Henry Kamphoefner:

Renowned former design dean recalls Fuller's difficult journey to success

I built this house before you were born. I came here in '48, the year I met Fuller. Bought the lot three weeks after I arrived in Raleigh and started designing the house. Got it under construction August of '49, moved in February of 1950. First house out here. Must be 600,000 of them out here now in this part of Raleigh. Way out in the country when we moved in, now almost the middle of town.

A museum curator once said I'm the only person he's ever known who everything I ever bought is worth more now than when I bought it. Got a Mercedes out there 16 years old, just had it cleaned up. Bought at the factory for $5,200, I could sell it for $7,200 right now.

This talent I guess may to attributed to having something of judgment about intrinsic values of things. And about people, I was always good at that. I had one of the greatest faculties of any school of design in the world in the '50s and '60s. They did things. They were widely known.

I was a dean for 25 years and taught for seven. Just when I was getting really good they let me go.

When I retired – when the university retired me – the Association of Accredited Schools of Architecture gave me an award for having furnished more faculty members to other schools of architecture than any other dean in the United States.

Thirty-nine people had been stolen from me. Two people I brought here, who'd left Argentina under Peron and gone to teach in London, got here as associate professors. MIT stole them from me as full professors.

But everytime somebody left us it was always a challenge to find somebody just as good. I looked throughout the world. Once I had to fill an instructorship and had 11 candidates. I gave it to a young Hindu from New Deli – thought he was the best one.

Why one person is superior to another, that's difficult to say. You evaluate the criteria, you judge the background they've had and the work they've done while they were in school and out. You have to make a proper judgment about how good they are.

But the great people like Fuller, that was slightly different. That would take a shorter period of time.

I heard of Buckminster Fuller for a long time before I met him. I ran into him at Black Mountain College in the summer of 1948. Black Mountain Colllege was a marvelous experiment that ran out of money. Nobody was going to put in very much money in that kind of a school at that time, so it just ran out. Walter Gropius, chairman of architecture at Harvard College, had done wonderful things there.

It was an experiment in education. The students were carefully picked to make sure they were highly self-motivated. They literally developed an educational program of their own. Although there were a lot of people on the faculty they were coming and going, never enough money to pay them even a very small salary.

Bucky was probably getting almost nothing at all. In fact, Bucky Fuller was pretty poor during most of his career. He lost one daughter who probably would be alive today if they hadn't been so poor. She was denied the medical attention she needed. Another daughter, Allegra, the only survivor, married a television man in Chapel Hill named Snider. She was probably left a considerable amount of money.

Fuller's an architect, he's an engineer, he's a mathematician. But the architects for years said he wasn't an architect, the engineers said he wasn't an engineer, the mathematicians said he wasn't a mathematician. I don't think anybody ever denied he was an inventor. It's fairly clear that everybody admitted he was an inventor. But the architects didn't want to claim him for a long time.

Granted, about 15 years ago the American Institute of Architects finally got around to giving him the gold medal. The AIA can give one gold medal a year to the architect the American Institute thinks is the most outstanding architect in the world at that time.

So here is a man about whom the

Synergetics, Inc.
Thomas Clifton Howard

I knew Bucky very well for a long time, in fact worked with him on many projects. An absolutely first rate person, do anything to assist you. He was not the kind of person to take advantage of you, other than in the sense you would wind up working yourself to death. Bucky's energy level was such that just to keep pace with him you'd work yourself to death. He was so energetic, so full of ideas you'd answer one question he'd have ten more for you. Just to try to cope with that you'd spend ungodly hours dealing with him. He was a great guy to try to keep pace with.

When I first met him, hearing him lecture at school, he wasn't the kind of person who was prying into who you were and what your pedigree was and that sort of thing. He was more interested in whether you were on the same wavelength he was on, whether you could put projects together and ideas together. Those that weren't he had no bad feelings about, but the ones he got to know well tended to be on that wavelength.

He tested you with a thousand questions and problems, present you with problems, see what kind of answers you'd come up with, not knowing what in the world he was after himself half the time. Routinely he would call me from god only knows where – he may be in India going to a lecture and have some question to give me.

What you're trying to do with any network structure is simulate a membrane. A chicken egg is a nice idea of a membrane structure, a thin shell construction. If you can take the material going into the shell and isolate it into little packages, say struts and members, then fasten these together, you put a network together that simulates the shell. At the same time you enhance the buckling strength of the shell by the fact that you get an effective thickness greater than the original shell. So in a sense, what you're doing with networks, be it domes or space frames whatever the shape, you're simulating shell construction.

Nature does it beautifully. Some of the most beautiful network structures are found in the ocean, the structures for microscopic animals called radiolarians, an incredible world of network structures. Most everything NASA ever did for a spaceship – I look through the old radiolarians and they've pretty well been worked out, some beautiful little spaceships.

Every dome we've ever done, the geometry whatever the concoction may be, I look at the radiolarians and it's been done, eons ago. So the geodesic dome Bucky prided himself on inventing, in fact millions of years ago radiolarians did it.

Bucky wasn't big on making money. That wasn't his aim in life. He was an inventor. He was tagged as an architect, he was an architect eventually, licensed the first time after he was eighty. I would not call him an engineer, he claimed to be but he would have a hard time with engineering *per se*.

He was an inventor, designer, a philosopher. He was interested in finding out the rules of the game that nature plays.

architects had been saying for most of his lifetime, 'He's not an architect,' and they finally give him a medal at the Boston convention 15 years ago.

Long before the American Institute of Architects gave him the medal we gave him his first degree. He dropped out of Harvard or was kicked out twice, so we made him a Doctor of Design.

He came to the commencement, and I wrote the citation. It was in one of these little folders that you get when you get an honorary degree. He got about 40, I only got two.

He stood up and was hooded by the provost with the cap and gown. I read the citation and he accepted it with tears. Really cried.

He took that all over the world to show the people that he finally had a degree. But I think it's a conservative estimate that he probably received 40 honorary degrees by the end of his life.

Bucky contemplated suicide a number of times. He told us about it. I was glad he didn't.

After we invited him other schools began to pick him up rather quickly. Whether or not we managed to stamp him with the aura of legitimacy I wouldn't want to say, but at least we were the first ones to do it.

By then I already knew about the geodesic car, about the geodesic house, knew about the geodesic dome. I thought we ought to have him around for a while. And a lot of good talent, likewise. I brought two of the greatest structural engineers in the world in here.

He had never been invited to a design school or architecture school before we took him up. And I was the first one to see the possiblity he should be invited.

Ours was one of the first schools of design that started a visiting lecturer program. After I left somebody took that money and put it in a permanent position in Landscape Architecture. I don't think they have much money for visiting lecturers now.

Yet to get, for example, Frank Lloyd Wright to come here for three days was of course a marvelous thing for the students. He came and lectured in the Coliseum. Had the largest crowd that ever heard him in his lifetime, in Raleigh. We got 5,000 people in the Coliseum. He gave them a good show. He was born in 1869, and here in '50 so he was 81 years old. He lived till '59, highly productive to the last days of his life. But you came to talk about Fuller.

He's a cathartic. The ideas come popping out of his head all the time.

A lot of students get into design for the wrong reasons. They get into design because they can do drafting, which is a very minor part of being an architect. Ideas are the important thing in design. Ideas are particularly important in architecture.

'He had never been invited to a design school or architecture school before we took him up.'

Fuller was just a man whose loaded with ideas. Many of his ideas are sort of far out, they are just now being recognized as having sense.

He developed sort of a cult within the school. He had a good and questionable impact on some of the students. I wouldn't say that he had a good and a bad impact, but that he had a good and a questionable impact.

The questionable impact was on the type of student who could be easily brainwashed. And you've seen them all over in universities, particularly in philosophy. So many philosophy students get brainwashed because they think the philosophy professor who's so obscure that they don't understand a thing he's saying – they think he must be terribly bright because they don't understand a thing he says.

A lot of the kids who didn't understand what Fuller was talking about wanted to go out and build a geodesic house.

That's another thing I haven't taken up yet. Fuller designed a geodesic house, and it looked like Beechcraft Aircraft Corporation in Wichita, Kansas was going to go with the geodesic house commercially. He claims that he had 8,000 orders from people who wanted to buy a geodesic house. It looked like Beechcraft was just a month away from gearing up and producing the geodesic house on a commercial basis.

Then they dropped it. That was quite a blow to him, too.

But some of the students listen to him talk and they want to go out and build a geodesic house. It's like going out and building one Ford automobile. It'd cost you two million dollars to build a single Ford automobile, but when you build a million Ford automobiles you can build them for what they cost today.

The geodesic house had to be built on an assembly line. If it wasn't going to be mass-produced, it was no good. Couldn't build half a dozen. Take somebody like Beechcraft to do it. But Beechcraft finally got cold feet on it, and only a couple of prototypes were built.

So you see all those are in a long, long series of defeats: really, really magnificent accomplishments that were never accepted by the American industrial establishment.

It didn't slow him down, it didn't generate any self-pity. I can't say I ever detected any self-pity in Fuller. He was so sure that he was right that he didn't pity himself.

We still don't have the geodesic car.

The first thing he came out with was the geodesic car. He had an idea that we needed to conserve energy in the United States, and proposed in 1938 that you could build a car that didn't consume much gasoline. But he didn't have the resources to do it. He gathered together enough money to build three Dymaxion cars. They were identical. They were all wrecked. One of them should be reconstructed and put in the Smithsonian.

Because he didn't have the resources like Ford and General Motors to do the whole thing, he used a Ford four-cylinder motor and designed a light-weight frame out of aluminum.

The Ford four-cylinder motor was designed to go in a car that would hold approximately four people. You could cram three people in the back seat and get five in the car. It got 19 miles out of a gallon.

Fuller used that motor with a light-weight frame and the whole body in a shape of a falling teardrop, the shape nature uses to get

Interior of Climatron at Missouri Botanical Gardens in St. Louis. Designed by T.C. Howard for Dr. Fritz Went, who also gave N.C. State the idea for the Phytotron atop Gardner Hall.

the teardrop through the atmosphere with the least possible resistance. The frame was plexiglass with aluminum. It was a three-wheeled car, two in front, one in back. You sat up front and steered but the wheel in back guided the car.

You could turn it around on its own length, could seat 11 people in the car instead of four, and get 40 miles per gallon instead of 19.

The interesting story I've never seen printed, Bucky used to tell it every once in a while —

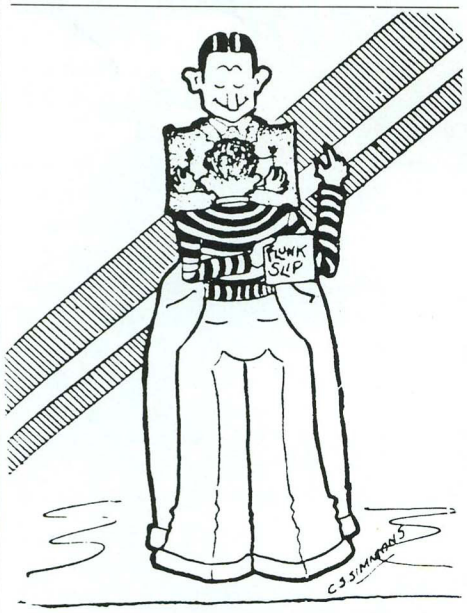
He drove the car to New York one time, before Madison Avenue became a one-way street. He drives up Madison Avenue going 25 miles an hour so all the lights will be green. One of these lights is out, and a traffic policeman is there working traffic.

Bucky in this car is coming up the street, the policeman sees him and figures somebody has just come down from Mars.

Bucky catches the expression of astonishment on the policeman's face, decides to have a little fun. He does three quick u-turns around the policeman and is a block away up Madison before the policeman can figure out what is going on and get his whistle to his mouth. Bucky's a block away before the policeman starts blowing his whistle.

Bucky liked to do things like that. He liked to startle people — very gently.

He was here for seven years. We had him come for a month and let him have a group of 12 students. The students would fight for selection. They did some marvelous things in that month.



"—And then I says: Professor, you can't flunk me on your course.

One of the things he was working on when he came here was the Dymaxion bathroom. It's all one piece. You bring it in by truck and put it in place with a crane, connect the hot and cold water and the sewer. He devised a way to atomize the water so that a person could take a shower in a quart of water. Bucky said you could get twice as clean with his quart of water as you could with a conventional shower!

He couldn't sell it, to Crane or Standard Plumbing, or anybody.

I think all of Bucky's inventions ran against interlocking directorships. There's no question that the oil companies, being highly involved with the automotive industry, did not want a car which is going to get by on 40 miles to a gallon. They wanted a car that would get less than that.

The other thing that comes to mind is the Dymaxion dome. He couldn't merchandise that either. In my opinion the steel companies, the aluminum companies are not interested in saving material. They want to sell all they can.

When an American architect builds a building he has to design the building five times stronger than it needs to be. We know steel will support 80,000 pounds per square inch of tension. If you pull a one-inch square steel bar it will take 80,000 pounds of tension to rupture the steel. But you only design for 16,000 pounds, so there's a factor of safety of five.

This is not to take care of things like what happened at the Hyatt Hotel in Kansas City. That was some damn fool cutting corners: killed a lot of people. You can still have building failure if you have incompetence in people who don't know what they are doing.

Bucky wasn't able to sell any of his domes commercially until in the 1945 World's Fair in New York. Ford Company built a huge rotunda as a showplace there. Since World's Fairs were always conducted in summer, the rotunda was open in the center. They removed the rotunda piece by piece to Dearborn, Michigan and got the architects in Dearborn to puzzle on how they were going to cover the dome.

The architects and their engineers said it could not be done, the structure will not support it.

Somebody had heard of Bucky Fuller's geodesic dome, so they called in Bucky. He built a geodesic dome over the rotunda for a fraction of the material needed in the conventional dome.

That was one of his first successes, but even that didn't make him a celebrity, or get his domes manufactured commercially. He didn't begin to build a dome that began to make him really famous until Expo '67 in Montreal. Then the United States gave him the commission to do the United States Building, which he did as a giant geodesic dome. It was so big that the cars touring you around the fairground for an overview went through the dome and out another side. It lasted for a long time and then a devastating fire put it out of commission.

Born in 1895, he builds that first big dome in '67 so he's already 72 years old, and just beginning to become famous. By that time, however, he's in demand all over the world and he's traveling everywhere. I'd say from 1967, from that point on, Bucky was a very content person. Governors would call, he could drop in on Jerry Brown anytime he wanted.

In the last few years Fuller has been lecturing a great deal, and he doesn't think petroleum energy is going to be one of the big problems in our future. He thinks water is. He completely sold Jerry Brown, who started talking about water conversation.

When he spoke this summer at Chapel Hill, he only spoke for three hours — not six. I didn't think he could do that!

When he lectured here Bucky began at eight o'clock and continued until two o'clock in the morning. We finally got him, after he did that a couple of times, to give a break at 11 and let people go out. Ninety-nine percent of the people came back and stayed till two!

He was a fairly respectable listener. I could always talk to him, we had long conversations.

The only time I saw him at a loss for words: I had a member of the faculty named Jim Fitzgibbon, a devout Roman Catholic. We had Fitzgibbon and his wife out here for breakfast with Fuller and his wife. And Fitzgibbon did a thing that I wouldn't ask in anybody else's home: Fitzgibbon asked Fuller to say the blessing.

It was one the cruelest 30 seconds you know to go through. He had obviously never said the blessing in his life before.

But he managed to stammer out a few words. I don't think he'd ever want to have a tape of that repeated! Otherwise I never saw him with a loss for words.

I never discussed religion with Bucky, but

Working from Bucky

Bruce Hamilton, The North Face

I started out deciding whether to go to graduate school or not about 1970. Decided I was going to read some books. I read Fuller's *Education and Automation*. From that point on I just read everything he wrote. Studied the geometry quite a bit — so geometry has become my avocation. I really understand synergestic geometry, which not a whole lot of people do.

As a consequence in 1975 we were able to make the first geodesic backpacking tent, which we called the Oval Intention. We went on from there to change the small tent world entirely. They used to be all A-frames, all these mountineering tents, and they are now all based on geodesics.

Somewhere in 1977 we made a big tent for Bucky, a three-meter tent that he was going to be able to transfer on airlines and take to pitch for people as a demo: 'Here's what you can do.' Twenty feet across, a show and tell thing. Interacting back and forth there he got to know me a little bit. He would then once in a while suggest something: 'Why don't you do this?'

A couple of suggestions I tried to great length just didn't work — very difficult to do in the kind of quick-erection, quick-takedown, light-weight business that we're in.

Last year he actually called us October and said, "I'd like to work with you again and try to make a tent." We put him under retainer, $10,000 that we could work together in design and try to really make a breakthrough in tents. Quantum leap. We were trying to eliminate poles so there'd be no metal. You'd pump this thing up, either air or fluid, and you'd have a pump of some kind. That was the direction we were moving in, and he came out here and of course he's gone.

We built a new building here just last year. Bucky came down to be our keynote speaker. We had a big day about that, have a video tape of it, two weeks to the day before he died.

He gave one of the best talks I've heard in a long time, very concise. As a consequence we are pursuing larger structures now. The North Face itself is getting to be a rather diverse company. We acquired in Scotland a company that makes big tents, big as in military, the Mid-East, but there's no design in that and we're working from our end to modernize the design and really get into bigger geodesic structures.

In a nutshell that's the relationship and I'm the link because I personally studied him and then started into the business end.

I'm not a businessman. I mean I wasn't. I am now vice-president of manufacturing. But I learned all of that backwards, started with Fuller's global economics, started with the way he thinks, and then tried to get back to 'How do you actually run a business? How do we make these things?' It's almost what my work is: to make that link.

I'm well aware, a lot of people are, that Bucky's a total failure at business, and everyone's always known that.

Even when we made the Oval Intention we made a conscious effort to expose geometry without having kids read books. You can go camping and notice some things. We are still are working on that as a company, it's part of our philosophy. In some cases we spent a lot of money that wouldn't be a good business decision, but we did it for this reason. Just look at our catalog, look at that poem Bucky did on the last page.

Because I do the business part of it also, he said this last time out, "I'll give you an honorary degree in comprehensive design science. I'm the only one who can give it, and I'm giving it to you, so you have now got it."

I'm not much on titles, but it had been 11 or 12 years that I was trying to get to that point, and this was only two weeks before he died. I feel really good he said that. A really personal thing, meant something to me and that's all that counts.

I'd make a guess he was an agnostic. I don't talk about religion very much. My wife goes to the Episcopal church but I don't go with her. I was a Methodist minister's son. My father made $800 a year as superintendent of schools in Cleveland, Ohio. When I was 17 months old he decided to go into the ministry at $400 a year.

People ask me why I don't go to church at all, and I tell them "By the time you die, you will not have been to church as many times as I've been already."

We had morning devotionals, we all knelt down at the breakfast table and my father read through the scriptures and would pray before breakfast. I went to prayer meeting on Wednesday, church school during the week, Sunday school on Sunday night, church service at 8, I went to everything that went on. All the church suppers, ate all the mashed potatoes and peas that anybody could eat at a church supper. I went to church until my father died. So I didn't discuss religion with Bucky, I just guess.

He was a great stimulus to the students. He came in with fresh ideas, he turned the young people on. He was a great example for work: he worked all the time. He was a workaholic. He claimed he slept only four hours a day.

He had the capability to lie down and sleep for a half hour and get up and be refreshed. I lie down for half an hour and I get up and feel like I've been run over by a truck. I don't sleep much anymore, I take a sleeping pill. Fuller could lie down for 30 minutes, completely relax, and wake up refreshed.

Takes lots of self-disipline and concentration to do that.

The last time I saw him, he was actually running through O'Hare airport. Running so fast, and he's eleven years older than I am, I'm 76.