7-15-1987

Steketee, Charles A (mathematics and science) Oral History Interview: Science Professors at Hope College

Brian Williams

Interview with Charles Steketee, Mathematics
Interviewed by Brian Williams
July 15, 1987

BW: What was Hope's reputation at the time? Did they have a field they were noted for?

CS: Chemistry. You may have heard of that _____. The chemistry department was under Van Zyl and Kleinheksel, those two. Of course they were here more when I was a student, I don't know about way back when I was being born. They were the chemistry department when I was a student here, both quality men and they complemented each other so well. Van Zyl was very good at contacts outside, getting grants for the kids or getting them into graduate programs in universities and so on and teaching the upper level courses. Kleinheksel was very good at the opening courses. Freshman and sophomore chemistry and the reasonably large classes, just introducing the kids to chemistry.

BW: Did you have either of them while you were at Hope?

CS: I had Kleinheksel. I never had Van Zyl because I only took one year of chemistry. But different personalities and so on, but a very strong program.

BW: So you had a lot of math here?

CS: I majored in math.

BW: So you had Lampen?

CS: I had Lampen all the way through.

BW: Who else was here?

CS: He was the math department. He had some part-time work either for maybe a seminary student who had majored in math or some strong senior or something like that. I believe I had trigonometry from a student teacher. Not a student teacher, but

a student who taught the three hour course.

BW: Did you have any physics while you were here?

CS: I minored in physics under Kleis. I had decided as a senior in high school that I planned to come to Hope College to train for teaching. I decided that way back in 12th grade. I came here with the idea of math education _____. I carried it on through until a few years ago.

BW: You graduated from Hope in '37?

CS: Thirty-seven. We had just had our 50th anniversary.

BW: This summer? Last year?

CS: Just this past summer.

BW: Then after that you went to...?

CS: I went to the University of Michigan and received a masters and I was back some years later for a summer.

BW: After that you didn't come to Hope right away?

CS: No, I taught in Howell Public Schools of Howell, Michigan. Do you know where that is?

BW: Yeah.

CS: Nice school system for a smaller town at that time. It has grown greatly since. At that time, we had whole school systems in one building. Grade school was on the first floor, junior high second floor, and that surrounded the gym. The gym was in the same building and then the high school and auditorium were on the third floor. Everything in one building, rather unusual but it fit that town very well. I taught

there eight years.

BW: And then you came to Hope?

CS: I was called by Mr. Lampen, so was Dr. Folkert.

BW: At the same time?

CS: At the same time. World War II was just closing. I came in '46. Hope, during the war, had 500 girls or something like that. But they had a unit, I don't know if it was Army or Marines, it might have been officer training.

BW: Yeah.

CS: Have you heard of that?

BW: SATC or something like that.

CS: I don't know exactly what it was, but it was training for the Army to go directly into the Army and so on during the war. Well, the war ended and that training program ended and everybody coming back from the war field, and then the GI bill of rights, you know? Hope College jumped to about $1500 over summer--just about tripled.

BW: That was a big jump.

CS: Mr. Lampen had to have some math teachers and he telephoned both of us and we both accepted it. The circumstances for me were that Mr. Lampen called and wanted me and offered me a job. I said, "I'd be very interested, but I've already signed my contract for the coming school year, and I would have to see if there was any way I could come." The next day I saw my superintendent and he said, "Sure you can go ahead, that's a real advancement for you." This may have been in July or maybe even in early August, at least quite close to the school year, and he said, "If you just

wanted to jump to another high school, I would be angry, but I'm not going to hold you back from an advancement like that." So I was able to come over here right away.

BW: Is it quite a difference between teaching high school to college?

CS: In Howell Public Schools, they had two math teachers above the 7th grade, and I took both ends and the other one took the middle. I was teaching two 8th grade math classes. I had two "dummy math" classes or general math classes, general everything. And then I had the 11th grade algebra, we called it advanced algebra in those days, the trig and the solid geometry. During the war, I had a senior math course which was full of mathematics related to various phases of the war because a lot of the kids would go away into officers training right away. And so I was teaching navigation, I was teaching weather, I was teaching phases of aeronautical engineering, which requires a lot of mathematical computations--air lift, air drag, big formulas and so on. Using a lot of logarithms, trig and so on. The main idea was just general background for whatever they might be going into. Some of them were navigators, pilots. I didn't teach all of that in one year, I rotated. I always taught the 8th grade and the 9th grade stuff. I taught advanced algebra. Did I teach advanced algebra and solid geometry at one time? Yeah, and then the trig and senior math. So then 8th grade, 9th grade and two upper level courses. The other teacher taught the geometries. In fact, we had a lot of geometry. I think that is about all he taught geometry, geometry, geometry. I liked very much that I had a master's degree and I knew my upper level math. And I had 7th grade home room. You earned your

money, you know. Working with the 7th and 8th graders is hard because their attention span is short, so you really work. Teaching the 11th and 12th grade was similar to what I was teaching here. You teach in very much the same manner. The kids were mostly college preparatory and they were very interested in their work and discipline problems were a minimum. I was interfered with once in a while, you know, you had to get things together. Most of the time, just like here at Hope College, you walk in and start teaching and teach the hour. Two or three kids may be a little bored, but basically everybody is ready. So there is not that much difference in the senior high level and college.

BW: Was everything in Van Raalte Hall when you came? Is that where they taught the math?

CS: And in Graves Library, Graves Hall.

BW: That's right. Now I saw somewhere that you had a pretty big course load right off, didn't you? A large number of hours?

CS: I had seventeen hours and five preparations, and all five were different. One of those was spherical trig which I taught for either two or three years, and then we threw it out because it was becoming obsolete. The only use that you would have for spherical trig would be in navigation or something related to navigation, spherical navigation. Newer scientific processes just threw out the demand for navigators to know all of this stuff. And engineers didn't want it. Only very specialized people...maybe an astronomer. I had never even heard of the course before and here I came and started teaching it. But I really knew my trigonometry backwards. Adapting to spherical,

and having taught geometry and so on and knowing geometry well, the spherical part of the geometry and the trig, I could learn it but I was staying two or three weeks ahead of the kids that was all. With five different preparations, I was working seven days a week. I only took time to go to church on Sunday and go to the football or basketball games. And even then, I was in charge of selling the tickets and so on and taking the money to the bank and keeping the records.

BW: There were a couple of courses you developed here, didn't you, for the math department? History of math?

CS: Under Mr. Lampen, I taught the college geometry course. I taught with his textbook and very much like the way he had done. After he finished his last year here, that book was getting old, in fact it was going out of print. Not that it was low quality, but there was new material that had come out and that book was semi-obsolete, but of good quality. In fact I used a great deal of the material because it was good stuff. But more things had been happening in the field of geometry. I organized a new course in college geometry. I had a new text. My general interest in it was to...the course definitely was not to sit and review high school 10th grade geometry. Most of those who were in the course were going to be math teachers, but there were a few others. But the idea was not to say, "Well, now let's go through high school geometry with a fine toothed comb and help you master it all because you are going to teach it." That was not the idea. The idea was to use their background of geometry. You can't do much unless you use 10th grade geometry. But to enter into other topics of geometry that you haven't covered basically in high school, and work on these.

There were a variety of topics that were very nice. One topic that would be quite different would be a unit on finite geometry where you have certain assumptions, actions, or postulates. And the geometry that you develop depends on what you accept to begin with, such as what action you start with and what postulates, and what definitions. And from that, you can get a theorem, a theorem, a theorem and more and more and more..._____. Supposing instead of having, like we have, points, lines, and planes where you have an infinite number of points, you can't count them, and infinite number of lines and infinite number of planes. Supposing you started with a geometry where you only allowed yourself to work with four points. Nothing else. You can think about connecting those points A with B, but not with a line, not with an infinite number. They are related to each other. What can you do with a geometry where you have elements of just four points, and you allow an operation like pairing or something like that. And then take not four points, but take say seven points, and then say take something else. Take a very limited number of things, define them properly and define operations which would be very simple. And then see what you can do to develop some theorems. The idea is to show the kids that here is a very simple and very limited geometry that's absolutely logical. If you accept what you start with, you've got all the rest. That is a sample. There were several chapters in there where we studied things that hadn't even been put in textbooks before 20 years ago. I might mention two others along the line of this finite geometry. Somewhere along the line we also worked with...the nickname is wax paper geometry, or folding geometry. That is, what can you do with just a sheet that

you can fold. You fold it, and you make a straight line and then you open it and there is a straight line. That is why it was nicknamed. We would define what you may do. For instance, you may fold and make a line, and you can fold again and make another line. But then if you have the first line with the first fold, now you make another line with another fold, you can make an angle. The definitions may involve how you may fold to make a line. So you have to define some things. Then how do you make a line perpendicular to another line? And then see how many constructions you can make with this what we call folding geometry. And then we have a nice, extended unit on constructions with ruler and compass, and things like that. The best unit, as far as I'm concerned and the most interesting for me to teach, and the one that I think was of the greatest value for the kids, was the non-Euclidian geometry. I always put that as the last thing because it was a nice climax for the course. Have you ever heard of elliptical geometry or hyperbolic geometry? Well I taught both of them. A nice, large unit on hyperbolic geometry. And an abbreviated unit on elliptical, for one thing, we were not going to far with it. What we wanted to learn from the elliptical we had already learned similarly in the hyperbolic, so we wouldn't do it all over again. Do you know a little bit of how hyperbolic geometry develops?

BW: No, not too much.

CS: Hyperbolic geometry evolves from taking Euclidian or regular geometry, and just change the parallel postulate. In elliptical geometry, there are no parallel lines. In hyperbolic geometry, there are an infinite number of parallel lines through a point.

Here's your postulate. Here's a point. Through a point, one and only one line can be drawn parallel to this line in the same plane. In hyperbolic, through this point an infinite number, many lines can be drawn parallel to this line. That sounds crazy. Through a point in elliptical, no lines can be parallel to this line. I wanted to go through this to show a rather large body of geometry knowledge in hyperbolic geometry to these kids who are going to teach in high school. To teach them that the geometry that you end up with depends upon your axioms and postulates that you agree you are going to allow yourself to start with. And we did that. I won't go into the whole thing about that, but I'll give you one idea. In elliptical geometry, you have a line or what you define as a line, and a point and you can have no parallels. Well, what is a line? A line in elliptical, you see in Euclidian geometry, nobody ever defined a line. Nobody ever defined a point. Nobody ever defined a plane. You just talked about them. A line in non-Euclidian geometry is a great circle arc or a sphere. Like say on the world, the equator. Now take Holland, Michigan. How many lines, how many great circle arcs can you draw through Holland, Michigan, parallel to the equator. You can draw small circles, and small circles ain't great circles. It's impossible. The way you illustrate the hyperbolic geometry, an infinite number of points, I won't get into that too deeply except to say, do you know what a hyperbola is? There is one branch here and one branch down there. Revolving of a hyperbola, a line would be created by chopping right through the whole thing. You would get an arc here and an arc down there. Now can you imagine an arc like this and here, and you know there is a point where you have the two ascentopes, there is a point down

here. So then you chop so that you go through this point and you get like this and like that. And now you go out here and pick a point. You pass the plane through here and you can actually demonstrate that point. You can cut many of them and they are parallel to this one because they will never meet. So there you have that concept. And it was taught in this way. You first say this about the parallel postulate and then hyperbolic, an infinite number of lines going through a point. But then, you start out and you prove one theorem. Almost all of the proofs through that type of geometry is that you establish either something can be or can't be. In hyperbolic and elliptical geometry, you usually prove the elimination of the can't so then it has to be. Like here is a point and a line. Well if you pass a line through it you can meet it in a point. Well either you are going to intersect or you aren't.

BW: You start from the given? Start with the definition?

CS: Start with the given and then have a theorem and prove it. But then you draw a picture of it. Here is a point and a line. This line is parallel to that line, but then you start saying well this is or is not going to meet. Eliminate the is not. Well then you go from there and you prove the theorem and in like manner you prove, and prove, and prove, and you got a nice chapter full of theorems. I also reorganized the math methods for teaching in high school. Again, Mr. Lampen had taught that for many years, and I had it under him. It was one of my five courses. I taught it for a while following his approaches. I completely reorganized it. I visited all of those training to be high school teachers. I visited every one of them every year. I organized the math section of the curriculum library. Do you know what the curriculum library is?

BW: I am not familiar with it, no.

CS: The curriculum library was down in the basement of the library. I don't know where it is now, maybe it is still there. That was where there was a collection of high school level texts that we would get gratis from the different publishing companies. And we had sample textbooks. When the math section was to be organized, I was asked to do it, and I did it. I wrote to scads of publishing companies and asked for everything at the high school level, from 7th grade, 8th grade, 9th grade, and all the way through. Houghton-Mifflin, all of them. They were organized on the shelf. Put all the 8th grade books together, all the 7th grade, and all the 9th grade algebra texts and so on, so kids who were going to teach, could look through all of these and even take them out for a few days and then bring them back. Someone who is teaching high school level can have three or four rather current books to look through in comparison to the one he is teaching from.

BW: Do they still offer these classes, the methods classes?

CS: Yes. Mary De Young now teaches that and I think she has reorganized it, and is a better teacher at it them I am by far.

BW: Do you do it through math or through education?

CS: The methods course is taught in the math department. I taught engineering drawing one and engineering drawing two for a number of years. Then we stopped that. It has become obsolete.

BW: That was located in the E. E. Fell?

CS: I taught it in several places. First I taught it in Van Raalte, second floor. Then I

taught it in the basement of a dirty, dusty, old room in the girls' dorm...

BW: Voorhees?

CS: Voorhees. In the basement room. When the DeWitt building was built, I was given a room there and I taught there for five years or so.

BW: Was there a Martin that taught?

CS: Yeah. I had the course from Mr. Martin. He taught it before I took it over. When I took it over, they sent me to the University of Michigan. I had the course with Mr. Martin, a year of it in 9th grade. When I came to Hope College, I took his college course which were two of them, same ones that I taught. So I had a year of that under Mr. Martin. Then I went to the University of Michigan in summer school. I had just joined the drawing one course with the others that were there, and there was no one teaching in that summer the second course. The department head at that time, said, "Why don't you just take the course by yourself? Once a week I'll meet you for 20 minutes and I'll go over what you are doing." So I took that course by myself. The first course, course number one, was just the basic drawing that you get in high school or junior high. The second course was descriptive geometry which was a nice course for engineers at that time, but now _____. But it is a course where you are solving geometry situations with drawing procedures. Other than that, I taught the regular math courses, gradually worked up from an algebra course, then college geometry, taught trig, and I taught analytics.

BW: Was there a history of mathematics?

CS: That was my course too. Mr. Lampen taught that, and then when I came, I took it

over. Again, I organized my course. He had a history of math text and he taught that. I had all of the notes because I took it, but by the time I taught it there were very nice books, excellent texts. I taught from a text and I had others of them in the library. I developed a whole lot of handouts. In order to cover more material--it's a one hour course--and in order to cover material without having to lecture on it all, I really gave out a lot of handouts. I collected the history of many topics in math. I had them all on sheets. We met twice a week for half a semester. But I gave these handouts to them, and they were on the history of various phases in math. I had a nice unit on the development of early history of the development of trig for instance.

BW: You taught in the evening school? Did you have anything to do with that?

CS: No, I taught a couple of times in National Science Foundation programs with Dr. Folkert--he was in charge. I think I did that two or three times. We were teaching high school teachers.

BW: It still goes on there at least in the chemistry department.

CS: At that time, I just taught the analytical geometry and focused on calculus.

BW: You did something with the weather here?

CS: Yeah, for _____.

BW: How did you get into that?

CS: What we did at that time is not done anymore. There was a weather station, this was a United States weather service at Muskegon. I believe the Coast Guard here did the readings the last time or maybe someone else does it now in Holland. It could be that it was discontinued. Back then they didn't have this centralized weather development

in one place in the United States, isn't it in Kansas or something?

BW: I believe so.

CS: They didn't have that then, so we had a whole lot of these little stations all over in different cities. I had a little coop, which was a standard coop just like in every other city, right along side of Van Raalte hall. In there we had a rain gauge or snow gauge and two thermometers. One thermometer for the current temperature and the other would register the high and the low, the high of the day and the low of the night. It would go as high as it would go, and when it cooled off it would stay there. I would have to whirl it to reset it. I had to record such things as the maximum and minimum temperatures of the day, and measure precipitation due to rainfall or melt the snow and then get it back into water. I had to describe generally whether the day was clear or whether it was partly cloudy or cloudy, and describe wind direction, things like that.

BW: Did you have to do that every day?

CS: Every day. Seven days a week.

BW: Did they give you reimbursement for that?

CS: I think I earned $200 a year for it. I didn't do it because of just that. Whoever did it just before I did wanted to get out. Dr. Lubbers thought this was a fine opportunity to get it on the campus, sort of a scientific thing. He wanted somebody to do it, and I did it. But I was glad for any dime or any dollar I could earn because my wife was ill during most of our married life.

BW: She had lupus?

CS: Yes. We were going through scads of money. I was anxious for any part-time work that I could get.

BW: How did you manage to teach through that, your wife's illness and all?

CS: I just did. Dr. Folkert and others have said they never knew how I could do it.

BW: You didn't miss many classes?

CS: No, rare, very rare. But I lost a lot of sleep every night because I would be up at least three times every night to help her. I couldn't let her sleep very long, I won't go into a whole lot of detail. I'll give you one example. I would put her to bed around 10:30 and give her sleeping pills. She would lie down and sleep. Her first time she would wake up around 12:30, quarter to one. She would stir, she couldn't get up, she couldn't move. I would have to go around the bed and get under her shoulders and set her up. And then switch her with her legs down off the bed and move her legs and arms a little bit because they would just be almost numb. At that same time she would be wet with sweat. I'd have a whole pile of flannel nighties there and change the soaking wet nightie every time. And then she would want to go to the bathroom, but she can't go to the bathroom. So what I would have to do is hold her and walk her around the house about three times or so until she could go the bathroom. And then give her another sleeping pill and do it again at about 3:00 and then towards morning. Then she could really sleep and actually get rest. That's just one thing. I was strained, but I kept my teaching going. I think I did alright too. I had a boy that I was raising at that time. I think I did about two-thirds of the raising.

BW: What does he do?

CS: He is now a math teacher in a high school in northern Illinois.

BW: So math runs in the family?

CS: Well, the two of us. He is more brilliant than I am. He is a smart kid.

BW: My father is a professor of chemistry, Dr. Williams.

CS: Oh yeah, I know him well.

BW: I went into history. I decided we had enough chemists, so I decided not to get into that. (laughter) What do you remember about the presidents that were here?

CS: I remember Dr. Wichers. Dr. Wichers was the president when I was a student. That would be for four years, before 1937. He was a banker and then he took this job. Quite different than what we have today. Dressed in immaculate pinstripe suit, and a tie, and always very proper. He had a very limited budget. He was keeping this college going on almost nothing. My first contract as a public school teacher was for $1200. That was a year's contract. I lived on it and I saved $200 of it because I wanted to get married as soon as I could.

BW: You went through school during the Depression. How did you manage that?

CS: My dad was a merchant. A lot of people were hard pressed but we weren't. But you live very close to the dollar. You didn't have much. But I lived through that. Dr. Wichers did a very credible job, I was proud of him. I would say that he did an excellent job with a very limited budget. You couldn't spend money on mowing grass or sprinkling in the summer on the campus. So you just cut out everything you could. Then there is a period Dimnent was in here. I knew him from the last few years when I came under Lubbers. But I wasn't around when he was president. Dr.

Lubbers I think had been here one year or two, I think it was one year before Folkert and I came. I found him to be a very successful president. I liked the guy very much, and one thing in particular. He and his wife were so sympathetic and helpful with me and my wife. They would come to my house every now and then and just sit with that girl, so sick as she was, and sympathize with her, and encourage her. He was a wonderful visitor. One thing during his time that I remember which was very interesting to me, I'll never forget it. That is the library in those days was in Graves Hall. Graves has been all rebuilt since, but if you come in the front door and you turn right then that whole section is sort of an auditorium now, that was the library. But then it extended around the whole building like an "L", and there were two levels. But in that main building, the reading room, wherever kids sat down to work, there were big tables where you could have maybe eight or ten kids around a table. All those tables were about as long as this room like this. Those tables were oak, about that wide, and about that long. We put two of them together like this and like that and that is where we had our faculty meetings. The whole faculty and Dr. Lubbers could get around that two table arrangement. That was the size of the faculty at that time.

BW: Things have changed now.

CS: Yeah, very much.

BW: It's about 180 I think, the faculty.

CS: I just thought of something. I think I still have it at home. I have my catalog from when I was a freshman, 1933 or '34 if that might be of interest to you.

BW: It might be.

CS: It has in there every department and what was taught by every department. If you want it, you call me up sometime and I'll look for it.

BW: Okay.

CS: Nineteen thirty-four, '33 something like that.

BW: You were here under Vander Werf also, right?

CS: Yeah.

BW: He has a reputation for really building science.

CS: He was interested in the academics and the sciences, but he was also very interested in sports.

BW: He has been accused of building sciences more...

CS: That might be, but I think you had better talk to someone in the science departments rather than me, and Dr. Folkert can give you a lot of information in that area, where I can't do too much.

BW: A lot of grants happened when Vander Werf was here. Did you get any of those? Well I guess that National Science Foundation.

CS: Yeah, Dr. Folkert was chairman of the math department at that time. We ran it for quite a number of years, and you could get more exact information from him on that. But I remember going to a training session at the University of Illinois, and starting in the first year and I think we ran about three years. Well, I did. And then Dr. Folkert carried on much after that. Somewhere along in there, my wife died. That was in June, and from then on, I didn't teach in the program. But Dr. Folkert and others,

Vandevelde, and so on. They did it for quite a few years. But talk to Dr. Folkert about that.

BW: You've answered all my questions, unless you have anything to add.

CS: I found it to be very desirable in this kind of work when it comes to retirement. Now a person in the United States can work until 70. But when I retired a few years back, the rule at Hope College was at 65 you retire from full-time, which meant that if the school would like it and you would like, you may continue to teach part-time. I still agree with that today. By the time I reached 65, I was still teaching very well. My evaluations were fine, I was doing good. But at the same time, I wanted to quit before I started feeling that I'm not doing so hot. I believe to this day that you shouldn't teach way up into your seventies. At least in the sciences. By the time you are 65, the science world is getting away from you. You're not teaching what is new. In my case, all the computer stuff was coming. And here I was 63 years old and so I'm not going to get into that when I only have a couple of years left. In other words, I think it is time to get out and let the younger people come in.

BW: You taught part-time for a little while, didn't you?

CS: Yeah, that's what I was going to say. I really think it is very wonderful to go from full-time which would be four courses, between 12 hours and 17. I taught three courses for a year, and then I went to two, to two, to two and then I taught one, one, one, like that. It took me four years to bow out. That was good. I could handle it, but I didn't want to. In the end, mostly because I wouldn't be as sharp anymore as I was before.