, I wondered how I would manage. But I spent the time reading a huge fat Mahabharata, and Ramayana, and then Srimad Bhagavatam. These are Indian classics, like the Iliad and Odyssey, kind of. So [I've been] catching up on those.

And then I thought, "OK, the month will be over." But then [the pandemic] stretched on. I said, "I can't be unproductive like this. I have to get done something or the other." And it was clear that I could not. Not only could I not visit any municipality to give waste management advice, I couldn't even write to them. Because in a time when everyone's scrambling to cope with COVID crisis, who's got time to read a letter about improving their waste management? So then there's a whole lot of other little porcupine-bristle ancillary subjects that I never had time for which I addressed. And it keeps going like that.

For instance, yesterday I was trying to persuade a leading refrigerator manufacturer, Godrej, "Why don't you switch your polyurethane foam insulation to non-isocyanate PU foam, so that when you're dismantling a fridge that PU foam does not become a hazardous waste requiring very expensive incineration, that it could be shredded, stuffed, melted, if it's non-isocyanate?" So, little odd things, trying to reduce the phosphorus in detergent, trying to phase out PVC from single use— So many things.

BUTTREY: That's all very impressive work.

Is there anything else you'd like to go back and elaborate on?

PATEL: Nothing, except my father being always ill, expecting to pop off any time for want of medicine for TB. As a young child, also he would give me a whole lot of philosophical about ethics, and truthfulness, and generosity, and especially treating servants and poor people with respect, dignity and politeness. That kind of thing has stayed with me, so that a whole lot of my non-working life is spent helping villagers with educational and medical help, advice, and so on.

And my mother always gave me one mantra: "Leave the world a better place than you found it." So when I've had a problem with a charity commissioner, having such



a backlog of applications unattended because they won't— Every two years you have to file a change report: Who are your new trustees for the school trust? And they will only put that on your record after giving you a magisterial hearing in person, which is ridiculous. There's 100,000 trusts, and everyone having to do a mandatory filing every two years. How on earth do you keep on top of physical hearings?

I happen to know a senior government official in the general administration department, so I wrote to her [saying], “Why don't we digitize all of this and have automatic uploading, and just have hearings by exception if you want to merge your trust or sell your property or some major thing which can lead to fraud?” So every day, some new leave-the-world-a-better-place opportunity arises.

BUTTREY: So you're acting on both of your parents' idealism and ethics.

PATEL: And loving it.

BUTTREY: Thank you so much, again, for doing this interview. I really enjoyed talking with you.

PATEL: Sure. Thank you. It was a pleasure.