

CHEMICAL HERITAGE FOUNDATION

RUSSELL E. MARKER

Transcript of Interviews
Conducted by

Jeffrey L. Sturchio

at

Pennsylvania State University

on

17 April 1987

(With Subsequent Corrections and Additions)

THE BECKMAN CENTER FOR THE HISTORY OF CHEMISTRY

Oral History Program

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RUSSELL E. MARKER

1902 Born in Hagerstown, Maryland on 12 March
1995 Died in Wernersville, Pennsylvania on 3 March

Education

University of Maryland
1923 B.S., chemistry
1924 M.S., chemistry
1925 Completed thesis requirements for Ph.D.

Professional Experience

1925-1926 Chemist, Naval Powder Factory, Indian Head, Maryland
1926-1928 Chemist, Ethyl Gasoline Corporation
1928-1935 Chemist, Rockefeller Institute
Department of Chemistry, The Pennsylvania State
University
1935-1936 Fellow
1936- Assistant Professor
Associate Professor
-1942 Professor
1944-1945 Partner, Syntex S.A.
1945-1946 Owner, Botanica-Mex S.A.
1946-1949 Consultant, Hormosynth S.A.

Honors

1969 Honorary Member, Mexican Chemical Society
1984 The Russell Marker Lectures in the Chemical
Sciences, The Pennsylvania State University

ABSTRACT

Russell Marker begins the interview by describing his childhood in a farming community in Maryland, his early schooling, and his growing interest in organic chemistry while a student at the University of Maryland. He then talks about his first jobs at the Naval Powder Factory and the Ethyl Gasoline Corporation, where he devised the octane rating system, and his subsequent move to the Rockefeller Institute. Next, Marker discusses his interest in synthesizing human hormones from plants, which resulted in a fellowship at Penn State and his first travels to Mexico to examine indigenous plant life. He then describes his laboratory work and business ventures in that country, including his role in forming the companies Syntex and Botanica-Mex. Marker concludes by discussing his retirement from chemical research and his newfound interest in silver reproduction.

INTERVIEWER

Jeffrey L. Sturchio received an A.B. in history from Princeton University and a Ph.D. in the history and sociology of science from the University of Pennsylvania. He was Associate Director of the Beckman Center for the History of Chemistry from 1984 to 1988, and has held teaching appointments at the New Jersey Institute of Technology, Rutgers University, and the University of Pennsylvania as well as a fellowship at the Smithsonian Institution's National Museum of American History. After a sojourn on the senior staff of the AT&T Archives, Dr. Sturchio joined Merck & Co., Inc. as Corporate Archivist in June 1989. He is currently Director, Science & Technology Policy, in the Public Affairs Department at Merck.

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INTERVIEWEE: Russell E. Marker
INTERVIEWER: Jeffrey L. Sturchio
LOCATION: Pennsylvania State University
DATE: 17 April 1987

STURCHIO: I know you were born in 1902 in Maryland. Could you tell me about your childhood and the origins of your interest in science?

MARKER: My parents were married in 1899. They lived on a farm near Hagerstown. They were what, in the South, might be called sharecroppers. For instance, they gave half of the wheat and half of the corn that they got, but they could build up their implements and their livestock and everything like that off their share of the crop. Now, this was only about forty acres. The man who owned the farm owned a larger farm of roughly two hundred acres. After they had lived there and farmed for a while, he decided that he wanted to change farms with them and go into sort of a retirement. His son lived close to the place that he was going to move into, so my father changed farms with him and went onto the larger farm.

I was born on the first farm in a one-room log cabin. That was all that they had to live in while my father was there. In those days they built a brick house over the log cabin for warmth, you see. That's what this man did—he moved with his son for a year and built a brick house over the log cabin to retire to. The log cabin still remains, covered over with brick, with the chimney stack on the outside. I went by with my sons just about two years ago, and we stopped a little bit there—it's still the same. My father farmed that for about six or seven years. Then he went onto the larger farm for about eight years, and then he had accumulated enough stock, machinery and so on, so that he could buy his own farm. He bought a farm in the middle of a Mennonite section. We were of another religion. Almost all of his neighbors were Mennonites.

I went to school for two years in a town called Maugansville, one mile south of the Mason-Dixon Line. When my time came for high school my father wanted me to be a farmer, but I didn't care so much for that. My mother wanted me to go on and get a little bit more education. In those days if you completed the eighth grade of your country school, you had the privilege of going in and taking the final exams of the first year of high school with the high school students. If you passed you could miss the first year of high school and go on to the second year. Well, it so happens that when we got to the eighth grade we only

had three students left in the school. Another was a boy about as capable as I was; he wouldn't go in and take the exam, but he went to high school later. I passed the exam and so missed the first year of high school—which made it a little difficult for me.

My sophomore year in high school was the same as all of the other students. We only had one type of class in high school; that is, we weren't divided into academic and commercial tracks at that time. In my junior and senior years, I took commercial courses in high school. I had no chemistry and no physics when I went to college. My father took me down to the University of Maryland a few days before summer school was to start to see about me entering there. He wanted me to go back to the farm, and my mother wanted me to continue on with schoolwork—if I could get into the University of Maryland.

The registrar at the University of Maryland was looking for students. It was the year after the war, the year following World War I. He said that I should come to summer school, and take a few of the courses which he would outline, one in mathematics, another in English. I took those and got good grades. I went around and asked him, after the summer was finished, "What about coming to regular college?" He said, "Well, we'll overlook everything, and you can come to college."

STURCHIO: This was in 1919.

MARKER: Yes. As I was telling Dean [Thomas] Wartik earlier, I decided first that I was going to take chemical engineering. I don't know why I decided on that, but after the first year I changed to regular chemistry. We had laboratories in those days, and in the general chemistry laboratory I didn't know what a beaker was, I didn't know what a test tube was! I had to ask the man working next to me, because he had had it in high school. I had nothing like that. I brought Dean Wartik a copy of my grades. Would you like to see it?

STURCHIO: That would be very interesting [see following two pages]. Before you say more about your college years, I'd like to go back to your years on the farm. Had your parents had any experience with science? Were there any science books around?

MARKER: No, there was no experience. When I went to high school I had to walk for two miles to get a train, then I took a train for four miles, then I walked another mile to high school. That's the condition under which I went to high school for the three years.

FINANCE UNITS

UNIVERSITY OF MARYLAND

STUDENT RECORD

Washington Co. Male High
 Prince of School

Principal J. J. Zentkyer

Years in attendance

(Graduate) Yes

Date of graduation 1919

Name and address of student MARKER, Russell Earl
 Name and address of parent or guardian James I. Marker, Hagersstown, Md. R. R. 4
 Date of matriculation September 18, 1919 Curriculum ~~Chemical-Engineering~~, Gen. Chemistry, Sept., 1920
 The pass marks are A, B, C, or D. 65 Condition, 65-65 Failure, F. Below 50
 FIRST YEAR, 1919-20 SECOND YEAR, 1920-21

SUBJECT	Units
English	4
History	1 1/2
Algebra Elementary	1 1/2
Algebra--Advanced	3
Geometry--Plane	3
Geometry Solid	2
Trigonometry	1
General Science	1
Physics	
Geology	
Chemistry	
Biology	
Botany	
Zoology	
Physical Geography	
Physiology	
Agriculture	
Latin	2
French	
German	
Spanish	
Home Economics	
Commercial	4
Woodwork	
Porcelain	
Mechanical Drawing & Shop	1
CONTEMPORARY	

COURSE (Symbol and Number)	Credit Hours	Mark	(*) Def.	First Term		Second Term		Third Term	
				1919-20	1920-21	1919-20	1920-21	1919-20	1920-21
First Term									
Composition & Rhetoric	101	3	90						
Reading and Speaking	101	1	Satisfactory						
Trigonometry	101	5	83						
General Chemistry	101	4	90						
Freehand Drawing	101	1	75						
Mechanical Drawing	103	2	80						
Woodwork	101	1	95						
R.O.T.C.	101	1	73						
Second Term									
Trimester hours for term 18									
Analyt. Chem.	103	5	81						
Composition & Rhetoric	102	3	80						
Reading and Speaking	102	1	71						
General Chemistry	102	2	70						
Chemistry Laboratory	102	2	89						
Plane Surveying	101	2	78						
Mechanical Drawing	103	1	85						
Engineering Drawing	104	1	80						
R.O.T.C.	101	2	76						
Trimester hours for term 19									
Third Term									
Composition and Rhetoric	103	3	85						
Reading and Speaking	103	1	77						
Analytics	103	5	84						
Plane Surveying	102	1	75						
Descriptive Geometry	105	3	56						
General Chemistry	103	2	85						
Chemistry Laboratory	103	2	85						
R.O.T.C.	101	2	90						
First Term									
Trimester hours for term 18									
Adv. Inorganic Chemistry	101	3	C						
Adv. Qual. Analysis	104	3	B						
Mechanics & Sounds	101	4	A						
Physics Laboratory	101	1	A						
Advanced Algebra	106	3	A						
R.O.T.C.	102	2	D						
Residual Writing	104	2	B						
Second Term									
Trimester hours for term 18									
Inorganic Chemistry	102	3	C						
Qualitative Analysis	105	3	A						
Electricity & Magnetism	102	4	A						
Physics Laboratory	102	1	A						
Calculus	110	3	B						
Adv. Composition	105	2	C						
Gen'l & Appl. Psychology	101	2	B						
R.O.T.C.	102	2	B						
Trimester hours for term 20									
Third Term									
Heat & Light	Phys. 103	5	A						
Inorganic Chemistry	P. Chem. 103	3	B						
Qualitative Analysis	Chem. 105	3	A						
Calculus	Math. 110	3	A						
Short Story	Eng. 115	3	B						
R.O.T.C.	M.I. 102	2	B						
Descriptive Mineralogy	Chem. 110	2	B						

NAME OF STUDENT MARKER, R. E.

Third Year, 19 21-22

CURRICULUM General Chemistry

Fourth Year, 19 22-23

COURSE (Symbol and Number)		Credit Hours	Mark	(*) Def.
First Term				
Advanced Organic Chem. O. Chem. 105	4	A		
Quantitative Analysis A. Chem. 106	3	A		
Chemical Calculations A. Chem. 108	1	A		
Elements of Economics Econ. 101	3	B		
Elementary French Fr. 1	3	B		
American Colonial History H. 104	2	B		
Garratt. History H. 101	1	B		
Advanced R.O.T.C. M.I. 103	3	B		
Trimester hours for term 20				
Second Term				
Advanced Organic Chemistry 106	4	A		
Quantitative Analysis 105	3	A		
Chemical Calculations 106	1	A		
Elements of Economics 102	3	B		
French 2	3	B		
Advanced R.O.T.C. 103	3	B		
Advanced Physics 4	4	A		
Trimester hours for term 21				
Third Term				
Advanced Organic Chemistry 107	4	A		
Chemical Calculations 108	1	A		
Colloidal Chemistry 103	3	A		
Elements of Economics 102B	3	B		
Elementary French 3	3	B		
Advanced R.O.T.C. 103	3	B		
Advanced Physics 3	3	A		
Assaying 111B	1	A		
Trimester hours for term 21				
First Term				
Industrial Chemistry 115	2	A		
Chemistry of Foods 106	3	A		
Metallurgical Calc. 114	1	A		
Physical Chemistry 104	4	A		
Organic Chemistry 201	3	Passed		
Adv. Physics 109	3	A		
Second Yr. French 101	3	A		
Chemical Seminar	1	B		
Trimester hours for term 20				
Second Term				
Physical Chemistry 105	4	A		
Chemistry of Foods 107	3	A		
Industrial Chemistry 116	2	A		
Dairy Chemistry & Anal. 119	3	A		
Organic Chemistry 202	3	W. R. 7-23		
Chemical Seminar	1	B		
Second Year French 102	3	A		
Trimester hours for term 19				
Third Term				
Advanced Organic Chem. 203	3	B		
Physical Chemistry 106	4	A		
Industrial Chemistry 117	2	A		
Chem. Seminar	1	B		
Trimester hours for term 10				

Date of graduation 6-16-23
 Degree of B.S.
 Graduate study at

Record transferred
 Honor First Honors in College
 in Arts and Sciences - Phi
 Kappa Theta Fraternity

Scholarship
 Fraternity
 Athletic
 Date of withdrawal
 Reason for withdrawal

Out under rules
 Date re-admission
 Date probation
 Term probation
 Date dismissal
 Date curriculum changed

Military - Sec. Lieutenant

(*) EXPLANATION : Date in column time deficiency is removed.

STURCHIO: You certainly got exercise.

MARKER: I had to leave around six-thirty in the morning because the train left at a quarter after seven, and it was almost always on time.

STURCHIO: You said you hadn't had any science in high school. Had you been reading science books?

MARKER: No. After I finished summer school, the registrar wanted to know what course I wanted to take. I told him I thought chemical engineering would be as good as anything to sign up for!

STURCHIO: You don't remember why you thought that?

MARKER: I have no idea.

STURCHIO: Let's go back to the chem lab.

MARKER: Yes. I took organic chemistry. It was given in my junior year and I got very interested in organic chemistry. I was told by someone who had taken the course before that it was one of the hardest subjects that I would be subjected to. So, I bought the Norris book which was used in the course (1), and went completely through it during the summer. When I went back, organic chemistry was just like rolling off a log. And it was the same thing with the laboratory. I got interested in laboratory work. They had a new organic chemistry teacher come in my senior year and I took advanced organic chemistry with him, although that wasn't required.

STURCHIO: Who was your teacher for that course?

MARKER: That was Morris S. Kharasch, who went to Chicago later. The first year when I worked on my master's degree, I had to take my master's degree in colloidal chemistry with Neil Gordon because Kharasch only had the one fellowship and I needed a fellowship to get some money to go to school. I couldn't talk my parents into supporting me for more than undergraduate work.

STURCHIO: Did you have any brothers and sisters?

MARKER: I had two younger sisters.

STURCHIO: Did they go to college?

MARKER: No. One died of cancer when she was about thirty-five years old. The other one just went to high school.

STURCHIO: So your parents had other children to support?

MARKER: Yes. They were interested in making the farm produce as much as it could. I felt that after I finished undergraduate work, it was necessary for me to support myself. There was no fellowship available in organic chemistry. Ben Scher was the man who had the fellowship in organic chemistry. He got his doctorate after I had worked with Gordon for a year. Then there was a fellowship available for my second year of graduate work. I did that with Kharasch.

STURCHIO: Do you recall the topics and what text Kharasch used in the advanced organic course that you took?

MARKER: He would vary his course from one lecture to the next. He would tell us to look up so-and-so's work. We didn't have much of a library at the University of Maryland. When I went there we only had 350 students. Now, it's around 60,000. At the end of the year, Kharasch told me that I had done enough work for my doctor's degree but I would have to take some academic courses like physical chemistry. I said, "The hell with it." And so, I never got my doctorate. He accepted my thesis. I wrote it up and he signed it. The Penn State room up here has a copy of it.

STURCHIO: Was that the work that you published on organic radicals (2)?

MARKER: Yes.

STURCHIO: I noticed that there was another paper that you had done with Gordon (3).

MARKER: That was from my master's degree and the other was from my doctorate.

Then I went with the Naval Powder Factory. I was there for about seven months. Jobs were a little bit hard to get in those

days. I went there with the idea that I could look around from there. Kharasch made a few suggestions. One was to look at the rubber companies. I went to Firestone and Goodrich in Akron but I wasn't interested in that. I also went to Naugatuck Chemical Company in Connecticut. I looked at several places but I wasn't interested in any of them.

I had married in the earlier part of the summer. It was necessary for me to look around. My wife was a schoolteacher. She stayed at her home until I could get located down on the eastern shore of Maryland. We would meet in Washington occasionally.

STURCHIO: What year did you get married?

MARKER: It was 1925. Towards the end of that year, I heard that the Ethyl Gasoline Corporation was starting a laboratory in Yonkers. I wrote to them and was very disappointed when I went there because it was nothing but an old garage that they were converting into a laboratory. Ethyl had just started their production and they had just discovered that additives to gasoline would be helpful in preventing knock.

STURCHIO: Was this laboratory at a production plant?

MARKER: No. There was no production plant there. There was a garage that was available and they converted the first floor into laboratories. There were a few rooms on the second floor and I was assigned one of them at the end of the building. Later I realized that the only reason that I was hired was because of the fact that I worked with Kharasch on organometallics. They were using tetraethyl lead as an additive. I went there and my wife joined me a few days after I went up. I started on the first of February, 1926.

STURCHIO: What sort of work did you do at the Naval Powder Factory? That must have been in 1925.

MARKER: It was in late 1925. It involved routine things. A chemist wasn't needed for the things that I did. There was no research of any kind. It was really just a place for me from which to look around for another job. I wasn't getting much money—only \$1800, although that was quite a lot in those days.

STURCHIO: How much was the fellowship?

MARKER: Kharasch was able to get me a \$1000 fellowship.

STURCHIO: Were the rubber companies interested in the work on organic radicals? Is that why Kharasch suggested that you talk to them?

MARKER: No, I don't think it was. They wanted me to work on rubber and I wasn't interested in that.

The head of Ethyl Gasoline Corporation was Graham Edgar. He was a physical chemist who had taught at the University of Virginia. I asked him what I was to work on after I got there. To begin with, he raised my salary to \$2600. Then he said, "Oh, organometallics of some kind. Whatever you want to do." They had set up a bunch of Delco motors with "bouncing pins" in them. I think they had about half a dozen motors, and there were two boys running them.

STURCHIO: So you would make up a batch of new organometallics and they added it to the gasoline and tried it in the test motor?

MARKER: I got acquainted with the boys downstairs. I was the organic chemist. They had a physical chemist. He was working on various gasolines, burning them and seeing what compounds he would get out of them.

STURCHIO: Was that George Calingaert?

MARKER: No. George Calingaert got the job at Ethyl Gas because of the fact that he published on organometallics at MIT (4). He was a Belgian.

STURCHIO: So the physical chemist was someone else.

MARKER: Yes. His name was Rowin. I've never seen any of his publications.

STURCHIO: So there were four chemists—you, Graham Edgar, Calingaert, and Rowin.

MARKER: Yes. Eventually they got a new fellow, [Charles M.] Gambrill, working on organometallics. He was also from the University of Maryland but he was several years back of me.

I could hear the knocking of these motors downstairs. After working on organometallics for a period of a month or so, one day I went downstairs. One of the boys said, "We're having trouble down here. If we had a gasoline that wouldn't evaporate and change its properties, we could call that the standard. But when any gasoline that we have evaporates a little bit, the loss of the volatile material changes the knocking." I asked him, "How about making a hydrocarbon that would have a constant boiling point?" And he said, "Good."

So I made about a liter of normal heptane. It knocked so badly that it blew the bouncing pin out of the Delco motor they were using. I told them that I would try to make another one. The easiest one that I could make was an octane [2,2,4-trimethylpentane] that boiled about the same temperature as the heptane did. They ran that in the motor and got no knock at all. So I decided then that I had the problem solved. I thought the heptanes knocked because they had an odd number of carbon atoms and the octanes, having an even number, didn't knock at all—until I made normal octane. That knocked as badly as the heptane. From those first two compounds that I made we formulated the standard testing gas, which was 90 or 92 octane, by mixing them together in different portions—because they both boil at approximately the same temperature.

I made all of the heptanes and about two-thirds of the octanes. I was working on the octanes when I quit. At the end of the first year, I got a raise to \$3200. Towards the fall of the second year, I had a visitor. He had some business in New York, but he had heard I was working on heptanes and he wanted to find out about heptanes. That was Frank Whitmore, who eventually became dean of the school here at Penn State. He stayed about half the day in the lab. He wanted to know what everything was and what I was doing. So I went over everything with him. I had about a half-dozen Grignards in five-liter flasks going at the same time. He was quite impressed by what I was doing. When he left he said, "If you're ever looking for a job, let me know." That was the reason that I came to Penn State when I did.

STURCHIO: Had he known your work from the literature?

MARKER: No. I hadn't published anything but he had heard that I was working on hydrocarbons and he was very interested in them. In fact, after I had been at the Rockefeller Institute and had come here [Penn State], I found that almost all of his laboratory work was on hydrocarbons.

A few weeks later he called me on the phone. There was an organic symposium in Columbus, Ohio [Second Symposium on Organic Chemistry of the American Chemical Society, 29-31 December 1927]. He was wondering whether I was going to Columbus and if I was, whether I would bring along a small amount of a hydrocarbon in a

test tube. I asked Edgar whether I could go out to this meeting in Ohio and that Whitmore had suggested it. Edgar said, "Sure, go ahead." [James B.] Conant, one of Whitmore's friends from Harvard, was at the meeting. Conant had been trying to produce hexamethylethane, which boils at 108 °C and melts at 105 °C. There's only three degrees' difference in the boiling and melting point.

When Whitmore came up [to Yonkers] I had shown him a sample. I had a distilling flask there with about 500 grams in it. He told me that his friend at Harvard was trying to get his hands on some of it. He had some students working on it and he wasn't ever able to produce any quantity more than about a gram. Whitmore asked me at this Columbus meeting whether I had brought the material along. I pulled the test tube out of my pocket. He said, "Well, we'll have dinner together." So I had dinner with Conant, Whitmore and some others. We were a table of eight. Whitmore asked me to give him this material and he asked Conant, "Did you ever see this amount of hexamethylethane before?" Conant was greatly surprised.

I went back to Ethyl Gasoline Corporation and shortly after I got back, I got a letter from P. A. [Phoebus Aaron Theodore] Levene at the Rockefeller Institute. I had never heard of the Rockefeller Institute before nor of Levene. He said that they were having trouble making a certain compound and he was wondering whether I could make it for them.

[END OF TAPE, SIDE 1]

MARKER: I took the letter and showed it to Graham Edgar. Edgar asked me whether I thought I could make it. I told him, "Oh, yes. It won't be any trouble at all." He asked me how long it would take and I told him that it might take a couple of weeks. I asked him whether I could do it at night. He said, "Oh, no. If you want to make it, we'll give it to him as a present." I called Dr. Levene on the phone and told him that I could make it and that the Ethyl Gasoline Corporation said that I could make it there with them. He said, "Go ahead and make it." He insisted on paying for it, but it ended up that it was a gift.

I called him up one day and told him that I had completed the work. I asked him whether the Rockefeller Institute was open in the evening because I could deliver it then, otherwise it would take me a whole day to go down to New York and come back. He said, "No, everything is closed up at the Rockefeller Institute and there is no one working there in the evening. How about bringing it to my home and having dinner with me?" (He and his wife had an apartment [129 E. 82nd Street] not far from Simon Flexner, the head of the Rockefeller Institute.) I delivered it to him and we had quite a talk that evening. He called me a few days later and asked whether I could have lunch with him and Dr.

Flexner at the Rockefeller Institute. He said that he would like to show me the Institute.

I went down in the morning. I had never been there before. I told Edgar that I was going and that I didn't know what it was all about. After showing me around the Institute, it was about lunchtime. He said that he had made arrangements that we would have lunch with Simon Flexner in a private dining room at the side of his office. (Flexner was the first head of the Rockefeller Institute. It's now called Rockefeller University.) During the course of the meal Flexner asked me whether I would consider coming to the Rockefeller Institute to work, which was a great surprise to me. He said, "Would you think about it? We've already talked it over and decided that we need an organic chemist." Levene was an organic chemist, but he was doing medical work. He did quite a bit of his work in Germany with Emil Fischer, who worked on sugars. Then he met [Karl] Landsteiner, who got his doctorate in Vienna and worked for four or five years with Fischer beginning in 1891.

First they told me that they would raise my pay to \$4000 a year. (After I went back and told Edgar that I was going to the Rockefeller Institute, he wanted to know how much they were paying me. He said, "We were going to raise your pay to that on the first of January.") Flexner told me that I would be working for Levene and anyone else that wanted any compounds. Levene then said that the work would be primarily with him and Landsteiner. He said, "Occasionally you'll be making a compound or so for someone else because that was the arrangement that you came here under." Flexner, in making the offer, said, "You know that we close down in the summer. You'll have two months' vacation." So I accepted right away, without going back and consulting Edgar.

STURCHIO: Was this in 1928?

MARKER: Yes. I had a few things that I wanted to finish at Ethyl Gasoline so I told Flexner that I would come there on the first of February in 1928. Levene showed me a room that was about one and one-half times the size of the room we are in [20 feet by 30 feet] that I would have as my laboratory. They were using it for storage at that time. In the meantime, I would be working upstairs where they had a number of dogs that he was using, feeding them ribonucleic acid and various other things.

STURCHIO: So your job was to be the organic chemist of the team?

MARKER: Yes. I was supposed to have my vacation of two months but I stayed and worked on compounds all during the summer. In September I was to move into my laboratory which had been

arranged for me. I was to have a fellow to work full-time with me to do little jobs. Quite a number of people that were in the Institute wanted to have compounds made for them. Levene would say to me when they wanted a compound, "Will that take much of your time?" I would tell him about how much time I thought it would take, and he would say, "We'll have to cancel it or put it off." Otherwise, I made a few of the compounds. I was working mainly for Levene who was a good friend of Landsteiner. Anything that Landsteiner wanted, Levene would let me do.

STURCHIO: Who were some of the faculty at the Institute then?

MARKER: Before I left I worked with [Alexandre] Rothen and [Albert L.] Raymond.

STURCHIO: Did you have any contact with [Donald] Van Slyke?

MARKER: Van Slyke was the fellow who worked on human hearts for a while. He would show me the tissue that he had to trim off. We would have dinner together. They had a big lunchroom and everyone on the faculty would have lunch there. If you weren't on the regular faculty of the Rockefeller Institute, you couldn't eat there. You had to bring your own lunch or go out for lunch. The boy that was working for me had to do that.

During the first summer, I worked on products for different people. During the second summer, I made some compounds and I started doing some research on the Walden inversion. I worked all summer during my second year. When Levene came back, I had written the first paper (5), and I showed it to him. He said, "I didn't know you could do things like that. Do you want to continue?" I said, "How about making compounds for lab people?" He said, "Could you do that on the side?" It ended up that he gave me a Japanese coworker for a year or two, and a German for a year or two. They were just making the compounds for other people but under my direction. My main work was on the Walden inversion. I worked on that for about five years.

STURCHIO: What first got you interested in that? Do you recall why you started working on the Walden inversion?

MARKER: I didn't want to be making compounds all the time because that was the principal part of the research—to make compounds. All they had to do was give them to animals or whatever else they needed to do and record the results. Levene and I published about thirty-two papers (6). I had to write up a few after I left and came here to Penn State. At that time, in early 1934, there had been quite a bit of work on hormones. It was mainly by the

Germans. When we would finish our lunch, we would head back to the library to see what journals had come in. If there was an article that we were interested in, we would read it before going back to work. In the meantime, the boys were taking care of anything like the distillations that we had going.

I got interested in hormones. I thought there would be a big demand for hormones eventually. I went to Levene about it. He asked me what I thought they could be made from. I said, "From vegetable material." He said, "Dr. [Walter A.] Jacobs, who is in the pharmacology department here, has worked and proven definitely that hormones cannot be made from sapogenins." He worked on the sapogenin that comes from sarsaparilla root.

STURCHIO: And he "proved" that you couldn't make the hormones?

MARKER: He "proved" that definitely. I told Levene that I wanted to work on that regardless of what was proven here at the Institute. Levene then got quite excited. He came back about a half an hour later and said, "I have an appointment with Dr. Flexner. The two of us are going down to see him." Dr. Flexner wanted to know why I wanted to work on hormones. He said that my work was satisfactory there. I told him that I just got the idea that I wanted to work on hormones. I said that it was a practical thing to work on and that if I couldn't work on them at the Institute, then I would find a place where I could work on them. Flexner got mad and he hit the table. He said, "No one leaves the Rockefeller Institute if their work is satisfactory. Your work is satisfactory here and you're going to work with Dr. Levene on whatever he says." I said, "All right. If that's your attitude I'll find somewhere to work on my own."

I wrote to Whitmore and said, "Do you remember that you said if I was ever ready to change jobs to let you know?" I told him that I was ready to work on hormones and they wouldn't let me work on hormones at the Rockefeller Institute. "Do you have a job?" He asked me to come over and see him. I spent almost two days with Whitmore. This was probably in May. Whitmore told me that the only thing that hadn't been signed up for was a fellowship but that paid only \$1800. He asked me if I could live on that and I told him that I would try. Here is a copy of my letter from [R. D.] Hetzel showing that I got \$1800. I was getting \$4400 at the Rockefeller Institute then. After eight years my salary went up to \$3480 and I was then a full professor here [see following two pages].

STURCHIO: I want to ask you about the context in which you got interested in hormones. That was a period when there was a lot of interesting work going on in Europe.

THE PENNSYLVANIA STATE COLLEGE
STATE COLLEGE, PA.

OFFICE OF THE PRESIDENT

June 12, 1934

Mr. R. E. Marker
Department of Chemistry
State College, Pennsylvania

My dear Mr. Marker:

It gives me pleasure to inform you that by action of the Board of Trustees of The Pennsylvania State College you were appointed a Research Assistant in Chemistry for one year from September 15, 1934, to September 14, 1935, at the rate of \$1800 per year.

Enclosed herewith you will find a memorandum of agreement. Kindly sign both copies, retain one and return the other to this office for our files. Because of the difficulties and uncertainties incident to financing the work of the College at this time, all contracts governing tenure and rates of compensation are subject to cancellation or change upon thirty days' notice.

Sincerely yours,



R. D. HEZZEL, Secretary
The Board of Trustees.

Enclosure

NOTIFICATION OF MODIFICATION OF CONTRACT OF
EMPLOYMENT AND ACCEPTANCE THEREOF BY EMPLOYEE

Russell E. Marker
Chemistry

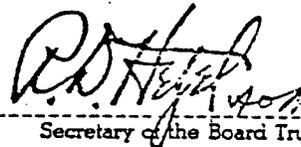
June 13, 1942

In accordance with the action of the Executive Committee of the Board of Trustees of The Pennsylvania State College, you are hereby notified that your contract for personal service with The Pennsylvania State College, dated the eighth day of July, 1936, has been changed in its terms as follows:

Rank to Professor of Organic Chemistry

Salary to \$3480 a year, effective July 1, 1942

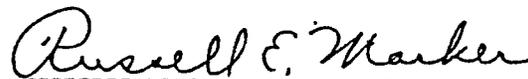
Other changes:



Secretary of the Board Trustees

And now, the 1st day of Aug, 1942

I hereby accept and approve of the changes in the terms of my agreement with The Pennsylvania State College as above set forth.



(Please sign both copies and return the original
to the Office of the President)

MARKER: It was mostly in Europe, although there was some work by [Edward A.] Doisy at St. Louis University Medical School who was working on estrone and estradiol.

STURCHIO: Was anyone at the Rockefeller Institute following this? Jacobs must have been following it.

MARKER: No. Jacobs had discontinued his work about a year before that.

STURCHIO: And Levene wasn't very interested in it.

MARKER: No. He wanted me to continue on with the Walden inversion.

STURCHIO: Were you just reading the literature?

MARKER: I was reading the German journals to find out what they were doing in Germany. [Leopold] Ruzicka was a big worker. [Adolf] Butenandt was just a young fellow.

I went to Germany in 1938 on the Queen Mary and who should I meet there and have dinner with for every meal going over but Earl Butz and his wife. He was just married. Later he became Secretary of Agriculture. He was working at Purdue at that time.

I went over with the idea of seeing Butenandt because he had been working on hormones. I had an appointment with him in Berlin. I got to Berlin on a Saturday night. On Sunday, I went down to Potsdam to see where the old German emperors used to have their castles. On Monday morning I called Butenandt's office, but he wouldn't see me. I think it was because of the fact that on Saturday night, near the hotel that I was staying in, I was looking at what was advertised as a nightclub. A young fellow came up beside me and said, "Are you English?" I told him that I was American. He said, "They have a good show in there. Do you want to go to it tonight?" I said, "Well, if it's a good show and I can get a good deal on it, then I'll consider it." He said, "Could I join you? If I can, I'll go home and get my wife." (They are the ones who wanted me to go to Potsdam with them the next day.) When the bill came, they wanted to pay the bill. His wife said, "If it hadn't been for you, we couldn't come here because we're Jewish." So I went to Potsdam the next day with them. She prepared a nice chicken dinner and we had lunch there. Apparently the word got around that I was associated with some Jewish friends. So when I called I couldn't get my appointment with Butenandt.

Schering has invited me to go to Berlin this coming May 22nd [1987] to what they are calling the Russell Marker symposium. Butenandt is going to that meeting. Butenandt is a few years younger than I am. He's living in Munich at the present time, so I will get to meet him.

STURCHIO: You would finally have the appointment with him! By that time you had already published several papers on hormones.

MARKER: Yes. I had published a number of papers (6). This was 1938.

STURCHIO: I'm sure that by then you were getting quite a reputation in Europe.

MARKER: I got several letters. I corresponded with Ruzicka. He told me that anytime I was in ZUrich, he would like me to see him. I have been to Zurich several times, but I kept putting it off because he was still working and I wasn't. I retired in 1949. I just decided that. I had put hormones into production in Mexico. That's what I went to Mexico for. Then I went into silver and various other things.

STURCHIO: Was 1938 your first trip to Europe?

MARKER: Yes. It was my only trip there until after I retired. Then I went to Europe quite regularly. My wife has counted up the times that she has been to Europe. She has been there twelve times and only two of those twelve times did we stay for only three weeks. Otherwise, we would stay for the whole summer, two or three months.

STURCHIO: Did you see any other chemists in 1938?

MARKER: I was at the Pasteur Institute. There was a friend of mine there. His name was [Robert E.] Steiger. He was at the Rockefeller Institute and then he went to the Pasteur Institute. After the Pasteur Institute in Paris, I went to Berlin, then to Copenhagen, and Oslo. (I was just killing time because I had my return reservations.) I took a boat across the North Sea to England and then I came back to Penn State. I spent about two to three weeks in Europe.

STURCHIO: When you got to Penn State in 1934, did you set up your own lab and start to work?

MARKER: When I came here I was very disappointed. The only thing they could find that I could work on was about a kilo of very dirty cholesterol. That's the only thing that was in the storeroom for me to work on. I spent more than a year just repeating work that the Germans had done.

STURCHIO: Would this have been Butenandt and Ruzicka?

MARKER: Yes. There were a few other people. [Rudolf] Tschesche and [A.] Hagedorn were working on sapogenins. They decided on the wrong structure for the side chain of the sapogenin (7). And [Louis F.] Fieser agreed with them. He said that it was correct.

STURCHIO: Was that the paper by Fieser and [Robert P.] Jacobsen (8)?

MARKER: Yes.

STURCHIO: If you could think back to the techniques that were being used in the 1930s, there are two questions that I have. How did the equipment and the help that you had at Penn State compare to Rockefeller and Ethyl Gas? Secondly, what were some of the techniques that you were using in the 1930s?

MARKER: When I first came to Penn State there were some pretty good glassblowers around. If we wanted some equipment, we could probably have it made. But for chemicals and things like that, I had to wait until the second year. Then Parke, Davis and Company would buy things after I became a fellow. When I went to Europe, my first major thing was in the bag. It was the getting of pregnanediol from bull's urine (9). It was because of that that the president of Parke, Davis decided that Mexico wouldn't be the place to produce after I showed him that hormones could be made from cabeza de negro (Dioscorea macrostachya). He said, "We'll run a stable of bulls in like we have horses and we'll get the urine from that," because I made them thirty-five grams and they thought that was an awful lot of progesterone.

STURCHIO: How many gallons of bull's urine did that require?

MARKER: The first thirty-five grams that I made was from human pregnancy urine. They had been getting estradiol from that. They had been saving what they called the neutral fraction. I worked up the neutral fraction here. There was a lot of allo-

pregnanediol in it, and after separating the allo out, I got enough pregnanediol to make thirty-five grams of pure progesterone. They thought that was an awful lot of material in those days. Now they make it by the ton.

STURCHIO: Things have changed largely as a result of the work that you did in the 1940s.

[END OF TAPE, SIDE 2]

MARKER: I have this book and the author is a medical doctor (10). He came to Mexico for a couple of days and I gave him some information. Only a portion of his book deals with me. The rest of it is on the subject of the control of biological processes through steroids. It's in German and they have it in the library.

When I left Syntex, I started another company called Botanica-Mex. I had so much trouble with Syntex that some people in Mexico said they would take Botanica-Mex over but they would change the name to Hormosynth. Then, after I left in 1949, SmithKline & French bought it and changed the name to Diosynth. Then Organon bought Diosynth from SmithKline & French. At the present time they are one of the producers of hormones in Mexico.

STURCHIO: You were starting to talk about the work that you did with pregnanediol and some of the other early syntheses. You said you had good glassblowers at Penn State but presumably you didn't have the kind of help that you had at the Rockefeller Institute.

MARKER: I generally had graduate students who were working on their doctorates. Occasionally, I would get someone who had finished their doctorate who wanted the additional experience on the type of work that I was doing. Occasionally Whitmore would come to me and say that he had a man who wanted an extra year or so of work with me. So there were thirty-two or thirty-three different men that I worked with in the time that I was here at Penn State. Several of them were working full-time on their doctorates. One was [Daniel L.] Turner. Turner, who was Canadian, was caught in the war. He was working with Butenandt. He left when the European war started and before we got into the war. He came down here and I saw him in back of me in the laboratory. He said, "I'm working for you." He told me later on who he was working for in Europe. He got his doctorate with me and then he went to Philadelphia to work.

There was only one outsider who already had his doctorate that I wanted to come here. There are two different groups of

hormones that can be made from these materials. One group is the progesterone type and the cortisone type would come under progesterone because both have the same number of carbon atoms.

When I was about ready to retire, Upjohn wanted me to see them. They had an idea that they wanted to use pregnanediol alone as a starting material for the products that they were interested in. They were getting enzymes out of adrenal glands and oxidizing with their enzymes in the 12-position. The other type of compound was the male and female hormone. There are two male hormones—andosterone and testosterone. They have two less carbon atoms. The female hormone has the same. The first ring is a benzene ring. Estrone and estradiol are the two female hormones. Both have two less carbon atoms than the progesterone.

I was interested in a fellow named [John] Krueger who was working in Virginia on the Beckmann rearrangement. I was interested in applying the Beckmann rearrangement to a product that we were getting from sarsaparilla root because it didn't have an extra double bond in to interfere with it. He was able to knock that off with the Beckmann rearrangement, to what we wanted. At the present day they are still using the same process. That was about 1939.

STURCHIO: That's one of the things I had in mind when I was asking about techniques that you used—applying the Beckmann rearrangement.

MARKER: I talked to [Hector] Flores-Gallardo who was vice president in charge of Searle in Mexico. (Monsanto has taken over Searle.) The man from Syntex in Germany was here. He's been here a few times. He told me that Searle has discontinued production. They were one of the big producers in Mexico. He said that they and Ciba have both decided to buy the hormones from the ones that are producing. They are all very friendly in the hormone production. One will make one product, another will make another product, and so on. If one needs a product that another is making, they will exchange products. They have been doing that for years. Dr. Flores told me that all of the processes that they're using in Mexico at the present time, they're essentially using the processes that I took to Mexico. When I went to Mexico there were no chemists there and there was no equipment. I spent almost a year getting the equipment and the chemicals that were needed. That was before we got started with Syntex. I was here at that time.

STURCHIO: Did you send things down from Penn State to Mexico?

MARKER: No. I would tell them what to order and they ordered it.

STURCHIO: I can imagine that was a problem in the early days.

MARKER: I went to Mexico quite often in those days because I was working on a lot of plants that grew in Mexico. One of the things that I was working on in Mexico after working on the various sapogenins was to get all of the different Dioscoreas that I could find in Mexico. I could get only a small amount of some of them and some of them would have practically nothing in them. I got some twenty Dioscoreas that are collected in various parts of Mexico. One of them was called "barbasco" (Dioscorea composita) by the natives. That's the one that's used at the present time. It had almost pure diosgenin, in contrast with cabeza de negro which had quite a lot of other products there. I couldn't use that earlier because I found it at a place called Tierra Blanca and the only way that you could get the product out of there during the war was to put it on a boat and take it over to Veracruz and bring it over from there. I didn't want to do that so I started on cabeza de negro when I first got to Mexico. When I broke off with Syntex and went on my own with Botanica-Mex I started immediately on this barbasco root.

STURCHIO: I have a few more questions about the early years at Penn State. How did the other organic chemists in the United States who were working on steroids react, for instance, when you came up with the right structure for the side chain on sarsasapogenin? Did you have contact with Fieser and the others?

MARKER: Yes. Up until that time, Fieser was refereeing all of my papers. I think I had about forty of them on sterols. Arthur Lamb, who was editor of the Journal of the American Chemical Society, was also at Harvard. I sent this paper in with [Ewald] Rohrmann (11), showing that Fieser was wrong in agreeing with the Germans that the side chain was inert. In this paper, we pointed out that there were so many typical reactions, especially that you could use acetic anhydride at 200°. No one ever thought of using it at 200° until we did one day. It worked; it opened up the side chain. All of the reactions that we had couldn't be explained except by this formula. Lamb got in touch with me and asked if I could go to Harvard. So I went over. Fieser and Mary, his wife, both invited me to dinner that night. Fieser thought that I was going to agree with him and that this formula we were proposing was wrong. Fieser got so mad during the day that he let his wife take me to dinner but he wouldn't show up. Lamb said that he didn't know anything about this matter but if I was so convinced that I was correct, he would publish it. He published it.

There was an organic symposium where Fieser gave a paper on the sapogenins. I didn't go to this meeting. I was told that he

gave his formula and said, "Others disagree with me." That was just about the time that the paper was being published (12).

STURCHIO: It would be interesting to look up Fieser's paper (13).

MARKER: His book is not very complimentary (14).

STURCHIO: But the Fiesers certainly did talk about that piece of work that you and Rohrmann had done. Obviously they finally had to accept the structure. Was that the only contact you had with Fieser?

MARKER: Yes, that was the only time that I saw Fieser.

STURCHIO: Was the reaction using acetic anhydride what became known as the Marker Degradation?

MARKER: Yes, and they tell me that they're still using it. I was surprised when I went to the Syntex production facility in Puerto Vallarta, Mexico. They were producing and then sending the product to the United States. Indications were that they were collecting about 75,000 tons of root per year and that was all brought out of jungles by natives on their backs. Some of it is dried in the little villages where they chop it up and dry it in the sun. More is dried at the coffee drying places. But at the present time, starting back in about 1974, the Mexican government has taken over the collection of all root in Mexico. They won't let these various companies collect their own root anymore. Then, the government will sell it to these companies. There was between 75,000 tons and 80,000 tons of raw root per year that was brought out by the natives. That was twelve years ago. I don't know what is brought out at the present time.

STURCHIO: That's remarkable.

MARKER: They tried to put it under cultivation but they have to let it grow for at least four years.

STURCHIO: That creates problems, doesn't it?

MARKER: Some of the barbasco roots are huge. They get rings in them just like a tree stump. You can count the rings and they told me that some of them are as much as 250 to 300 years old. They weigh as much as 250 kilos.

STURCHIO: Let's go back to the mid 1930s. How did you get onto Dioscoreas and all the various other plant species that you began looking at? Did botanists come to you with the idea that you might be able to look for those or did you have the idea yourself?

MARKER: I never had a course in botany in my life. I went over to the botany department at Penn State. The head of the botany department came out and he had a talk with me. He said, "You're the fellow that goes around collecting all of these roots. We're botanists. Why don't you let us do it?" That's the last thing that I had to do with him. I told him that I was well satisfied with what I was collecting.

I got some material from Japan. Some Japanese had published a paper on what they thought might be a sapogenin that had a double bond in it. They called it diosgenin (15). They sent me a small sample of it. It was a very crude material. I purified it and I worked it up to progesterone (16). I thought that was going to be a material that would be of commercial interest. I decided that I had better try to find the source of it.

S. B. Penick and Co. in New York sold various products to be extracted for drugs and things of that nature. They had Smilax and similar substances which would give a sarsasapogenin type of compound. But one of their products that they had available was Beth root. They only had a small amount of it. I got it and sure enough, it had diosgenin. I got a very good product out of that. I found out that they got the Beth root from North Carolina. I went to North Carolina and the roots are only about the size of your thumb. Collection of one hundred pounds a year would be about the limit. So I decided that that wasn't the thing.

I went to California, Texas, Arizona, and various other places looking for plant material. I was looking for Dioscorea. I generally had graduate students going with me or retired botanists. At Texas A & M College they told me that there were two retired botanists who lived close by. I called the one who lived nearest to San Antonio. He furnished the truck. He invited us to stay overnight in his home. He had an old botany book and I looked up Dioscoreas. There was a picture of a big one. It said it grew in Mexico between Orizaba and Córdoba along a stream of water. I thought that that would be the ideal thing and that was exactly what I was looking for.

STURCHIO: Because it was large enough that you didn't have to collect vast numbers.

MARKER: Yes. The book said that it gets to be several hundred pounds. I called Whitmore and told him that I thought I had

found what I was looking for and it grows in Mexico. He said, "The war is about ready to start. You don't want to go to Mexico." I said, "Yes I do, but I don't have enough money. That's why I'm calling you." He sent me the money. When we finished collecting plants in Texas, I went to Mexico. I was pretty smart and cocky at that time. There were no Americans on the train going to Mexico because no one knew whether we were going to get into the war or whether Mexico would be in on it on our side or not. The embassy was advising all Americans to stay out of Mexico at that time. I asked the head porter on the train for a hotel. He gave me the name of one which I later found out from the American Embassy was where all the German spies were staying. I took a room there. It was a very nice hotel but I forgot the name of it. I've been there many times.

STURCHIO: Was it the Hotel Geneve?

MARKER: No, not the Geneve. The embassy was right beside the Geneve and they told me the next time I came to Mexico to stay at the Geneve, where the majority of their war workers lived. There were roughly four hundred rooms at the Geneve and half of those were taken by workers of the embassy. I went over to the Palace. I didn't know who to go to so I went to the office of the president of Mexico. I had no letter [of introduction] but I was able to get into an inner office and someone spoke English there. They told me that I would have to take a matter like this through the embassy. So I went to the American Embassy. They told me that I would have to have permission to gather plants in Mexico and to get them out, even for research. Also, that they were getting out of Mexico. Everyone that didn't have compelling business in Mexico at that time was leaving because they didn't know how things were going to be. One thing I could do would be to get inoculated for typhoid because I would be going down to the typhoid area. They said to come back in January. They would try to have the collection permits and a botanist to go with me.

I went back in January of 1942. It was right after Pearl Harbor. I went on collecting plants in Arizona and California. I happened to be on a train going from Los Angeles to San Francisco when it was announced over the loudspeaker that we were at war with Japan. I went down to Mexico in January and the embassy hadn't done anything. They hadn't expected me to come back. They finally got a botanist with one of the universities in Mexico. They thought that I would need a truck because I told them that I wanted to collect some other plants. We got a truck and I assumed that the botanist was going to go with us on the truck, so there would be three of us. The botanist came on Monday morning and he had his girlfriend and her mother. He said that he couldn't speak English so he had someone with him that could speak a little English.

[END OF TAPE, SIDE 3]

STURCHIO: It was quite an entourage.

MARKER: We got to Puebla which was about eighty miles, and that's as far as he would go the first day, because he was interested in getting plants. I was only interested in cabeza de negro, which he said he could get for me. Then we went maybe forty or fifty miles further the next day. We stayed a couple days in a hotel in Tehuacán. The botanist collected quite a number of things that he was interested in but that were of no interest at all to me. On Thursday or Friday, he came to me and told me that some of the people out there found out that I was an American and they were against Americans. He said that he couldn't go any further with me and that we had to go back to Mexico City and give up getting the plant. We went back. We had a little bit of trouble with the truck on the way so it took an extra day to get back.

I went to the embassy on Monday and they told me that they couldn't do anything further for me and that I should take the next train out of Mexico. This botanist came to the embassy when I wasn't there and tried to blame the incompleteness of the trip on me, since the locals had found out that I was American and it wasn't advisable to take Americans down in those days.

Instead of taking the train out, I found out from the hotel where I could take the bus that went to the vicinity where this root grew. I took the overnight bus and I had to change in Puebla. There I got onto an old run-down bus. It had pigs in the bottom and the woman in the seat beside me had some chickens with her. I got to Orizaba at about daylight. I checked into a hotel and found out where there was a bus going to Córdoba. Orizaba is a big bottling place for beer. They make a very good beer there. I had to stand up on this bus which was used to haul the workers back and forth between the two towns, about fifteen miles apart. We came to a stream of water. I asked the driver to let me off at the little store there. I went into the store and got the owner of the store, Alberto Moreno, to understand that I wanted some cabeza de negro. From a distance it looks like curly hair because about one-third of the round part grows out of the ground. Some that are not deformed by trees growing close to it look like the perfect head of a negro sticking out of the ground.

He told me to come back the next day. At least that's what I understood. I went back to my hotel. He wanted to know where I was staying. All I could mention was Orizaba. I went back there. It was a little hotel. I found out later that there was a very good luxury hotel about two miles away from where Alberto Moreno had his store and where he had a coffee-drying place across the road. He dried coffee in the coffee-collecting

season, and I used it quite a bit later on.

I went back the next day. The local bus was quite crowded. Moreno put two plants in bags and put them up on top of the bus. We got to Orizaba but by the time I got off the bus they had both disappeared. A policeman came up to me and started to speak in Spanish. I didn't know any Spanish in those days. I know a little now. I understood that he wanted some money to give them back. I had a ten-dollar note in my pocket and I handed that to him. He took that and gave me one of the roots. I told him I had no more money, so I just got the one and I took it back to Mexico City. I brought it back to Penn State and I did my work on half of that. I did all the work personally. I found out that it would be a source of material for sapogenins. I took the other part out to Parke, Davis & Company. Three of my workers had been working for Parke, Davis. I wanted to show them the entire process of how to make progesterone from the material that we would extract and also show them how to get the material out of the root.

STURCHIO: Where did all the money come from for your travels around the Southwest and Mexico?

MARKER: The most money that Parke, Davis had ever put up was \$10,000. I had to pay my graduate students. They got a small fellowship, something like \$800 a year. I had to pay for my chemicals, glassware, and things like that. Whitmore would come to me and ask if I needed more money. Then I would chisel some out of him.

STURCHIO: When did the relationship with Parke, Davis start?

MARKER: About a year after I got to Penn State.

STURCHIO: How did that develop?

MARKER: [Oliver] Kamm and I became very good friends. He was the director of research of Parke, Davis. He came here several times a year and would stay for a few days to see what I was doing. Anything that I would want when I was out there, he would give me. After I showed the process to my fellows, Kamm and I went to Dr. [Alexander W.] Lescohier, the president of Parke, Davis. He was a medical doctor.

We wanted to set up in Mexico. Parke, Davis had just established a new packaging place in Mexico City and I had been out to that. I knew what they had in Mexico. They had a lot of land and the buildings were sufficient to see whether the process could

go into production. I asked for \$10,000 to put Parke, Davis into production in Mexico. Lescohier said that nothing useful could be done in Mexico. He was certain of that from the time that he was taken off of a boat in Acapulco with appendicitis. He was put in a hospital and he got such rough treatment there that he thought he was going to die. Parke, Davis would not give anything. He said, "It was just a waste of money and besides, you have established for us the production of progesterone from bull's urine. You've established it from the pregnanediol which we get out of pregnancy urine here and that is enough for us. We're going to have a stable of bulls in here just like we have a stable of horses. We'll get a thousand bulls if necessary and just collect the urine. But there's no use of thinking of going to Mexico City because it can't be done in the first place."

After I went to Mexico, I told Lescohier that I would have to look for someone who would be interested in going to Mexico if Parke, Davis was not interested in it. I went to several pharmaceutical companies. I went to Merck, Ciba, and Schering-Plough. None of them were interested in it because they thought that nothing could be done in Mexico. There was no equipment, and no glassware. There was some German glassware there but you didn't know if you heated something in it whether it was going to break or not. Fortunately, there were some five-gallon Pyrex bottles that they had for other purposes. I got all of those that I could. We distilled out of the Pyrex bottles because I could trust them. There was no Mexican chemistry. They didn't have a chemical society until approximately 1954.

STURCHIO: When Parke, Davis and the other companies turned you down, you went back to Mexico City?

MARKER: I went to Mexico and I was wondering how I could make contacts. I went to the head of Salubridad. Salubridad is the health organization of Mexico. They're tied in with the government. The only answer that I could get was from a man, whose name I cannot remember. I talked to him for quite a bit. I went out to some of his meetings, because he was running for some political office. He would take me with some girls who spoke English—I don't know what it was all about. I thought I had made arrangements with him until he finally told me, "You produce it at your expense and I'll sell it for you." That was all that I could get out of Mexico.

I was in the Hotel Geneve and I was looking in their telephone book under "laboratorios." There was a Laboratorios Hormona. I thought that they must use hormones because of their name. I went to see them. There was a man who was in charge of production, Dr. [Federico A.] Lehmann. His son became a chemist later on. His son was maybe eight years old when I first went to Mexico. I talked to Lehmann. He said, "What is your name?" So I

told him again what my name was. He excused himself and came back with a Journal of the American Chemical Society. He said, "I thought I recognized your name." I told him that the product that I was interested in working on looked like potato chips. It would be chopped up from a product that grew in the tropics and sun-dried. Then that would be ground up and extracted with alcohol. He said, "It sounds very interesting but the man that owns Hormona is in New York right now." That was [Emeric] Somlo. Lehmann asked if I could stay over for a day or so. I told him that I could if there was some possibility of getting the funds. Lehmann, Somlo and I had a talk the next night. I had some of these chips with me that I had brought from Moreno, who was drying some for me. Somlo said that he would be very interested. The only hormones they had were those that they were bottling—they had bought some crude stuff from Germany and they were putting it up in ampoules at that time, but only in minute amounts. He said that he would be very interested in establishing something.

So we worked out that we would form a new company and if I could get the process to go into production, I would eventually come to Mexico to produce it. I went to Mexico several times during that year and I went out to see Lehmann. I told him that during the year to be sure that I could make a good product I had worked up around ten tons of root with Moreno. I sun-dried it and I got out roughly two tons of dried root that were brought up to Mexico City. I made arrangements for alcohol-extraction in Mexico City. I could never find the place where I had that extractor. I don't know whether or not it was torn down. I have some pictures of the place. It wasn't too far from Guadalupe.

I knew a fellow in New York City that I had become very friendly with. He was selling some hormones and he had gotten into trouble with Ciba over a patent. It was the only time that I ever went to court for patent purposes. I went to Washington to try to tell them in court that this man should have the patent and it didn't belong to Ciba. That's how I became acquainted with him. I asked him whether he had a laboratory. He told me he had a laboratory at that time. After we were through [with the patent case], I asked him whether he would be interested in my producing some progesterone from an extract that I would get from Mexico. I told him that I would give him one-third of the material. He just jumped at it and said, "Do you know how much progesterone is selling for now?" At that time, it was roughly \$1000 per gram because there was practically no progesterone available. He wanted to know how much I thought I would get out. I thought I would get maybe three kilos and I would give him a kilo if he would let me work in his laboratory and furnish the materials that I would need. I would need acetic anhydride, and things like that. He said, "Oh, yes." So I worked there and I got a little over two kilos that I had for myself.

When I was ready to come back to the United States, I went to Hormona to see what the status was on the equipment that they

were getting for me. It ended up by me telling Lehmann that I had in my hands in the United States, a little over two kilos of progesterone. Somlo was out of town at that time. Lehmann told Somlo when he came back that I had a couple of kilos of progesterone, which was an unheard-of amount at that time.

I came back to Penn State. Fortunately, I was able to get on a plane. Sometimes I could get on a plane and other times I had to take the train. They had small planes at that time and sometimes there would be all embassy people taking the plane and even though you were reserved, you were kicked off and you had to take the train back. But fortunately, I got the plane back to Washington and took the train from there.

After I got here, Somlo wanted to know if I still had two kilos of progesterone and whether I could meet him in New York. I met him in New York. He took me to the Waldorf-Astoria for dinner to butter me up. He wanted to know whether we could work out something so that Hormona could sell this product. We had agreed to establish a new company to produce hormones in Mexico. The company was going to be set up for 500,000 pesos. At that time, a peso was worth about twenty-one cents. My share of that would have been about \$41,000 because I was to get forty percent of this new company that was to be set up. He said that he had an office in New York and the man that was running the office was named Houben. He wanted to know where the progesterone was. I told him that it wasn't in New York. He said, "Can you bring it back to New York and give it to Houben?" I gave it to a friend of mine to deliver to Houben.

The arrangement was that my share of this new company, which was going to be called Syntex, would be paid for in full out of the funds that we would get for these two kilos. He said that he would establish a price of \$80 per gram because we didn't know what to establish it for. That would have been \$160,000 for the two kilos. We then made the arrangement that my share of this new company was to be paid for in full. Any remainder would be turned over as profit for this company. The rest of the \$160,000 would go as profit and would be split as follows: he would get 52%, Lehmann would get 8%, and I would get 40%. I never got it. That was the end of it. After a year and four months, he kept telling me that there was no profit and when we got a profit, we would split it. I kept asking him for the accounting for this new company which was set up as Syntex. He kept putting me off.

I decided to set up my own company and leave Syntex because I wasn't going to get anything from it. He had given me enough money to live on and I sent that to my wife, who had come back to State College. She was educating my two sons because we decided that Mexico wasn't the place at that time to educate our sons. She was in Mexico the summer before and we sent the youngest son to school down there. He just considered it a big joke because they went to school in the summertime and he thought that should be his vacation. He was about eight years old then.

STURCHIO: You were living there for sixteen months by yourself?

MARKER: I would go back occasionally.

STURCHIO: Did you ever bring a lawyer in?

MARKER: Yes. I set up a company called Botanica-Mex and I needed a lawyer. I got a French lawyer that the American Embassy recommended to me. He spoke English perfectly. He set up the company of Botanica-Mex. He met with Somlo and Somlo's lawyer several times. He had a meeting with Somlo once which was unusual for a lawyer to meet with a man on the other side. Somlo told him what he would settle for. I had a paper from Somlo that said I was to have forty percent of Syntex. I kept that in a safety deposit box in a bank in Mexico. Somlo told him that I had been having quite a bit of trouble. The man that was collecting barbasco for me was having a lot of trouble collecting it. He and I went to a small village and he pointed out a man and said to me, "That's the man that's been giving you your trouble." My man was killed that night. He died in Orizaba.

[END OF TAPE, SIDE 4]

MARKER: The first year that I was producing progesterone in Mexico my lawyer got me two pistols. One was a Smith and Wesson, and I've forgotten what the other was. I had two watchmen. They would go out for their evening meal. One would stay on duty while the other would go out and they would alternate their sleeping. When one of them went out he would carry his pistol with him, although I had given them orders not to take the pistol out of the place. He was grabbed right outside of the door and he was shot through the leg with his own pistol. My lawyer knew all of these things that were happening. I met with Somlo once. We had dinner at a good restaurant which he paid for. He wanted me to come back and give him the processing details. That was before [George] Rosenkranz came to Syntex.

By the way, one day this week I showed Dean Wartik an article I received from Syntex that is only given to its employees (17). My son has a few shares of Syntex stock but he can't get this. In here is the story of the starting of Syntex. This is Rosenkranz who took it over. Here is about my coming and this is the old Hormona building. I had two laboratories here. The entrance was between the two laboratories. Then I had the extractors down further. But this is the section that I set up in about five months. This area apparently was taken over because the whole thing now was called Syntex. [Ulrich] Schippke

wrote this article for Stern Magazine (18). I took him and the man that was going to write the script for the movie part around and showed it to them. But this front is broken down now. There's copper shops and things like that in here. Just little shops. It's not used for hormone purposes. But this is what I was using years ago. Here's Rosenkranz and he tells a little about his coming there.

STURCHIO: Did you ever meet Rosenkranz in those early days?

MARKER: No. I never met him.

Once when I was getting an award for something in 1969, they thought I had disappeared (19). Roger Adams was head of the American Chemical Society before I went to Mexico. I had dinner with him several times while he was in Mexico. He died shortly after his last visit. He wanted me to come to Illinois to visit him. I told him that I couldn't. But he told me at the dinner, which was at young Lehmann's, that he and some others were fully convinced that they were going to do a memorial for me that was set up by the society that was meeting there. He thought that I was dead because the report said that I had disappeared. He thought that this was to be the memorial. Lehmann gave a speech and then I walked in. That was a big surprise to everybody.

STURCHIO: I was recently reviewing Maisel's book, The Hormone Quest (20), that came out in 1965. In that book he has a statement that nobody knew if you were alive or dead. Obviously you knew where you were.

MARKER: I was working on silver then.

STURCHIO: You left Syntex in 1944 and set up Botanica-Mex.

MARKER: That was in 1945.

STURCHIO: You told me about the trouble you were having with Botanica-Mex, such as the people attacking your workers. What was the outcome of all of that?

MARKER: Somlo doesn't have a doctorate any more than I have. He gave it to himself. He's a lawyer and lawyers don't have doctorates. To sell his product, he called himself Dr. Somlo. He's dead now. He died in France. Somlo was working for Gedeon Richter for a while. Suddenly, Richter found out that there was a company called Laboratorios Hormona which was selling similar

products that they were interested in selling, only it had a label on it "Hormona." And Somlo was working for Gedeon Richter at that time. This is the story that I got from them. He would take these samples and give them to his wife. His wife would put them in ampoules and distribute them. That's how Hormona got started. There were Hungarians at Gedeon Richter. They took over Botanica-Mex and then started operating as Hormosynth.

STURCHIO: Had you taken out Mexican patents on your processes?

MARKER: No. I took no patents out. I left everything open to the public.

The Richter family came from Budapest originally but during the war they went to Turkey. I had dinner with young Mr. Richter, the son of Gedeon Richter, in New York a few times. I had met him in Mexico. He stayed at the Geneve Hotel where I was staying. Apparently, their Turkish project was pretty good. The Richter who was running Gedeon Richter in Mexico was the nephew of the original Gedeon Richter. At the start of the war, Richter knew that they would have difficulty in Mexico. They didn't know how things were going to come out in Mexico. He got his nephew to talk over the thing with him. They decided that he would give him a power of attorney for everything in Mexico. When the war was over young Mr. Richter came to Mexico to find out what the situation was there. He stayed there for a few months, asking questions, and he found out that they had taken it over completely. They had taken over because the old Mr. Richter had given them a power of attorney. He said to me, "Never give the power of attorney to anybody, because I'm not getting anything out of it." He told me that that was the reason he asked me to come to New York.

This was after I had become affiliated with them. Then, the three of them came over to look at the equipment that my friend had set up in Texcoco to make progesterone. We made roughly thirty kilos during the year and some dehydroisoandrosterone which was made by the Beckmann rearrangement. My friend in the United States had put up all the funds that were necessary for setting us up at Texcoco because I didn't have any money. They had cheated me out of what I was supposed to have at Syntex. This was the fellow that I went to use his facilities and who got the first kilo of progesterone. He knew that I could make progesterone.

STURCHIO: What was his name?

MARKER: His name was [Norman] Applezweig. He's dead now. He died of a heart attack a number of years ago. The arrangement when I went with Gedeon Richter was that they would get a good

chemist to come in and I would show him the process of making progesterone. Progesterone was the only thing that they were interested in. They wanted to go against Somlo because they had it in for him.

STURCHIO: He had also taken them as well.

MARKER: They wanted to know if I had any suggestions. There was a fellow that worked for Jacobs at Rockefeller Institute. He worked on sarsasapogenins. Not only that, but when he left the Rockefeller Institute he went to Zürich and worked with Ruzicka. At Rockefeller he worked with [Max] Bergmann, who was a refugee from Germany. He was on the floor below where I was so I was pretty well acquainted with him. I also knew his girlfriend. I got in touch with him because he had been with Upjohn for a while. Then he worked for the government.

STURCHIO: What was his name?

MARKER: [Edwin L.] Gustus. I got in touch with him and asked whether he would be interested in a project in Mexico. He said that he would. He came down and I showed him how to make progesterone. I had a few of the girls that were training with me at Syntex. They went with me to Botanica-Mex. Then I went to Gedeon Richter, Hormosynth, with the same girls. I asked him whether he knew the process and he said that he thought he could handle it. This was around 1946.

I went back home to my family here at State College. At the end of two months, I got word that they didn't have a gram of progesterone. Something had happened and this fellow was unable to make it for them. So I went back. It so happened that this fellow had a hobby of learning Spanish. He spoke Spanish fluently and he knew enough Spanish to call them "pigeon brain" whenever anything went wrong. So they saw to it that he got nothing. Richter told me that they wouldn't have him. They asked me whether I could come back to them until they could get on their feet and get someone else. They got a Polish fellow. Somlo had him put in jail after he was there for a short time. The same thing happened with other people. I was there off and on for about three years.

STURCHIO: How did Somlo manage to get them put in jail?

MARKER: He claimed that they had no permit to work in Mexico. He had them put in jail and then they finally left.

STURCHIO: So you had to keep going back to make the progesterone.

MARKER: Yes. Then I decided that I had had enough in 1949. I wrote to Richter and told him that I was finished. I wasn't going to work anymore. They finally sold it to SmithKline & French who changed the name to Diosynth and then they sold it to Organon, probably in the 1960s.

STURCHIO: In the last couple of years that you were in Mexico you kept publishing on the sterols. I noticed that one of the authors was Josefina Lopez (21). Was she one of the women who worked with you?

MARKER: She was with me at Syntex. She went to some people that were with the oil firm in Mexico. She learned English by being with them. When the war started, she was in England. These people had to leave Mexico and when they went back to England they put her in a school in England and then they sent her to study music in Switzerland. She spoke English perfectly and was looking for a job. I ran into her and I hired her for Syntex. She was the only person at Syntex that spoke English. I saw her about eight years ago. She was married to a Norwegian sea captain who became a United States citizen. I haven't been to Mexico since then because my wife couldn't travel anymore.

STURCHIO: Did she stay in chemistry?

MARKER: No. When I left, she left, too. She got married very shortly after that. She met her husband in Acapulco.

STURCHIO: One of the pictures that we're going to run in your article in CHOC News is a picture of you with a group of women at Syntex (22). She must be in that picture.

MARKER: Yes. I had that picture out the other day but I didn't think to bring it out.

STURCHIO: Another major paper that appeared in the last few years that you were still active was the summary paper of all your work on the steroidal sapogenins (23).

MARKER: That's the real long one. It's about sixty pages long.

STURCHIO: Were you at Penn State when this was being done or were you still in Mexico?

MARKER: I was here when the whole thing was done. I went to Whitmore and told him that I had about a dozen papers that needed to be written up. I was suggesting that it all be put in one paper. Whitmore also thought it would be a good idea. He said, "Which one of the men that are working for you do you want to write it?" He mentioned that some of them were going to be here for a year or so. [Romeo B.] Wagner was the one who got it in shape. He sent me a copy several times and it was then published. We also got in touch with Dr. Lamb who was the editor of the journal. Lamb thought it would be a good idea to publish it all together.

STURCHIO: It's a very interesting paper.

MARKER: Wagner stayed here. [Paul R.] Ulshafer went to Ciba. [Emerson L.] Wittbecker went with Du Pont. [Dale P. J.] Goldsmith was with Merck and later on went to the University of Iowa. [Clarence H.] Ruof went with Mellon Institute in Pittsburgh. So Wagner was the only one who was left here. Ulshafer is dead now.

STURCHIO: I noticed that a number of your Ph.D.s and postdocs went to companies such as Upjohn, Merck and Parke, Davis. So you were really acting as a center for training people in steroid chemistry that became important to a large number of pharmaceutical companies.

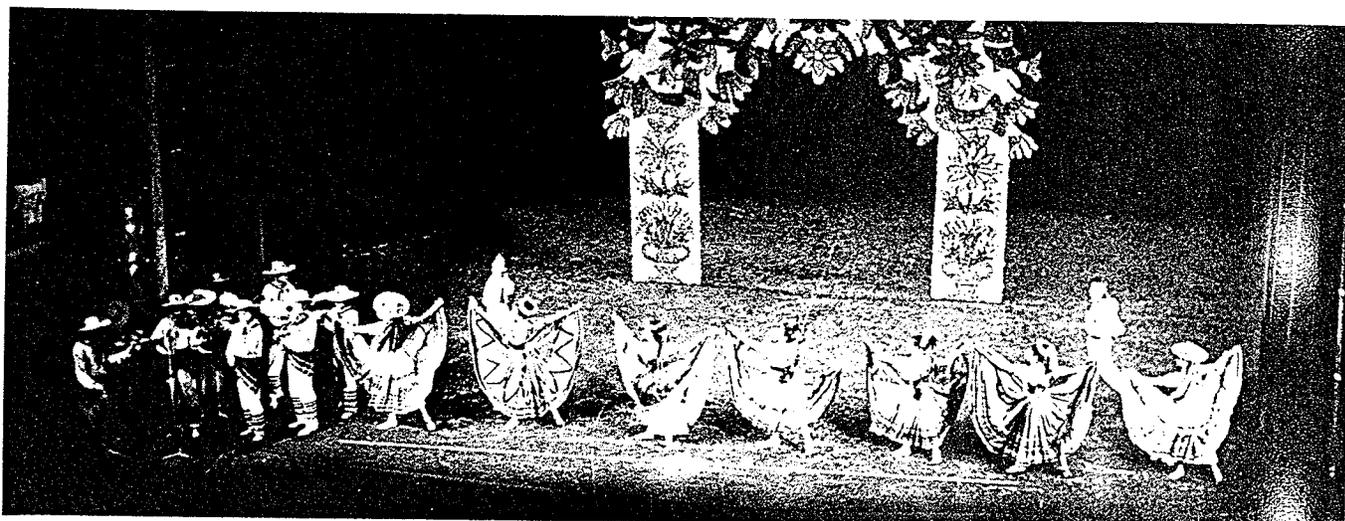
MARKER: The chemistry of sterols would fit in quite well with whatever they wanted to do in organic chemistry, because in sterols we eventually used all of the chemical processes that were used for ordinary chemical work. For instance, the Beckmann rearrangement. Who would have thought that could have been used in sterol work? I had this fellow come up from the University of Virginia who was experienced in that from his doctoral project to work a year with us to show us the techniques, anything that would be of use to us. It is used an awful lot commercially in the present day.

STURCHIO: That's an interesting point. Twenty years ago Carl Djerassi published a book called Steroid Reactions (24), in which he argues that sterols really provide a useful laboratory preparation for teaching organic synthesis because you can use all of the basic techniques. They just seem to be more complicated because the molecule's backbone is so much larger but in fact the active sites are still the same.

Mexico City meeting offered many activities



Herman S. Bloch, ACS board chairman (second from front), joins officials of Canadian and Mexican chemical societies at the opening ceremony



Highlight of the cultural program at the congress was a special performance of the Ballet Folklorico de Mexico in Mexico City's Palace of Fine Arts



ACS president-elect for 1976 Henry A. Hill mingles with the crowd at reception preceding the congress

Highlight of the technical program was a symposium of five Nobel Laureates chaired by Dr. Severo Ochoa

Russell E. Marker, U.S. pioneer in hormone chemistry and founder of the Mexican steroid industry, received an award for his life's work during the congress



A flamenco concert held at the Palace of Iturbide was another attraction at the generally successful congress



The big band at the closing reception and dinner dance held in the Camino Real brought attendees onto the dance floor in great numbers



ACS president William J. Bailey (right) flanks the congress' president Jorge Louis Oria at closing ceremonies

MARKER: And you can do it with such small amounts, too. You can work with milligrams.

STURCHIO: How did you analyze the final products? This was before things like infrared and other instrumental methods.

MARKER: I used an analyst that Jacobs was using at the Rockefeller Institute but he would do this in his home. Eventually I had too many for him. Dr. [George H.] Fleming here at Penn State started studying microanalysis and he set up to run microanalyses here. When I had too many for [D. N.] Rigakos in New York and Fleming, some of them were sent down to Washington.

STURCHIO: Those were just elemental analyses?

MARKER: They would work on four milligrams or something like that.

I don't know if you've seen this photograph in Chemical & Engineering News (25) [see following two pages]. This was when I was getting the last award, the one I went to Mexico for. The American Chemical Society and the Mexican Chemical Society and the Canadian Chemical Society met in Mexico. Djerassi was one of the vice presidents of Syntex and he gave one of the talks. He was leaving at the end of that year. He had his wife there and they were applauding my getting the award. This is Bill [William J.] Bailey from the University of Maryland. He was head of the American Chemical Society at that time. I think the fellow with the glasses was the president of the Mexican Chemical Society. The other is president of the Canadian Chemical Society.

STURCHIO: It was appropriate to have Bailey there since he was from the University of Maryland. In 1949, when you mentioned all the running back and forth between Penn State and Mexico, I gather your family was still at State College.

MARKER: They stayed at State College all of that time. As a matter of fact, my sons came to Mexico occasionally, but they would come only for a day or two. Then they would have to get back to school. They would get a job in the summer.

[END OF TAPE, SIDE 5]

STURCHIO: When you decided to quit Hormosynth and leave chemistry did you miss chemical research since you had been so active in it?

MARKER: No. I was on some classified work then with the governments of the United States and Mexico. I was on that program part-time for a number of years. About 1956, I met a woman on the street, walking two big dogs. I had met her before. She had a shop where she sold leather goods and she had moved [her shop] about a block from the Geneve Hotel. She told me that she was still selling leather goods. In fact, the briefcase that I brought in here today I bought from her about thirty-five years ago. Her father was a Frenchman who had worked in Paris. This girl was married to a Mexican. She opened up a leather shop because she wanted to make some money in addition to the husband's salary. She said that her father had retired from Paris. She said that she would like for me to meet him. I told her that I would drop around there sometime. He was interested in silver and his silver shop was right across from the American Embassy in Paris. As a boy, he worked with Fabergé in Russia. Fabergé was making these famous eggs. They have some at the Metropolitan Museum but they are mainly in Paris. He was forced to leave Russia in 1916. Fabergé went to Switzerland and this girl's father went to Paris. She would only see him occasionally when she would go to Paris. Now, he had completely given it up and was in Mexico. He was selling secondhand silver in the shop. I went in to see him.

Several times I had gone to the library at the Vatican. I had become familiar with one of the bishops in charge of things there. We talked quite a bit about various things. He wanted to know whether I had ever been to the Louvre. I had been there several times. He said, "They keep some of their valuable things locked up in the basement. When you next go there see if you can go down to view them." He was particularly interested in a vase, which they kept locked up. This vase came from Turkey. It was supposed to be from the burial place of one of Nebuchadnezzar's generals. He was quite interested in this vase. The story goes that a French woman found a Turkish man who was doing some fishing on the side, but he came to her and wanted to know whether she wanted to buy some gold that he had melted down. She told him right away that she knew this melted-down gold came from something that he robbed from a grave. If he would bring her any original pieces that he had, she would buy it at the regular selling price of gold. He couldn't turn this down and this was one of the vases that he wished I would take a look at.

There was another thing that they showed me at the Louvre. This was a drinking cup made for Anne of Austria. This was made of pure gold, too. It was another of the things that they keep locked up. I got pictures and the size and weight of these two items. I took them to this girl's father in Mexico and asked him whether they could be made. He said, "At your expense." He

always said that. [laughter] I told him that I would like these to be made in silver and then plated with gold. The copy of the Turkish vase was so good that I considered it a perfect reproduction. I asked him what the price of it was. He told me and it was very cheap so I asked him if he could make some more. I wanted to give one to each of my sons and one in silver to keep for myself. I had three of them gilded and took one to this bishop at the Vatican Library who had been doing work for me. He was very pleased to get that. I have given all of my silver to my two sons because I didn't want to be bothered with it. After I die, I don't know how they would assess it.

STURCHIO: Is that how you got started in silver reproduction?

MARKER: Yes. This man made these pieces for me. Then I asked him whether there were any other silversmiths in Mexico that he would recommend that could be trained in rococo. Rococo is extremely hard because it has so many twirls and twists and it costs much more than the plain silver. For instance, one of the best rococo workers was Paul de Lamerie. His parents were French but he was born in Holland. He then went to England with his parents and he became a silversmith. But he was interested in making rococo. He couldn't find anyone in England who wanted to put the amount of money into rococo that it would cost. They all wanted plain things because they considered this as a place to put their money. So he only made a few pieces of the real rococo. I remember when I was at the Ashmolean Museum at Oxford University and I was talking to the girl in charge of silver there. I was looking at a particular piece of de Lamerie's that was listed as being at the Ashmolean Museum. She asked me whether I could come to dinner with her supervisor. I did and we talked about silver the whole time. They wanted to know whether I had ever visited this shop on Regent Street which was originally Paul de Lamerie's shop until it was taken over by Gerrards. I said that I hadn't been in there. I was heading for London and my wife was with me at that time. She had never seen Churchill's place and things like that, so while I went to the Ashmolean Museum, she went out on a regular tour. I pulled that quite a number of times on her.

I went to this shop and they had a table in the back. It was about the size of this table. There was a big sign on it in the middle: "used silver." I asked one of the clerks if the silver was for sale. He said, "Yes. Are you interested in it?" Sitting right in the center was the piece that I was looking for which was made in 1902 and was being sold as used silver. It was the only rococo piece and was made by a man who was a silversmith for Queen Victoria in 1902. Later, they wanted to buy it back from me. I gave the piece to my son but I have a statement from them.

STURCHIO: That's very interesting. How long were you active in collecting and commissioning silver pieces?

MARKER: That's the only piece that someone else made. I was actually going to have my silversmith work on it.

STURCHIO: And you found the original?

MARKER: Well, it was a reproduction. This silversmith was the head of the silversmiths at Paul de Lamerie's shop. It was his hobby to reproduce some of de Lamerie's work. The guards told me that it came from one of the estates. They said it had never been used.

STURCHIO: During those years, were you living mainly in Mexico or were you living still at State College?

MARKER: I was in Mexico and State College and Europe.

The son of this woman that owned the leather shop became interested in silver. He's taken over this shop. The workers that I had on rococo have either quit or died. I left him in 1970. I see him occasionally when I go to Mexico. [Pedro] Leites is his name. He told me that Tane now is one of the six leading producers of silver in the western world. Quite a lot of their products are sold to Tiffany's. They have two shops that are set up here in the United States and about eight or ten shops in Mexico.

Here are some photos of a few pieces of rococo that I found. There's only about twenty pieces of the best worker on rococo that France has ever had that are in existence at the present time because Madame Pompadour needed money to fight the British and she ordered all silver melted down. There are a few pieces that escaped being melted. A few pieces went to Portugal and a few went to the brother of the king, the Duke of Orléans. That's a soup bowl that's in the Louvre.

This is unusual. The original of it is a fruit bowl. It's oval in shape. John Wayne was making some movies in Mexico. He went to the house of the ambassador and admired some of the silver. He asked about his silver and was told that it came from Tane's shop—the shop that I was working in. He came in. There was a piece that I didn't like and wanted to make again, so I had it for sale. That's how I got the money for making this silver. If I didn't like something, I sold it. The price that he paid for that was about \$4000, because the original exists, and I found a painting with a number of Germain's pieces in it and this is one of the pieces. So I could get the size of the other

pieces that didn't exist from the size of this piece. The last piece that Tane had made was wanted for show purposes. I asked what price he was going to put on it. He said that if anyone wanted to pay \$40,000, they could get it. So I don't know what price they had on it. The original is gilded. My son has the one that I like.

These are not salt shakers. They are sugar shakers and they are about a foot high. These are gilt and the originals do not exist. They were in one of the paintings that I got. These are goat's legs at the bottom. This is the same painting with two spice boxes. These are divided in the middle. You put pepper in one side and salt in the other side. I had a pair of those made.

This is the work of one of the Englishmen. I was surprised at where I would get the original of this. It was bought by the [Robert] Untermeyer estate in Yonkers, New York. We used to live close to that estate and I knew of it quite well. I had one made for each of my two sons. I had down there a full-time artist who was working for me. I had a half-time wood carver because all of the pieces were carved in wood, they were molded and then they all had to fit together from his carving. They were wondering how this inside had chisel marks on it the same as the outside. Well, you make two molds and you solder the two together. It was so simple.

This is a tea kettle which is in the Louvre at the present time. It was made for the lord mayor of London's daughter. Germain made it while they were fighting England. This piece here, I only had one of these but I have a pair of these wine coolers. These are dogs' heads on the side—cocker spaniels. The wife of the president of Mexico came to the shop every once in a while to see what was going on. This was a room that they cleared out in the back. Eventually they gave up the leather shop completely. There was a whole wall of things that I had which I eventually brought home.

Anyway, she wanted to know whether she could have this to take to her home to show to some of her friends. I told her, "Sure," but she never brought it back. I had Leites call her about it because I didn't want to lose the piece. She wanted to know whether it could be partially gilded because she would like to have it. They gave it to [Richard] Nixon. That was the present from Mexico that was given to Nixon. I had a silversmith I had trained make one for each of my boys. I quit everything all of a sudden.

Thomas Germain worked on rococo and his son then worked for the king of Portugal on rococo because he couldn't make it in France because it was all nationalized. This is from one of the paintings of Germain's work and is what I was going to work on when I quit. The boys could have done it. When I quit, I told

them not to publish anything because I didn't want it known that I was living in the Geneve Hotel. For twenty years I lived there and I knew the manager quite well. He was a Canadian and eventually his son-in-law took it over. Recently, a United States firm bought it from the son-in-law.

STURCHIO: What year did you leave?

MARKER: I left in 1970 because when they published this article everyone found out that I was still alive. I gave up silver. Then I wanted my men to work on some of the designs that I had, but they weren't interested. They were only interested in the rococo silver. I was at a place where Mexicans come to sell their artwares on Sunday. They have paintings and various other things. There was an Aztec Indian there. He had some copies made of brass and then they were stuck onto wood. Things like the Virgin of Guadalupe. I asked him where he was working. He was working for a government department that was interested in making money and he was doing this on the sideline. I asked him whether he would be interested in making some Mayan pieces similar to what he had. He asked what I would be interested in and whether I could get pictures of them and bring them in next Sunday. He was there every Sunday. I brought him a picture of a Mayan head. I got this from a publication that was taken from a Maya ruin at Palenque. He asked me if I could come back in a few weeks. I did and he had this on a block about one foot square and it was painted in color. His girlfriend did the painting. I asked him if he could do some more. It got so that I spent five years with him. Once I went to him and asked him what he had for me. He said that the Mexicans wanted to know whether he could put on an exhibit in Colombia in South America of some of these plaques. He wanted to know if he could send a couple of these plaques along to the exhibit.

[END OF TAPE, SIDE 6]

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