Transcript for

AUTOMOTIVE DESIGN ORAL HISTORY PROJECT

INTERVIEW WITH DONALD KOPKA, 1984 AND 1990

Object ID 91.1.1673.51

Published in Hardcopy Format: circa 1990

Published in Electronic Format: August 2021

Benson Ford Research Center
The Henry Ford
20900 Oakwood Boulevard · Dearborn, MI 48124-5029 USA
research.center@thehenryford.org · www.thehenryford.org

NOTE TO READERS

This PDF-format version of the Donald Kopka interview transcript was created from digital images taken of the original bound hardcopy transcript held in collections at The Henry Ford.

The Automotive Design Oral History Project, Accession 91.1.1673, consists of over 120 interviews with designers and engineers conducted by David Crippen of The Henry Ford during the 1980s. For more information, please contact staff at the Benson Ford Research Center (research.center@thehenryford.org).

Staff of the Benson Ford Research Center
August 2021

AUTOMOTIVE DESIGN
ORAL HISTORY PROJECT

KOPKA, DONALD

1984

EDSEL B. FORD DESIGN HISTORY CENTER

Henry Ford Museum &
Greenfield Village

This is Dave Crippen, and it is May 22, 1984. This is an interview with Donald Kopka, Vice-President for Design, Ford Motor Company, in our continuing series on the history of design for the Henry Ford Museum. Don, if I may, I'll let you take over, and you can begin. It would be helpful if we decided on a format which would be most comfortable for you; perhaps, a step-by-step look at your personal career before coming to Ford and the influences on you in terms of what schools you went to and your career choices.

A I actually started my education in the Navy in World War II. I enlisted in the Nary Air Corp and was sent to a college training program of Western Michigan [University], and after about the first semester of this, the Navy decided they had all the pilots they needed to finish the war, and I was transferred to a Deck Officer School at the time. But, when I got out of the Navy, most of my credits were in engineering. So, I decided to further pursue engineering at both Western Michigan and then on to Wayne [State] University. In my senior year at Wayne University we took some field trips and went out and saw how beginning engineers worked, and I saw them sitting at drafting tables and in labs, and it looked kind of boring to me, and, in addition to that, my major was in electronics engineering. And, after the war, there wasn't any call for it. As a matter of fact, most of the electrical and electronics engineers were out of jobs then, so a friend of mine and I were sitting over a coffee one day, and both of us were complaining a little bit that we thought we might be in the wrong curriculum. I said, "What would you like to do if you really had your choice," and he said, "I always thought

I'd like to design cars." And, I said, "I did too," and he said, "Why don't we go over and talk to the dean," and see if we could get into a newly-established industrial curriculum there. And we went over, and I got in, and he didn't. And, although this kept me in school for two and a half or three more years, I think, I ended up a professional student. I finally graduated in 1950 with a degree in industrial design.

Q Where was that?

A At Wayne [State] University. I was given a job with Chrysler. It was sort of interesting. Trained designers were so unique in that era, that they didn't know what to do with them. When I applied at General Motors in styling, they called it back then, as a matter of fact, the interviewer in personnel told me that I couldn't have it both ways. That I couldn't be both an engineer and a designer/artist, that I had to choose one or the other. And, I tried to explain to him that it was a combination of these things, but they really didn't understand it, and he finally tried to offer me a job in their publishing group doing brochures or something.

So then I interviewed at Chrysler, and they seemed to be quite anxious to try this. Although they'd never had a graduate designer before, they created a college graduate training program for another fellow and myself. I think he came out of Ohio State. And, for the first six months of the training program, we worked as clay modelers right in the studios and handled the clay, did full-size clay modeling, which probably is marvelous experience to get a three-dimensional feeling of the scale of the car.

After about six months, I was taken into the Plymouth studio and worked there with a man by the name of Henry King who was head of

Chrysler design at the time. I went from there into the DeSoto studio, and during the time I was in DeSoto studio, we were starting to fight in Korea, and we had captured a couple of Russian tanks, and they brought them back to the United States. Chrysler was very heavily involved in the ordnance design and tank manufacture back then, and they were extremely impressed with these Russian tanks. I think they called them Tiger Tanks or something like that, and they were very, very modern design. Quite fast. Had good engines in them and so on.

To make a long story short, they asked a number of our designers to take a crack at some blue sky thoughts on new tanks -- things they could incorporate in a new tank design. And, fortunately or unfortuantely, I ended up with something they liked, and I was, literally, drafted into the ordnance section of Chrysler, which turned out to be a very interesting experience.

We had a very, very small team, and one of the team members was John DeLorean, as a matter of fact. He was sort of our resident genius. It was before we had access to large computers, and John was our computer, in effect, and John did all of the hydraulics, gun control systems and leveling systems on the tank. Another fellow, who's with Ford Motor Company now, head of testing, was the chief test engineer, Howard Frears, for the tank group.

To make a long story short, we designed the M-48 tank, which became the main battle tank for the Army. It was the first time in history that anybody had ever done a full-size, clay model of a tank, and it was huge, as you can imagine. An interesting sidelight is that, through the clay model, we were able to develop almost perfect ballistic surfaces in

turrets and all over. I think the year that we finished that, somebody invented the shaped charge, which went right through ballistic surfaces. But it was extremely interesting.

I thought I was going to get stuck in the ordnance group, because they were so impressed with somebody that could take our approach to doing perspective sketches and exploded views, and we were helping on the manuals, and I decided I didn't want to get left there, so I went back to the man who was head of body engineering, [to] whom styling reported. I tried to think of some ploy to get back, so I went over, and he granted me an appointment, and when I went in, he said, "What do you want," and I said, "I want a salary cut," and that got his attention. He said, "Why do you want that?" And, I said, "I'm a trained designer, and I'm over there in the ordnance group." I was back in styling the next day!

Another interesting sidelight is that a few months later I decided that I didn't like the way they were designing the cars -- that they were too subjective and too superfluous, so I went to this same man who had the reputation for just firing somebody if they complained, and I told him that I didn't like the way they were designing cars. And, rather than fire me, he said, "Well, sit down. Let's talk about it." He took the wind out of my sails. But he said, "If you have patience with a big company, you can achieve a lot." You know, in small companies you get things quicker, but with a big company you have all this leverage. And, he said, "If you have the patience, you'll get what you want." And, he was right. Finally, cars are just about the way I want them, and it's only been thirty years later, so, he was right!

Q Can you tell us who that gentleman was?

A Yes, it was Harry Chesborough. A very, very bright man, and Harry went on into the international group at Chrysler. He was a good friend, as it turns out. I was lucky, I think, because of my education, perhaps. I advanced very rapidly, and I was made a studio manager when I was twenty-six years old, and Cliff Voss, a friend of mine who worked there, kept track of those things, said I was the second youngest person ever to be a studio head at that time. That Virgil Exner, who was our boss, was the youngest. He'd been head of Pontiac studio when he was not quite twenty-six.

Q Was that DeSoto?

A I had the Dodge studio first, and then I got the Chrysler/DeSoto studio after that. And, unfortunately, it was during its waning days. They'd already decided to do away with DeSoto, and, as they say, I was sort of put in there to preside over the demise. The last couple of years they just used the Chrysler body and spent very, very little money to give the DeSoto some identity knowing that they were phasing it out, but they had to do it in steps because, I guess, the dealers would have been upset if they just cancelled it, so they sort of phased it out in steps.

But, shortly thereafter, I did have the Chrysler studio, and this was during the era of the flight wings and the fins on the cars. And, it was an interesting story. Well, the design or styling, as they called it, at Chrysler was sort of under the direction of Henry King, who was a very, very nice man. He'd actually been a hoofer -- a dancer in vaudeville. He had some training in art, and he took it over, and he was very well liked by Fred Zeder, who was one of the [ruling engineering

triumvirate at Chrysler in the 1930's-'40's] -- Zeder, Skelton and Breer [group]. Fred started the styling group. He called it the Art and Colour Group first, and, I think, he was impressed with the fact that they had one at G.M., so he set this one up under Henry King.

Q When was that?

A I'm not sure. It was several years old when I got there in 1950, so, I think, it went back to the late 'Thirties. It was sort of interesting in that it was a bit of a show place. Fred Zeder had a lot of friends in high places -- movie stars and this sort of thing, and every once in awhile, they'd come through town, and he'd want to show them the styling operation, but they didn't want us cluttering it up. So, they'd tell us that Gene Autry or somebody was coming through and would we please take a long lunch hour. So, we had an awful lot of long lunch hours over a few years. And, then they'd bring the dignitaries through and show them around without the young designers cluttering the place up. But, the interesting part of it is that Virgil Exner was brought in from Studebaker. Virgil Exner worked down there [South Bend] for Raymond Loewy and ran the Studebaker outfit, and a couple of people at Chrysler were very impressed with him, and they brought him in to head up an advanced studio that was sort of in competition with the other studios that Henry King had.

And, eventually, Henry King retired, and Virgil Exner took over. Exner was a real purist. He loved the European cars, especially Italian cars. And, it was his intention to bring this type of style to Chrysler, and he did a number of them, and, unfortunately, that kind of style, when it was on a small car, like a little Fiat or Maserati, it looked awfully

good. But, when you blew up to American size proportions, it had kind of a strange look about it. As a matter of fact, it seemed to go back to the 'Thirites, and a lot of the cars done with that kind of a style on the American proportions looked a lot like an old Hupmobile or a Nash.

And, so, the management of Chrysler had a little trouble understanding this, how these were the newer generation of cars. About the same time, I was in the DeSoto studio, and one of our designers, a fellow by the name of Don Ried, who also was a graduate [designer] out of Michigan State. Don Ried came up with this wild-looking thing that looked like it just landed from Mars, and it had the fins on it. But, it captured everybody's imagination, and he and I started to do a series of those, and we did some full-size illustrations, and more and more management was dropping in and looking at these and found them interesting.

At some point in time, Tom Baninster, who was head of DeSoto design at the time, was commissioned by the company to start modeling a couple of these cars with the fins on them, and we did several of them. Exner detested them. To him they were strictly the styling type of thing, and they weren't pure design [and] didn't look like anything that he thought a car should look like. But, when we came down to it, we had several models that were quite well done, and they looked good because they were low and long and sleek, and we actually, surprisingly, did some wind tunnel testing. We took the car's models to the University of Detroit and did some testing there. So, they were really quite good, aerodynamically, and we were building a case for the fins as acting like a weather vane effect. It would help stabilize the car in cross winds.

Well, to make a long story short, it came down to a choice, and they had a courtyard outside of our building, and it was fenced in

around, but I went into the men's room on that end of the building, and I could peek out under the window and watch the meeting. And, the two cars were there. Exner's car, as I say, which was a very nice-looking car but seemed to look more like something out of the 'Thirties, and then this wild-looking thing that just clung to the ground with the fins coming out the back.

Q Did it have a code name?

A I think we called it Flightwing or something like that, if I'm not mistaken. Exner did his best to try and sell his car, but as he was making the points on his car, I noticed that all of the management was looking the other way, and, finally, one by one, even during his presentation, they drifted over and started looking at this other car with the fins on it, and he finally lost his audience entirely. As a matter of fact, he got upset. He said, "Goddamn it, I'm trying to show you this car here," and they were all over looking at the other model! But, at any rate, it really captured their imagination.

Now I think another fact that needs to be stated, and that is that Chrysler was in pretty bad trouble. They were in deep, dark trouble. They were losing money. They didn't know where they were going to go, and, I think, they felt that they needed something really exciting, that they needed to step out and do something different. So, anyway, as a result of that, they bought the idea of the finned cars, and there were a whole series of them. Once they were convinced this was a good idea, we backed up and put fins on the 1956 cars. Those new cars were going to come out in '57, I think, and we backed up and redid the '56 cars and put fins on them, which looked kind of funny because they were another generation of car, and to stick fins on them, looked a little bit strange.

When the fins hit, they called it the "Forward Look," and they had the Flightwing series, and they really did the job. They just sold like the devil, and people liked them. They gave the company a whole new image. There was one problem, and that is that they were rushed into production, and they were not good cars. For some reason, they had bad engines that year. The cars rattled and fell apart, and, in a couple of years, Chrysler probably captured a lot of imagination of people, but they brought a lot of buyers on board that were terribly disappointed that they probably turned off for a number of years, so they had to go through another cycle. I ended up as chief stylist of the Chrysler and Plymouth group, and Bill Brownlie was the chief stylist of the Dodge [studio].

Q Did Exner leave about this time?

A Exner had a heart attack, unfortunately, and was quite handicapped. They brought in a man from Ford Motor Company named Bill Schmidt to back him up. Bill had written into his contract that he had some say in the design, and although Exner wanted to use him as just an administrative guy, Bill insisted that he play a role in design selection to the point where he and Exner were at odds. And, it finally came down to the point where it was a showdown, and Bill had quite a few followers in the company that were impressed with him, and it came to a climax. It was the president of the company, who, I think, was Tex Colbert at the time that finally made the decision that Ex would stay there. But Bill had a contract, and they had to buy him out on it. And, to do that, they reached an agreement where they would set up a studio for him, and he could do industrial design, which he wanted to do. As a matter of fact,

he had an industrial group on the outside. But, Chrysler gave him several contracts to do advanced cars for them -- the next generation of cars. And with Bill went several of the better designers. Dick Teague, for one, who had been V.P. at Packard before and then later headed up American Motors design, and Homer LaGassey, who was well-known, who had been at General Motors before, went with Bill. And, we all expected that they'd do quite a job and that we'd have competition on our hands.

For some reason, I don't why -- maybe once you get out of the environment and don't have all the effects --their presentations were not very good. We were quite disappointed in them. I think, although we didn't want them to win, we expected that they'd give us a good fight. So Bill Schmidt went on to head an industrial design business that's done very, very well over the years. He's still quite active.* Dick Teague went to American Motors then to replace Anderson there as the vice-president. Homer LaGassey went on his own as an industrial designer and tried that for a few years. He decided that he liked cars better and then ended up at Ford Motor Company. He retired from there a few years ago and has been teaching at the Center for Creative Studies and now heads the transportation design department at the Center for Creative Studies [Detroit].**

Sometime in the early 'Sixties -- I think about '62 -- Exner did decide to retire, and they looked for a replacement for him. Just shortly before that, George Walker retired at Ford Motor Company. George had groomed Elwood Engel to take over at Ford Motor Company, and they

* Editor's Note: William ("Bill") Schmidt died in February, 1990, at the age of 68.

** Editor's Note: LaGassey retired from the Center for Creative Studies and is, in 1990, heading the Pioneer Design Group.

didn't accept his recommendation, and, instead, they made Gene Bordinat his successor. And, George was quite upset about this because he'd actually released to the press the fact that Elwood would replace him. So he went over and sold Elwood Engel to Chrysler management, and they bought him, and he came over.

Elwood was still a fairly young guy, I think -- late forties or early fifties, and he and I got along quite well, but I saw my career blocked with Elwood. I knew it would be a number of years and that I really didn't have any place to go, so, at that point, I decided to start looking around. Cliff Voss, who had been one of Virgil Exner's right-hand men, had been recruited to Ford Motor Company by a good friend of his, Buzz Grissinger, who was head of Lincoln-Mercury group. Cliff had gone over there and got in touch with me and said that Henry Ford II had decided that he was seeing too much vanilla design at Ford Motor Company. He wanted some chocolate and strawberry, and Cliff Voss had recommended me as somebody that might come in with a little different perspective on things.

There began a very cloak and dagger, clandestine operation in which I was contacted at night. I will give Ford Motor Company credit for this in that they didn't put me at risk. The fellow that actually did the interviewing with me was Bob McGuire, and Bob McGuire loved this. He was an ex-Army major, and he put on his trench coat, and I would make an appointment at a doctor's office someplace and go there and meet Bob McGuire in the doctor's office when the doctor wasn't in, and we had several of these clandestine meetings.

It culminated in a fellow by the name of Tom Burns, who was head of administration for Ford design, coming to my house at 1 o'clock in the morning when we were making the final deal. He kidded me about it later. He claims it was 2 or 3 or 4 o'clock in the morning. The more years went on, he made it later. But, it was finally concluded that I would come to Ford Motor Company and work with a fellow by the name of Dave Ash, who had just started a new group in response to Henry Ford's desire to get a different look at things. We were actually housed in the basement of the Design Center, and we had a pretty free hand.

Dave was a very nice guy to work for in that he let you do your own thing, and he allowed me the opportunity to make a contribution. We did a number of models in that department. Ken Spencer was my counterpart. We were executive designers. I actually stepped back in rank and money to come to Ford Motor Company, but I felt that I needed to have a challenge and an opportunity. Ken Spencer designed a series of Thunderbirds back in the late 'Sixties that I thought were quite interesting, and we got started on a design for a Cougar, and I liked the project. It was to be somewhere above a Mustang -- a more sophisticated Mustang, a more expensive Mustang, and it really appealed to me, and I went at it wholeheartedly. I made some sketches for Dave Ash of what I thought that type of vehicle should look like. He liked them, and we started a full-size clay model.

As the model progressed, as it started to take shape, all of a sudden we noticed that a man by the name of Iacocca was appearing in the studio down in the basement every day or two, and he'd come down and puff on his cigar and kind of look this vehicle over. By the way, there were

several other Cougars on-going in the Design Center. The Lincoln-Mercury group were doing one or two Cougars, also. Lee seemed to like this one. Most of the time he didn't say anything to us. He just came down and stood and looked at it, but when it came down to the wire, they liked the one we had, and it won. It won the contest, and it was the first-ever Cougar XR-7, and, I think, that gave my career a good boost probably because I was noticed by Lee, and very shortly thereafter, I was invited to go into the Ford studio as the design executive to run part of the Ford studio.

I had the Fairmont, which we then turned into a Torino; and the Mustangs; and Falcon; and the smaller cars. Bill Boyer had the Thunderbird and Ford LTD cars at the time. But, it was interesting because I just completed the '67 Cougar, and now I was being given a chance to do the first facelift on the Mustang -- the '67 Mustang. When I first came to Ford Motor Company, Dave Ash took me over the Pilot Plant and showed me one of the first Mustangs -- a pilot Mustang. He was very proud of it. Dave had had a lot to do with it -- perhaps, designed it. There's a lot of confusion in that area, and I didn't come there until after it was finished, but a lot of people said that Dave actually designed the car. I have to admit I was very disappointed in it. I think I expected something more like a Ferrari. We'd heard about the Mustang, and here was this, to me, slab-sided, little car that looked more like a two-door Falcon rather than an all-out sports car -- a hairy-looking sports car, and I was kind of disappointed. I tried to hide my disappointment from Dave, knowing that he'd had something to do with it.

But, anyway, because of that, when I was given an opportunity to

design the next generation Mustang -- the first one after the original -- I was delighted to have a chance to impart some of my thinking to it. And, basically, my thinking was that it should be a more solid-looking vehicle -- rounded off a little bit, a more stable-looking vehicle -- more quality, maybe, not so flat sided, and everything on the original one looked to me like it was delicate. The little grille was delicate. I thought it ought to have more guts and look more like the Ferrari or Maserati that I had in mind. So, we were able to do that. We were able to put a whole new body on it that had a lot better stance, I thought, and stronger detailing on it, and it was approved.

Before leaving that studio, I also had a chance to do the successor on that which was the '69 facelift which used some of the same sheet metal but put new fronts and rears on it. I was a little disappointed in the way that came out in that I thought the original Mustang served a broad marketing area in that it had all the way from being a performance type of car with big engines in it. It was also a car that a school teacher or a secretary could buy and get an economy car without having stigma of being a cheapskate. It was a sporty little car, and they could literally buy an economy car and be smart but, at the same time, be a sport. And, we started to walk away from that for some reason. The perception of the management was that this was a powerful car, and they started to make it look more like that which is sort of an irony, because I was trying to get some of that shape into it, but, I think, I recognized that it served these different roles. And, as a result, in '69 they added several inches to the front end on it, and then, in subsequent years, through the 'Seventies, it got to be quite a

big car. It got to be a powerful, big car, and, I think, they literally walked away from their market with that car. They made it a powerful image rather than the people's car that it was originally -- the sporty, little people's car. But, after I was in there for awhile, they decided that they wanted to rotate me around and give me more Ford Motor Company experience, so then I was given responsibility for the interior group, and I had that for several years.

Q About when?

A That must be '67 or '68, I think, in that area. I was in there for a year or two, and it was the time that Bunkie Knudsen came on board at Ford Motor Company.

Q We'd like some elaboration on this area. What were the reasons that you could see for Bunkie Knudsen being brought in and how he and his assistant, Larry Shinoda, impacted on the design situation at Ford?

A Yes, it was very interesting. I had understood that Henry Ford II always liked check and balance in his management, and, I think, that he saw Lee Iacocca as a very strong guy who would be president, at some point in time, but he felt that he needed check and balance. It's my understanding that Mr. Ford and Mr. Knudsen were quite good friends -- that their families were close friends, and they knew each other well, and that Bunkie was ready for a move. I think, he got passed over at G.M. at one point, or thought he was going to, so it seemed to be a good fit. I think that Henry Ford thought that Bunkie had a lot of product know-how. He'd been in the Pontiac group and done the wide-track cars, and he felt that he was a good product man -- a good marketing man. So he decided that it would be a good idea to bring him on board. I

don't think that he was trying to block Lee Iacocca from what I saw. I think that he intended to have Bunkie do this for awhile and then Lee would take over, and he felt that he had the best of both worlds with these two strong guys there.

A number of things happened. First of all, a lot of the executives and officers of the company resented Knudsen coming on board, and, secondly, Knudsen, unfortunately, picked a bad method of operation. Rather than recognizing that Iacocca was one of the best marketing guys in the world, and Gene Bordinat was one of the best designers in the world and so on, he tended to try to teach them their business. He used to get them together. He'd call us together early in the morning. I think, we had 7 o'clock meetings, but he'd show up at 6:30, so then we started to show up at 6:00 to be ahead. Honest to God, it got so I was getting up at 4 o'clock in the morning, and we were all there waiting by 5 o'clock for a 7 o'clock meeting! But, I think, he made that mistake. He's basically a very, very nice man. I knew him, and he was very bright and did understand product, but, I think, he made that mistake of assuming that he knew more just because he came from General Motors. And, as such, he built a tremendous amount of resentment in a very, very short time. Now, interestingly, I'm pretty sure Bunkie decided that he wanted a backup for Gene Bordinat -- that he felt it was important to have somebody second in command who could work their way into his job, and there wasn't really an apparent one at the time.

He did a search, and Larry Shinoda, who had been an old friend of mine from General Motors -- as a matter of fact Larry lived in the apartment across from my mother-in-law in Royal Oak, so I'd known Larry

for years and followed him when he raced the little go carts, and we'd had a number of discussions. Larry's an interesting guy. He's got kind of a difficult personality -- not too many people know him. And, he's kind of the guy that I feel can get pretty tough if he thinks he needs to. However, we had a good relationship. For some reason we respected each other. I knew that Larry had designed several of the Corvettes that I admired, and I had a great deal of respect for his design knowledge. I suspect that Larry recommended me as one of the contenders for this job that Bunkie wanted to create. He was going to call it the executive director and sort of have everything report to him and then report to the vice president.

Q [Would this be] bypassing Bordinat?

A No, no. It would be reporting to Bordinat, but just as a backup. He was looking for some younger talent, maybe a little bit more intellectual to back up Bordinat and do the day-to-day stuff, to infuse some of this thinking. At any rate, I was recommended for the job, and, I believe -- a lot of this is assumption on my part -- that Lee Iacocca was promoting Don DeLaRossa who had really had a lot more years there and probably was more nearly the heir-apparent. I was the new kid on the block. I'd only been there a few years, but Bunkie seemed to be impressed with what I'd done and liked the things I was doing. I didn't know him before, and I have a hunch that Larry played a role in this one. Larry had been working there for some time, and I have a hunch that Larry recommended me.

At any rate, I suspect that Bunkie got his way over Lee's objections, and it created a little bit of animosity. I don't think Gene

Bordinat was too happy with it, because, I think, Gene felt that DeLaRossa really had first shot at it, as did I. But, anyway, when the decision was made, Gene called me at home and said, "Shut up. I'm going to tell you something, and I don't want to hear any buts about it." Then he told me, and I said, "Well, I think, you know, [DeLaRossa] really, is more nearly the guy." I said, "I've got a few years. I can wait for it," and he said, "I told you to shut up! This decision has been made, and it's going to go that way, so, shut up!"

Well, it was a very uncomfortable position because I was put into this top job. I had all of the design reporting to me -- everything -- interior, exterior, advanced and everything under Gene. I think Gene retained administration, if I'm not mistaken, and personnel. And there was a lot of animosity. I know that DeLaRossa was quite upset, and, I know that Iacocca was quite upset. I had a hell of a time dealing with Iacocca after that because, no matter what I said, he didn't like it. There were a number of occasions where I had to make a choice in designs, and I could tell that it was going against the grain, and, I swear, he almost bit his cigar off a few times. But I talked to the guys, and I said, "We're in a tough spot," and I said, "The only thing I can tell you to do is let's do what we think is right, and, by God, we'll stick by it. If they don't like it, well, at least, we know that we've done right." And, we did, and we hung in there real tough, and there were a lot of times when I know Gene didn't like it, and Lee didn't like it, and it was like walking on eggs for a long time. I had the feeling that they couldn't fire me, but I wasn't sure they wouldn't get a hit man out and kill me! So we went through a few years like this, and....

Q How did it go in terms of progress?

A I think quite well. It was the whole series of cars that was introduced from '69 through '73, and my recollection is those were some of the best years we ever had. We made a lot of money, the cars were popular, and it wasn't easy times. We were being faced with the new Federal regulations, by the way, and in several cases, we had to literally just chop inches out of the front and the back of the car to meet the weight targets and that sort of thing. It was a really a tough time with a lot of compromises made, and some of the results were questionable. I remember we cut nine inches out of the rear overhang on the Mercury, for instance, and everybody thought it looked bobtailed, and I was catching a lot of hell for it. I think they pointed to the fact that, "I told you he couldn't do it. Look at that crummy-looking car." Well, that crummy-looking car got out there and just sold like hell. People loved it.

Q What year was that?

A I think it was the '72 series. I'm a little hazy.

Q A good car.

A They were excellent cars. They were very, very well made cars which helped us out. But, anyway, during that era, cars sold very well. At some point in time, I think that it was after Bunkie left, and I've got some thoughts on that. Would you be interested?

Q Yes, and also Shinoda's impact on the...?

A Okay. That was interesting -- Larry is a very bright guy and a good designer, but, unfortunately, Bunkie made him a director, and Larry had never been in a position where he had to manage before. He was in a

nice, little experimental studio downstairs at G.M. and just had his own way, and all of a sudden, he was thrown in a position where he had to manage people, make policy decisions, and he was out of the water, frankly, and it frustrated him, and he tended to have a lot of battles and fights with people and so on. In spite of that, he infused people with a lot of interest in terms of performance cars and racing and did a lot, I think, to change the character of design and get people interested in that aspect of it.

An interesting side light is that if Larry couldn't get his way with Gene, he would go directly to Bunkie, and this made Gene furious. I was in Gene's office one day when he called Larry in on some specific thing Larry was proposing, and Gene said, "Larry, I oppose this. I don't want you to do it." He said, "I know you can go to Bunkie around me and get it if you want to, but," he said, "I'm asking you not to, and I'd like to remind you that Bunkie might not be here forever!" which was quite prophetic when I thought about it later. Larry did go around him and continued to. Part of it was the fact, I think, that Larry just didn't understand the large corporate structure that he was thrown into at that level and clung to somebody he knew and trusted, and they were very, very good friends. Bunkie had a lot of respect for Larry and vice versa. To make a long story short, the morning that Bunkie was let go, we were at lunch, and somebody mentioned it, and Larry Shinoda was in Europe, in Germany, I believe. When I got back to my office, I had a call from Larry's wife, and she said, "What's going to happen to Larry now?" and I was recalling Gene's comments, and I said, "Well, I don't think anything too good. I don't know, we'll see. He'll probably have

to come back here first." To make a long story short, I was called into Gene's office that afternoon, and we got Larry on the phone in Europe and told him to come back immediately, and Gene couldn't wait for him to get back to can him, and the minute he got back, he was told he was through. And, Gene reminded him of that discussion he'd had earlier.

Q The story that I get is that he actually told him he was through over the phone?

A He may have told him that. My recollection is that he didn't. My recollection is that he just told him to get back on the earliest plane, and, which, in effect, was as much as telling him he was through. He knew what was going to happen I'm sure, and, I think, he told him when he got back. That's my recollection of it. [Mr. Kopka is correct. Ed.]

Now, there was another guy, Dave Wheeler, who came over with Larry, but Dave was a very, very cooperative guy, and he would bend and do what Gene wanted him to, so when this hit, Gene kept Dave, and Dave is still there. He's head of our color and trim group now, and he's been a very valuable guy.

My perception of the Iacocca/Knudsen thing is that, at some point in time, Bunkie had alienated a number of the officers and executives of the company, and Lee helped this alienation. I believe that he literally went around and enlisted people. I don't know whether they signed on the dotted line or not, but, I think, a number of them agreed to stand with him in what really became a palace revolt.

Q What kind of levels?

A They were vice-presidential levels, and he also talked to some members of the board and other executives below vice-presidential level.

But I understand that he had a number of vice-presidents signing up that they would stand with him. And, by the way, Lee had an offer in his pocket when he went to talk to Mr. Ford. He was being asked to take over Criscraft, which was an industrial conglomerate. He knew the man that headed them, and he'd offered him a job to take this group over, so he went in armed with that, and, I believe, that he gave Mr. Ford an ultimatum. That he told him that if they didn't move Bunkie out, he was going to walk and so were all these other people. So, Mr. Ford, in effect, I believe, was blackmailed into making that move, and I don't think his heart was in it because he still liked Bunkie. I happen to know they remained close friends thereafter.

And, as a matter of fact, it was here at the [Henry Ford] Museum one night during one of the Grand Prix events we had -- the reception where they were together. I was in their company. I was talking to Bunkie. I hadn't seen him for some while, and Mr. Ford came up and kissed Florence Knudsen, and they talked about their next trip they were going to take together, and then they went on to reminisce about some they'd been taking through the 'Seventies, and it was apparent to me that they had never parted company -- that they had remained quite good friends --families -- and this was something that Mr. Ford didn't want to do but was forced to do.

Q Is it your impression that H.F. II never quite forgave Lee for that?

A It's definitely my impression. He'd been blackmailed and put into a situation that he didn't like and turned his own people against him. Now my perception is that sometime later Lee decided that he would like

to be chairman of the board after he'd been president and decided that Mr. Ford was standing in his way. I saw this process start all over again, only this time the target was Henry Ford. He started lining up executives again. He started circulating the idea that Mr. Ford was getting senile. He talked to some of the members of the board.

Q Was this the time when he was having medical problems?

A Yes, it was, right. And, pretty soon, I believe, Mr. Ford perceived that here was another palace revolt, only guess who was the target this time?

Q And, he went down on the attack?

A Well, he just didn't wait. I understand that it was a rough fight. That, by this time, Lee Iacocca had so many people aligned with him, including Henry's brother, Bill, who felt very strongly about him, that Henry had a real tough job, and it really came down to a him or me thing, I believe. That he went to the board and said, "It's him or me," and won. Now, that's a side of it that nobody's ever heard. They think that Henry in his crusty manner just decided he didn't like Lee one day and kicked him out. And, to Henry Ford's credit, he's never told this side of it. He's been a real classy guy -- a gentleman -- and never revealed the side of it that he was literally being blackmailed in a palace revolt. And, he didn't have any choice in that matter, as far as I could see.

Q Did you see his interview with [J.P.] McCarthy [on television]?

A I did, yes.

Q He clung to that.

A But, nobody's ever really appreciated this other side of the story, I don't think, that he was put against the wall. That it really wasn't a

snap decision on his part to do this. It was something that built up and actually was forced by Lee Iacocca.

Q It's good to have that. Can we move back to how these events [impacted] on the design process at Ford -- how these decisions affected...?

A They certainly had a strong effect on it. George Walker was a very artistic guy, very clever, glib type of guy, and he assumed responsibilities during a time when people didn't know what design was. Literally, there wasn't any criteria by which to judge it. So, back in that era, the fellow that was the flashiest, wore the brightest clothes, had the best lingo, could weave more black magic and smoke screen anybody else was the guy that was, obviously, the best.

Q And that was George Walker?

A Yes, and it's not to put George down. He was a very, very bright guy, and he was quite well educated, but he was also very clever at recognizing what was needed to be a design head at the time. It was a guy that had to have this image, and he had that image. He was always tanned and drove a white car and had a black dog, and everything he did was designed to build this image.

When Gene Bordinat took over, Gene brought a little different approach to it. Gene was much more of a businessman. Gene was a student of business, and although he only had a year of college, he was very, very interested in national and international business, read it, and was well versed in it. We had many, many interesting talks over the years, and he brought to the whole profession, rather an artsy/craftsy profession, he brought it in more as a business. He started operating

on a budget, and, also, he brought a business to the design of the car in that he was more mechanically oriented and more engineering oriented and more business oriented. He started designing cars in which the mechanics and the engines were right. They went together with the car in that you designed it at a cost that was within the assumptions. So, he brought this aspect to it, and he started to run his whole organization in a much more business-like manner.

And, rather than [being] the flashy guy in the sports coats that told jokes. They tell the story about the fellow that headed up Kaiser-Fraser [design] -- Darrin -- that he used this trick often as he was making a presentation. If he lost his audiences' interest, he would have his pants on in such a way that he could just release one thing, and they'd fall off. So, if he started to lose their attention or was in a contest with somebody else, he'd unloosen his belt, and his pants would fall to his ankles, and he'd get everybody's attention back. So, these guys were showmen back then. Gene Bordinat, in opposite, dressed very much like a businessman. He wore three-piece suits, beautiful clothes, and gave more of the professional image. In addition to that, rather than hiding in the studios as most of the designers had done in the past, he had opinions on what else was going on in the company. He had opinions on management, organization, engineering structure, products worldwide. He became much more of an internationalist than anybody before him. Travelled all over the world. Sat in on the planning committees in Europe and so on. So, he brought this different image, and, I think, it changed the character of the car and the character of design during that era.

Now, counter to that, was Lee Iacocca and the sales group who were really holding forth. They were the strongest element. The companies go through different fads. I saw it go through engineering, marketing, finance, sales. The sales force had full control during this era, and, unfortunately, their perception of design was one of rock 'em, sock 'em, steal 'em, cheat 'em, we can sell another car, throw another wide chrome molding on the side of that car, and we can sell it for 50 bucks more, and so, they were much more interested in the superficial aspects of design and the ability to jazz 'em up and sell them to the customer.

One of the themes of the Thunderbird back then was "Park a rocket ship in your driveway" or something like this. So, that had, unfortunately, a very, very strong effect on things, and that effect was around until -- actually, until the late 'Seventies, believe it or not. Iacocca also thought that a car ought to look as big as it possibly could no matter what the size of it, and this was sort of a philosophy that Joe Oros had preached where you pull all of the shapes right out to the corners of the car. You fill the cube, in effect. If a car's 80 inches wide, then the taillamps are out at 80 inches. There's very little shape down the side. You didn't want the hood to drop because that was negative. You wanted it straight up. So, in other words, it dictated boxes.

This boxy theme then was further sustained by the need in the mid 'Seventies to meet Federal requirements in terms of emission and fuel economy. And one of the few ways they could figure out to meet fuel economy was to take weight out of the car, and one of the few ways they could figure to take weight out of the car was to make it smaller. So, in effect, we ended up cutting off the front and rear, and the theory was

that the most efficient shape is a box. And, that's absolutely true if you're building a house or a room. It's not true on the road because this box has to pass through the air and go over bumps and around curves. But, anyway, this further sustained the idea of boxy cars, so through the late 'Seventies when, I think, another influence would have taken over, it was sustained by the need to meet Federal requirements, and, therefore, we had lots and lots of boxes -- little boxes and big boxes, and cars in the United States tended to all look alike.

And, at this point, I would guess that the predominant influence was the government. It had been sales, now it was the government mandates. We then went through an era in the late 'Seventies where finance seemed to take over, and, all of a sudden, cost became the major consideration, and, I believe, that they actually fooled engineers and designers into telling them that a given car was going to compete in a level below it to try and keep the prices down. We did a Fairlane/Torino type of car that they told us would be a Falcon replacement, and it ended up being a Granada, and, as a result, a lot of things were done to save cost that, in my estimation, created cars that were not finished compositions. They were bare boxes in many cases and stripped and not total cars -- not good designs.

That gets us up to the era where we started to recognize the need for a new approach, and it had two inputs. One of them was the fact that in the mid-'Seventies we suddenly recognized that aerodynamics could make a contribution. We had a fellow on our staff who was a chief engineer by the name of Jim Chabot, who had a degree in fluid dynamics. Jim Chabot worked for me as a chief engineer, and he came to Gene Bordinat and me

and convinced us that there was something to be gained through aerodynamic testing of the cars. We were desperate to get every tenth of a mile per gallon we could to meet the fuel economy [standards], and Jim made a pretty good case for just making the cars a little slipperier and changing things here and there that would actually contribute up to a mile per gallon on certain cars. Having done some aero work at Chrysler, I was very impressed.

Our cars were very bad aerodynamically at that point. The box is a lousy aerodynamic shape. Both Gene and I were very interested in this. Gene was a guy that loved conceptual things and new ideas and knew how to sell them to the company. And Gene was a very close friend of Henry Ford's and had a lot of sway. And, a number of times, I know, I was representing Gene in negotiations or discussions over something, and as we started the discussion, the other executives would say to me, "Well, what does Gene really want, because he's going to end up getting it anyway?" So, we had a little lever there.

I cut Chabot loose to start to influence the company with the need for better aerodynamics. He went out as missionary, and he got some concurrence that, yes, maybe there was something there, but we're too busy to back up or bother with it, and we don't want anybody telling us how to design the body or chassis. So, although he got lip service, he didn't get much more. He came back, and we met again, and we decided that we needed a task force. So, Gene went the next level up and convinced corporate management that this was a good thing and that we needed a task force on aerodynamics. They concurred.

A task force was formed composed of the engine engineers, the test engineers, car engineers, and the chassis group. Chabot made his case

to them, and they got a directive that they would start testing cars. Now, the interesting part of it is is that, up to this point in time, the engine engineers had most of the onus for making fuel economy. It was almost all on their backs, and they didn't know how they were going to do it. They were under the gun. When the light went on, and they began to realize that they could get some help in this for almost free by just shaping the exterior of the car, all of a sudden, the idea was embraced. And a great deal of cooperation and a tremendous amount of intensive testing and research went on, and, although it wasn't apparent in the total shape of the cars in the late 'Seventies, those cars had been tuned to the teeth -- little things -- angles, radii and so on. Air dams went on. And, as a matter of fact, that effort produced a mile and a half per gallon corporate average fuel economy over a period of four or five years. Now to put that in perspective, the company estimated that a tenth of a mile per gallon was worth 200 million dollars to achieve it any other way, by virtue of downsizing new engines, new materials, new technology. So, that was a contribution. What would that be? Three billion dollars! Three billion dollars over that period of time, and the total investment for the testing, I figured, was around 10 or 12 million dollars, so you can look at it as an investment of 10 or 12 millions dollars. It was a three billion dollar payoff, and that may give you some idea of why we've embraced aerodynamics to the degree we have. It isn't a fluke.

About this point in time, I started to realize that it was actually a gold mine and that we just scratched the surface. We were just beginning to mine it, and there was a huge mine there. We seemed to have

the lead on it in that we recognized this sooner than the other companies, and we did for several reasons. One of them is that the aerodynamic effort started within design; whereas, at the other companies, the aerodynamic effort was in advanced or research areas, and the designers resented it. They didn't want those guys coming in and telling them how to design cars. In our group, very early on, we got the designers and clay modelers to go down to the wind tunnel and live in there, and, all of a sudden, they became aerodynamic experts, so they embraced it. They could see what it was doing, how it helped, and how to design cars to take advantage of it.

As a matter of fact, where early on we would have to take a new design and go down and warp it and change it to get better aerodynamics out of it. As time went on, and the designers and modelers learned more about it, they got a seat-of-the-pants knowledge of aerodynamics, and they all became experts, and pretty soon we could go from the original sketch to a model and find that we didn't have a hell of a lot to do with it -- that it was pretty doggoned good in the wind tunnel. So we saw these opportunities, embraced them and started to incorporate them. The other companies began to look at them at the same time, but they were slower to embrace and slower to incorporate them.

We had some measure of that -- about two years ago the government published a report on how the different companies had achieved their fuel economy improvement, and Ford Motor Company achieved about 13 percent of their improvement through aerodynamics alone, whereas the average of all of the other companies was about 6 or 7 percent, so we, literally, had contributed about twice as much to the fuel economy improvements through

aerodynamics than the other companies. That gave us the conviction to go from there, and it gave our management the conviction.

About this time I realized that some of the shapes we were playing with were fairly radical when we first started to look at these softer shapes. This is before we'd introduced any, and I felt that somehow we had to find a way to condition our management -- our company -- to educate ourselves to this, otherwise, we wouldn't sell the ideas. That it would shock people, and they would be frightened of it. So, I conceived of the idea of the Probe series of cars which we said were aerodynamic concept cars.

Q These were your conception?

A Yes. It was worked out with Jim Chabot at the time. But we decided -- and I named it the Probe, as a matter of fact. I thought the Probe was a good name for it. The Probe was a tool that you use in the wind tunnel to test the air pressures. So, we conceived the Probe I. This is back in '78, and we wanted to make it an optimum aero car, but we wanted to make a real car, so we made it a full-size, four-passenger car. About the size of a Thunderbird -- in that image. And, we were told that we couldn't get a coefficient of drag below .3. And, by the way, at the time, the average coefficient was in the mid .4's and some in the .5's. Nothing under .4. We worked very hard on this and came up with a .25, which was just revolutionary at the time. You know anything that had been down that low before that had been a very small test vehicle of some type. I think this Probe experiment served many purposes. One of them was that it did condition our management. It educated them. They saw this car, and it was a driveable car. It was the real thing. It wasn't

just a paper idea. They were very impressed with it, and, I think, that it helped to condition them to accept these new shapes that we wanted to sell.

The car went on to -- we used it to condition management, and then we put it on the show circuit, and it went all over the world. It was in every major auto show worldwide. So then, as an after the fact, we decided that we had three strategies. One was to give our designers and engineers a chance to stretch their minds and do something they wanted -- to reach out. The second was to educate -- condition management -- ourselves, if you will. And, thirdly, was to condition the consumer to give him an idea where we were going by showing him these vehicles. And we did that, and they were very well received.

The next Probe we did was the four-door sedan to prove that you could do the same thing on a four-door, and then Europe did one, which actually was the prototype of the Sierra introduced over that. We called that the Probe III, and they showed that at the Frankfort auto show. This did a marvelous job of convincing management that this was the way to go. Now, in retrospect, you must realize this was a pretty gutsy thing. Here we were losing a billion and a half dollars a year. We were talking about investments of a minimum of a billion dollars to do a new car, so during a time when we were losing our shirt, on the one hand, talking about going out of business -- we were willing to risk going to an all-new style -- leave our traditional buyers, our traditional image and everything else. Go to an all-new style and invest several billion dollars in that new style. That's probably one of the most gutsy moves that any large company has ever made. A year before the Taurus was

introduced, the company had a worldwide management meeting at Boca Raton [Florida]. In Henry Ford's speech he mentioned that he didn't like the design of the Taurus and Sable. He said they were too far out, and Bill Ford commented that maybe we were getting too advanced with our designs. After the meeting a number of people asked me if I wasn't concerned, and I replied that it was too late to change. After the cars had been on the road for five months, both Henry and Bill said that all of their friends were complimenting them on the good looks of the Taurus and Sable.

Q It's a fantastic story. Can you elaborate a bit on the internal dynamics of that decision? Who was involved?

A Well, that's very important because the "who" was involved made it, and it wouldn't have happened without them. The "who" was involved were Don Petersen and Phil Caldwell. Now, we didn't have much trouble with Petersen. Petersen had actually lived in the Design Center. He'd been my counterpart when I told you I was executive director. Don came in out of planning as executive director of administration and engineering during those years, and we worked as counterparts. I was the designer, and he was the engineer, and so he understood our organization quite well and was very impressed with our group. He liked our guys. He said they were the most creative, hard-working group he'd ever seen in the company and still believes that. So, he liked them. He came to really understand the design process. He knew a lot about it before, but, on top of that, he's a product guy and really knew product, and, so there wasn't much trouble selling him.

Phil was an unknown to us. Phil had come up the finance route, and I knew Phil from truck. I'd worked with him when he headed the truck

operations. I had truck as part of my responsibilities. So, I knew him from there, and I liked him. I thought he was a good guy --that he was straight, and, although he didn't come up the product lines, I felt that he understood. The first few meetings we had with Phil, I had the feeling we were shocking him with some of these things. But, to his credit, he's an extremely quick learner, and I said I knew we'd done our job after a few meetings. After a couple of months, we showed him some wild, far-out, new things in terms of maybe a Probe/Arrow concept car or something like that, and as he left the meeting, he turned to me, and he said, "Don, do you think we're reaching out far enough with these things?" And, I thought, that was great. I could have kissed him then. So, at any rate, he became an advocate rapidly, too, and was convinced, as were most of the engineering and planning community. They tend to embrace this. As I look back, it is sort of a miracle now that we were able to sell such a radical idea, and making those kind of investments. It's just incredible.

Q Radical in this country? You're taking a concept that was developed in Europe?

A Yes. That's also a very good point in that all of these people knew the world-wide market, and Phil had worked in Europe -- had been Chairman of the Board over [there] and knew that European market. So, he had a much better appreciation because of his experience there and saw these as -- there was a tendency at first to call them European types of cars. We got off of that. We said, they aren't. We said, they're international cars, they're our own character, which we further embraced. But that's a very good point that many of them had been conditioned with this experience.

Q The second Probe was a final design for the Sierra?

A No, the third. The Probe III was the final design, and they did a wind tunnel version of it in which they slicked it up and put biplane spoilers on the rear, so they introduced it as an aero concept car -- Probe III -- but they let it leak that it looked a lot like the new Sierra that was going to come out in the Fall. Now, subsequently, we've all decided that this is a good technique, and we've been doing a lot of that lately -- the Aerostar concept vehicle that we introduced in January at the Detroit Auto Show was a direct result of that in which we did an aerodynamic version of the production car that's going to come out and tricked it up a little bit. I think it's a great idea because anytime you're dealing with these new shapes, there is a conditioning factor, and some people [who] are on the leading edge will accept them immediately. Others will be very slow to accept new forms. They perceive that they might be a fad that's going to go away. So the more we can do to condition people on the outside and tell them where we're going and why we're going there -- why these shapes are the way they are -- prove to them that they have aero advantages which are well beyond just the slipperiness and the fuel savings. They go on to road holding, and cross-wind stability, and wind noise, which is more of my reason for saying that this is a gold mine. We know how to handle the coefficient of drag, but we're still learning lots in terms of more efficient cooling and wind noise and stability. We've got years and years to go.

I did an interview with Jim Jones of Newsweek yesterday, and he wanted to know where cars were going to go in the year 2000, and I told him exactly where they're going to go. Because you get all this free.

Just in the shape of the vehicle. It's form follows function. Finally, we're getting there.

To get back to what influences are, the influences here now are good ones, because sometime during the 'Seventies where the designer was still perceived as the stylist who could pretty up a car and make it sell better, the company got in serious trouble trying to meet functional dictates on it by Federal regulations in terms of the fuel economy, and emissions, and damageability, and safety. Literally, in their panic, they came around begging everybody to help them out of this problem -- to solve it -- to make a contribution. This is the best thing that ever happened to the designer. During this era, which was hairy, we worked terribly hard and had tremendous challenges, but friends used to say, "This must be the worst time in your career, having to meet these things." And, I said, "It's the best time in my career. We're finally able to design cars the way we all think they should be designed. We're able to make a tremendous contribution as designers." Now, during this period, also, a transition happened where the designer went from the beret wearing artiste -- the art and color fellow -- to where, when it was recognized that he did have some training and could make a contribution, he inherited the responsibility for the package. Before that, the package had been done somewhere else and handed to him, and then he could shape the metal over on an already existing design of a car, in effect.

Q This [was] the way it had been [done] previous to this?

A Back in the early 'Sixties and 'Fifties. Up until then, yes. They started to inherit some responsibility for the package when Bob Alexander came over as our chief engineer back in the 'Sixties, and then more and

more until we ended up with the full package responsibility. We also ended up with the responsibility for most of the early feasibility. I don't mean to say that we engineered the car, but once the design was approved, we put it into a feasibility studio where it went in to soak and stayed there for a month or six weeks, during which time we worked with all of the body engineers -- chassis engineers, manufacturing, assembly -- to make this car right. To make sure it was right and was perfectly feasible. At the time it left there, all of these representatives, literally, signed a piece of paper that said this car will meet all of the criteria in the assumptions. It will be produced of the material specified, at the volume specified, at the weight specified, and at the cost specified, within a nickel.

So, it became a completely different business. All of sudden, the design community had a big stake in that car, and whereas before they could wear their beret and do pretty lines on it, and then if the engineer couldn't make it, they could criticize him for not being able to do it. So, you went from the point where you had the nuts and bolts engineer who had very little appreciation for aesthetics -- the beret-wearing artiste who had no appreciation for nuts and bolts, and they've grown together. The designer now being trained in universities -- takes a much more intellectual approach to it -- understands engineering and manufacturing, and the engineer has a lot greater appreciation for the aesthetics, marketing, sales and design. They're more nearly the same person.

Q Where does the product planner fit into this?

A The product planner has played a variety of roles. Product planning was started at Ford Motor Company. As Don Petersen says, he

started it. When he applied for a job there, they asked him what he wanted to do, and he said, "Product planning," and, he said they hadn't heard the term before, but they hired him as one. Product planning went through several phases. It through a phase where it was a growing phase, where they were trying to learn what product planning was, and it was, mainly, in those times, an accumulation of facts. They tended to be able to accumulate the input from all of the different areas: design, engineering, manufacturing and put together a package of assumptions. That's the role a planner played. Up until then, it was probably the divisional management, or corporate management, that kind of set the philosophy for what the car was. These guys actually put together a set of assumptions that described this car, and, I think this was the first time it was ever done. That was their planning role. Then they also had the responsibility to shepherd it through all of the different steps that it took all through the manufacturing and out to marketing to make sure that it stuck to the assumptions -- came up to the cost level they wanted. Before that, cost floated all over the place. Had the engineering features they wanted. So, they played a very vital role.

Now, something happened along the way in that product planning were the ones that were able to accumulate all of the facts. Suddenly, they held them and decided to release them as they saw fit, and so, in effect, they [retained] absolute control of the product, and it was wrong. It got to the point where the other disciplines didn't have the input, and they, literally, held everybody's hand, and they told them how to design a car and how to engineer a car, and they didn't release the information they had to the degree that the designer knew enough about the assump-

tions and the product to do his job. He got a little piece of it -- what they thought he deserved.

So, it went through this era, and, at that time, the head of product planning was an executive vice president -- a very high level. There was John Nevin and Don Frey -- several people in it at a very high level who were, maybe, on their next step to the presidency. For this reason, it got kind of a bad name with the operating groups within the company. They felt that planning guys had become sort of elitists, and they were hurting the product by not bringing everybody in on it. So, subsequently, planning got downplayed somewhat, and probably occupied about the right role through most of the 'Seventies.

Unfortunately, right now for some reason, this trend has continued, and, in my estimation, planning is not strong enough or well enough represented in the company now to the degree that they furnished an awful lot of business planning along with the product planning. It was very important. And, also, they were able to take these assumptions and see that they happened. They were able to take the assumptions for a particular feature from the design level through the body engineering into manufacturing and see that it happened and worked with the vendor if they needed to. In effect, shape people up -- keep them in line -- keep things going. They've been cut down to such a low level now that they are not able to perform many of these functions, and, I think it's a mistake. I think that the company is lacking a degree of continuity. A lot of other people are trying to make up for it through meetings and teams and a lot of other things, but, I think, that its actually been cut back too far, and I suspect we're seeing a cycle like all other things in

companies that seem to have fads and go up and down, and, I think, we've just gone too far down, and a lot of people realize that.

Q Can that trend be reversed?

A Yes, I think it can be. I think it's been recognized. I know I've been quite outspoken on it. We've had several meetings with the President, Don Petersen, to discuss where we're going in design, and although it was design oriented and had to do with what the cars would be like in the future, I pointed out that I felt that a serious inhibition was the lack of strong planning function, and I'm sure he concurs as did others in the meeting.

By the way, there was really a historical point in time, now that I think about it. When Don Petersen first took over as President, he came over and was talking to Jack Telnack who runs the North American design operation and myself. In effect, the discussion went something like we were all putting down the current designs we had -- those big, square models. We were saying that it was too bad that we were stuck with them, and I recall Pete said, "Well, do you guys like those designs?" And, we said, "No, we don't." And, he said, "Well, I don't like them either." He said, "Why don't we do something we like?" And, this really -- you can pinpoint [this discussion] as the catalyst that got us started on these new trends.

Q About what year?

A I think that was probably four or five years ago.

Q 1979?

A Yes. So, he set out to see that we had the opportunity to -- he said, "Why don't you do something you'd like? Why don't you do some cars you'd like to see," and, we did.

Q He's talking to you and Jack?

A Yes, Jack Telnack and myself. And Jack launched off on, I think, the Thunderbird immediately thereafter, and I started doing more of the concept vehicles -- the Probe and that sort of thing. And, as you know, we have Ghia that is one of our advanced studios in Turin, Italy, and it's an honest-to-God coach builder, and we do about twelve vehicles there a year. So, we have the opportunity to do some rather exciting things over there. A bit of irony, I think, is that when I was at Chrysler back in the 'Fifties, Virg Exner had a working relationship with Ghia. Ghia was owned by the Segres -- Louisa and Luigi Segre. They were good friends of Exner. Exner was very impressed with them, and they were doing the kind of cars he liked, so we started doing a series of cars that Ghia would build for us. They would sort of help in the design, and Exner could have some influence on them while I was there, and I ended up working on several of them. It was quite interesting, and I got to know the Segres a little bit and worked on several of the Ghia cars which were very well received in this country. There was the DeSoto Adventurer. That's the one I had the most to do with. There was one called the Flight Wing. There was the K-310, C-310, one called the Falcon that was a black car with some fins on it. But, it was an interesting relationship.

I found it extremely adventurous at the time as a young designer to be able to work on these cars that were being made in Italy. And, by the way, I occupied a rather favored position with Exner back then. I was racing MG's and Austin Healys. My wife and I both were with the Detroit Sports Car Club of America, and Exner was just a sports car nut, and he

acquired a number of them over the period of time. We had Ferraris and Maseratis and Mercedes and everything else, and I was the only one he trusted to take them to the garage and get serviced, so I lived a charmed life. I got to drive these and take them home.

As a matter of fact, we showed a number of those and a some of our concept cars -- the Ghia concept cars -- at some of the major auto races like Watkins Glen Sport Car Races and Elkhart Lake back in those days, and I got to drive them. Another fellow and I drove them to these races and put them on display there, so it was a lot of fun. I'll never forget when we got a Mercedes 300-SL, gull wing coupe -- the first one. It was actually purchased off of the Paris auto show exhibit by Lyons, Incorporated, who made wheel covers here in Detroit, and Lyons was a good friend of Chrysler, and they loaned it to Chrysler for a period of time -- several months. Maybe more like a year. And we had it, and, my God, I was given the responsibility of taking that car up to Elkhart Lake Road Races, which were the old Elkhart Lake Road Races which raced around the lake. It's since become Road America. But, we took this thing up there, and it was like driving a Martian machine. This beautiful thing, and the doors opened up, the gull wing doors, and it went like the devil! I remember, I got up to 132 miles an hour across Michigan at one point in time. But, that was a charming thing.

But, the irony of it was that quite a few years later in the mid-'Seventies when I had responsibility for engineering and administration for design, Don DeLaRossa ran Ghia. We'd bought it from Alejandra DeTomaso who had purchased it from the Segres -- Louisa and Luigi Segre. And, we purchased it. Once we owned it, we went in and did an audit on

the way they were doing business, and they got a satisfactory minus. And, part of that is due to the way we -- anybody -- did business in Italy back then. Today when we have a board meeting over there, and our lawyer will present us with a problem with the government, and I'll say, "What are we going to do?" and he says, "There's three ways of handling it." And, I say, "Okay, don't tell me the first one, and we'll go on to the second," because the first one is always some money under the table, and we can't do business that way.

But, to make a long story short, Del was running it, and we identified some real business problems, so Gene made me the business manager. He gave me responsibility for straightening it out and getting a good audit over there. So, I got involved at that point in time. And, I said, it was ironic after having done business with them back in the 'Fifties and then to inherit some responsibility for it in the 'Seventies.

So, I travelled with DeLaRossa a number of times over there and would sit in on the meetings, and we did our job. We installed some good practices, and we made our finance people in design work with them -- give them consultation and also our personnel people, which helped, and we got the audit up to excellent within a year. But by the time Del stepped down, DeLaRossa went to Chrysler -- I knew more about Ghia than anybody, especially the workings of it and so on, and Gene knew of my former experience with it, so I was given the responsibility for it at that point in time which was really interesting.

Q Interesting counterpoint. Does the company still own it?

A Oh, yes.

Q Who has responsibility for it now?

A It's part of my operation. I recently brought Dave Rees, one of our young guys who has our international design responsibilities, on board, and he started to coordinate the Ghia activities. They work through him, and I just brought him onto the board of directors this year in our Spring meeting so that he's now on board and could inherit it. I'm getting to be one of the older guys now, and I'm trying to figure ways of phasing out without an abrupt transition, so I'm starting to turn it over.

Q If I could take you back quickly to your Chrysler with Ghia, what was the background of that experimental model which went down with the Andrea Dorea?

A That was interesting. I did work on that one, too. That was called the Norseman, and it was a very, very innovative car. I don't even remember all the innovations on it, but it was a good-looking car. One of the most interesting innovations to me was the fact that it didn't have any A-pillars. It didn't have any windshield pillars because it was done under a completely different theory that I thought was fascinating. What actually happened was that the roof was designed in an up position so that it didn't meet the header of the windshield. It was about a foot off. I may be wrong. It may have been nine inches, but it was something like that. It floated free so that it was structured in such a way that that was its natural position. Then, to get it to come down to the windshield header, they used a little, 1/8th inch chrome steel rod under tension. The rod was fastened to the body at the base of the A-pillar and to the windshield, and then the nuts were tightened so that it was

pulled into position on the header so, in effect, you had a structurally sound roof that would take rollovers and everything else and yet no A-pillars at all -- nothing in the way of your vision going around the front of the car.

The windshield pillars were not there. All you had was this fine, chrome rod going down there. There were a number of other innovations on the car. It was a beautiful car. It was black with a -- it looked like it had a bubble top. The steel roof itself had trailing pillars that went into the rear corridor, and they were painted the color of the glass -- sort of a dark gray, so that it looked like a complete bubble roof, and we were really anticipating -- thinking it would be a fantastic show car and to show some of these new ideas. Unfortunately, it's in the bottom of the ocean. I think, the company decided after it was safely down there, nobody could get it up. Then they claimed all kinds of great things for it. Maybe somebody will get it up someday.

Q I had the impression that this was a swan song for that kind of activity at Chrysler?

A I think the swan song for Ghia working with Chrysler was due to a couple of things. One of them is poor Luigi Segre died at age 42 on the operating table. It was some simple operation. It was an appendectomy or something like that, and he insisted that a university roommate of his who was a doctor do the operation even though it was a minor type of thing, and they brought this doctor in. And, as I understand it, he was killed by the anaesthetic. He got an overdose of anaesthetic, and even though this was a minor operation, he didn't come out of it. So, Luigi was gone. His wife, Louisa, who was a very good business woman, continued it, and, as a matter of fact, she continued it with an ex-dictator

from [The Trujillo Dominican Republic]. He fled to Europe with lots of money, and they became partners, and he's the one that brought DeTomaso in later. It was quite a coup down there, and he escaped with a lot of dough. So, they became partners, and, again, I think she, maybe, [was] the business partner, but he brought in an infusion of capital -- all they needed. Then he brought DeTomaso in, who had been a race driver in Argentina -- Grand Prix level. He was a good race driver and a good engineer/designer, and they brought him on board to run it. Gradually, they bought Louisa Segre out, and more and more DeTomaso took over. DeTomaso married a gal from the East Coast who was one of the Rowan Electric family who was probably the best female sports car driver in the United States, and her name was Isabelle Haskell and was quite an interesting gal. I'd met her a few times, and she was the top race driver -- she drove Jaguars, if I'm not mistaken. He'd married her, and she had a good business sense and lots of money, so that helped, too. Someplace along the way, Ford then got interested in Ghia, and Iacocca and DeTomaso struck up quite a close friendship. They became close friends. Iacocca admired DeTomaso, so we started to do a lot of work with them. Sometime in the late 'Sixties or early 'Seventies, we bought into them. I think we bought half interest.

Q The Pantera was one of theirs?

A The Pantera was one of the results of that [relationship], and it was produced at Ghia, and Vignale was another coach builder company that was part of that combine, and the Panteras were built at Ghia and Vignale. And, it wasn't a very successful project. It wasn't a very good car, unfortunately. It was built in small quantities, and it had a

lot of problems. The first one I drove, I remember, I lost control of just coming off the expressway onto a ramp. It switched ends on me, and it was a lousy package. There wasn't room inside, and the heating and air conditioning, literally, didn't do the job, and it wasn't well put together. The rear wheel rubbed in the rear wheel well under jounce. It had a lot of serious problems. I don't know, to tell you the truth, the reasons that Ford decided to get out, but I believe that Henry Ford became quite disenchanted with DeTomaso.

I think that he was going through a period where he resented some of the things that Lee Iacocca was doing more on his own, and some people had referred to Ghia as "Lee's playpen." That nobody else knew what was going on there, and it seemed as if they made it a point not to let anybody else know what was going on there and sort of did their own thing. Unfortunately, they used Ghia to embarrass some of the other affiliates. They would wait until somebody in Europe got in trouble with a new design, and then they would come in with something from Ghia that they'd been doing quietly and throw it in and embarrass everybody, and they did the same thing in the States a number of times. So, it got kind of a bad name, and, at some point in time, the company decided that DeTomaso was not the person they wanted to do business with, so we bought him out at quite a high figure, I understand. Something like three to five million dollars, so he made out. The guy is a very capable man, evidently, who, subsequently, has taken over Maserati, Autobianca, many of the famous motorcycle companies in Italy: Motogutsi, Bellini and so on. He's taken all of those over and done quite a good job with them. I've been told that it's been a good device for the Italian government, in that many of

these companies had a group of old-line people, and too many people on board, and they were losing money. What they did, in effect, was do away with the company, and when the bankruptcy cancelled it, then DeTomaso was able to reconstitute the company with new personnel at lower figures and lower [salaries], and so he was able to make them profitable, and he's worked [that device] very well that way.

Q The influence of -- or the counter-influence of the Ghia and the Ford of Europe stylists -- [created] an antipathy toward the [European] approach for a time?

A Yes. I think during the last couple of years that Lee was there, he saw this group quite as a threat -- the European Mafia they called them, [which] included Caldwell. They were getting high marks for having pulled Ford of Europe up by the bootstraps, were making a lot of money over there, approaching a billion dollars a year. They were getting a lot of credit for their new products, and that's absolutely right. Among a number of the so-called North American people that hadn't been this route, there was some animonsity. They resented anybody telling them how to design cars, and they thought European cars still looked funny. In a way, we were very fortunate that a number of our designers were trained over there, including Jack Telnack, who was head of design for Ford of Europe and understood that environment. What I see is that it was not so much a matter of mode of style as it was the fact that in Europe they had been faced with the kind of criteria of having to meet stringent fuel economy requirements, high fuel costs, to get the maximum efficiency out of -- product efficiency, product size, engine size, so they were dealing with a completely different set of parameters than the United States designers were working with.

United States designers have been working with the price of gasoline at 50¢ a gallon, and, my God -- as a matter of fact, people used to brag about what low mileage they got in their big cars, their V-8's, so it was a completely different setup in the United States. In Europe you get into a car, and you travel 50 miles, it's a long trip. In the United States, people used to get in cars and drive a thousand miles in a day on expressways. In Europe you're going over bumps. It was a different environment entirely, so it's no surprise that the cars looked different.

The interesting thing is that in the mid-'Seventies when fuel started to become precious and we started having to meet Federal dictates, all of a sudden, the designers were facing the same kind of criteria that they'd been in Europe for years. They'd all been trained in the same schools, so it was no wonder that the cars started to look more and more alike. But, the fact that we had a number of designers who had had experience in Europe, and although I never worked there, I had had the international responsibility for a number of years and had travelled and spent time and helped work with them in Europe, so a lot of us had a pretty good feeling for what to do and how to get the cars more efficient.

Q I'm fascinated by the fact that it was dictated by environment and gasoline, but can you characterize it in terms of a design concept other than aerodynamics?

A I think that the base of it is that the role of the design in the United States was more of fashion than function. That people bought new cars because they saw something that had fins on it that last year's didn't or because they had new colors that they didn't see before. And,

in all honesty, if you pursue the thought that form follows function, part of the function of a car is to please the owner -- that he's proud of it, and it is something that he likes and is new. So, fashion plays a role in design, and the role that it plays goes from a purely economy car where fashion has played a very little role because it's so functional to the other end of the scale that is a Mark or Cadillac where fashion plays a very big role in it.

You could build a case that a lot of well-to-dò women buy a new Cadillac every year just as they would buy a new frock from Dior or because they want to have the latest. They insist on it. They won't be driving last year's vehicle, but they need a reason to do it, and the reason to it is the facelift, or the change in features, or new colors is the reason to do it. So, that's the environment you were working under in the United States, and that hasn't gone away. Fashion still plays a role here. The difference is that the trend toward the more efficient car was one that tended to put fashion aside, or it created a new fashion.

What the German's called "Vernunft" -- the efficient-looking vehicle -- is the new fashion, and so that <u>became</u> the fashion. We're seeing a backlash right now. A <u>lot</u> of people that bought the econo boxes -- these little, economical cars that thought they were being patriotic, doing the right thing, being smart and getting into the new fashion, after driving those things for awhile -- decided that really wasn't for them. They found out that they couldn't cram the whole family into it, they found out that it didn't have the nice materials inside they liked, they found out that it didn't have the features. Even things like the

automatic light shutoff on the headlamps, we found out people weren't buying Lincolns because they could get that feature on a Cadillac. Now, that's one tiny detail -- one tiny feature -- but the gals got used to it. They liked the idea of lights staying on until they got in the house. If they couldn't get that on a Lincoln, they wouldn't buy a Lincoln. So, what we're seeing now is a backlash of a lot of people that bought cars that were too small, too cheap, too spartan, didn't handle well, didn't ride well, and they've decided the heck with it, I'm going to get back to an American car that I like.

And, we're seeing them move back up, and today that's one of the reasons we're sold out on big Fords, big Mercury Grand Marquis and Lincolns. We're absolutely sold out, and it's because of that. That tells us, as we do new, efficient, American cars of the international class that meet the same kind of criteria they'd have to meet in Europe, Australia, Latin America, or Japan, that we still have a unique market in the United States. It's still unique, in that it's a huge country. It's still unique in that people drive long distances, that they look at their cars in different ways, and there's still a fashion market that says we'd better make these things stylish, good-looking, nice colors, nice materials and have a flair to them, so that they have personality.

I think we went through an era where we almost lost personality in cars. We got what I call the cookie cutter design. They looked like they were all stamped out of the same cookie cutter. You couldn't tell one from another, and G.M. has really been accused of this recently. Fortune had a cover article that showed all of their cars lined up, and they were all the same size and shape and everything, and it's a valid criticism.

We fell into that same trap. But part of our new direction was that we recognized that, and we said to ourselves, "Damn it, people still like cars they want to be associated with. They want something that has a personality. Something that has individualism that they can associate with," and, I think we've given a lot to our cars. I have a feeling that, coming out of this Federalization era of the 1974/'75 recession, that people heard a lot about all of the new things that would have to be done to make cars more efficient, [have] better handling, but they didn't see it. They didn't see anything that represented that in the shape of the car. There was just more of the same. Yes, it had catalysts on it, yes, it had bumpers that stuck out a little bit further. I don't honestly think until the -- actually, the Escort was the first one that started to show a little different image in this country -- European, if you will -- and then the Mustang got this wedge shape. They started to look a little more aerodynamic and different. Then, with the introduction of the Tempo/Topaz, the Thunderbird, the Cougar and the [new] Mark, they see something that's almost shocking to them for the first time. It represents the new generation of efficient vehicle that they've been looking for -- that they've been hearing about for a number of years and haven't seen, or, at least, didn't recognize it in the total shape of the car. And, of course, that philosophy of design is that the car should express its function. It should communicate. If it's an efficient car, it should communicate that. If it's a good handling car, if it's a powerful car, you should be able to read that in the shape and the character, and that's what we're trying to do.

That's one of the reasons above and beyond the fact that it's new, different, aerodynamic: it has character that people can identify with,

and it's not just like everybody else's car. That's one of the reasons they bought foreign cars, I believe, and Japanese cars, too, is that did have character. They had a different look about them.

Q Interesting that General Motors, while reacting to the downsizing situation very promptly which Ford had a problem with in terms of internal decisions, but they have so far resisted the switch to an aerodynamic shape.

A I think the very fact that they were forced to react and downsize is the reason that they didn't change the looks of it. G.M. owned that market, especially the middle of the market, and, I think, that they probably went through some traumatic days where they were trying to decide, "Look, we've got to do this downsizing, but how do we keep the G.M. identity?" The biggest mistake they could make in their minds would have been to have lost their identity. Because each car line had an individual identity before that in terms of the type of the grille they had, the type of taillamps they used, so it's my opinion that the reason that they've stayed as conservative as they have and haven't completely switched over to the designs that, I believe, are more appropriate to those size cars is that it was this over-riding concern for losing their identity and the fact that they might have to share their market -- give it up -- toss it up for grabs and give everybody a shot at it, and they were clinging desperately to try and keep their image in the markets that were traditionally theirs. Now, if you will notice on the cars -- the newest cars -- the ones where they can afford to develop a different identity such as the Camaro, the Firebird and the Corvette, they've embraced exactly what we're doing. Those cars are exactly our philosophy. That's the way we would have done those cars, and we really

admire them. We're jealous that they have the Camero and Firebird out there, and we're still stuck with the Mustang that's a generation back.

So, I believe that they understand the aerodynamics as well as we do. They have their wind tunnel in place, which actually is an advantage to them. And, even though the cars still tend to have some of the cookie cutter look, they are evolving into more aerodynamic shapes. The front ends are very similar to ours. They're getting softer, they have the wedge shape and so on. They're just clinging to a little more traditional proportions, a little more traditional treatment of grilles and taillamps that, I think, helps keep their image. This is my opinion, but it's the only one that really explains why it's going that way, and I do believe from everything we've seen and heard that they are definitely planning a transition that will end up exactly where we're going. That, at some point in time, our paths will cross. That we'll be designing exactly the same kind of car.

Q Obviously, you're thinking in the advanced studio of a new generation of aerodynamic Fords?

A Oh, yes. We're working on Probe V. I mentioned I, II, III and IV. We're on Probe V, and each one of the Probes has been so valuable to us. It's part of mining the gold again, but we've gotten in there, and we've just come out with buckets of gold out of each one of these tests. The public will probably never know all of the things that we've learned on these. We don't even know yet. We haven't been able to unscramble all the information. The Probe IV is an interesting case. We decided to introduce it in Detroit. This was Walter Hayes' idea. We'd introduced all the other Probes in Europe because we didn't think there was a good

enough appreciation for aerodynamics in the United States to do it here -- that we'd get more impact.

Walter decided the United States was ready for the Probe IV and decided to introduce it in the Detroit Auto Show. As a matter of fact, we had to rush it to put it together and literally took a couple of months out of the build on the thing, and when it was introduced there, although we wanted a fully-functional, driveable car, it wasn't. It didn't have brakes on it and a lot of other things because we had to rush it to make that date. But, it had a tremendous impact on things. But, the fact is that it was so popular as a show vehicle that we've never been able to get our hands on it.

It's been in Australia, Tokyo, Frankfurt, Geneva. It's been everywhere in the world, and although the first priority might be to learn from it, if you go back a couple of years, we had a lousy image for advanced technology. Ford Motor Company was kind of the old guys, the stodgy guys, and these Probes, plus a number of other actions that Walter Hayes introduced, have literally turned around our image, and many of us estimated it would take five to ten years to turn that image around. We turned it around in a year. All of sudden, the buff magazines, the auto writers and so on were starting to say how we were leading things, how we were starting to do cars the way they ought to be designed. We turned it around.

But, back to my point. The fact is that we are just now getting our hands on the Probe IV. By the way, it's starring in a movie. The movie "2010" is being filmed now, and this is a space-age movie, but the Probe and a couple of our other concept cars are the cars that the people

drive when they're on the ground on the Earth, and so it's just coming back from that. We're just now getting our hands on it to complete the feasibility of it so we can make it a driveable vehicle and start on our plan to do some testing and development on it.

There's a lot we can learn from it, and we haven't had that chance. Now, we started the Prove V a year ago, and if we'd have followed the same format that we did with the Prove IV, we would have had a show car in the works now probably to be introduced at Frankfurt this fall. Once we got into the Probe V, we started to really reach out and decided -- and, we took a completely different tactic. We said, "As slippery a car as you can get." And, by the way, the Probe IV was a .15 which is identical to a F-15 jet fighter, and it's a four-door sedan, so we really accomplished something there. About the time the Probe IV was being tested in the wind tunnel, and we were getting readings of .15/.16/.17, there was an international automotive aerodynamics conference in London. At the end of the conference they concluded -- these were the top experts in the world -- that nobody would ever get a production sedan below .2, and we were getting .15 at the same time, so it's really an accomplishment. On the Prove V we decided that we knew how to get a very, very slippery car -- slipperier than airplanes, believe it or not! Because the airplane has a function of getting off the ground, and we don't. We're supported on the ground, and that creates other problems. But we found, and this isn't public, that we can get all the way down to .11, actually, and probably below that. But, on the Probe V we decided that we wanted to use aerodynamics in the total context of air management to look at all the aspects of how you use air to do the job: cooling, road-

holding stability, wind noise and everything. So, what we decided to do was take it down to as low a level as we could and then pay back this aerodynamic efficiency whenever we had to help these other problems -- to use the air for negative lift to keep the car on ground -- to balance the negative lift -- to use it to control the weight so that it would be good in cross-wind stability.

We've done eight 3/8th scale models of this, and what we discovered is that we were learning so much, that the developments were coming in so fast that we decided not to conclude the project, but to go into a second phase of development. So, we're now in phase two, and we're going down the first of June to do some testing at University of Maryland with the next set of four aerodynamic Probe V models to do more wind tunnel testing. After that, we will probably start to zero in on a single theme, and then we will build a Probe V driveable model at Ghia for introduction in January of '85 at the Detroit Auto Show. But, the fact is that it's become more important as a learning tool -- a development tool than as a show car, so we're going to defer showing the car.

Q This has been well received within the company?

A Oh, very well received. There are a number of people in the company that always resent any advanced funds spent because they think they could better use them for production, and there have been a number of them over the years that have tended to want to overlook the fact that this is a development tool and just call them show cars, in effect, and say we're wasting money on show cars. But, I haven't heard that in almost a year now. In most cases, we haven't even had to defend ourselves anymore. The corporate management/public affairs, and even the

North American management, has come to our defense of how valuable these are as learning tools.

As a matter of fact, North America did, in all honesty, resent our show-car approach to things, as did they in Europe. They were afraid that we weren't representing their philosophies. Both areas have now decided these are such valuable tools that they want to work with us and develop [an understanding] of what we [can] do to help them further their strategy. So, it's become a very effective tool.

Q It seems to be very successful to approach it?

A In the old days, a show car was one of these blue sky cars, a styling exercise, and it had hardly any fundamental, technical basis. And this is another thing Petersen did [that was] quite interesting. We complained a lot that we didn't get the type of advanced engineering support and innovation that we needed to do some of these things. He came up with a thought. He said, "Here are you guys doing these far-out things that aren't really, in some cases, feasible. They don't have the engineering support on them, and, by the same token, our scientific research people are sitting over there doing experiments with motorized eggs or something that don't relate to what we're going to do around here, and our corporate strategy are doing esoteric, external factor studies that, maybe, don't relate directly to the product." He says, "Why don't we all get together?"

So, we did, and we formed an informal coalition that we called the Advanced Vehicle Concept Group, and what it's really done is put us (the design group) together with the engineering/research group and the corporate strategy group. So, what we do is build engineering technical

assumptions into the new vehicle --designed it around that -- and, at the same time, developed a strategy of where it would fit into the system. Maybe the strategy starts first, because we, first of all, identify areas out in the future that we think we might want to play in -- areas that we haven't covered or areas that are evolving or developing and then draw up a set of assumptions with the technology, design, aerodynamics, and the type of vehicle that would fit, and we put this all together.

In my estimation, it's been extremely successful. We had a lot of trouble working with the different groups because they're all different kind of disciplines, but I think we've learned how to work together. And, as a result of that, we've put together a series of projects -- I would say five major projects a year -- and a number of them end up in driveable, concept vehicles that you can actually test and help a lot to understand upcoming trends and external factors. So, this has been a great tool for us. It's been an informal one. It isn't an organization -- nobody heads the thing or anything. We all work together, and Dale Compton of Scientific Research works with us doing engineering research, Dave McCamon of Corporate Strategy and Bill Wilkinson under him, and we pulled this thing together. And there's several of our people that spend a lot of their time working at it. And, the other thing we do which proves quite valuable is when we get into one of these projects, we form a mini task force to do it, and then we invite in the production guys -- the line engineering groups, the advanced engineering and body engineering guys to come in as part of the team so that they live it, and, in that way, we feel that we're overcoming the "not invented here" problem because they live with it along the way, and it

isn't something that advanced has come up with and tried to hand to these guys.

That's been a terrible problem in the past -- a lot of resentment. Advanced areas would develop something and then pass it on to the production areas. The production areas, first of all, weren't familiar with it, they resented somebody else telling them how to do their business, they didn't have the advanced funding to take it on and do the subsequent development that had to happen, so we had a gulf there. We had a bubble, I call it, or a void, and we've overcome that to a great degree. We now have some theme groups that are composed of all of these people that try to identify these voids and see what we could do. And, although we haven't solved the problems, it appears to be the right approach to it.

Q You would say that [Don] Petersen was the hero of this thrust?

A Don Petersen, yes, right. I don't think there's any doubt it. I think his being a product guy and having both the engineering/product planning/design knowledge, that he was the ideal guy to pull this together. We like to take credit for having pioneered the new designs in such a way that they get better quality and efficiency. But the facts are that the company is now managed by a group of people -- starting with Caldwell and Petersen -- who know the business, who are automotive people and who do not have strong biases. And I attribute that to something kind of corny. I attribute it to the fact that they're honest and ethical, too. I think, it has a lot to do with it, I really do. I've worked for a lot of people in my life, and there aren't too many that I could honestly admire. There have been a bunch of scoundrels in this business over the years. <u>These guys</u> are honest-to-God-brilliant, very well-

educated, well-experienced, knowledgeable guys that are honest and ethical, and how refreshing that is. It's nice to go to work knowing that you're working in that environment, if you've worked under the other type.

But, I think, more than anything, they want to do the right thing for the customer and the people that work in the company. They want to give the people working there a chance to express themselves and to use their ideas, and they want to give the customer the best damned thing they can. I know, that sounds corny, but I honestly think that's the truth, and, if we're having any success, that's basically it. It has a lot of arms and legs on it the way it's engineered, quality, the durability, the design and everything else. It's really been a joy, in my peak, waning years, to finally work in an organization like this where I feel absolutely free to express myself and feel that we're, in most cases, getting the best out of our people and that they're being able to make a contribution.

Q I'm interested in the dichotomy that has grown up in the Design Center -- you and Petersen and others working with advanced concepts, and then you've got the North American people, headed by Jack Telnack, who are working on the day-to-day....

A Production programs.

Q How did that start, and how does it work?

A Okay, it's interesting. It's unique. It started because the European group that came to the United States and took over here -- Phil Caldwell and Red Poling -- had liked what they experienced in Europe where they were all one small group, and so the theory developed that

Europe is this small group where design, engineering, manufacturing and marketing all worked together as a core group, and so it is in Australia and so on, why couldn't it be that way in the United States? So, that's where the idea came from. They said, "Why shouldn't the North American operations be organized in a manner like Europe where all of these things that are related to the production of a car -- design and engineering be part of this group." I think the company agreed with this idea. Then they said we are an international [company], and we don't want to lose the world-wide view. Therefore, we should have a staff, just like our finance staff, our marketing staff, [with] world-wide responsibilities, and [there] should be a design staff that has responsibility for the real far-out advanced stuff that the production guys don't have budgeted. That [expenditure] shouldn't come from their area. They don't have the budget, or the manpower, or the time, or facilities, so we should have this research group to do design research, advanced engineering -- Ghia as a part of that -- and have over-all <u>functional</u> responsibility for all of the world-wide design so that they could tie together the communications, the ideas, get commonalty.

So, that was the reason for the invention of it, and although a lot of people still have trouble understanding it -- many writers don't seem to understand it yet -- it's exactly the way all of the other parts of the company have worked for fifty years. They've all had the line operations and the staff operations that represent the big view, report to management, counsel management, and have international responsibilities, and that's really all it is. Now, the job for me was to make it work because nobody knew what the hell it was! Not only that, there was a lot

of resentment at having another organization around -- another staff. In effect, we've never worked as a staff, in that we've been the doers. We've worked more like a line group but just with a different set of responsibilities. We had a lot of trouble the first year working with our North American group and our European group. They didn't know who we were. They resented us, they were afraid we were going to try and compete with them. So, the first year I, literally, had to work as an emissary going around the world convincing them that we were there to help them and not compete with them, that we were there to help their budgets, if they were stuck on something. If they didn't have the manpower, if they had too big a job, we'd give them a hand on it, and, all of a sudden, we started to build the reputation, but the first year we, literally, had to justify our existence.

Q They were suspicious?

A They were suspicious as hell. I think any one of them would have done away with us in a moment. We, literally, fought for our existence the first year, and it was a tough time. I had suddenly realized I had high blood pressure I'd never had before. Ghia, also, was an unknown. They resented Ghia, so we had to convince them that Ghia was working for them. I went to each one of them and said, "Look, Ghia is going to help you. You treat it as one of your studios. I'm not going to tell Ghia what to do on your case. You give them the assumptions. You follow the work, and, not only that, Ghia will do one free model for you a year of anything you want -- a far-out advanced model." Well, they didn't have the budget to do concept models, and so they're doing that now.

The first year we had to justify our existence; the second year we had to build credibility because they accepted the fact that we were

there and maybe could help them, but they didn't know whether we could do anything for them. So the second year we had to build our credibility by working our butts off, leaning over backwards, working night and day to do things that helped them where they could see it doing a job for them and helping them. The third year, finally, they recognized that, and now they're coming to us. Now they're coming to us to the point where we can't handle it all.

Q Earlier, Telnack had been posted to Europe?

A Yes, he was. Jack had been in Australia. He ran the Australian [design center]. He came back to the United States for awhile when we needed a guy in Europe. We've vacillated between the idea of having a European national run the thing over there and an American. I'm not sure of all the problems, but one of them is that none of the European nationals had the breadth of experience, unfortunately, that the Americans did. They hadn't had these other posts and come up through some of the things, so Jack was sent over to head it up and did a very good job, and he worked with Phil Caldwell and Red Poling over there and did a very good job for them -- came up with some of the significant cars they came out with. So, he was well prepared when he came over here, and Red had a very good opinion of Jack and was quite anxious to have him head the North American thing. And, as we all agreed, Jack's a very bright guy, and really all he lacked was that he hadn't spent a lot of time in the United States in a senior position for very long, and he had to learn the United States' system of how to deal with people. And, all of a sudden, he inherited something that was several times as large as he'd ever had before, so it was kind of a big fish to swallow, but he's

caught on very rapidly, and, fortunately, we were there to give help and guidance along the way.

Q You seem to have the best of two possible worlds there. You have a very efficient and forward-looking design line group, and you have yourself heading up the staff administration and forward planning.

A I think it's working. I really do. One of things that design lacked in the past, although Gene Bordinat was a very, very good spokesman and reported directly to Henry Ford, they really didn't have the credibility with top management to be able to get things their way. More often than not, if it were a contest, they'd lose out to engineering, or marketing, or manufacturing. I think the thing we have now in the design staff is an organization that top management can rely on for guidance and that <u>does</u> have a say, not only in design, but has a voice in manufacturing, and marketing, and advertising, and engineering matters, and, I think, more than anything else, that's what's important because we have built this credibility now, and they call on us.

Over the years, we'd get the corporate papers of advanced-planned programs to comment, and, for years, design seemed to have so little comment to make that you usually didn't see much about it -- it wasn't printed. And, that brings up another subject. One of the things that I felt that design was sorely lacking, again, was the credibility, the voice, the ability to talk to engineers and planning people. For a long time, I talked to Gene Bordinat about what I called design planning, and I tried to do it myself. I tried to do a lot of it because I started auditing a lot of these papers and making comments on them. He would send them over me, and it was fun. It was great learning process. When

I took over as vice-president, I set up an advanced administration planning department, and I brought on a couple of guys that were very, very bright young product planners with a lot of savvy and engineering know how. All of a sudden, we had the ability to talk their language. These guys were good. They were tough, and even though they were the lower level, they would speak up to a vice-president or anybody else if they thought we were right. We were able to articulate our point in terms that they would understand. I noticed, suddenly, that our comments on corporate programs were being printed. They were listening to us. Not only that, they were starting to solicit ideas. The corporate strategy, marketing [people] were now calling us and wanting to come over and see things in advance and hear our feelings on them. So, we suddenly had a voice in the corporation. We had a voice, in that I was serving on all of the top corporate committees, [such as] the product planning committee. I am one of four members of the design committee. It's [comprised of] the Chairman of the Board, the President, Bill Ford -- who was in the Chairman's office -- and myself. Just the four of us are the design committee for world-wide decisions. Gene was, too, before me. That's one of the offices that we have that gives us this voice. So, to me, that was significant in that we now play a vital role and can help make the strategy.

Q In terms of what Ford is doing in the next ten years, I first want to pause briefly and ask you about the new design approval process -- how that works.

A I should have mentioned that. The design approval process was a series of hit and miss things and not really well-defined at all, and

there wasn't a good definition of who had responsibility for what. As a consequence, whenever anything went wrong, fingers were pointed back, forth, up and down, and, unfortunately, the design area being the initial area, it was everybody's opportunity to point back over their shoulder, and whatever went wrong got blamed on design. If they missed a date, it was their fault. It didn't matter that they changed an engineering program, they had to go back and do it, it showed the date missed in design. It was convenient for everybody else. I could go on and on of the fact that there was not a smooth flow of information in the design process. The engineers were so busy doing current problems, that although they were supposed to come upstream and start working with design on innovations in the early phases, they couldn't -- they didn't. And so a new idea didn't get done. It didn't happen as a result of that.

The design approval process, I suspect, actually started on the part of North American management as a method of keeping design in line. They had blamed them for everything that was wrong, and they decided that if they defined responsibilities in the approval process, they could then have a handle on design where they'd get those guys to stick to the costs and the feasibility and release things on time. The most interesting thing in the world, as this developed and the facts started to come out -- it was run by an independent, an outsider consultant. By the way, it gradually became apparent that design was the only area that was doing it right, and we used a technique of owning up to your own problems in this process. And these guys, when they started to think about it, owned up to a lot of them. Oh, a real confessional! Finance, and body, and

planning, and these guys all owned up to their problems. What it really did was turn around and start to build a formal structure that would allow design to do it their way. It would give them the responsibility -- more responsibility for things they ought to have done -- by pulling the engineers up so that they got the backup to start getting some credibility and feasibility to advanced ideas and recognized where the schedule messes were. And, it's been very interesting. As a matter of fact, somebody -- I won't use his name -- quoted one of the chief engineers in the North American group when he really saw this thing laid out and how it was working, he said, "Goddamn it. I thought this was supposed to whip the designers in line, and it's whipping us." He said, "I'm sick of this." So that's kind of the way it worked.

An interesting aspect of it is that the management of the North American operations thought that they could give lip service to this and that would whip those guys into line. When it really came down to it, it ended up that everything was their fault. They hadn't really taken it seriously, they hadn't delegated the people to finish the job and so on and so forth, so it was quite a learning process. We put a guy -- one of my planning guys, a guy by the name of Lou Spear -- on the committee. They wanted a representative, and Lou did a brilliant job. First of all, he's a brilliant guy. He's a tough guy. He's a West Point graduate, fought in Viet Nam, was an artillery officer over there, a brilliant engineer, worked in planning in Ford Motor Company, has a master's from Stanford in business. He's just the guy I wanted -- big guy, too. And, he got on this thing, and, in all honesty, he shaped the philosophy of the group and brought it around and kept it going, and so it really

helped us. First of all, it recognized the fact that we're involved early on. Everybody chose to ignore that, if they could, and that the rest of the company had a real responsibility to support this operation and see that it was an easy transition from the advanced to the production, and then he helped put things in place that would insure this. I see it as a great opportunity. It isn't working one hundred percent because it doesn't have one hundred percent commitment, frankly. If we can get one hundred percent commitment, it will do great things. It already has, but it's eighty-five percent efficient, perhaps, at this time.

Q A great concept.

A Isn't it, though? I've always had the feeling that people working for the same company of good faith should do these things without this formality, but I have discovered over and over again that you almost always have to create an artificial device of some kind to get it to happen. We found, for instance, that we were suffering in our trim and color area, and when we analyzed it, it was because trim and color used to have a head. It used to have somebody that was the czar of trim and color, and that was his personal pride and his reputation. Well, they'd split it up so that the trim and color thing just reported to each one of the exterior groups, and so it was an after-thought type of thing. We were experiencing some real problems in ergonomics and trim and color. We couldn't seem to get anybody's attention to fix the thing, so I finally made a proposal to Don Petersen. We identified this problem and thought it was serious and couldn't get anybody else, really, to recognize it. They said they didn't feel they had a problem, as a matter

of fact. We finally suggested that we create a world-wide trim and color task force to bring the groups together and share the knowledge of all this.

Well, that did it, finally. Then we proposed that Trevor Creed, who had been running interiors in Europe and was doing some nice stuff, as a catalyst. Again, we couldn't get them to change the organization. We proposed that he come over to the United States to help out. That forced a change in the organization, so it's a strategy. I've found in the last two or three years that I've organized more things which didn't have to be organized and should have operated the way they were intended to. But you had to create this artificial forum to get things to work properly.

Q In a couple of minutes, Mr. Kopka, could you give us an overview of what is going happen in design at Ford and in the industry in the next ten or fifteen years?

A Yes. Ford, I'm absolutely confident of. I mentioned the aerodynamics as being a gold mine, and, in all honesty, we're going to be mining that gold throughout this century. We'll still be doing aerodynamic things in the year 2000. I think we're fortunate in that we know exactly where we're going, and that's never been true in the past. We know where we're going for the next twenty years, and we have models like the Probes that are the year 2000. They're exactly what those cars are going to be in the year 2000 because by then we will have them efficient. As an example, the Probe IV only requires 2½ horsepower to drive at a sustained speed of 50 miles an hour. So, it says there's a whole new generation of engines, transmissions, suspension, and materials that's going to come as

a result of it. I think aerodynamics and ergonomics are really the driving forces. Design is now dictating what the products will be in future years.

I am absolutely convinced that the other companies are going to have to go that way, because I say aerodynamic design is the way nature intended cars to look. Think about it! The car is trying to shove its way through this medium that is air, and the one that's the most efficient at doing that is the way nature intended it to look. So, I don't think there's any alternative. I think they're all going to have to come to that. Even if fuel is not expensive, still, given two cars that are basically the same from different companies, the one with the same size engine, the one that gets the better fuel economy, and the other advantage of aerodynamics, will be the one that's a better car and more preferred. So, I know exactly where we're going. G.M., I believe, is embracing aerodynamics and are coming along fairly fast. Chrysler tended to pooh-pooh it at first. They said, "Aerodynamics, yes, it's there, but it shouldn't dictate design."

More and more they're coming around to that. So, I believe in this country, at least, and, by the way, Japan -- who earlier didn't have anything to do with aerodynamics -- at the auto show in Tokyo in November had six aerodynamic concept cars, everyone of them with low coefficients of drag. So, we were lucky enough to stumble on to what is the trend, get a running start on it and have the conviction and confidence to stay with it and know exactly where we're going.

Q And, that's the course you'll be charting for the next...?

A Oh, very definitely. We know what our cars are going to look like in the '90's. We already have cars up through the '88, '89 and '90 on

the boards. We know exactly what they're like. And, the good part of it is we're learning with aerodynamics. We're learning how to handle it, too, and what you can do with it. The first time around, it's an unknown, but we're learning now what to do with it.

#

POSTSCRIPT I*

THE FUTURE:

My predictions about product trends were quite accurate. I said that I believe that G.M. and other car manufacturers would eventually embrace the aerodynamic approach to design and that their future products would look more and more like the Ford Aero designs. They have embraced the aero look so completely that even I, a trained designer, have trouble telling the difference between a Chevy, a Lexus, a Pontiac or an Infinity and the Taurus and Sable.

Almost every car maker in the world is designing Taurus look-alikes. Even Chrysler is being dragged reluctantly into this mold. As a matter of fact, Ford has allowed other manufacturers to cash in on aero promotion at Fords expense. They've eaten our lunch.

* Written in May of 1990.

POSTSCRIPT II*

AERODYNAMICS:

It came to me that from the moment of my departure the Aero effort at Ford has greatly diminished. I know they are still doing concept vehicles at Ghia and are still doing aero testing, but the tremendous momentum we had going seems to have waned.

The great breakthrough that we discovered in aero efficiency, road holding, handling, cooling, etc. with the Probes and other aero concept cars seems to have slowed.

There are always detractors of any new fever in a large company, saying that efforts like this are costly and the results aren't proven. If there are not champions of new ideas, then the detractors are able to normalize ideas and nudge things back to status quo.

* Written in May of 1990.

POSTSCRIPT III*

"PRODUCT PUSHERS:"

In Ford Motor Company there were a group of people that I call "product pushers." These are people that love the product and know the product so well that they are able to quite accurately project where the product should be in the future. There was quite a generation of this kind of people at Ford during my tenure. These people had the knowledge, and because of this knowledge, the conviction to speak out and take uncharacteristic (for a large company) risks to promote ideas that they knew were right.

Some of the "product pushers" were Lee Iacocca, Don Petersen, Phil Caldwell, Bob Lutz was one of the best, Charlie Knighton, Bob Graham, Don Kopka and Lou Veraldi. They are all gone.

I would like to say that they have been replaced by another generation of "pushers," but it is my perception that the new generation is not the gutsy pioneers. They have been trained to be great critics and second-guessers who can analyze an idea to death. They are much more politically-oriented and not willing to risk their job for their convictions.

There were always the "product stoppers," and we all knew exactly who they were. Unfortunately, they have some very good weapons. With the tremendous drive to quality and cost reductions, they used these goals as excuses for not doing new things, saying that new ideas could jeopardize quality or increase investments.

POSTSCRIPT III continued

I believe this to be one of the main reasons that Ford is in the process of falling into a flat period from a product innovation and model replacement standpoint. In my estimation, they did a brilliant job of product innovation with Taurus, Probe, Continental, Aerostar, Mark, etc. and got rave revues from car mags and auto writers, but are now allowing everyone to catch up. I hope I'm wrong. I do think that Red Poling is the guy that can get things going again, but there still may be a dead spell. Many of the major "product stoppers," both in North America and Europe, have retired or moved on so there may be hope for a better balance.

* Written in May of 1990.

POSTSCRIPT IV*

THE FUTURE AFTER 1990:

It's remarkable, all of the travail of recessions, government regulations, Japanese threat, etc. have resulted in incredibly beautiful, powerful, efficient vehicles. Cars look and behave exactly as I dreamed they would when I started out as a designer in 1950.

Automobiles today are a true miracle. When was the last time you heard of an engine or transmission breakdown, and they are so sophisticated and complex? It seems like you almost don't have to replace anything anymore. You can even go long periods between oil changes, and it is not unusual to get 100,000 miles from a set of tires.

When you consider this incredibly complex machine (thousands of parts) all working together, it is truly one of the world's great accomplishments.

From a designer's standpoint, I think the new cars are beautiful.

I have always been a great critic of design, and through the years I had a lot to criticize, so it is nice to sit here in 1990 and be able to say that, by and large, we have beautiful designs.

I am very proud of the fact that we, at Ford, literally wrote the book on contemporary design. The aerodynamic influence has pervaded car design worldwide. I have always believed that form follows function, and the functional design of these aerodynamic vehicles looks and performs beautifully.

The future can only produce better performing, better looking and better quality vehicles. When we designed the Probe V, we said it was

POSTSCRIPT IV continued

the car of the year 2,000. In retrospect, I believe we were right because it represents the evolution of aerodynamic development that will occur between now and 2,000 A.D.

With the advent of electronic four-wheel drive, traction control, automatic anti-skid brakes, etc., the level of performance and safety will increase dramatically.

The company that does the best job of investing in production innovation and quality will be in good shape to compete in the year 2,000 and beyond.

* Written in May of 1990.

Benson Ford Research Center
The Henry Ford
20900 Oakwood Boulevard · Dearborn, MI 48124-5029 USA
research.center@thehenryford.org · www.thehenryford.org