

G. Eugene “Bud” Adams Oral History

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Note to Readers

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This copy was produced from a bound, hard copy final version of the interview.

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- Benson Ford Research Center staff, 2023

DESIGN ORAL HISTORY PROJECT

ADAMS, G. Eugene "Bud"

1984 & 1985

EDSEL B. FORD DESIGN HISTORY CENTER

**Henry Ford Museum &
Greenfield Village**

This is Bud Adams finally getting around to sending what I promised some time ago on my experiences and my reactions to the work environment in the early days of Ford's Design Department. I apologize for taking so long to get the material back to you, but it seems like we just had too much going on here in Arizona, and I couldn't get around to dictating even though I did prepare an outline.

What I'm enclosing with these tapes is a collection of various papers that I dug out of my old files here, and it includes a couple issues of the Craftsman newspaper published by the Ford Trade School back in 1937 and '38. It includes a couple of outdated resumes of mine that will give you some dates and other information, if you need it. It includes a copy of some of the old material in my company personnel folder that I discovered at the time I retired in 1981, and this should prove interesting to you because it gives the wage level of a lot of people in the design department at that time who were fortunate enough to get five or ten cents an hour raises. Some of the names might clue you onto other people that you should contact and interview.

One of the amusing things I found, and which I'm including, is a Ford Trade School bulletin board notice that I prepared for an alumni club dance, and this shows that at the time I was in the Trade School, I was interested in lettering and had Speedball pens, practicing their alphabets in Speedball booklets and was doing things of this kind for the Trade School, including preparing a diploma for the Trade School which they never had previously. The amusing thing about this bulletin board notice is that you could go to an alumni dance at the Grande Ballroom at that time for twenty-five cents a person. How about that!

To give you an idea of how I've organized this material, the first section here will be on my personal background and career highlights as you had requested. The second part would be some comments on the working environment in the Engineering Lab and the old Design Department in the years 1937 to 1942. The third section will be some comments on the Design Department staff during those same years of 1937 to '42, and the old Craftsman newspapers that I've included will provide information on the Trade School graduates that were actually in the Design Department at that time. The fourth section includes comments on the activities and the philosophy (if there could be said to be a philosophy) of the old Design Department 1937 to '42. The fifth section outlines some of my personal projects that I worked on during those years. The sixth section covers later experiences which touch on the Design Center activity. The seventh part puts down some thoughts that I would like to give you on automotive design or, for that matter, any product design and development activity. These stem from not only my time close to Styling, but my later years in Engineering at Ford as well. The eighth and last section provides some remarks on what I feel that the Ford Design Center has contributed to the auto industry as a whole.

I hope this organization of material meets with your requirements and that these low-priced cassettes that I'm using are adequate for you to pick up on your playback equipment. So without further apologies, let's start on section number one -- my personal background and some career highlights.

SECTION I

My father was a toolmaker at Ford, and he died when I was twelve years old. My mother got me an interview by means of contacting my dad's old superintendent -- an interview to possibly get into the Ford Trade School. The records indicate that his help resulted in me enrolling in the Trade School on February 25th, 1932, which was at the depth of the famous Great Depression.

I went through the Ford Trade School, graduated in 1935, and as a "senior," took all the Apprentice School courses while doing tool design and machine design work in the Trade School. A "senior" was a Trade School graduate who was not yet eighteen years old and, thereby, couldn't be given a full-time job in Ford Motor Company. So what was done was a lot of the graduates that were still young were given full-time jobs in the Trade School itself. No more classroom work. We did work for the company on work orders that were sent over to the Trade School.

Then I was sent to Gate Four where the tool design activity was, and after a short period, about three weeks, I was notified that I was to go over to this Design Department in 1937 at the Engineering Lab with another Trade School boy named Emmett O'Rear. Emmett and I arrived a week or so after John Najjar was sent there from the Ford Training School at Gate Four. This Training School was another school that Mr. Ford established for high school graduates, teaching them how to operate tool room machinery.

At about this same time, in September, 1937, I was lucky enough to win a five year tuition scholarship to the Lawrence Institute of Technology. What Lawrence Tech did was to award such a scholarship annually to a Trade School graduate.

I was going to Lawrence Tech three nights a week, working in the Design Department during the day. I was going steady with a girl in North Detroit about a mile from Lawrence Tech, and, in 1940, I was also taking flying lessons through the U.S. government civilian pilot training program there at Lawrence Tech and getting my private license. As a matter of interest, I only flew five hours after I got my license because I couldn't afford to buy my own flight time then. Looking back, I wonder how in the hell I ever had all the energy to keep everything going; it was an interesting, busy time.

Then, evidently, the cheap labor that the Design Department obtained from the Trade School to help out with clay modeling and other design work was not too badly received, because in March of '39, five additional trade school grads were working in the Design Department.

I graduated from Lawrence Tech with a bachelor's degree in mechanical engineering in 1942. At this time, anyone working in the Design Department or anyone doing drafting work or who could do engineering work at all, was put on war projects. This included the early B-24 drafting work, and I remember I drew up all the pieces of tubing that were necessary to be cut certain ways, and have their ends shaped certain ways, so they could be welded together as an engine mount assembly. There was a range finder project and several other things that Ford was working on at that time.

I'd been coached by some of the older designers there in the Design Department, like Johnny Walter, who was always a pretty salty character, that if you were worth your salt at all, you didn't stay at one company. You floated around and got a higher salary and advanced every time you

moved to a different company in the industry. So, as a result, I left Ford in June of '42 for a salary amount which Ford couldn't match (at least that's what old Joe Galamb, the chief body engineer, told me), and I went to Briggs Manufacturing Company as an engine designer on a military contract that they held covering the British Aspin engine patents. I had met a couple of the fellows there at night school at Lawrence and also in the student activity of the Society of Automotive Engineers, and they had made me aware of this opportunity and arranged for the interview.

A little farther on -- in 1944 -- the war was moving on, and because of my training and the fact that I was supporting my mother, the draft authorities were not breathing down my neck real hard. But I got the urge to join up because my mother had secured a job as a file clerk in a downtown U.S. Army Ordnance office and said that she was okay -- she's "able to take care of herself," which was true at that time.

I wanted to get into Navy flying, but, at that time, every flight school they had was filled up, and the officer at the examining center recommended I take a direct commission as an ordnance officer -- an Ensign -- in the Naval Reserve. This I did and went off to Navy in May of 1944.

I came home on leave at the end of July of '44 to marry Clare Block, who was one of the few girls in the Engineering Lab building secretarial pool, which was upstairs. I got out of the Navy in June of '46; was released from duty down in Jacksonville, and when I came back, I scouted around for a job and ended up interviewing with Joe Felts, whom I had met during the war work period at Ford and who was now Lincoln-Mercury chassis supervisor. He hired me to work on the board doing

suspension design. From that time I worked in the car engineering end of things pretty much except when I was brought over to Special Military Vehicles Operations from 1961 to '63, which was extremely interesting military development work. We did the turret design for the Shillelagh weapon system; worked on gun development; had a couple of underground firing ranges at the Rouge Plant, where weapons were developed for the Springfield Armory at that time.

Following that, I went into Chassis Engineering. I went over to Ford of Europe as Chief Chassis Engineer from 1971 to '74, which was a terrific experience. From that time 'till my retirement in March of 1981, I was in Chassis Engineering. I always felt my retirement was my personal contribution to the cost-reduction effort, because I retired at sixty-two instead of hanging around to the decrepit old age of sixty-six!

My Styling contacts were intermittent and irregular from 1946 to '81 consisting of feasibility and functional guidance on chassis components such as wheels, wheel covers, steering wheels, air conditioning and radio packaging, brake pedal and pedal pad design, accelerator design, parking brakes.

One contribution I did make early on working for Joe Felts in 1947 that could be considered basic was that I devised a method of laying out and identifying the various controlling geometry points for the front suspension and steering linkage, which together with the tire dimensions, would define the so-called "tire envelope" as the front wheel went through its jounce and rebound and steering motions. What this did was permit the stylist to create a front fender "cut line" that would not interfere with the tire. This, of course, with modern developments, has

been elaborated upon and then computerized for quite some time. But it was something that related to the styling of the product.

My pre-war styling work -- '37 to '42 -- gave me an appreciation for the designer's attitudes, objectives and his problems so that I was able to encourage an attitude of willing cooperation in my engineers who were working with the Design Center on new programs. One of the last projects along this line was our development, in Ford of Europe, of the first high-production styled cast aluminum wheel for the Capri II. This was a classic example of what can be done to create an exciting new product, on time, with reliable function, when a Stylist, the Engineer, and a respected, qualified supplier all work together.

My Design Department time -- '37 to '42 -- I consider the most satisfying work experience I ever had.

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SECTION II

The following are commentaries on the working environment in the Design Department at the old Engineering Lab [Dearborn], circa 1937 to '42. First of all, there was no smoking. [Henry Ford I's ironclad rule]. And, of course, there were no coffee or candy machines anyplace on the property. The only girls you ever saw were those from the secretarial pool on the second floor, either going to or returning from lunch or in the cafeteria itself. There were only a couple of "older girls" downstairs: one was the main phone operator, and there was a secretary or two for people in the mahogany row along the front of the building. Rachel MacDonald, the librarian, was on the second floor, and she was one helluva fine person, highly thought of in her profession. I think she was president of the Industrial Library Association. But that was it, as far as females were concerned. There were none on the main floor where the working people could see them, be thus inspired, or bother them.

Henry Ford came through the Lab center door from the parking lot area frequently, and if you happened to be around going to lunch or coming back, he always said, "Hello," in passing through the center doors if he happened to encounter you. The Lab had a teak herringbone floor that was always polished. I think the polisher operator worked at it from one end to the other, full time. This was in the center area of the Lab building.

There were two desks at the center with chairs. These were for visitors, and this was as far as a visitor was allowed to penetrate the engineering area at that time. If a person -- usually a supervisor -- had an appointment with someone from the outside, the receptionist at the

front desk would okay them to go in, and they would sit at one of these two desks. The engineer or supervisor that had the appointment would have to come up to the desk and sit there and cover their business at that spot. There was no wandering around between the drawing boards and the engineers' desks, as is so common today.

There was an activity in the basement of the Engineering Lab where Johansson gauge blocks were manufactured. I never went down and saw this operation myself, but these gauge blocks were something that Henry Ford had gotten the rights on from Sweden and were the industry base for dimensional accuracy. They're still referred to as Jo Blocks in the industry today, although several other companies manufacture them. They're really the foundation of highly-accurate, interchange-able part manufacture in all fields, as well as automotive.

One of the other offices that used to be on the first floor near the aisleway that led out to the center reception area was Mr. Ford's watch repairman, and there were always a lot of watches and a few clocks hanging inside in his glass-walled office there. The office partitions in the engineering area and the partitions that surrounded the Design Department were golden oak with obscure glass in the upper area. The old Design Department was located at the Southwest corner, enclosed by these golden oak partitions. I've seen Henry Ford walk into the Design Department while I was working on a clay model at the one end there. He walked in just a few feet and sort of looked around, lightly shook his head like he didn't understand this particularly, and then walked out again.

One of the other interesting personal observations I had was that of Harry Ferguson, over from England or Ireland. He was in there himself

for a number of days working on a clay model of the radiator grille and top tank enclosure for what became the Ford-Ferguson tractor. The thing that attracted me was that he had taken off his suit jacket and rolled up his sleeves. This exposed his suspenders, and these were the most beautiful pair of all-leather suspenders that I had ever seen. I was used to the cheapy, striped elastic variety that United Shirt Company and Thom McAn used to sell, and I'd never seen a first-class English leather set of galluses supporting a pair of heavy tweed pants before. They were really pretty. Henry Ford used to come in and consult with Harry Ferguson over this particular model.

Also on the first floor of the Engineering Lab down toward the cafeteria, at the North end, was a print shop and a machine shop. There used to be a "morgue" of older concept chassis and engines at this North end, including a five-cylinder, in-line engine. I don't think the thing ever ran very well, but I recall one of the Bryant boys was working on that particular project.*

The Design Department, initially, had rather crude modeling "bridges." These first ones were made out of wood, nice pattern-making grade mahogany, and the "bridge" would slide on wheels. We would push 'em and kick 'em to get 'em into position along the side rails, and then wedge them into position so they wouldn't move while you were taking measurements. At the time I came in there in 1937 with Emmett O'Rear, these modeling bridges were being replaced by aluminum and steel designs which were created by Bill Wagner -- Willys P. Wagner. We still had one-tenth size bridges with little surrounding platforms which were made of wood.

* Editor's Note: The Bryant family included Clara Bryant Ford, wife of Henry Ford.

One thing that was nice about working at the Engineering Lab then was that, in the Wintertime, the twin ponds in front would freeze over. I used to get to work early, take my ice skates and skate around in front all by myself in the beautiful dawn light on the real smooth ice until it was time to come in and begin work. One of these twin lakes was buried just a few years ago to add an additional parking area to the Engine and Electric Engineering activity.

The boss of the Design Department was E.T. Gregorie. His nickname was Bob, and he was a beady-eyed redhead who was going bald, with a straggly mustache. I can remember that he always wore his pant cuffs very high, exposing some sock above his shoes, and in Wintertime he would show up with a raccoon coat! We Trade School boys that were working there then figured that he was the tightest tightwad in the world with pay. The other thing was I made several tenth-size clay models based on concept sketches that Bob Gregorie had produced. I'd have to say that Gregorie had a talent for drawing stuff on paper that absolutely couldn't be made in three dimensions. However, looking back, he's not all that bad a person, and a lot of these tenth-size models did turn out to be concepts that Edsel Ford approved for development of full-size designs later on. So this, again, was one of the good experiences that I look back on.

The designers that were "on the board" at that time were John Walter and a fellow named Walter Kruke. Walter Kruke, as I recall, was a graduate of the Yale School of Fine Arts, and he had been at Yale at the time of Rudy Vallee. He was actually a competitor of Rudy's as Walt had organized his own band and was attempting to make his way in the music

world. As I recall, Kruke's band failed, and in order to pay off his obligations, he took a job on a Ford lake freighter, and ultimately ended up in the Design Department.

Another fellow I've mentioned before is Bill Wagner, who retired a number of years ago out in Tiberon, California. He was a very gentlemanly, calm, scholarly type of fellow that, again, did just about anything that had to be done.

The head clay modeler, to whom Emmett O'Rear and I were more or less apprentice to begin with, was named Dick Beneike. There was a shop boss named Jimmy Lynch. Jim had previously worked at the Ford aircraft activity when they were building Tri-Motors there in Dearborn.

And there were a couple of pattern makers and carpenters -- Jimmy Mearns and Jack (I can't remember Jack's last name). Jimmy Mearns was a one hundred percent Scotchman, and Jack was either Scotch or English.

At that time, the clay we were using for clay models was a gray type clay, and it was soft when warm and would set up after being modeled in place so that you could smooth it with various tools and actually paint it. The clay that's used today is a superior variety, and it's sort of a tan terra cotta in color. But, at that time, the clay shavings and pieces of clay blocks that were virgin pieces were placed in aluminum trays and softened in ovens that were heated by lightbulbs. This oven arrangement with the lightbulbs was an in-house design and was manufactured there at Ford. When you wanted to get some clay, you'd go over to the oven and pull out a drawer and grab a glob of the stuff. Hopefully, it wasn't too hot so that it overheated your fingers, but you'd take that back to your model and proceed to rub it in place. And you could keep

this gray clay -- a portion of it -- in your one hand to keep it warm enough so that you could take off a little bit at a time and apply it to the model.

The clay modeling tools were largely made on site, based on the sculpture and modeling tools that Dick Benieke had from the old country from his trade as an industrial sculptor. Occasionally, the Design Department shop would have some handles turned up and bend some spring wire for the tools, sharpen them and provide them for the rest of us that were working on clay models.

The painter that I remember came in somewhere around 1939, was named Gar Evans. He was a little guy, and we all used to help out on the painting of a small clay model or an instrument panel. Gar would show us how to modulate the pressure of the spray gun and spray the primer on, and then we would proceed to sand it and smooth it out.

We had a sweeper that was pretty busy all the time keeping the floor free of small bits of clay, and his name, I think, was Jay Haskins. I believe he became a clay modeler later on.

The real first design winner for the Design Department, which I was told insured its success with Edsel Ford, was the "facelift" job for the 1938 Zephyr -- the front end, grille and hood. I don't think there was too much change '37 to '38 on the rear end. But the Zephyr in production at that time was a Briggs creation. A man named John Tjaarda did the Zephyr that was in production in '37, and it was quite a radical-appearing car. Gregorie and his very small staff, at that time, got the job of designing what we would call a "major facelift" today -- a new grille, new front fenders and new hood. That was a pretty car because the

contours of the front fenders flowed down between the headlights and the center of the grille. It flowed in a soft curve down behind the bumper and was sort of patterned after the low, graceful grilles that some of the European -- such as Mercedes Benz -- race cars had at the time.

Things sort of went on from that '38 Zephyr success. One nice thing about the Design Department work, at that time, was that you could do almost all of the steps of a project yourself. An example: if I were assigned to work on an instrument panel model, I could run across the hall to body engineering and pick up the intended line of the windshield and the width between the A pillars and come back and help the carpenter design and build the mockup. Then you could make your plastic templates from the drawing you had made yourself and proceed to clay up this suggested instrument panel. This is assuming you'd gotten some sort of okay to go that way, based on a drawing that you would have made. Then when the clay model was smoothed and finished, you might even help Gar Evans paint it, sand it down, put the finish coats on it, and maybe cut out the lettering for the instruments, and see something completed from beginning to end.

I, also, at that time -- like a couple of other guys -- did design work at home because it was so interesting. I can remember bringing back some hubcap designs for evaluation by these designers on the board that I mentioned previously -- John Walters, Bill Wagner and Walt Kruke. One idea I had was of combining the rear license plate light on the deck lid with the deck lid handle that you use to open the lid itself. And another thing that I helped conceive was the concealed running board that we put on Zephyrs later on, starting in '39, but I'm not real sure of

that model year. It covered up the part of the exposed rubber running board and gave "body color" from top to bottom.

We used to simulate chrome plate on our clay models by rubbing aluminum foil over the clay extruded mouldings or over the grille bars that we had cut in on the model. I don't know whether they still use that technique today or not.*

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Editor's Note: Bob Gregorie remembers getting the aluminum foil idea from eating Hershey candy bars at lunch time.

SECTION III
[1937-1942]

At that time [1937] there was Johnny Najjar, myself, and Emmett O'Rear, who had been brought over from the Trade School to help with the clay modeling. It was an unusual opportunity. We were making sixty-five cents an hour as Trade School "seniors" when we came over. Later, more Trade School boys were sent over, and this included Benny Barbera. More designers were hired into the activity as Edsel Ford expanded the Ford design responsibilities and brought in more product programs. There was Bruno Kolt, who was a sculptor primarily. He did a lot of nice work in clay and in wax. There was Ross Cousins, who was an illustrator. He did excellent work with airbrush. There was a young man -- Johnny Hay --who worked in the shop. He got his job by sending in a model car he made out of tin cans and other scrap metal which was just a marvel of workmanship, and, when the Ford people saw that, they figured they knew where he belonged!

Then Martin Rigitko came in, and he was an outstanding body designer and body engineer who came from one of the East Coast coach-building outfits. Martin Rigitko -- God, we just admired him so much. Before he retired, he created a body drafting course and a textbook which I wish to hell I had a copy of, frankly.

Dick Beneike was head clay modeler. After we were there a short time, we had been assigned to put clay on one of these full-size models and were just getting the first idea of what the shape of the darned fender and the car should be, I remember asking Beneike, the old German with the long upper lip, "How do you tell when you've got a good shape, or how do you tell when you've got a good line?" In other words, what's

the guiding principle here? And he sort of rolled his tongue around for awhile and mumbled, and then he said, "Well, what you do is you put on what isn't enough and take off what's too much." So that's about the guidance that we had, and, really, his answer wasn't too bad. You have to pick up the feel of that activity by actually doing it and having a pair of sharp eyes yourself.

When Martin Rigitko came in the first time (I don't remember what Rigitko is, whether Hungarian or whatever, but he was a European), I remember Dick Beneike's reaction to him. Martin had an armful of thick plastic curves under his arm when he first came in the place, and he took them over to his board, and Dick and I and several others looked at those curves he had in amazement, as they were so damned old-fashioned. They were like the letter L boomerang, and they had a sharp radius at the corner of the L and were, evidently, what Martin used regularly back East when he was doing custom body design work -- where the roof came over rather flat, and made a sharp turn, and rather vertically came down the side of the body. Old Dick looked at me and sort of chuckled about the fact that these curves were so very old-fashioned. Well, you can't keep a guy like Rigitko in the dark very long. It was only a couple days later that he had a vise attached to his drawing board, and he was, at lunchtime, filing each one of these curves to suit the shapes that we were working with at that time. We were pioneering, you might say, the more rounded roof and the angled "tumblehome" from there on down to the side of the body in generous curves. He reworked that whole family of curves until he had a new family of curves that suited the types of shapes that we were working on!

Beneike came to the Detroit area in the heyday of the construction of the large movie palaces, like the Michigan and the Fox downtown, and he was an industrial sculptor who learned his trade in Germany. He told me about how over there, after you'd finished an apprenticeship and you became a journeyman, you had to leave your hometown for two or three years. If you came back to your hometown, it was a sign that you didn't have the stuff to make a living, and you were a failure, and you turned into a street sweeper or something. He came over here as an industrial architectural sculptor, and when the theaters were completed, he drifted into modeling work for Briggs, and from there he was brought over to Ford.

I liked Dick very much. He was a typical taciturn German fellow, but I enjoyed him. I think he felt friendly with me because we used to talk at lunchtime, and I learned a great deal from him. He outlined a philosophy that, I think, prevailed on the clay models we were working on at that time. This was that the shapes and the forms should be "modeled" versus being "sculptured" from, say, a solid block or being based on drawings that were made first, and then duplicated on the clay model. Dick's position was that you identify certain key points, like windshield points, the width of the body, and where the radiator is going to go. Then you modeled and added clay in between there to get a softer feel to the form than you would if you had tried to draw it on paper first or carve it out of a block of mahogany and end up that way. And if you would look back to the General Motors products of those years, I think you'll find that General Motors had more of a stiff, hard, architectural look to their cars than we did at Ford. The '38 Zephyr I mentioned, and

then if you go to the '39 Mercury and other cars, ours were generally rounded, and flowing, and softer, and not the stiff General Motors' type of appearance.

One incident I remember is that Dick Beneike used to subscribe to one of the German language newspapers published there in Detroit. The masthead of the paper had German style black lettering, and there was a red circle in the center which had the swastika in the middle of it. One lunchtime Dick was reading to me from the paper about Hitler's program for the German people's car -- the Volkswagen. The scheme was that they had coupon books, and they could go to their local bank and buy stamps to stick in this book, and when the book was filled, they could turn it in, and they would get their car. Of course, Hitler's other plans wiped out that one, and I don't know how many Germans got screwed on their coupon books, but this is what he read from the German newspaper. Of course, he thought that the Porsche design of VW was quite an advanced piece of machinery, and, at that time, it sure as hell was! You can't argue with the Bug being so popular for so long.

One of the men around the Engineering Lab was a guy whose last name was Becker, and he was head of payroll in the Engineering Lab, and he was the other guy that we thought was a super tightwad because raises were few and far between. But from today's perspective and experience, one doesn't know how much of a budget Edsel had for the Design Department and what instructions had been given to Becker and Gregorie, and what their limitations were.

The so-called designers that I referred to -- John Walter, Walt Kruke, Bill Wagner -- had Star badges, and, at that time, a Star badge

meant that you earned \$250 a month or more. So being hard workers, and good boys, and doing our damndest, our ambition was to, hopefully, one day get a Star badge. I know out in the Ford assembly plant or out in the Ford tool room, a Star badge meant that you wore a white shirt and a suitcoat, and everybody was afraid of you. It was quite a badge of authority as well as indicating that you were at higher levels of the salary payrolls.

Martin Rigitko was able, as a custom body engineer and custom body builder, to layout the internal structure for a body, that included door pillars and the members around the windows and everything else internally for the structure of a body, as well as develop all of the exterior surfaces, so he was one terrific guy. And I remember him working on layouts for what became the Continental, and if you've ever looked at a body draft or a good body drawing, you know that it's one of the most complicated pieces of technical drafting that you can imagine. Lines overlay each other all over the place, and you have to know what you're looking for in order to find the piece that you're concerned with, or to trace a line you're concerned with and so on. Martin really opened my eyes. He laid out the interior structure of the body as well as the exterior surfaces for the car that became the hardtop Mark I Continental, and this was a beautiful piece of work.

The way things would work at that time was that when we, in the Design Department, had a clay model that was approved, we -- with a measuring bridge -- would take the "offsets" off the car. In other words, we had measured the different sections at the zero line, ten, twenty inch line and so forth. Then various body draftsmen would be

brought in from the body engineering activity to put these sections on a full-size draft, clean up the lines and get the surface defined, trued up, so that they could take the draft back into the body engineering activity and do all the structure and the hinges and everything else that goes into a body. Templates for making die models would be made from the draft also. Some of the fellows who I remember from the body engineering activity that would come in at these periods would be Tom Stephenson, first of all, and he had a helluva sense of humor and was just an outstanding guy for skill. He had a couple of fingers missing from one of his hands, but, boy, he would lay these sections on, true the lines up, and come back and tell you that you had a little flat spot or a little hole in your model here or there, and, damn it, he was always right!

And Guy Manuel was another one that I remember. I think Guy eventually became head of truck body engineering before he retired. We looked at the curves and sweeps that these body engineers had, and, sometimes during lunch, we could get a sheet of plastic, trace their curves off, saw them out on the jigsaw and file them smooth. During our lunch periods we would make our own sets of curves. We couldn't afford to buy them at a drafting supply house. They were just too expensive.

I have a very fond recollection of Edsel Ford, who, of course, was the sponsor of this whole activity. When he visited to look at our work, I recall that he was extremely quiet, very tastefully dressed -- just a real gentleman. His pants cuffs were precisely at the right height, and, I think, his shoes were the first pair of hand-benched, English-made shoes that I ever saw in my life. He was very mild mannered; he didn't bluster or stomp around the place. He'd sneak in quietly, and Mr. Gregorie would be told that Edsel was there, and they would proceed to

confer, and we would get the hell out of the way. Edsel was just a fine gentleman, and I guess there's a lot of history that shows that the old man and the crew of bandits he had there at the time pretty much were responsible for putting Edsel Ford in his grave prematurely.

One of the other people who came into the Design department was Bob Thomas. He is now retired and lives in California. He's a musician -- plays piano and organ and was a guy that organized a small band which used to practice in the basement of the Design Center in later years. His name was Robert McGuffey Thomas, and he was related to the McGuffey Reader McGuffey. I guess through that connection, he came into Ford Motor (it seems like you had to know somebody). If you knew somebody who knew Henry Ford I, you could come in and get a job. But Bob came in, initially, to help the artist/painter who was up on the second floor doing work exclusively for Henry Ford. This artist's name was, as I remember, Irving Bacon. And Bob was brought in to help him, which he did for awhile, and then got transferred down to the Design Department and worked with the rest of us on models or sketching up design proposals for wheel covers and everything else.

Bob told me in later years, when I went to visit him in California, that Bacon told him that he'd never make a fine artist, and he'd better get his ass someplace else if he was going to have a good career. One day he came in wearing one blue and one green sock. We started to needle Bob, and it came out in the discussion that he was, basically, colorblind, if you can imagine that! Bob used to use colored pencils in making his renderings, and they all had a number on them corresponding to their particular shade of color. So Emmett and I made a chart of happy

color combinations, by number, that he could use, so his colored pencil renderings weren't so wild for color combinations. This was our solution to Bob Thomas' color blindness problem.

Benny Barbera was not provery-stricken like the rest of us, and he had a car. When Monday morning came around, "what you did on the weekend" was the primary lunch hour subject of conversation. Benny was one of the guys that considered himself quite an operator with the girls. I remember one time we asked Benny what he did the previous weekend. He was an Eastsider and would have been a patron of the Vanity Ballroom, whereas a Westsider like me would have patronized the Grande Ballroom. Benny replied this one time, "Oh, I was out with one of those Grosse Pointe debunons or whatever you call them there whores." We almost died when he provided that definition. Benny kept on as a modeler, I understand, and he retired again a few years ago.*

*Editor's Note: As of April, 1990, Placid "Bennie" Barbera was still working at the Ford Design Center with a record of over fifty years of continuous service.

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SECTION IV

I've mentioned Dick Beneike's "modeled," not "sculpted," philosophy for getting a pleasing surface. There were various ways that you could develop a design. One way was to start by doing a full-size blackboard side view and, perhaps, end views or some cross sections. Then you would complete the shape on the drafting board using various trade secret "keys" to handle transitions in shape -- to define the shapes between what you had established as basic sections. Then you'd convert this information into a full-size wood or clay model. This type approach is what, I feel, gave General Motors' products their architectural, hard feel compared to Ford, who started the process with a full-size clay model at the earliest stage. Then they took the information, or "offsets," from it, cleaned up the surfaces on the drawing board, and went ahead with the engineering.

I remember that Emmett O'Rear and I made the graph paper-type form sheet for recording sections taken off a model, using a bridge. We constructed this form sheet with spaces for the name of the program and the date and what particular section it was; whether it was vertical or horizontal, and at what line. We would plot the dimensions on this graph and give the sheet to the body engineers. They would clean up the lines with their curves and then join the different sections and come back and tell us that, sure enough, we had a flat spot in our roof or something of that kind.

That type of philosophy was exemplified, initially, by the 1938 Zephyr front end which had a low grille and a ship-type prow to it as the hood came forward to down below the bumper. There was a flavor of the European race cars involved there. That first 1938 Zephyr had, I think,

a low grill with horizontal bars, and the next year I helped model the 1939 "facelift" which used the same sheet metal and grill opening, but it had a grill with vertical bars. Dick Beneike helped show me how to proportionally space the bars, as they went from the bottom and swept up past the bumper. The bars would not only be spaced wider as they went up, but the bars themselves were wider. So that was a tricky thing to make right, but when it was there, it was a real improvement on the 1938 design, and it carried the flow lines of what you might call the "catwalk," or the area between the fender and the hood, right on forward and down behind the bumper.

The Ford Motor Company, at that time, was not reluctant at all to look at competition and pick up ideas or design features that they considered striking and attractive, or, perhaps, better than ours or at least worth putting on a new model.

I remember I was assigned to work on a front end of a Lincoln major facelift (1941). The competitive car that was considered very smart was the Cadillac Sixty Special model. It had a greenhouse that was outlined in very thin chrome moldings, like a quarter-inch thick, and it gave such a formal, elegant look to that car that it was considered by everybody to be a very smart, very fine design. So the Company bought a Cadillac Sixty Special, brought it through the golden oak doors, and sat it right next to where I was to work on this Lincoln front end "facelift." As a result, we made what I thought was a pretty architectural, ugly, heavy-looking front end, but it was inspired by this Cadillac Sixty Special. I think the Lincoln kept that front end until following World War II.

One thing I hinted at before was that people in the Design Department [at Ford] were "jacks-of-all trades" in those days, to an

extent. We could make drawings, we made templates, we cut up letters for the instruments, we helped Gar Evans paint the models. We would bring in things that we had created at home and threw them into the pot for consideration. So, it was a delightful environment, because I enjoyed drawing, always did. Keep in mind that while I was working there all the time, I was getting this engineering education at night, so I could appreciate what went behind the surfaces and, with descriptive geometry and some of the drawing course I had, I could tell what was necessary to create some of this stuff and to pass on the information to somebody else who had to put it into actual hardware. So it was delightful to me because as I would get more advanced at college, I could apply more and more of what I was learning to my actual work in the Design Department. I still, to this day, admire the type drafting that the body engineers were able and, in fact, forced to do in developing surfaces and cleaning them up so that the dies and final product would be smooth and pleasing. Of course, in this day (which partly stems from the aircraft industry), the surfaces and the equations for conic sections have been computerized so that a lot of this hard body drafting work is done automatically by the programs stored in the computer.

The design philosophy that the Ford Company was following resulted in the rounded shape of the 1939 Mercury where the roof had quite a crown on it, and it curved down to quite a sloping "tumblehome" at the windowpane and then curved back in fairly sharply to the running board at the bottom.

One thing that has perhaps been lost in the early Ford Motor Company history is that there were some early concerns while I was there

about passenger safety. What this stemmed from was that there was, in the Detroit area, a famous plastic surgeon named Dr. Clair Straith. He wrote a letter, which Bob Gregorie got, and he included several photographs where he was relating the surgical work that he had to do to repair the facial cuts of a fellow having been in an accident, colliding with the steering wheel and the choke and throttle controls, which protruded from the instrument panel. He had a photograph of the interior of the car after the crash had taken place. He was, in effect, telling us why the hell don't we do something about this so people don't have these sorts of problems. The following year -- 1940 or 1941 -- we actually recessed the choke and throttle knobs into the instrument panel in sort of hemispherical depressions as a result of looking at his pictures and trying to do some small thing that would help. Now, our analysis was no damned good at that time because what was happening in a frontal crash was that the engine and the control rods for the choke and throttle, being rods, would move rearward along with the engine, and that's what caused these knobs to stick out, but, I guess, we were too dumb to figure this out at that time. That was like the first concern for crash safety that I can recall at Ford, and that's a long time back (pre-seatbelt days).

In the Design Department [at Ford] there were a few innovations that were dreamed up. I think we were the first ones to integrate the radio speaker with the radio and put it in the top of the instrumental panel. We, I think, originated large plastic panels on the dash or instrument panel. We came up with a concealed running board for the Zephyr. We came up with this integrated license plate light and rear

trunklid handle all in one assembly. We started the lower radiator grill theme with the 1938 Zephyr. We integrated the instrument cluster into the steering column and wheel on, I think, the first 1939 Mercury. We started, with the Mercury, these body cross sections where there was quite an angle to the side glass of the doors.

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SECTION V

I'd like to start Section V, which is some of my personal projects that I was involved in in the Design Department from 1937 to '42. My "claim to fame" involves my work on the first -- what became the first -- Continental. Edsel Ford, as I understood it, had been to Europe for a vacation and was impressed with the long hood spare tires on the back of sports cars or luxury convertibles that he saw. When he came back, he asked Gregorie if they could build such a car for him by making it out of a Lincoln-Zephyr. I was chosen to work for Gregorie in doing a tenth-size model and a tenth-size drawing of this Zephyr for Edsel's special car. What was done was: there were black wooden modeling tables on casters which would support a tenth-size modeling bridge. And one of these was moved over close to Gregorie's desk in the corner of the department, and our area was partitioned off with some of the full-size blackboards, that were also on wheels, for doing full-size blackboard drawings. We partitioned off this little area where I was to work near Gregorie's desk so that when Edsel Ford came in to look at this thing, he wouldn't be exposed to everybody else's stares, I guess; at least, he wouldn't be noticed.

This was sometime in October of 1938, and the story on this activity is in Car Life Magazine for April, 1967. Anyhow, this is when Edsel would come in once or twice a week and look at the progress. And if he'd come in, he'd always nod very courteously and say, "Hello," and if Gregorie wasn't around at the time, I'd of course rush out and find him and bring him back in there. Gregorie and Mr. Edsel Ford would confer at my clay model and drawing and carefully look them over, and I would

discreetly sneak up as close as I thought I could to hear any comments first hand. This was also when I was able to observe the beautiful tweed suit with perfectly tailored cuffs and the hand-benched leather shoes on a very tastefully and conservatively-dressed Edsel.

So this, among my associates anyway, was my "claim to fame," working on this car, which became the first Continental. What was done was, I understood, initially, that they were going to build three of these things: one for Edsel and one for Henry II and for Benson, the two older sons. I think only one was built, and I have a photograph in my file of the car, built over at the old Lincoln plant on Warren and Livernois. The picture is taken in the back of the plant near the railroad tracks. This was painted, as I remember, a silver gray color which was sort of Edsel's favorite.

The car was shipped down to Palm Beach when Edsel was down there on vacation, and he got such a wide, favorable response to this automobile that when he came back from vacation, he directed that it be put into production. What we did basically was take the Zephyr and lengthen the hood and front fenders about ten inches, as I remember, and then design a convertible top and a boxy back end with an exposed spare. For its time, it was quite a smart looking piece of machinery. It had the Lincoln-Zephyr grille, and I think Gregorie himself designed the unique hood ornament for it. But, anyway, that was Edsel's personal contribution, and it was put into production as the Continental. It would be the Mark I, and we're up to, what, seven today, I guess?

I also worked on the 1939 Mercury full-size clay model. When I got there in 1937, the body contours of that '39 Mercury were all established,

but the grilles were not. I worked under Benieke's direction, as I remember it, for modeling the grille for the front end.

One assignment I got was making a tenth-size, plaster model of the '39 Mercury coupe for Larry Sheldrick's daughter. Larry Sheldrick was Chief Engineer at that time and wanted to surprise his daughter with the gift of a new Mercury coupe. He must have loved her very much. For this "government" project I made a tenth-size, clay model of the car, then Dick Beneike showed me how to make a segmented plaster mold from it -- the top piece locking together the other mold sections. I think Dick did most of the work in showing me how. A plaster cast was then made from the mold -- sanded smooth and painted. I believe Mr. Sheldrick's scheme was to present the plaster model in a gift box. After his daughter, Bonnie, had opened it, he would tell her the real item was in the garage!

Some other projects I worked on were the 1939 Lincoln Zephyr grille, 1939 Mercury grille, the Zephyr concealed running board, 1941 Zephyr front end, 1941 Ford front end (created by yours truly "in the full-size, clay model"), several instrument panel proposals, designs of Mercury's winged-head medallions for the car ornamentation, the combination license plate light and deck lid handle, several tenth-size concept models based on sketches by Gregorie, several instrument cluster designs for Ford and Mercury cars, wheel cover/hub cap sketches brought from home and such detail items as brake pedal rubber pads and gear shift lever knobs.

The work was stimulating because of its variety and the freedom one had to create and innovate.

SECTION VI

My later experiences touching on Design Center activity, when I was in Engineering, follow:

One thing a Stylist must consider is whether or not his proposed design is practical -- from a functional standpoint, and from a manufacturing standpoint, and from a servicing standpoint. Today's stylists at Ford, to insure this broad practicability, must obtain a "feasibility signoff" -- usually at a review meeting set up by the Vehicle Engineering Office where representatives of the various engineering offices attend.

I participated in developing standards for radiator grille opening areas, air conditioning register and duct size requirements, wheel cover clearance standards, tire clearance standards, ground clearance standards, jacking provisions -- all of which required visits to, and coordination with, the various Design Center studios. Many times the feasibility of a new design concept depends on conducting some engineering tests. The engineer cannot be other than open-minded toward what might appear as a radical new approach -- otherwise progress stops altogether.

The 1958 Lincoln/Continental car, with its unitized construction, for example, meant evaluating bumper-to-sheet-metal clearances in John Najjar's studio, as the concept required integration of the bumpers into the body shape as much as possible. Jacking deflection tests were conducted for the same clearance feasibility purposes.

Designs of the dual exhaust rear outlets for the 1955 and '56 Lincolns required new engineering ideas to preserve the appearance, while maintaining their alignment and attachment security.

One can see that chassis items, though usually unseen, often have appearance considerations which make visiting the design studios a requirement.

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SECTION VII

This is Section VII. I think I said that everything else being equal, appearance will sell, but everything else includes reliability, durability, serviceability, safety, economy, dealer integrity. Not every customer places as high a value on style as the stylists do. For example, the VW Beetle was extremely popular, but I don't think it could be considered a style leader in its later years.

So today's Design Center and Product Planning methods of surveys and advanced model shows and panel interviews -- all market research techniques, are needed compared to the old pre-World War II dictated by a boss style of a car. A proper philosophy of product design involves a continuing ethical searching for "what does a customer benefit from?" What does he see and feel that is worthwhile to him? The hand solder-filled body joints that are laboriously filed and ground smooth where they aren't seen and rust through in fifteen months perpetrate a fraud, really. The well-fixtured, high-production press welders or robots that produce uniform, dimensionally-accurate, correct assemblies day after day give the buyer true value.

I found out the vaunted German Black Forest elves that are so famous actually come from Turkey anyhow, and the high workmanship standards of the German auto industry are, to a large degree, a myth.

SECTION VIII

Section VIII contains some concluding remarks on what Ford Design Center has contributed to the industry as a whole. I would say, first of all, that they have contributed some radical new products that set industry trends in some respects: the '38 Zephyr, the '39 Mercury, the original Lincoln Continental, the '64½ Mustang, 1956 Lincoln, 1958 Lincoln Continental, and the '62 Lincoln are a few that I can think of. And, I believe, the current models on the road represent a beautiful combination of appearance and functional considerations.

The accent on lower aerodynamic drag was something that the Europeans -- especially the Germans -- had been considering for some time because there was no speed limit on the autobahns over there, and being able to pass up your neighbor on the highway was very important to the Germans. The other thing that the Europeans tried to teach us, initially, was the value of fuel economy because their gasoline prices were so high. We got around to this as a result of the ridiculous fuel costs forced on us by the OPEC cartel later on.

I feel today Ford, more than other car companies, represents a company that has integrated the actions necessary in styling, actions necessary in product design, actions necessary in manufacturing engineering, and the contributions to be made by everyone in the company, including hourly personnel on the assembly lines, better than other companies do, and it's a pleasure for me having been involved in some of these procedural things at their initiation to see them come to full fruition as they have in the last two or three years. It shows in the product, and it shows in the customer acceptance of the product.

I always considered this cooperative effort to be essential, and, at one time, I constructed a little chart called the "Reliability Chain," in which I listed the actions of each element of the process as a link in a chain, which extended from the initial action at one end to the happy customer at the other. It involved everybody's contribution, as I say, including that review of the new designs before production by the Service activity to assure that they could be serviced at a reasonable cost and reasonably quickly (if they needed service at all) and would cause the dealers no particular problems. So, I think that this total system, if you will, is represented in our company now, which ties everybody together and doesn't compartmentalize each activitie's effort. It results in better people, it results in better products, it results in a better reputation for the company, and results in improved profits.

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Q This is Dave Crippen of the Henry Ford Museum & Greenfield Village for the Edsel Ford Design History Center. This is April 15, 1985, and we are in beautiful Green Valley, Arizona, talking with Mr. George Eugene "Bud" Adams who is a long-time stylist and engineering and design craftsman at Ford Motor Company, and Mr. Adams has recorded three earlier tapes for us, and today we are going to fill in between the gaps or expand for more details on his long and interesting career at Ford Motor Company. So, Bud, if you could take it from the beginning.

A Dave, my father was a toolmaker at the Rouge Plant at Ford, and he passed away when I was twelve, and, at the time, I was happily attending public school in Detroit with no particular idea of what I wanted to be or what career I wanted to pursue. I was taking what would amount to a college preparatory course in intermediate school. I remember I had a Latin class and a real tough teacher, Mrs. Savage. After Dad died, Mother found it pretty tough going, because those were the Great Depression years. She was able to contact my father's old tool room superintendent, Mr. Gardham, and he got me an application to enter the Ford Trade School. So I left the ninth grade and became a Trade School student with the typical blue skull cap, the shop apron, the black bow tie, and the badge worn on the left shoulder.

Q What were the entrance requirements for the Trade School?

A I think the entrance requirements were to be either an orphan or have a father who had passed away and knowing someone at Ford Motor Company.

Q [Where was it located]?

A At that time the Trade School was on the upper floors of the "B" building at the Rouge Plant.

Q What year was this?

A 1932. For a youngster to walk into that environment, getting off the Michigan Avenue streetcar, and going up Gate Four road past the Engine building and watching those cupola rail cars full of either hot cast iron or slag go by, and in the Winter months it was dark when you were going to school --it was kind of frightening actually. I wasn't used to blue mercury vapor lights which the shop used, and I wasn't used to the noise and smell of cutting oils and things of that kind. You learn to punch a timeclock real quickly, however.

The student body was split into three sections, and so you were in the Trade School's shop activity two weeks, and then in their school rooms one week, and you alternated that way. When you graduated you really didn't get a high school diploma because the Trade School placed a heavy emphasis on mathematical subjects and drafting subjects, subjects that would be useful in a trade such as toolmaking or tool design or pattern making, and they were a little short on English and history, so some of the boys decided to go to public night school and pick up credits in history and English and get a high school diploma. Now I, myself, never did this. What I did was take every damned Apprentice School course that was available. The Apprentice School was an additional night school that was run in the same building where you would attend a class once or twice a week. You had to do your school work at home and bring in the answers on an "answer sheet" and turn them in for review and correction,

and this carried you through such subjects as slide rule and trigonometry and solid trigonometry. These were all courses arranged around skills that a qualified toolmaker would have to use, and they reflected problems that had been encountered in the shop, whether making dies for the body panels or fixtures and tools for machining parts of the engine or whatever. They all reflected problems that had arisen there and had been sent up to the Trade School for solution and assistance to the shop. The Trade School incorporated these into their educational material. Their practical shop mathematics books were actually published by McGraw-Hill and became sort of a Bible for that type of training that a toolmaker should have in mathematics.

But the Trade School feature, which my mother was mainly interested in initially, was that the Trade School paid a cash scholarship. Now I suspect that the term "scholarship" was used to avoid any implications involving child labor. Every week you'd get your pay envelope with cash inside at the starting rate for me, of fifteen cents an hour, and that's what kept Mother and me alive during those tough Great Depression years. My mother worked as a saleslady off and on, but, as I say, times were tough, and her income was largely dependent on commissions, and I could always tell when she would come home from work, by the expression on her face, whether she had a good day and she'd sold more than a hundred dollars worth. But the underlying security, which kept us alive, was the Trade School cash scholarship that I'd bring home and give to her.

The Trade School reflected, in its operation, Mr. Henry Ford's beliefs, one of which was in thrift. They encouraged that by every month giving you a couple dollars to deposit in a bank account. And true to

the Ford "bean counter" tradition, you had to bring your bank book in and have it checked off by the school office to make sure you were putting it in and not taking it out. The other thing was, there was an incentive to do good work, because on your report card -- as I recall, at the bottom of the card there were three basic grades. I think two of them had to do with shop, and one had to do with school, and if you could get three A's on there, you could get a nickel an hour raise, which was quite substantial. And for two A's and a B, it might have been three cents. So there was an incentive to do well in school.

At that time, the Trade School didn't have any females (which I didn't really think was much of a handicap), but they had a full range of athletic activities. We had softball teams, and there was an annual picnic at Boblo where you could play golf or baseball, and you and your girlfriend could dance at the pavilion afterwards. It was the whole day at Boblo, which was quite an experience.

During the Trade School time, I continued to sketch and do lettering, which I liked to do. Actually, as a very young kid in the public schools, my art teacher got me into a class on Saturdays down at the Children's Museum in Detroit. I remember making a little gorilla out of clay down there, which eventually fell apart, but I had an interest in art subjects that early, I remember. In the Trade School I did a lot of lettering. In fact, I made the first diploma that the school offered, and this was one of these old English script affairs -- pretty crummy by professional standards of today -- but, at least, it was legible. And I did a couple of program illustrations for the annual Boblo picnic and a few other jobs of that kind while I was at the Trade School.

I graduated in 1935, and the system then was if you were not eighteen, you were not old enough for a Ford badge. So they would keep you on as a so-called "senior," and this meant that you would work full time in the shop as a specialist on a certain type of machine, such as a precision boring mill or, like I did, spend my time in the tool design room doing drafting work and some of these special lettering assignments.

In 1937 the Design Department, which was set up by Edsel Ford under Bob Gregorie, evidently needed a little more cheap help for work on the full-size clay models. So they appealed to the Trade School to send someone over, and because of the lettering and other work that I'd done at the Trade School, I was picked as one of the guys, and Emmett O'Rear was the other. The two of us were the first shipped over to the Design Department, and we arrived there a week or two after Johnny Najjar (who had been sent over from the Ford Training School, which was a different school for high school graduates at Gate Four on Miller Road).

It was sort of odd trying to find the place on my first day. I got to the Engineering Lab and found the Design Department in the corner of the building, enclosed by golden oak and frosted glass partitions, and I tried a couple of the doors which were locked at that time. I had arrived there a half an hour early, I think. This character with a mustache and high-cut trouser cuffs walked up to me and asked me what the heck I was doing, and I told him I wanted to get in the place -- I was supposed to report there. It turned out that this mustachioed, balding guy with the beady eyes was Bob Gregorie. My introducer to the Design Department was wondering why I wasn't inside when all the doors were locked!

Emmett and I, initially, were sort of apprenticed to the head clay modeler who was this old German, Dick Beneike. Dick was a short, dumpy, lovable type guy. At least, I enjoyed him very much. Dick had learned his trade as an industrial sculptor in Germany, and he used to tell us how the apprenticeship system worked over there. When you got to the point where you earned your journeyman's ticket, you had to leave your hometown and earn your way in other areas of Germany --other towns. If you came back to your hometown, that was an admission that you had failed, and you couldn't cut the mustard, and it was a matter of disgrace. And Dick would assign us to help slap the clay on these full-size forms which were made out of wood and had sort of a wood lath skin to which the clay could adhere, because it would ooze in between the laths.

We got the clay from the Ford-made clay ovens. These were wood and aluminum structures heated by light bulbs, and they had aluminum trays in there with the pieces of the clay and the shavings from clay models which would be heated by these bulbs so that it would be workable. The clay we used then was gray in color, and it had sort of a wax base because it would be kneadable and workable when it was warm, and when it cooled off, it would set up, and it could be finished smoothly and actually painted.

After a couple of weeks or a few days doing this sort of thing, we were watching Dick apply clay to a fender, as I remember, and then shave it off with his different modeling tools and scrapers. I asked Dick, "Dick, how do you know when you've got a good line or you've got a good form?" I was trying to get at what the real principle was or what guided you when you were working on these full-size models. Dick had a real

long upper lip, and he sort of rolled his tongue behind that upper lip for awhile and thought for a minute or two, and he said, "Well, it's really pretty simple. What you do is put on what isn't enough, and you take off what's too much." That's the type of guidance that we were able to get out of Beneike early on. But after working there and working on these models for awhile, you developed a sense of form continuity and began to realize what the game was all about.

Q What guidance did Gregorie give you?

A I made a number of tenth-size clay models from sketches that Gregorie would produce, and these were for theme exploration or preliminary studies. We knew what the intended wheelbase was supposed to be. We'd take Gregorie's sketch and on a little tenth-size modeling table with a tenth-size bridge -- mahogany bridge -- we would get the wood shop to make up a form and then build up the clay on that to reflect what Gregorie had sketched, either as a front end theme or a rear end theme or both in a complete model. I'd have to say this, that I always felt Gregorie could make sketches that just couldn't be done in three dimensions. He had a rare talent in that respect. So there was a little bit of diplomacy that had to be utilized when you'd work up this model, and you'd have the right dimensions for the headlights, and the right dimensions for the wheels and tires, and you'd have the headlights positioned at the proper height per legal requirements, and it still didn't quite look like Gregorie's sketch. You had to indicate to him what was going on and that you'd done your very best.

But he was, I would have to say, easy to work for, even though we younger guys always considered him to be the world's greatest tightwad as

far as wages were concerned. Now when Emmett and I came over, we were Trade School "seniors" -- still had a Trade School "senior" badge. And in 1937 I was just about nineteen, I guess. Anyway, as my recent experience would indicate, I'd have to say Gregorie wasn't the master of his own ship as far as giving raises was concerned. The whole department was, as I understood, funded by Edsel Ford's private account. It was Edsel's baby, as he had created the department in the first place.

Q Before that they'd been sent to outside firms, had they not?

A Yes. Briggs used to do the body design and body engineering for Ford, and I think the first body that Ford completely engineered themselves was the 1937 model. I can still recall, on the body draft for that model, they showed a milk can standing up in the trunk, which was a requirement of Henry I. The farmer should be able to take his milk cans down to the station if he had to.

When we first came over, I don't think there could have been more than twenty-five people in total in the Design Department, and that included some designers that actually worked on the board. There was Walter Kruke, who was a graduate of the Yale School of Fine Arts. Walter told me one time that when he was at Yale, he had his own orchestra, and he was actually in competition with Rudy Vallee. Walt's band evidently didn't succeed, and he had committed himself for the cost of uniforms, so he came to work on the Ford lake freighters and earned enough money to pay off his debts for this band experience. And with his fine art training, he somehow ended up in this Design Department.

Then there was Johnny Walter, and John was a short fellow with thick glasses and sort of a rounding head that became a successful

freelancer. When he left Ford, he went into business for himself as an industrial designer, and I remember he used to do a lot of work for Whirlpool on appliances: ovens and washers and dryers and things of that kind. John was one of the guys that said that, "Oh, gee, if you're going to be anything as a designer, you got to get out and circulate. You don't want to work for one company all your life. You ought to go to Hudson, or Packard, or someplace and float around a bit."

There were also a couple of pattern makers -- woodworkers -- Jimmy Mearns was one of them. I can't recall the other fellow's name. But they helped build the bucks, and they would help Jimmy Lynch who ran the shop. I think we had a permanent sweeper/janitor around there, because there was still a little concern about security of design. You didn't want everybody marching in and out.

But if there was a total of twenty-five people at that time, that was about it. And evidently the work that Emmett and I did couldn't have been too bad because they kept sending over additional Trade School students afterwards to help out. I remember Bennie Barbera was one of them, Frank Byers was one of them, and several others. There's a copy of a Trade School paper [The Craftsman] that I saved that showed the group of Trade School graduates there. I guess the Trade School was proud of us.

The work that we did was varied, in that we didn't do clay modeling one hundred percent of the time. We had a chance to do some drafting and make some design suggestions for instrument panels and other components. We would be able to start an instrument panel design, for example, by picking up the A pillar width limitations and the proposed windshield line from body engineering, drawing up our own buck, and then having the

wood shop make the buck out of wood for us, and we'd create our own plastic templates from the design we had laid out, and proceed to model up the whole panel suggestion, draw up suggestions for the instruments themselves and have them made in the shop out of aluminum and Plexiglass. So it was a varied experience that was very, very worthwhile.

One of the things that I recall, which is hilarious by today's standards in the design activity, had to do with the '41 Ford. The '41 Ford and Mercury were to share a common body, and the....

Q Common practice in those days?

A Yes. And the Mercury had its own unique front end, four inches longer in wheelbase from the dash forward. And these full-size model bodies had been pretty well completed and put together, and they were set up so that work could begin on modeling the front ends. Well, I was assigned to the Ford model, and contrary to what usually went on, I was getting no direction whatsoever. I didn't have any sketch from Gregorie, I didn't have any sketch from one of the designers, Walt Kruke or Bill Wagner or Johnny Walter or anybody else, and so what I did -- all of us knew the legal heights for headlights, and we knew where the bumper should be and what an acceptable overhang on the front would be, and we knew where to find the corners of the radiator. So I went to work like a little crazy beaver, and I just modeled this damned front end design right on the full-size model. And, I thought things were looking pretty good. One morning Gregorie came by and did a double take and turned around and said something like, "Gee, that's not too bad," and I was kind of elated because this was fresh out of old Adams' head, you know. And I was even more astounded when I found a couple days later that it had actually been approved!

So I was proceeding to put the final touches on this front end model and getting ready to apply aluminum foil for the plated parts of the grill when I detected a movement of people behind me. I turned around, and here's the whole top echelon of the company marching in to take a look at this '41 Ford front end. There was Charlie Sorensen, and he was a tall, blond, handsome guy -- tanned -- very erect posture, and there was P.E. Martin, who was universally detested. There was Crawford with his shock of white hair.

Q John Crawford?

A Yes.

Q Edsel's personal assistant?

A Either that or he was company secretary. I can't remember what....

Q He may have been both.

A And Larry Sheldrick, who was chief engineer at the time, and A.M. Wibel, who was the boss of purchasing as I remember, and this whole troop of executives came in, and they wanted to see what they were going to have to build, of course. And, so, I very quietly got up off my stool and backed up out of the way. Then Sorensen picks up my clay knife (this is a knife with a toothed blade on it, so that you could slap it into the model and pull it along, and it would draw a true, straight, clean line). Well, he picks up my clay knife, which I'd left on the stool there, and he starts drawing lines on the front fender, because they were trying to figure out how the hell they could make this thing. It was a rather deep drawn design. And I'm in back of him muttering that Sorensen's ruining my model.

Q He was an old pattern maker, wasn't he?

A I think so, and he was the one that's given credit for being able to caste the V-8 block in one piece, so he, evidently, knew a few things about how to make things. As far as casting goes, they at least had to cast the dies to make this fender.

So what happened was that it was decided to make it in three pieces. There was a horizontal feature line -- a little groove -- that ran from the back of the fender up to the center of the headlight, and then there was a vertical cutline right over the center line of the wheel in the side view. So you had a top piece and a front piece and a back piece, in three parts for '41. Then they subsequently cooked up a way of making a special blank and folding the blank around and welding it where it would be underneath the headlight, and then they would form that in one piece for the '42 model. But that was my closest brush to the top echelons of the company at that time.

Q Do you remember what any of them said?

A No, I don't. I didn't think that snooping close enough to overhear was the thing for me to do. Then one of the other characters that visited the design department that I recall very distinctly was Harry Ferguson. I forget what year this was, but we were working on our clay models when there was a Ford tractor set up in the studio, and it was blocked up so that the front grille and the top tank of this tractor could be modeled in clay. And old Harry himself comes in and hangs up his suitcoat, and he was wearing English tweeds. It was a heavy tweed type coat, and he hung up his coat, rolled up his sleeves, and he was doing the clay work himself on this front end. And the thing I recall about him was he had the most beautiful pair of all-leather suspenders

that I've ever seen in my life. Now I hadn't been exposed to English suspenders or any other item of English clothing at that time. I was kind of used to the Thom McAn type of cheap elastic or whatever, and these things were really glorious gaiters that helped keep up his trousers.

So Harry did spend a few days in there working on the tractor front end, and I recall Henry I coming in to look at it a couple times with him. What they argued about later on, I never did find out.

My real "claim to fame" that I have in regard to my early time in the design department, is the creation of the first Continental. Gregorie got this request from Edsel, who had set up and was responsible for the Design Department. Gregorie asked me to create the model in tenth size and carry along a little tenth-size drawing at the same time. There were blackboards that were big enough to take a full side view of a car and, maybe, a half section on either end. And they were on rollers so they could be moved around for show purposes, and we got a couple of those and constructed a temporary partition around Gregorie's desk area in the corner of the department. I had two tenth-size modeling tables. On one of them I made this tenth-size model, and on the other one I carried along, at the same time, a drawing of the concept. And the idea was to create a unique car for Edsel which had the same flavor as the European sports cars that he'd seen when traveling in Europe. These were long hood cars with spare tires mounted on the back.

Q Do you know what type of models caught his eye when he was there?

A I don't. I would think there's more than one because that was sort of a regular arrangement. If you remember the early MGB's, even though

they're small cars, they were set up that way. Old Lagondas and some of the others were all long-hood cars, and I think a lot of 'em had two spares in tandem on the back end, because tire reliability then wasn't real great.

Anyway, the idea was to take a current Lincoln-Zephyr -- as much of it as you could -- and stretch out the front end -- stretch out the hood -- to create the length there and then create a special boxy back end with the exposed spare tire. So, as I remember, we added ten inches in the length of the hood and the fender of a standard Zephyr. We used the production Zephyr grille and front part of the fenders and hood and put this added length in there and then designed and styled a convertible type top and boxy back end to complete the design.

I can recall that Edsel used to come in a couple times a week and look at the progress of this, and when he would come in, especially if Gregorie wasn't there at the time, I'd say, "Good morning, Mr. Ford," and scuttle around and find Gregorie wherever he was and bring him in. And the thing that impressed me about Edsel was what a quiet, unassuming gentleman he was. He wasn't a loud bull-of-the-woods variety, and he was always just as neatly tailored as you can imagine. I think that his shoes were the first English handmade, hand-benched shoes that I ever saw, and his pants' cuffs were tailored at exactly the right height, and he would always speak to you. And, of course, when he and Gregorie were conferring, I would sidle up as close as I could without breathing on their necks and try and get the comments first hand rather than relying on some interpretation from Bob Gregorie later on.

So the model was accepted. It didn't show a heck of a lot of detail, but Edsel was evidently pleased with what he saw and thought it

would reflect his desires. The people at the old Warren Avenue Lincoln plant were put to work to build one of these things. I've dug up a couple of photographs of that particular car taken behind the old Warren Avenue plant. And, as I recall, the car was shipped down to Palm Beach [Hobe Sound] where Mr. Ford used to spend his vacation, and he drove it around there, and his friends commented or remarked about it so favorably that he decided to put the thing into production. It became the Continental. Looking at that little old tenth-size model in the photographs today, the workmanship sure looks crummy compared to what the boys do today, but, at least, it got the job done.

I think it was Martin Rigitko who had come into the department sometime along there that did the hardtop version, all "on the board." I don't think we ever made a model of the hardtop. But Martin was the kind of a guy -- he came from a coachbuilder, and I don't remember whether it was Brunn or LeBaron -- one of those outfits that Lincoln dealt with -- and he could do a body design from the ground up -- all the structural members, the surface development, the glass mechanisms -- you name it, he could do the whole bit. I used to watch him doing his drawing of the hardtop, which was, again, shipped over to the Warren Avenue plant, I believe, for them to make the first prototype.

When Martin first came in the department, there was an instant bolt of electricity between Martin and old Dick Beneike, who was the head clay modeler -- a German -- "Das Kraut".

Q Martin Rigitko was the layout person?

A Yes. Now Martin -- I don't know what nationality he was, whether it was Hungarian or German, but there was a little spark of competition.

I could tell the way Dick grumbled that he was not overly impressed. Well, when Rigitko first came in, he had an arm full of plastic curves under his arm, and both Dick and I kind of chuckled a little bit because these curves were pretty flat along the long edge, and they'd make a real sharp turn, and then come down pretty flat for the other part of the hook. And they were, obviously, curves designed to draw the type of body sections that Rigitko was used to at his former custom body place. Here Ford had pioneered the rounded shapes which were exemplified, probably, best by the '39 Mercury where the roof was rounded, and there was a lot of slope to the glass line, and a lot of tumblehome to the body side.

Q Had this been Gregorie's innovation?

A I guess you'd have to give Gregorie some of the credit.

Q And Edsel Ford?

A Yes. And I don't know how much creative effort was Beneike's himself? The way things went, a lot of times Gregorie or nobody else really drew the complete definition of what the shape was supposed to be. In fact, I can remember the Zephyr, as it was first built, had an exposed running board, and one of the slicked-up, modernized features that we came up with was the concealed running board. The door sheet metal was extended out so that it hid that ugly black rubber thing until you opened the door, and then there it was.

I worked out the type of cut line that you had to have at the front edge of the front door in order to open the door without gouging into the sheet metal. I worked that out on the clay myself just by visualizing the hinge line and how the door would swing.

So when you think of the '39 Mercury, I don't know whether Dick Beneike contributed to the shape or whether it was Gregorie or some of the

other fellows. It could have been a total team effort as far as I know. But I give Rigitko a lot of credit because he took a look around and saw the sort of shapes that we had evolved and what the direction of the so-called modern design was, and the first thing you know, he had a vise clamped to his big drawing table. These are horizontal, flat tables, and at lunchtime he proceeded to file on his damned curves until he had a whole family of new more rounded curves that would suit the work we were doing.

Rigitko had a lot of talent, and, as I say, he did that whole hardtop Continental thing on paper, as far as I know. I used to be amazed at how he could cut sections through the various framing members -- roof rails and door sills and pillars -- and indicate to the craftsmen how this piece of wood was supposed to be beveled and shaped to provide the structure. So Martin was a pretty good guy and a very nice personality. He used to have sort of a nervous manner, and he had a limp. I don't remember whether one leg was crippled. He had a problem with one leg or something, and he walked with a limp on one leg. Couldn't tell you whether it was right or left now, and he used to have a way when he talked to you he'd take the frame of his glasses in his hands and lift it up and down. "Euchene," he would say, "ve do it dis vay."

Dick Beneike was interesting to talk to because he would tell about the old days in Germany. He also used to subscribe to this German language newspaper that was published in Detroit, and I don't remember the title of it, but it was something or other "zeitung." The masthead was in this German style script, and there was a red circle, as I recall, with a black swastika right smack in the center. This one day he's

reading to us about the German "people's car." Well, this is the Volkswagen, and he told about how the scheme was that you got a coupon book, and every time you had a little spare money, why, you'd go down and buy a stamp and paste it in that book, and when the book was filled, you could turn it in and get your Volkswagen. Well, of course, Hitler and World War II and a few other things, sort of got in the way of that. I don't know if any German ever claimed a Volkswagen with his coupon book or ever got one filled.

It was interesting to have Dick read about that because we used to follow the design trends in the different automobile magazines. I remember one specific automobile from England, and a lot of the modern shapes were derived, to some extent, from the Grand Prix racing cars of that era -- Auto Union, Mercedes Benz. These other companies were producing some very fast cars that were streamlined, if you will, and brought low to the ground for minimum wind resistance and road-hugging ability, and it was the low grilles that were sort of "drawn" on the front shapes of some of these racing cars that inspired the facelift for the '38 Zephyr. The '38 Zephyr facelift was really the one car that insured the future of that Design Department. And when Emmett and I first came over, that "facelift" already had been done, and I can't remember whether the model was there or whether the actual prototype grille was there, but that low, flowing, built-into-the-surface type grille, which we would call a "facelift" today of the '37 Zephyr, was really an advanced design. The hood had a boat prow effect with a narrow section that came down through the center. That was also pretty damned advanced and pretty slick for its point in time.

I had understood that that was the thing that really insured the success of the Design Department. It allowed them to hire a few more people and bring in coolies like ourselves from the Trade School to help out.

Q The original Zephyr was done by John Tjaarda?

A John Tjaarda of Briggs, yes.

Q And derived from his concept car from the [1933-'34] World's Fair?

A I think so, yes. That was quite a unique form at that time. Quite a unique car.

Q Coincidentally, several people have indicated that the design of that original prototype looked so much like the 1937/'38 Volkswagen, that they accused Porsche of stealing it.

A Copying it?

Q Yes, copying it.

A Dr. Porsche did a great thing when he came up with that car. As an automobile, it never has been a performer by U.S. standards for good noise vibration and harshness, but it sure as hell was a reliable design. I know guys that have owned them, and they used to complain about having to grind the valves, the engine being air-cooled, and it didn't cool uniformly. It served very well for a lot of people for transportation.

When I was in Special Military Vehicles later on, I went to Europe. We were briefing the German military on this Shillelagh weapon system that Ford was developing, and we visited the German tank armored group. One of our host officers that drove us around for awhile had a VW of his own, and I asked him one time, "If money was no object, and you could have any German automobile that you wanted, what would you like to have?"

Well, his answer was, "I'd like to have a Porsche." The Porsche he was talking about was the one that was currently used by the German police on the autobahn because it was the fastest damned car around, and it could catch anything. They had to do a lot of catching on the autobahn because there was no speed limit at all. The Porsche designs were certainly respected in Europe.

We had another fellow that came in, who was a younger guy like ourselves, named Bob Thomas. His name was Robert McGuffey Thomas. He'd gotten a job at Ford because Henry was well acquainted with the McGuffey Readers, and there was some connection there or sympathy, so Bob got a job. He was helping the fine artist that worked up on the top floor of the lab as the artist for Henry I. What was his name? Anyway, he finally told Bob, "Geez, you're just never going to make a fine artist. Why don't you get yourself a job someplace else in the company? I think you'd be better off. Bob told me this story himself.

Q Was he working for Irving Bacon?

A Yes, Bacon is the guy's name.

Q Who was sort of a court painter?

A Yes, he was. And I remember that Bob told about how for that Edison fifty year celebration of whatever it was....

Q It was the Golden Jubilee of Light.

A Yeah. A big deal that was held at Greenfield Village [1929]. They had this fantastically large banquet hall all set up, and there were all sorts of dignitaries, including -- was it President Hoover at that time?

Q Yes.

A And nobody but nobody took a picture of the darned thing, and, so, when Mr. Ford wanted a record of it, they had to go back to the seating

arrangement and get individual portraits or photographs of all the people that they knew attended and where they were sitting and so forth. Mr. Bacon then created this thing out of thin air from all this seating plan these individual photographs. This was one thing that Bob was helping him with, I think, to begin with.

Q We still have it. It's still extant.

A Is it?

Q Occasionally, we exhibit it [at the Henry Ford Museum].

A Well, the history of those things gets pretty funny. Oh, one other thing that I don't know is documented or not, but in the middle of this Design Department at the corner of the Engineering Lab used to be an area where Henry Ford had taught [old-time] dancing. The whole floor of this engineering lab was a herringbone, teakwood affair that was just beautiful. There was always somebody polishing that thing from one end to the other. But anyway, when I got in the Design Department, one of the things that was there, and I think it was a holdover from the [folk] dancing days, was this damned stuffed black crow hanging by a wire from the ceiling. Now if anything belonged to Henry Ford, you didn't monkey with it until he told you to. So that old dusty black crow hung up there for the longest time in the middle of the Design Department.

Q Did they ever bring it down?

A Not that I can recall, no. It's probably been in the incinerator for quite awhile.

The other thing that we used to do was to make our own tools. Jimmy Lynch had his little shop there, which would make sample instruments for instrument panel models and things of that kind. Jimmy Lynch

had had charge of the propeller shop at the Ford aircraft operations on the other side of Village Road before Mr. Ford kiboshed the whole aircraft operation after his favorite test pilot had died.

Q Harry Brooks?

A Yes, Brooks. I think it was the Brooks thing that did it. But some of those fellows found other jobs. I don't whether Al Esper was in the aviation part or not. Al Esper was in charge of our automotive testing for a long time. But, anyway, Jimmy Lynch used to have the propeller shop, I believe. So at noon, while we were on our lunch hour, we could go in there and get some spring wire, and bend it up, and grind it, and put handles on 'em, and make our own modeling tools, all patterned after the ones that Dick Beneike had.

And, oh, another fellow that came in a little later -- I don't know, maybe, 1940 or thereabouts -- was Bruno Kolt. Bruno was, again, a very soft-spoken, gentlemanly, timid type of guy, and very good at small-scale modeling in wax. For ornamentation and things like that, he was outstanding. So Bruno was one of the guys.

Us younger fellows would look at the tools that the old timers had, and we'd borrow them and go in and use that as a model to make our own because most of the time the tools either weren't available or you couldn't afford them at the art supply stores. And we used to make our own French curves, too. There was a supply of plastic there, and we could jigsaw them out and file them in our spare time. You really need it if you're going to do any surface drafting work. You needed a "family" of curves -- which would be twenty or thirty curves.

One thing I should stress was that on a full-size model, you get an educated pair of hands after you work with it for awhile, and you can

feel very slight irregularities on a roof panel, for example, which is fairly flat. It's a very gradual curve. We used to have true radius curves there with numbers on them, and I think that number one was only an eighth of an inch height of arc in something like sixty inches width, so it's a pretty flat curve. Anyway, the roof curves were very flat, and after you had worked on a model for awhile and learned to scrape clay, even lay flexible strips on it to check for smoothness, you could put your hand over it and feel the little depression. When you actually took a flexible straight edge and laid it in that area, you could just barely see light at that spot that felt low. It was actually less than a thickness of paper, so the hand sensitivity is there. Then when you painted that thing, of course, and you had highlights running across it, you could see if there was a little depression.

The degree of smoothness of the fairing of one area into another gradually, was what you learned as a clay modeler. And what today is exemplified on all of the automotive bodies of the industry is that beautiful flowing surface. Today, of course, they're all trued and calculated with computer which, really, the aircraft industry initiated.

Q Did they?

A Yeah. I remember saving articles from magazines where the aircraft companies on the West Coast were the first ones to define mathematically the different sections and the transitions between them as conic mathematical functions. And, of course, once you can put something in an equation for them, or in a mathematical form, computerizing it is duck soup.

The other sidelight to working in the Design Department was there were no girls on the first floor of the Lab at all except a couple of

secretaries to the higher level guys that were in the front of the building in that executive row, and the telephone operator, as I remember. So if you wanted to see a girl, they were upstairs in the secretarial pool, and my wife to be worked up there at that time. Your chance to see the girls was only during lunchtime, if you went down to the cafeteria at the other end of the building. You'd see them going, or coming, or eating lunch while you were there, and they were not allowed, by this old witch that ran the secretarial pool, to smile or talk to anybody.

Q Much less fraternize?

A Yeah. So, any social activity was strictly after hours. And the other thing, of course, at that point in time, was that there was absolutely no smoking any place, and no candy machines, no coffee machines, and if you wanted to steal a smoke, you went downstairs in the lavatory and were careful about what you were doing, because being caught smoking was cause for instant dismissal.

One technique I learned, because I used to go to the john and try and do a little homework on my calculus at the same time -- one that one of the guys taught me to avoid falling asleep in the john. You stick your index finger out, palm down, and hang your keys over your finger, and if you happen to get a little sleepy and doze off, your finger would relax, the keys would fall on the floor and make a racket and wake you up again. So, the old Ford people developed a lot of subterfuges to get around the tyrannical management they felt they had at that time.

Q Did Harry Bennett ever impinge on the Design Department?

A I don't ever remember seeing him, no.

Q The elder Henry Ford?

A The elder Mr. Ford, I've seen him when he came in to talk to Ferguson at that time, but he studiously avoided the thing, and I don't believe he really understood or sympathized with what was going on. I remember when I was working on a front end of this one Lincoln model -- the one with the boxy front end, and we had this Cadillac Sixty Special along side of it -- Mr. Ford walked in the door at that end of the department partitions there. He walked in, maybe ten or fifteen feet, and stood there just sort of looking around, and shook his head a couple of times, and walked back out. So I sort of assumed that that wasn't his thing.

Q He left it pretty much to Edsel?

A Yes. It was Edsel's baby, and styling wasn't Mr. Ford's forte. But I remember when the war came along, any of us that could do drafting or engineering work would be put on war projects that Ford had. We started on the B-24 work. And, oh, some of those crummy prototype drawings that we had from Consolidated Vultee were just amazing at their crudity.

Q You had to accept those in the early days?

A Oh, yeah. And we were making Ford drawings from that, and I recall making the drawings of their engine mounts, which were tubular -- welded tubular structures, and making details of all the individual tubes and how they had to be cut to weld them together and make a mount assembly. All of us that could do any of that sort of thing were put on war activity, and styling work just died. Some of the artists were making cutaway drawings of the B-24 and illustrations for technical manuals and things like that.

So the styling activity just sort of died, and the guy that was directing us on this type of work -- there were war projects where Ford was cooperating with Bell Telephone Labs. We also had some independent Ford projects. The guy that was head of this, sort of a chief engineer, was old Joe Galamb, and Joe used to come around to your board and look at what you'd done and offer suggestions, and he'd say, "Ve make it dis vay," and pull out a little stub pencil about an inch and a half long and proceed to mark what he was thinking about on your drawing and put the pencil back in his vest pocket. As I recall, he had whitish gray hair and a black mustache and was sort of an old country gentleman.

Q Hungarian?

A Yeah, I believe. And he was the guy that I talked to when I left the company in 1942, because I had graduated from college, and I met some guys in class there that were working at Briggs on these advanced engine designs. They had an opening, and this one fellow introduced me to the boss and evidently gave him a story along the line that I was a good guy, and, I believe -- my memory is getting fuzzy on this -- but I believe the offer was three hundred dollars a month salary.

Q Was that good?

A Yes, it was pretty damned attractive. I know I wasn't making nearly that. So I remember talking to Mr. Galamb, and I told him I'd like to stay at Ford, and if he could match that salary offer that I had from Briggs, I'd rather stay. And he demurred and said he'd have to check. Came back a couple days later and said no, he just couldn't come close to that, so I made arrangements to leave the company and go to work for this engine project that they had at Briggs Manufacturing over on Mack Avenue.

Following my couple of years at Briggs and my couple of years in the Navy, I came back to Ford. But when I came back in '46, it was into Engineering, so I never got back in the styling activity other than to go to the studios on chassis items and advise, and approve, and review whatever would be involved there.

Q How did that happen?

A It was my choice. One of the things, while I think of it, that sounds pretty simple and dumb today, was something I thought was a real original idea of mine. The hardware on the back ends of cars was pretty much a blob here and a blob there, and the example that I can give you is that there was a handle with, perhaps, a key lock in the pivot of the handle to unlock and unlatch and lift the trunk lid up and push it down and latch it. Then there was a separate light for a license plate up above. Sometimes the light for the license plate was part of a taillight that jutted out from the rear fender. Well, I got the fantastic, original idea, mind you, of combining that license light and the deck lid handle into one assembly that was a little slicker and smoother and would put one unit on the deck lid instead of two or three others that weren't related. So I sketched up at home a handle with a license light in the top of it and sort of put it all into one shape and brought it in, and I think it was Bill Wagner that modeled the thing in its final form, and we got a combined decklid handle and license light. Now, as an accomplishment, that's a big chuckle, but, at the time, I thought it was a big deal!

Q Was it adopted?

A Yes, it was adopted.

Q What year did that show up?

A 1940 or something of that kind.

Q I remember that. That was quite an innovation.

A One picture that I have is of a high-angle view of the Design Department at that time, and it shows the bridges, and, I think, I'm at one bridge, Emmett O'Rear is at a quarter-scale model, and Bill Wagner is working on the back end of a Mercury, I believe, and he did the taillights and rear ornamentation, I think, for that -- either the '39 or the '40 Mercury. So, that's how things got done then. The innovation could come from anybody and not necessarily all from Gregorie.

But one thing there was no darned schedule for completing certain jobs or releasing information to engineering as there is today. The whole design and engineering and manufacturing activity, as far as that goes, all the way through sales, is rigidly controlled by the calendar today. You work backwards from when the dealers have to get their cars to introduce and hit the public at the right time. You work backwards through all the manufacturing "lead times" and, eventually, come out to where Styling has to transmit this surface to body engineering by such and such a date or the whole thing's going to fall apart. Well, there wasn't any such control then, and like I mentioned on that '41 Ford front end, I wasn't getting any direction, and there wasn't any schedule or anything that I was aware of, and today that sort of thing just wouldn't fly at all.

But the war activity....

Q Before you leave the pre-war material, can you tell us about Willys P. Wagner who seems to be have been an inspiration for you as a colleague and good friend?

A He was a fellow I respected very much. One reason was because I was taking an engine design course at college at the time, and I commented to him on the inherent balance characteristics of the different engine configurations: straight six, V-8, straight four. And when I was commenting to him, he said, "Bud, I think you'd better check on that straight six. I think you're off on such and such." I went back to the textbook that night, and Willys P. was absolutely correct. And, as I say, he designed the aluminum bridges that replaced those old mahogany jobs.

Q Can you tell us about how that came about? That was quite an innovation?

A It was, but that was done, I think, before the time Emmett and I first came over. I think we had a mix of bridges at that time. Some of the models were still in the old mahogany, kick-it-along and wedge-it-in-place bridges. And some of the new ones were there. Ultimately, all the old wood ones were replaced with these aluminum structures, and I had been told that Wagner did it.

Emmett and I made up the sheet -- a little 8½ x 11 transparent graph sheet -- that was printed on vellum. It was printed in any number of copies so that you could identify the model, the section that you were taking -- whether it was tranverse, or longitudinal, or what inch line it was, or whether it was vertical or horizontal, and then you could use the bridge and the different scales to measure these offset points, record them on the graph sheet, and then give this to the body draftsman that would be brought in for that particular program. When we had a new model about ready to go, and it looked like it was approved, and the surfaces

weren't too bad, they would bring in two or three body engineers that were qualified for surface development, and they would -- on these big, horizontal draft tables -- lay out the sections that we would give them, which were "offsets" off the model. They then proceeded to use their curves and sweeps to true up the surfaces.

It was all done by eye and by magic little "keys" that had been developed over time on how to get from such and such into another section and have the shape flow smoothly and not be full of bumps. So what would happen is if Tom Stevenson, for example, who was one of the body engineers that was brought in, would be laying a surface out, he'd come back and say, "Hey, you got a flat spot in the rear door right about here." You could go up to the model and feel it, and, sure enough, he's most likely right, and you could actually work in a thin layer of clay and correct the model. So there was a back and forth working relationship between the body engineers and the modelers.

And the other thing I want to leave with you, Dave, is this folder that I've titled "Old Ford Body Constructions 1941." What this is is just a collection of sheets that I ran prints of and saved that were made by a body engineer named Binkins, and there's a couple of others in here too. What they are are typical construction sections through an A pillar, through the roof rail, through different parts of the body that would be made in conjunction with the clay model work. And the idea was to make sure that the thing we were modeling as a body was truly constructible by modern methods. The drip rail would mesh in with the top, and the glass seals would all go together to confirm that the clay model we had done was truly a practical body engineering design. So

these key sections were made, and then we would pick these up and indicate the exact width of cut lines between the door and the quarter panel, or between the two doors on a four-door model so that when the clay model was primed and painted, all these cut lines would be practical. They would be the ones that the engineers would specify, and the painted model would represent what should come out as a final car.

So these whole sections, I guess, would be pretty hilarious by today's standards. I've got one in here that shows a quarter-panel section with a nice running board on it, and you have to buy a sexy van today to get a running board. But they were part of the process at that time to do our job.

Q Thank you for that. That'll be very helpful -- quite an addition to our collection. One of the questions that John Najjar posed for you was when did you decide that you preferred being an engineer rather than a stylist?

A I suspect, like other people, I was always bothered a little by the fact that I didn't have a clear idea as a youngster that I wanted to be a doctor, or a dentist, or a fireman. When my mother succeeded in getting me into the Ford Trade School, I was really attracted to the mechanical drawing aspect, and I enjoyed the mathematics. I think this actually goes back to the drafting and shop instructor that I had in grade school. He was terrific. He taught the shop subjects.

Q Do you remember his name?

A Oh, gosh. I think it was Boyd, but it was at the elementary school. It's the Marr Training School on Grand River. It's in the Northwestern High School group and was a training school for teachers,

actually. During certain times of the year, we'd get young student teachers in there -- good-looking, young women. And the older permanent teacher would stay with them for a few days, and then she'd disappear, and the young ones would teach the class at which time all the tough boys in the back row would make disparaging remarks and try to look down their dress when they'd lean over to help.

But, anyway, this guy was a great shop instructor, and he taught drawing, and lettering, and shop subjects: carpentry and how to repair home appliances. So I enjoyed that. When I got in the Trade School, there was kind of an engineering aspect to what we were doing, and I was made aware of this cash tuition scholarship which Lawrence Tech awarded each year to a Trade School graduate. I think the reason that Lawrence Tech did this is that Lawrence Tech was founded in the Great Depression years by George Lawrence who was head of engineering, I think, at the University of Detroit, and it was founded at a real tough time for money. Mr. Ford, I believe, let them use the old Trade School building on Woodward Avenue in Highland Park, Michigan, for a dollar a year, and this is where I went to night college. All five years I was there, it was up in Highland Park -- the old ivy-covered, brick structure.

So, in reciprocation, Lawrence would give a five-year night school tuition award to any Trade School graduate that was selected by the Trade School faculty. I decided to apply, and I had no more idea than the man in the moon that I'd win, but I got it in 1937, so that paid my tuition all the way through night school. All I had to do was buy my books, which was a struggle. Engineering texts are still expensive as hell. My mother bought my books one year because she got her kicks by playing the

horses, and she was not reckless by any means. We didn't have enough money to be reckless, but she would join some of her girlfriends and get on the Greyhound Bus and go down to Toledo and have an afternoon of betting the horses and then come back. This one time she hit a couple of big winners and bought all my texts for that year at Lawrence Tech. I thought that was pretty good.

So I got into engineering by default, I guess. I didn't really think I'd win this scholarship, and the first term at Lawrence was -- oh, I always thought I was a pretty smart guy at school, but the type of trigonometry that was in freshman college there was totally foreign from what I had learned in the Trade School -- practical trig versus theoretical cartesian coordinates and so forth. I really had to struggle. The other thing was, I'd been out of the habit of doing any homework for a year or two, and, boy, I had to come back to earth there because you went to school three nights a week, and you had to do your homework on Tuesday, Thursday and the weekends, and the "blue books" kept coming up all the time, so, I really struggled that first term. Second term, I got on the ball, and then, I think, a couple of years there I got all A's because I kept my nose to the grindstone.

But I got into engineering rather than design or something like that sort of by default, you might say.

Q John Najjar tells us that -- coming back to Ford in '46 -- you were first assigned to specialize in chassis design, and that you were under the direction of Joe Felts. Can you sketch for us the atmosphere in the body engineering area of Ford in those days?

A Well, Joe Felts was one of the layout designers that I became acquainted with when the war started and the Design Department began to

fall apart, and everybody that knew how to do any drafting. was assigned to some war project. Now Joe was like a senior designer, and he made the most beautiful layout drawings that you could ever imagine. His lettering was perfect, and he had had all kinds of experience in the automotive industry. He had worked at Duesenberg, and he worked on the Auburn car, and he came from Indiana, so he was a top expert in the field of chassis design. I got acquainted with him in those early war years when the Design Department began to fold up.

When I got out of the Navy, I, like a lot of other fellows, was scouting around for a place to live and a place to work. With the styling experience that I had had, I went back and actually interviewed with one of the groups at Fisher Body. I almost went to work for them in a building behind the G.M. Building. In interviewing I also contacted Joe Felts at Ford. Then I found that he was now a Lincoln-Mercury chassis engineer, and why don't I come out and talk to him. So I went out and met Joe, and he introduced me to Jack Wharam, who was Chief Lincoln-Mercury Engineer at that time. Mr. Wharam explained that Lincoln-Mercury Division was really on the way up. They were going to build a new Lincoln-Mercury plant as part of their expansion.

Joe was willing to take me on as one of the designers, and he explained that they were looking for young men to expand their activity because there were new programs for Mercury, and new programs for Lincoln. One of the guys that I had met at Lawrence night school and one of the fellows that worked at Briggs and was influential in getting me in there was a guy named Tex Ragsdale. Tex was an orphan that had worked his way through school and graduated from Lawrence Tech and was one

helluva good engineer. He was doing engine work there like all of us were. Tex, after the war work pooped out, ended up at Ternstead, which was the hardware supply division for Fisher Body. Tex Ragsdale, after a time, became Chief Engineer at Ternstead and one of the high-ranking engineering officials when that division was incorporated into Fisher Body itself.

I got back into Ford through Joe Felts. Joe had a number of us new guys working on the board initially. Tex Ragsdale had done some studies on suspension work, and he gave me a copy of one his papers and some of his drawings and referred me to some of his texts, which I went through. Suspension work is terrifically interesting because it's an exercise in geometry, and the steering has to match the suspension so the wheels don't steer improperly when they go up and down. It's an absorbing study. The history of the development of the independent front suspension, in itself, is an interesting story. This was developed at G.M., at Cadillac division, specifically, and it's not a styling story. But it turns out the basic problem with cars of that vintage -- they all had solid front axles -- was when you tried to get the spring load/deflection rates low enough so that the car had a low frequency in motion on its wheels, the springs were so wembly that they wouldn't control the axle adequately. You'd get into the vibration conditions termed tramp and shimmy, and these could get so severe that you'd have to stop the car and start up again because you were really totally out of control. On a bad tramp a wheel can actually leave the ground. The wheels are sort of stomping along like a guy bouncing from one foot to the other.

I had done some study on suspension, and when I got into Joe's activity, that's what he put me on. Norm Downey and I were put on the

layout of the front suspension for the first post-war Mercurys and Lincolns -- the '49 models. They were originally scheduled to be '48 models, and the part numbers have 8M part numbers, but they didn't come out until the '49 model.

Q That was a styling decision, as I recall.

A Well, let's see. The Mercury ended up -- that was a design that was supposed to be a Ford. I think it came from -- did it come from France?

Q It was Gregorie's original '49 Ford design.

A Well, it was obvious, I guess, to everybody there that it would never make a Ford because it was too big, and it was too heavy and expensive, basically. So that got pushed down the line to become the Mercury. For '49 there were two Lincoln models. One was based on the Mercury body with a Lincoln front end -- extended front end and Lincoln engine. And that was one fast machine. It had the big Lincoln engine in it, and it would go like a scalded duck, but as far as handling was concerned, it wasn't real great. And then the other Lincoln was a unique model called the Cosmopolitan.

Anyway, Norm and I started on the layout of the front suspension, and pretty soon Norm got assigned to something else, and there were some space problems that came up on the way as well, so I started a new front suspension layout, and that's one thing I did. I also invented a sway bar that didn't have to have a link connecting it with the suspension. I think the Chrysler guys had done that initially, but their design had a real long, crude looking bracket to attach it to the frame. Anyway, Joe Felts had an assistant -- in fact, he later had two assistants, as I

remember. Hans Matthias was one of them, and Sid Freers was the other. Sid Freers was the suspension engineer at the time, and I was doing layout work for him, so I designed this linkless sway bar and the front suspension for the '49 Mercury and Lincoln. That was a real interesting experience. It got put in production, and Sid was the guy -- Sid Freers is Howard Freers' uncle.

Q And Howard was?

A Howard wasn't around Ford, but I think he was -- Howard was in the Army in World War II, and, I think, he came later into the company. Howard was in development work when I was in Special Military Vehicles, and Howard had been in artillery, so he knew about artillery sighting devices. And we were working on this gun development contract, so we had a legitimate government contract under which we could request standard items that were necessary to do our contract work. Howard was doing vehicle development work. Getting the proper drive shaft and axle pinion angles was a problem at that time on some of the cars, and Howard asked if we couldn't get a Mark III artillery sight which had a bubble level and protractor arrangement in it that he was familiar with.

So I remember I had to alibi to the contracting officer at the Tank Auto Command that we needed one of these damned things, and it was because we were working on this helicopter gun, and we were designing ammunition chutes, and we had to make sure that the angles between the ammunition box and the gun at various positions was proper. So we got this thing, and I loaned it to Howard, and I don't think the Army ever got the damned thing back. They haven't come after me yet.

Sid Freers was Howard's uncle, and he'd been, again, one of these Indiana-type guys that had been in the automotive industry, and he's the

fellow that impressed me with how important it was to coordinate the product engineering activity with the manufacturing end of it. He took me over to the Warren Avenue Lincoln plant where these suspensions were going to be assembled on a merry-go-round fixture. We made a couple minor revisions and adaptations to our forgings so that they would suit these fixtures. And that's something that a lot of people in the company have just come around to learning in the last year or two. You just can't take an engineering design and throw it over the fence and expect the manufacturing guys to pick it up successfully and run. A lot of times they've got better ideas than what you have on how to make something simply and make it reliable.

In talking about Joe Felts, I also considered Joe to be a guy that the company could have written their personnel manual around. He was absolutely a square-shooter. If you did your job, you never had to ask for a raise, he got you a raise. And he took good care of his boys, and everybody that worked for him loved him. On top of that, he had a good sense of humor. He wasn't an old tyrant by any means. Joe, when he retired, started the Ford Retired Executive Engineers' luncheon club meeting once a month, and he passed away about a year and a half or two ago. It's a shame, but Joe was one wonderful guy, and he could do any of the work himself.

I remember when we did the '52 Lincoln ball joint suspension, on which I was project engineer, Joe had me go up to Port Huron to a company called Pressed Metals of America with him and the Pressed Metals representative because Pressed Metals of America had supplied the prior type of steel threaded bushings that all the suspensions in the industry had,

including Ford's, for a number of years, and this ball joint didn't use any of his threaded bushings at all. We had rubber bushing pivots and ball joints at the outer ends of the spindle. Joe took me up there, and we explained to the boss, Mr. Leighton, that this ball joint development was coming along, and he'd better think of something like this that would use his equipment because, if our crystal ball was correct, this was the suspension of the future. It turned out to be correct.

Q Were you the first company to use ball joint suspensions?

A In the United States, yes.

Q Where did you have the inspiration?

A It turns out that there were a couple of research projects going along in the Research end of Ford at the time the need for a new Lincoln came on the scene. Joe went over to the Research guys to see what they had and what they were doing. They were working with Thompson Products on one type of ball joint, and another outfit called O & S Bearing Company on another design. I remember the O & S representative used to refer to themselves as the "obsolete and senseless" bearing company. They had a fabric-type, never-lubricated-type joint that wasn't much good. But delving into it further, it turns out that the ball joint idea was explored back in the old days at Cadillac when they were first trying to improve the ride of the car and its steering stability. This was the reason that an independent front suspension was developed, because you could uncouple the steering and suspension so that its function was not dependent upon the spring rates at all. It was all a function of the linkage -- solid linkage that you had. So you could get a very low front frequency by having very soft springs and get a ride that was flat

instead of pitchy. To do that, you had to have lower frequencies in the front than you had in the rear, and had to end up with a front suspension that was devised to accomplish that. So you could say that riding comfort was the initial need or "forcing function" that resulted in the development of independent front suspension.

The pioneering work was done at Cadillac, and at that time I understood that they had experimented with the ball joint front suspension because they wanted universal type pivots at the outer ends of the suspension arms.

Q What was that device again -- a pivot?

A Pivot. Which would allow the upper suspension arm to swing in a different plane than the lower suspension arm, and the reason for that was that when you got real low front suspension rates -- real soft front springs -- and you would put on the brakes sharply for a fast stop, the front end would nose dive -- drop perceptively, and this was a little disturbing. They found that if they could vary the geometry of the upper and lower front suspension arms by having them swing in different planes -- in other words, tilt the upper suspension arm, let's say, up at the front end -- the braking effect would generate forces that would counteract this nose dive. And that, again, counteracting the dive, was the need which required the use of ball joints. Well, nothing ever happened with it at General Motors, and they were using the threaded bushings and parallel arm pivots.

One of the first ball joint cars was English, I think -- the XK-120 Jaguar sports car. And I can recall that we were working on this '52 Lincoln program when one of the suppliers' representatives that we had

was from Canada. He had taken delivery on an early XK-120, and I was able to coax him into letting us bring that thing in the experimental garage. We put her on the hoist, looked at the front suspension, and, of course, it attracted quite a crowd because it was a new car at that time. Anyway, ball joints were used in Europe, but the '52 Lincoln was the first one to do that in the United States, and that set the pattern for the type suspension that came out on the '54 Ford and Mercury. The reason that Ford and Mercury didn't come out at the same time as the Lincoln was that there was a total package condition in the front end of the car involving the engine, and the new overhead valve engine for the Ford just wasn't ready, and that had to be delayed for a couple years.

I can remember that Mr. Earle MacPherson, who was Chief Engineer, felt that, "Aah! Who would want power steering? With ball joint suspension, you don't need power steering." But he had never at that time parked a car at low speed with the new, modern, low-pressure tires.

I might make a comment on basic body design in the respect of unitized construction versus frame and body. The most horrendous "plan for failure" program that Ford ever introduced was the 1958 model Lincoln and Continental. The reason I say that is that this was a long wheelbase, luxury car -- 131 inch wheelbase -- and Mr. MacPherson, who had come over from Chevrolet Light Car, was enamored of unitized construction for its efficiencies and weight.

Q Had General Motors been using it?

A Overseas. And their light car, which didn't fly, had been designed with a unitized body. So this new Lincoln for 1958 was to have unitized construction. We were working for Harley Copp at the time, who had no

real talent for managing people, in my opinion, but Harley -- I was vehicle engineer at the time -- had us maintain a continuing weight comparison during the development of that '58 Lincoln -- between unitized, as it was being designed, and what it would have been if we'd used body/frame. The weight picture always came out in favor of the unitized construction, which went into production.

However, one of the thoughts was that unitized construction would allow you to seat the passenger lower, and since you were getting rid of the frame members that ran around underneath, would provide a lower overall car height, which seemed to be the accent at that time. Getting a low car was very important for some reason or other. Doing a unitized body and having it be successful on a short wheelbase is difficult enough, but when you've got a 131 inch wheelbase on a big car with a 430 cubic inch engine, it was asking for trouble. On top of that, there was an entirely new plant to build this car -- the Wixom plant in Michigan -- there was an entirely new staff of people from the production guys right on up through the plant superintendent. So if you're asking for failure, you take a radical new design where every-thing's new, you put it in a brand new plant with brand new people, and you're lucky to come out alive. And I think that's one program that taught the company that that's not the way to run a railroad. You don't introduce new products that way, especially if you're concerned about reliability.

Q Had you had any input into the Mark II?

A Basically, no. This program was under Bill Ford and Harley Copp at that time, and a group that were over in the old Navy barracks buildings. I understand that Bill Ford had a golf green built there in one of the

enclosed areas of one of these H-type barracks buildings so he could pitch up to the green and keep his game sharp. When I say I didn't have anything to do with it, the Mark II guys were always trying to use whatever Lincoln parts they could to avoid special tooling, and, especially, being a bunch of cheapskates to, hopefully, avoid having to buy expensive prototype parts. They'd rather let us buy a couple extras and steal them from us. So that's the only input to the Mark II that I remember I had on that program.

Q The '58 Lincoln was one that you had quite a bit to do with?

A Yes. Johnny Najjar was running the Lincoln studio at that time, as I recall, because I can remember going over there and looking at the Continental model which had a reverse slope backlight treatment. The backlight could be lowered, and you could get flow-through ventilation. It was wonderful. And the '58 Lincoln convertible was a real slick machine, the way the top would fold down and stow itself automatically. So John Najjar, with what he had to work with, did quite a good job, I felt, on that car.

The '58 Lincoln and Continental were all new. The only thing that was a carryover were the wheel nuts -- the nuts to attach the wheel to the spindle and to the axle. They had a model B part number. But everything else was brand new, so it was a guaranteed difficult program from the word go. The body/frame, from an NVH standpoint, provides in its body mounts an extra layer of isolation between the road and the passenger which you don't normally get from a unitized construction. In the body/frame you have to be very careful that your body mounts are located in the right place, and the frame has a proper rigidity, or you'll get a shaky car which can be quite disconcerting.

Q What was the standard that you quoted?

A With body/frame construction, you have to be particular where your mountings are located. They're like little pivot points in one aspect. And if you have too many of them, and they're all bolted down tight in production as they should be, you tend to distort the body and sort of strum it up tight, which can give you all kinds of troubles for noise as well as door fits. If you have too few body mounts, the body itself has to have a pretty damned good structure or it's going to be bouncy. So there's a happy combination if you're going to have a body/frame system, and that's where some of the art of development lies in tailoring the body mounts and the frame and body rigidity.

When you go to a unitized kind of body, the body lower structure has to do it all for rigidity, and your danger there is that all of the high frequency stuff from the road is going to travel right up through the suspension and into the car, and you get a noisy car that transmits all of the road roughness. Like on a gravel road, it can just drum like crazy, and so you have to use a lot of noise isolating-type insulation in the body, and dash, and the doors, but you get by. So, beyond the styling and the structural aspects of body engineering, you have those different methods of "hooking it to the ground" that come into the picture, too.

In 1971, I was approached to take a foreign assignment to go to England. Jack Hooven was the engineering boss in Ford of Europe at that time, and came back to talk to me because evidently Hans Matthias had recommended I be considered for the position over there. Basically, it was to go over and replace Connie Rueter, who was Chief Chassis and

Transmission Engineer at Ford of Europe at the time. He was about due for his assignment to be completed and for him to return to the United States. So I was nominated for this job, which I was happy to accept. Our children were old enough where we didn't have any problem there on moving out of the country, and I thought there was no foreign language to learn going to England. It turns out that there's English English and American English, however.

I went over on a trip -- it must have been maybe April or May of '71 -- to check on a few things which were supplier problems with parts supplied for the Pinto from English sources. There was a clutch disk and a shift lever and a couple of other things that I was going to review with the suppliers over there, and, at the same time, I thought I could get briefly acquainted with the Ford of Europe setup in England and talk to Connie Rueter and then maybe scout around to see what things were like for finding a place to live.

When we moved over to England, we found that there was no company home available that suited us that was appropriate. Normally, the company owns a number of properties, and bigger ones are assigned to the corporate chairman of the board, and the smaller ones are for foreign service personnel like myself. There just wasn't anything available, so my wife and I had to scout around to the "estate agents" and try and locate a place to live. This one day in our nearest village there, which was Billericay, we stopped into the estate agent's place and looked at the pictures he had in his window and told him what we were looking for. He said, "Gee, you know, contemporary homes over here are just few and far between. Would you be interested in a 'period place?'" I said,

"Tell us what's a 'period place.'" He says, "We've got a new one. We don't even have pictures out on the front window yet, but I've got the pictures here we just took. You're welcome to look at them if you'd like to." And what he showed us were pictures of a cottage that had been built in 1565 or earlier, at the time of Queen Elizabeth I. It was the cottage for a farm which had been auctioned off separately and modernized inside by the current owners. It was one of these half timbered places with the black timbers and white wattle in between and a red tile roof. We arranged to go over and see it as the number one couple to look at the place; fell in love with it right away, and managed to stir up the Ford people enough so that they bought it for us. This old cottage had been, as I say, modernized inside. The owner had put in a central heating plant and had built a modern kitchen in what used to be an old shed at one end of the house. It was just a delightful old place. It was on about three-quarters of an acre of ground, the rest of which was in gardens, where things had been planted over the years and never been taken out. It had beautiful bent grass lawns and roses all over the place.

So, we found this delightful Elizabethan cottage to move into, which was just a short way from the Engineering Center at Dunton, and we always liked it because we were in a neighborhood of English people -- not in what was referred to as the "American ghetto," where all the other families had managed to locate.

The programs that were involved when we first went over there were the new Taunus Cortina and the new Granada car, which was designed to compete with the Mercedes-Benz functionally, and be more economical, which it turned out to be. The Granada was one fine automobile. In

fact, about a half a dozen of the early production Granadas were shipped over to the United States, and from the word we got back, everybody that drove them thought they were great. Mr. Iacocca was just dying to import it into the United States. We must have done about three studies on how much it would cost and how much time it would take to "federalize" that Granada so it could be introduced into the United States.

It turned out that all of these estimates were unfavorable, and I think the U.S. probably had plants that they wanted to keep busy anyway, so the result was they created a Granada car in the United States, but it didn't compare with the European Granada. The European Granada had an independent rear suspension and independent isolated front suspension. It was of unitized construction with one, good, stiff, structurally-sound body. We had quite sexy rubber isolation mounts between the front and rear suspension, and the power train, and it was just a real fine automobile. You could zip around those English roads, which are -- the only roads that are straight in England are the ones the Romans built and that are still being used. Every other road is crooked as can be, and the technique of driving on the left side of the road, if you want to stay alive, is to keep your left front fender in the bushes all the time.

The Taunus and Cortina programs were sort of in trouble from an NVH standpoint, because the cars were originally designed at a certain car height. As the story was told to me, Bunkie Knudsen came over there and decided that their car height was kind of old-fashioned and ought to be dropped about two inches, which completely screwed up the driveline geometry. The guys had been working very energetically to solve some of those problems, and it became kind of difficult because the same car that

Cortina produced in England was an identical car to that produced in Germany as the Taunus. The Taunus cars always sounded better than the Cortinas, or they sounded differently, even though they're made out of the same pieces. You go through a lot of that sort of thing when you're dealing with unitized construction.

So those two programs were the most important. The one that turned out really good was the Granada. It was a real fine automobile.

Q What was your input in that? Chassis?

A Chassis, yes. And I had fellows in Germany, and people in England, that reported to me, but all of the engineering work was done in England on our chassis things, even though the vehicle development work was done in Germany. I had resident engineers over there and engineers at the proving grounds.

Q Why wasn't the Granada platform introduced in the United States?

A I don't know everything behind the decisions, but there would have been an extensive engineering program to qualify it under the Federal Motor Vehicle Safety Standards -- of bumpers, lighting and just about everything else. And, as I say, the guys estimated on about three different occasions what it would cost to do it and sent the estimates to the United States. The answer came, "Thanks a lot. We just don't think it's the thing to do."

But I had heard that the reception was very favorable from the people that drove that car in the United States, and, as I mentioned, Mr. Iacocca was just drooling. He was just dying to have that car to sell in the United States at the time. It would have been a winner, no doubt.

Then we worked on a Capri II, and I might mention here that one of the features that the planners wanted to have for the Capri II were cast

aluminum wheels. There had been a special Escort rally car over there put together by a special vehicle sports operation, and these little Escorts had the hottest two litre engine they could get in there, and they were painted a nice lavender color, and had some proper names, and they were a great hit with the rally crowd and won a lot of races, and they had used some aluminum wheels made by the GKN people. When the plan or the need -- the desire, I should say -- for a cast aluminum wheel on the Capri II came up, we scouted around to find out who was qualified to make something like that because the choice of alloy and the soundness of the casting is critical to the function of the wheel and the safety of it. We checked back through service, and this little rally car had never had any wheel problems, and GKN, who was the English supplier, turned out to be the only one in Europe -- including the Continent --that was really qualified to cast and manufacture such an item.

We had the quality control people go through the GKN facilities and verify all of this -- the processing, and controlling of the casting, and the X-raying of the wheels and the machining of them. So with Joe Oros on the styling end of it and ourselves involved in the engineering of the wheel and a lot of help from GKN, we came up with this nice-styled wheel for the Capri II. And it had, I think, three different colors --two colors of gray and sort of a silver color involved, which was a tricky painting job. It turned out to be a real winner. The Capris were imported into the United States, of course, and when the U.S. planners saw those wheels on the Capri, and the Lincoln-Mercury dealers got hold of them, they were clamoring to have some wheels similar to that on the other car lines. This got the ball rolling on alloy wheels.

Our GKN source supplied wheels from Europe for some of our U.S. cars for awhile, and then we qualified a supplier called Superior on the West Coast, and there was one eventually built, I think, in Mexico to make these wheels. Then the Alcoa people had forging equipment, and they supplied some forged wheels for the large cars -- the Lincolns. And first thing you know, just about every car line had an option of a styled aluminum wheel, one kind or another, forged or cast. You could look back and think that it all started with that crazy little rally car painted lavender, and here it became one of the money-making hits of the wheel industry over in the United States.

It was interesting, at the time the Capri II was being readied for import, the the cost people had done a study in Europe to see how they were pricing it for shipping it to the U.S. It turned out that with the exchange rates, the Lincoln-Mercury people had been getting one certified bargain, and had been making money hand over fist on the Capris in the United States, while Ford of Europe wasn't doing real well on it at all. So, there was a little consternation when the cost analysts really developed the facts on that, and they had to change the price structure on the Capri II as it was initially shipped to the United States.

Q I wonder, in the few minutes left, Mr. Adams, if you could give us a bird's-eye view of the relationship between the body engineer and the designer?

A And the stylists?

Q Yes.

A Okay. Well, the body engineer has to worry primarily about how does the darned body, with all its components and panels fit together,

and can they be assembled: can they be welded into an assembly adequately, and can the door fits and body fits for the decklid and hood be maintained. So the body engineer is concerned with the structural elements that the person ordinarily doesn't see at all --the rocker panels, and the rails underneath, and the door pillars, seals and things of that kind that relate to the body structure -- and how these various panels can be fastened together and sealed against the weather. That's pretty much independent of what the stylist looks at as far as the outside surface is concerned and as far as the interior trim is concerned. And there have been various schemes over time on the best way to assemble a body and get the fits right, and the controversy is still going on today.

Q Who develops the original package?

A It depends on whether you've got a vehicle engineering group that knows what its responsibilities are. We've had vehicle engineering groups from time to time that didn't seem to realize what they were supposed to be doing, but the vehicle engineering group should dictate the package. And if the rear seat leg room or the head room develops customer complaints, it's really their baby, nobody else's. Because the stylist, the designer, the clay modelers and all those guys work to those critical dimensions of interior head room, let's say, in getting the contour of the roof, and they're the ones that really have to provide the specifications that the designer works to.

Q Had you gotten the original proposal from the product planners, or did you work together with them?

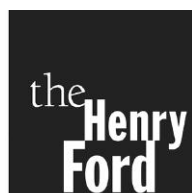
A A lot of us felt, and it depends on how old you are and what your prejudices are, that product planners were like tits on a bull. And

really their function is more "profit planning" than anything else and acting as gophers for the division's general manager, be it an Iacocca, or a Ben Mills, or whoever.

Now all product planners aren't idiots. I don't mean to say that, because they are supposed to be responsible for the economic profitability of their assigned car program -- for bringing the car program into being within budget and on time. This is quite an assignment. If you've got a planner that knows what he's doing, and he's got the responsibility and authority that should be given to him, he can be quite an important guy.

At Ford, we've had all kinds of product planners, and I, myself, felt that product planning came into existence merely as a staff function to give the first head of Ford Division the power to control his own products. This was Lewis Crusoe, and he was the first guy that was put in charge of Ford Division. Very logically, he didn't feel that Engineering, which, at that time, was determining what the hell the product was, should determine the product that he was expected to merchandise and make money for the corporation when he didn't have a damned thing to do with it, so he generated this group of product planners at Ford Division to give him product program control.

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