

INTERVIEW WITH ALFRED KNUDSON
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Dr. Hartzell: Do you want to start off with, say whatever you want, then we'll go with these questions for a short time.

Dr. Knudson: I think a general introduction that Bentley visited me while I was still in California.

Dr. Hartzell: Let me get your name, the number one question: name, department, rank, position at the time.

Dr. Knudson: Alfred Knudson, I was Associate Dean for Basic Sciences, I think. When I first came there we had kind of anomalous appointments Ed Pellegrino and I, as you may know, were the first two people there, arrived September 1st 1966. We had never met each other before. Bentley recruited both of us.

Dr. Hartzell: I see, how old were you at the time?

Dr. Knudson: 44.

Dr. Hartzell: From what institution or position did you come?

Dr. Knudson: I came from City of Hope Medical Center, Duarte, California, and I was Chairman of the Department of Biology there and I had previously been Chairman of the Department of Pediatrics there.

Dr. Hartzell: I see, where is Duarte?

Dr. Hartzell: I see, where is Duarte?

Dr. Knudson: It's in LA County, not far from Pasadena

Dr. Hartzell: Question 4, you were about to answer that one; who was primarily responsible for your coming to Stony Brook?

Dr. Knudson: Well, it was Bentley Glass. We had conversation, I think it was perhaps during the Christmas holiday of 1965, it would have been. He was visiting some friends at Cal Tech and he was telling about, or so I heard, this experiment that they wanted to try at Stony Brook, some new ideas about medical education in a different kind of setting.

Dr. Hartzell: Did he mention the Muir Commission?

Dr. Knudson: No, I don't remember, he could have, but I don't remember. I shouldn't say that, he easily could have and I just didn't know enough about it to recognize.

Dr. Hartzell: It was the Commission appointed jointly by the Governor and the Regents on education for the health sciences that had visited Stony Brook in 1962 and Malcolm Muir and Lester Evans of the Commonwealth Fund, and they had the idea that the two institutions, that is the health sciences center and the university should grow together so they were looking for, not for an existing institution, really, but one that was developing. The next year when the report came out, the first health science center to be built in the State was to be located at Stony Brook.

Dr. Knudson: They already had something in Brooklyn and Albany and Syracuse.

Dr. Hartzell: That's right, but this one was to be built fresh and more comprehensive.

Dr. Knudson: That was an attractive theme because, although there were other medical schools around generally on university campuses, they hadn't been built at this particular kind of crucial time, although there were some in the building that

many of them, this is a little off, but I think in a larger context because one of the things we did when we got there was to look at the other places that were building, notably Michigan State, UC San Diego, UC Davis. And the California ones, for example, were three built: there was San Diego and Irvine around the same time, and they all ran into big problems because they ran short of funds because they had gotten too ambitious. They all had to settle for County hospitals, which were removed from the campus and interfered greatly with progress in all three places, even to this day represent problems for those institutions. So this looked like a really interesting possibility and, of course, Bentley had his own personal view about new things in medical education, and he and I kind of hit it off. Over the next few months we talked some more and he identified Ed as another person he'd like to bring. Ed was already an experienced person in the administration of health sciences, whereas I had always stuck closer to the clinical and research side.

Dr. Hartzell: Hunterdon. I gather that was a sizable undertaking.

Dr. Knudson: Yes, it was a widely cited experiment by a medical school in the distribution of medical care, and since that idea was also raised by Bentley, and I had some thoughts that I guess meshed well with Bentley's about science in relation to medical education, where things were going. When I left there three years later, I'll get you a copy of this letter, which is my resignation letter, and *apropos* the present discussion, I said I believe very firmly that the plans for Stony Brook's Health Sciences Center constitute a unique contribution toward the resolution of one of the great crises in American and, in fact, world medicine, the crisis borne of an unprecedented conjunction of available technology and unfulfilled need for service. This combination, this coming together at that time, and as you know we still haven't really solved that problem. In fact, just this week in the editorial of the NEW ENGLAND JOURNAL SAYS something to the effect

that it's now time for universal health insurance. Well, I think we thought it was already late then. So, you see, a lot of the things we were addressing at that time still aren't really solved, because no one institution can solve that big plan.

Dr. Hartzell: Why did you go to Stony Brook.

Dr. Knudson: Well, it sounds a little crazy, but I got caught up in thinking about these problems and also the promise of Stony Brook. In fact, when you called me I got out some file, and one of the items in the file was the article on, I think it was TIME magazine, about Stony Brook and how it was touted as the Berkeley of the East. This was around '65 or '66, before I arrived, but not much before. And the arrival of Toll, Yang and Bentley all made it sound like there was going to be a big ocean. There was lot of excitement. We even had people writing to us inquiring about jobs and some of them were quite well known people, just out of the blue; so, I think there was some excitement generated by the possibilities there.

Dr. Hartzell: I guess that it was an opportunity for the State of New York really coming late to public higher education.

Dr. Knudson: Yes, and the factor that you mentioned, the fact that the college itself wasn't really that old and it was in a formative state too, that already indicating that it could attract good people. So, I think if one asks almost anybody that was recruited at that time, not just in the Health Sciences Center but in other areas too, they would cite this very excitement in the air.

Dr. Hartzell: I get that as an answer to this question from virtually everybody.

Dr. Knudson: I'm not surprised. We were all a little soft in the head in those days. Well, I think if you can't be excited something, life would be nothing but. I

think it was the main motivation for many of us, cause many of us sort of interrupted our normal careers to go there.

Dr. Hartzell: Well, let's see; I would be very happy to have a copy of the letter.

Dr. Knudson: Sure, I'd be glad to. When Ed and I got there, he's probably already told you, it's a little more compact in my memory because he stayed on for a while afterwards, I was just there three years. We moved rather quickly toward getting plans going for the place. I can't remember just when, but in the first year, Bud Goldberg was already signed up as the architect for the place.

Dr. Hartzell: How did you get him?

Dr. Knudson: We didn't get him. The State made that arrangement somehow. I don't know how that was done. I suspect it was done through Albany, but John Toll or Bentley would probably know the answer to that. We were not involved in selecting him as the architect. He was a given for us. But we didn't object; we went out to visit him in Chicago and had a lot of interaction with him first and I thought he was pretty interesting.

Dr. Hartzell: Had he had experience with hospitals?

Dr. Knudson: Not much, I think. He was most famous for Marina City in Chicago. But he was accumulating some people and there was also a big input from a medical center planning group housed in Tiburon, California, whose name escapes me at the moment.

Dr. Hartzell: You mean out in California?

Dr. Knudson: They had also been hired for our coming on the scene, and we had a lot of interactions with them. It was they who, I think they even went with us on some of these visits to other medical schools that were in the building at that time.

Dr. Hartzell: They were architects or engineers?

Dr. Knudson: Well, I think basically it was a planning group that contracted a lot of services to architects and engineers and had a lot of influence. You see there were a number of medical schools, either having just been built, or being built at that time, so they were the right people at the right place at the right time. I think they were in on the planning of a lot of the new medical schools.

Dr. Hartzell: What was their name again?

Dr. Knudson: Well, I can't remember, it might occur to me as we progress. So, it was Ed and myself interacting, of course, with the whole complex at Stony Brook, together with this planning group, together with Goldberg, the architect, who were really planning the center.

Dr. Hartzell: :I remember the long shelf of volumes that you came up with. We still have that, of course, in the library. You must have done a lot of work on these plans.

Dr. Knudson: Yes, the State even insisted that we draw up equipment lists for all the labs, nobody had been hired. It was really crazy.

Dr. Hartzell: They were accustomed to include with the appropriation for the building an appropriation for its equipment and they were getting ahead of themselves.

Dr. Knudson: Well, it presented a big problem for us because there were two aspects to it, one was the specifics of the equipment but there was also the general question of what kind of a health sciences center it was going to be. They had in mind a medical school that would start out with somewhere around, I can't remember, 100 or so students, but get up to about 200 students, as I recall. And that was really the determinant of the size of the medical school in some ways, but then Ed and I had the additional problem of deciding what kind of a medical

school, because the number of students doesn't decide the size of the whole place; because you see a lot of things are variable, if you look through the documents of various medical schools, as we did, you find that the number of post-doc fellows who are Ph. D.'s or post-MD clinical fellows or Ph. D. graduate students, those are very variable for medical school per 100 students. And the places like Harvard and Hopkins and Stanford that are research intensive, of course, have many more such people in those categories than the average school would have. So, we were in the position of trying to decide what kind of a medical school did we want to be? Did we want the numbers of graduate students and post-docs and fellows that the average school had or did we want to be aspiring to something better than that? Of course, we wanted to aspire to something more, so we had many more. That greatly enlarges the square feet per medical student, which is kind of a means thing because the health sciences center, medical center, might be the original reason for having it, once you decide to have it and there are many other considerations that come in that determine the size of the faculty and of the buildings.

Dr. Hartzell: What was the context in New York State at that time of other medical centers that you looked at?

Dr. Knudson: Both in New York and in the northeast generally, the tradition has always been that the private schools were the great schools: Harvard, Yale, Columbia, Cornell, Hopkins and so on, in medicine I'm talking about. And even to this day the state university schools are second-class compared with those. Now, I'm not running them down, I'm just saying that they don't have the same stature in medical science that the private schools have. So, if you go to places like University of Connecticut or University of Massachusetts or most of the SUNY schools or Rutgers or University of Maryland, you may find very good medical schools but none of them have the reputation of the others. So, even in New York

at that time Syracuse, a very nice school, and Brooklyn, you can cite many individuals who were fine in those schools, even in research, but if you looked at the place as a whole, they were definitely different from Columbia, Cornell, NYU, Einstein; the private schools were really pretty high up there. Mt. Sinai, I think, came into existence after that or around that time, I can't remember exactly.

Dr. Hartzell: Mt. Sinai, I always thought of that as a hospital.

Dr. Knudson: It was, but it became a medical school as well. So, Stony Brook was really trying to be one of these up here.

Dr. Hartzell: Yes, one of the best.

Dr. Knudson: They were trying to operate in the class with the private schools being a public school so there was a big challenge right there. We had this image that the private schools of New York, and that included Rochester upstate, there was Buffalo also a public school. Were pouring poison into the administration and the Legislature of New York to say let us, the private schools, do the high powered research, just turn out doctors at the state places, and we were doing everything we could to resist that.

Dr. Hartzell: Were you successful?

Dr. Knudson: Well, since I don't really know the situation there; I would say I don't know. But I certainly hear a lot more about Stony Brook's medical school, not because I was there, but because I read things in the literature and it seems to me that they have more than their share of publications in good journals from the public sector of the northeast.

Dr. Hartzell: I think that's true. The hospital now has 450 beds in operation.

Dr. Knudson: But just numbers aren't enough, most of them have plenty of beds so do these other places, there are a lot of resources in Buffalo, but I think if you just talk about good medical science, I think Stony Brook really did work its

way into a larger scene; but it's been tough, and I think that they probably still have a way to go to catch up with the others, because the others are pretty strong, the private schools, I mean. But they certainly are an anomaly, they are better than some of the private schools and I would say clearly better known in research circles than almost any of the state schools in the northeast. But, that's kind of a tradition in the northeast, that the state schools are not, in the midwest and far west it's a different story, and even in the south the tradition has always been with the state schools and the anomalies are the few private schools that are famous.

Dr. Hartzell: Emory, for instance, is one.

Dr. Knudson: Yes, Stanford and Chicago and a few, Washington University in St. Louis. But you could almost count the ones, Vanderbilt, that are private and really good in the rest of the country, whereas it is just the reverse here. Stony Brook was lucky in that.

Dr. Hartzell: You and Ed were the first people to come on the scene, but you two brought in some others, who were the ones that you brought in?

Dr. Knudson: Well, you put me on the spot. Howie Oaks was one of the first and, you're trying my memory now; we brought in a dean

Dr. Hartzell: Upton?

Dr. Knudson: No, he was later; I'm talking about right away, at the beginning, we brought in a dean of allied health, but I can't remember his name.

Dr. Hartzell: McTernan?

Dr. Knudson: Yes, and also the dean of nursing, whose name you will probably supply me.

Dr. Hartzell: Fahy.

Dr. Knudson: Yes.

Dr. Hartzell: F A H Y, I've forgotten what her first name was.

Dr. Knudson: Ellen.

Dr. Hartzell: How did you go about looking?

Dr. Knudson: Well, Ed was very much up on health science centers; first of all we had some consultants come in; we had a very strong consultant in dentistry from Alabama, I remember, and he had a lot to say about the design of teaching spaces. It was his emphasis that the wave of the future was once referred to as four-hand dentistry, where a dentist and a technician would work together and that many of the functions of dentists of the past were now going to be performed by other people who didn't have doctoral degrees. These consultants would also put us onto the people and Howie was interesting to us because he was in charge of this program at Harvard, which was a very small school, I think they had 16 students a year or something like that. And they had doctor of medical dentistry degree; now that's a rather more common thing; but I think Harvard was one of the first places to do that. So, he was interesting to us because he had ideas about community dentistry and the way dentists should work to solve the problems of dental care but at the same be related to research. The allied health, that was an interesting problem because there wasn't a very good model to go by in our estimation. The largest school was by far was at Boston, and associated with Northeastern. Yes, because each one of the medical schools didn't want to get into that. So, Northeastern picked up all the chips and got heavy endorsement from all the other places. So, it was like they got together and had a game plan, which is probably one of the few cases where all of the institutions in Boston really worked together for nothing. McTernan was there, I can't remember what his function, he might even have been the Dean of that program.

Dr. Hartzell: I haven't interviewed him, maybe I should.

Dr. Knudson: We got caught up in that and Ed always emphasized strongly that the training of all of the other people in the health sciences were very important for the distribution of medical care in the future.

Dr. Hartzell: Now, by allied health sciences, what does it mean, a Bachelor's or Master's degree?

Dr. Knudson: A level of the training sort of parallel with nursing but embracing all kinds of things, including occupational therapy, for example, physical therapy, but now much broader including some bio-engineering and very. I think the program at Northeastern consisted of something like 22 programs in allied health sciences. And that's why it was attractive to us, we thought we really, and as I recall we had had McTernan down as a consultant for allied health because we thought the Northeastern program was probably the most comprehensive in the United States; they had over 2,000 students in that program. My memory is not so sure on some of these things, but I know it was a huge program.

Dr. Hartzell: What was your impression of Stony Brook when you got there, the people you were dealing with on the campus and did you have any connections with the people up in Albany?

Dr. Knudson: I'll answer it yes all around. First of all, there was all the interaction with John Toll and Bentley and because

Dr. Hartzell: How did you find John Toll?

Dr. Knudson: Well, I found him keenly interested in the future of this operation and Bentley, of course, I think Bentley was the one who really was the driving force and cared deeply about it. I think John was much more interested in the university as a whole. He had to be. It might even be that he was worried about the Health Sciences Center taking over the place as was also true for maintenance other faculty. But we had a lot of meetings with people in various

departments, some of which were dictated by John's interest in making sure that the standards of the university were upheld in the Health Sciences Center so there would be input from distinguished faculty, people in various disciplines into the appointments of people and so on.

Dr. Hartzell: Can you mention any of them?

Dr. Knudson: Sure, for example, Max Dresden had a keen interest in the way things were going and even came up with some suggestions of people he happened to know about. Alex Pond was involved to some extent. Hoffmann, of course, had an administrative role at the university, he was Bentley's assistant or something like that.

Dr. Hartzell: Yes, for a while he was, that's right.

Dr. Knudson: Charlie was quite involved in the plans for the center. Bernie Semmel was on some committees. We had a lot of conversation with Kalish and Krasner and some of the other people in psychology, because that was one of the cluster disciplines, and then, of course, we had interactions with Erk. Our strongest interaction in biology was with Mel Simpson, because Mel was hired at the same time we were. I remember meeting him as we were both being recruited. He was hired into the biology department with the understanding that he would be the chairman of biochemistry in the Health Sciences Center and was supposed to be one of the magicians that would work biology and Health Sciences Center together. Then we had some interactions

Dr. Hartzell: That didn't quite work out.

Dr. Knudson: I don't know.

Dr. Hartzell: I see.

Dr. Knudson: During the time I was there I had a lot of conversations with him and he was always very helpful. There were some people in other departments.

Dr. Hartzell: Anybody in Social Sciences, Anthropology or Sociology?

Dr. Knudson: No, Herb Weisinger, as I recall.

Dr. Hartzell: He was in English, in Humanities; he was dean of the graduate school later, I guess.

Dr. Knudson: Peter Weyl was a personal friend of mine over in Earth Sciences or was it Marine Sciences, he was Oceanography basically and I am a little mixed up whether he was ever officially involved with anything or whether I just had a lot of personal conversations but he certainly was quite interested. So I found it very stimulating interacting with all of those people. I thought it was a good bunch. We also had some interaction with Yang; I can't remember exactly why. I guess the main thought was that the best people, by best I mean the ones who were old enough to have made big reputations wanted this to happen, they wanted it to be really good and I think that that was Toll's big preoccupation and Bentley's too.

Dr. Hartzell: Toll gets credit for the construction program, but he also is given credit by Sam Gould in wanting the same level of quality that Sam Gould wanted.

Dr. Knudson: I think on the idea side they were both very strong. For me the big failure was at the operational level and the big failure was somewhere. One of the big problems Ed and I had was identifying who was going to make any decisions. For example, I think we were there about two months when we submitted a proposal for a temporary building into which we could bring chairpersons for basic sciences and get a skeletal crew going because we knew that

when you start a medical school, if you really are going to do a good job, you should have a hospital there as soon as you can. So that we wanted to build a hospital right away. Now, when it came to basic sciences, assuming that you can't build everything immediately, we'd rather get started with the hospital, because we knew that in recruiting some basic science chairmen, as you bring in a guy you say look, here's a blank department. You are going to have ten to twenty people to hire; you're going to put up with temporary buildings under those conditions because it is just too exciting a possibility to pass up. You can't get a job like that just any day. So our job was that we would have the building get going on the hospital but ask for some temporary buildings for these other people, and the final surge building, as a result of that, the so-called surge building, which I guess is a permanent address now.

Dr. Hartzell: A half a dozen of them.

Dr. Knudson: So, we wanted to get going right away. Well, you know, the approval came for that just about the time I was leaving, almost three years later, which I thought was preposterous. And Ed became quite frantic because he was supposed to move through John Toll and John Toll was supposed to go through somebody in, I don't know, Sam Gould or whoever, and it just seemed to get lost somewhere. He didn't even know who was, he couldn't a "no" answer from people on many items.

Dr. Hartzell: That's the bureaucracy.

Dr. Knudson: My own personal reason for leaving was that things were getting, we already knew it was going to take until probably '72 from '66 to have a hospital up and running, six years. Well, everything was back at least three years. At the rate it was going, I thought it could be ten years before things were going. I

just didn't want to sit around that long. So, when a very nice opportunity came up in Texas, I went.

Dr. Hartzell: Where did you go?

Dr. Knudson: I went to the Andy Anderson Hospital, run by the University of Texas, a very famous cancer place, one of the four largest in the country. National Cancer Institute, Andy Anderson Memorial, Sloane-Kettering and Buffalo, those are the four biggest places.

Dr. Hartzell: Is the one in Buffalo related in any way to the University?

Dr. Knudson: Boswell Park. My understanding is that it's run by the Education Department of the State for some reason I don't understand. No, it's run by a different agency than runs the University but they elaborated and they are talking fusing them now some way. But it wasn't run by the University, but it was run by the State, but the particular agency I don't remember what it was, two different departments, as I recall, of the State.

Dr. Hartzell: State Department of Health?

Dr. Knudson: It might have been the State Department of Health, yeah, and then Education would have been running the university. So, I was really upset because I felt that I had put in a lot of effort for years and, while I had faith that something was going to happen, I thought there were two losses: one was my personal loss and the other was really a loss for Stony Brook, in that, although it was certainly going to be a good place because they were putting a lot into it, it had lost some of this excitement that it had created that was in that article in TIME magazine or NEWSWEEK, or whatever it was, that idea that it was going to be the Berkeley of the East, instant fame and all, really seemed like a possibility and the way things were happening all over the campus, not just in Health Sciences, but in the other department, hiring good people all the time, I thought, you know, maybe

we could just pull it off. But, then I had this opportunity to go down to Texas and start a medical genetics center and I had a big interest in cancer and genetics, which I have to this day, that I would sort of go back to the research part and abandon this education.

Dr. Hartzell: This place here?

Dr. Knudson: Clarks Chase Cancer Center, it's one of the twenty comprehensive cancer centers in the United States under the National Cancer Act that Nixon put in and it's a place with a hospital, research operation. Small but good quality. You had me identified as Director of the Institute, which I was for six years, but I haven't been Director now for the last five-and-a-half years. I've just gone back to doing research. My official title is Senior Member.

Dr. Hartzell: What's the name of your research, or what area?

Dr. Knudson: Well, I am still interested in cancer and genetics, and I have been involved in trying to understand what is it that's inherited that gives disposition to cancer. I had made, some years ago, not long after I left Stony Brook, the ideas were already incubating there, some models about how this could happen and made some predictions. The last three or four years, the predictions have been shown by other people to be correct, and so there has been a lot of interest.

Dr. Hartzell: By contrast, have you studied families in which there has been no cancer for many generations?

Dr. Knudson: I have not, but I think that is a very interesting subject and it was, somebody rather recently called attention to that problem, and in fact there are families like that, where there is just way lower incidence of cancer than one would expect.

Dr. Hartzell: I come from two lines like that.

Dr. Knudson: I think those are quite interesting.

Dr. Hartzell: One English and one German.

Dr. Knudson: I've been interested mostly in the ones where a single gene poses a great increasing risk, not just a little, great, try to understand what those genes are, and it turns out that they are very important in non-hereditary cancer, just regular cancer. So, it's actually a very exciting time now, because the old question was, "Suppose mutation does cause cancer, what are the genes that are being mutated?" There are two groups of genes that have been identified: one was identified through a study of cancer viruses and they are called oncogenes; the other was identified through the study of hereditary cancer and I call those anti-oncogenes, some people call them tumor-suppressor genes. The difference being that an oncogene causes cancer when it is doing too much, overacting, or mis-acting, turning on something in the wrong way, but it applies action of the gene. The anti-oncogenes, the normal gene, is turning down cell division and when you knock out both copies, there's nothing to turn down. So, it's the loss of genes that's causing cancer in that group. And when one gets hereditary cancer, you've inherited it within all the cells in your body one of those defects and then as soon as some cell in the target tissue loses the other normal copy, then you get a cancer. So, there's been a big improvement in the understanding of what's gone wrong in cancers.

Dr. Hartzell: You have given your impressions under 8, do you want to add anything under 9, what events, what persons, what experiences stand out?

Dr. Knudson: Well, I tend to remember the good things. I personally particularly enjoyed thinking about how we could impact on the world of medicine and medical science and that here was an opportunity to really train young people in a system of medical care in relation to science. And, that any previous efforts

that were, in retrospect, used had sort of grown like Topsy or been divided *ad hoc* bases and it didn't impact on medical education, that we weren't educating young doctors in this system, people were discovering things and learning how to improve the system and how to translate advances in medical science into practice and beginning to be concerned about the idea that everybody should be entitled to these things, but medical education had been somewhat ossified for a long time and really wasn't emphasizing these points, it was still pretty much one on one medicine. And at that time you remember, there was a lot of talk about socialized medicine and there was enormous opposition organized medicine to such things; and many of us felt at the time, it was the worst thing they could do because it was so obvious that something was going to have to be done that the government or other agencies would take over and medicine organized would have nothing to say about how it happened and to a large extent that's what has happened, by the time organized medicine woke up, it was a little too late. But at places like Stony Brook we were trying to get that brought into the system and educate young doctors in that. That is one thing I remember, conversations along those lines. And then on a more personal basis I remember how nice it was to be able to interact with people on the general campus and talk about history or psychology or whatever. I enjoyed those personal encounters very much. And I thought at the time there would some very aspect of that surely would improve the life of people in the Health Sciences Center, to be able to interact with people in all these different disciplines and *vice versa*.

Dr. Hartzell: To what extent that's been organized, I'm not sure. People who feel the need of it for themselves seek it out.

Dr. Knudson: Well, I think we had ideas that maybe we would invite our buddies from the other side of the campus to come over and come to grand rounds and participate in some things, sort of see what was happening.

Dr. Hartzell: What about Albany, did you have any contact with Albany?

Dr. Knudson: Yes, I went up there a few times; Ed, of course, had more. And the people we actually met with seemed to be quite okay but I think we tried to figure why didn't things get done, you might say that the people we were talking to didn't have the authority to do those things. So, there is some mysterious "they" somewhere that, I'm not even sure that John Toll knew who "they" were.

Dr. Hartzell: As long as Rockefeller was there, I think we felt that the State, in quotes, was supportive, highly supportive and sympathetic to the basic ideas of

Dr. Knudson: I don't think we ever questioned that. I think we felt that the ideas that we were talking about were quite agreeable to them and even received their strong endorsement, but the operational level was highly bureaucratic, perhaps even debilitating, and very difficult to cut through. Of course, it also cost the State a lot of money because there was inflation during this time and prices of things were going up. I remember we talked about building a medical center for \$160 million and people raised their eyebrows, \$160 million. Of course, I would like to know what the final number on it was.

Dr. Hartzell: I don't know; I could get that I guess somewhere. Did you find that you had to deal with the State Department of Health.

Dr. Knudson: I didn't.

Dr. Hartzell: That's another bureaucracy. Did you leave before Ed left.

Dr. Knudson: Yes

Dr. Hartzell: You did.

Dr. Knudson: I don't remember how much longer he stayed but I think it was a couple of years.

Dr. Hartzell: Yes, fine. I still see him.

Dr. Knudson: Yes, I saw him a year or two ago.

Dr. Hartzell: I interviewed him, Johnny had me talk with him. I was interested in the physical basis of intellectual characteristics, I was interested, as a Dean, why it was that individual faculty members decide to spend their life working on a certain discipline, seeking answers to certain questions, performing certain functions and I also noticed that within the department you had people who were theoreticians, people who were experimentalists, I'm using the scientific terms but you also had in the humanities and social sciences people who were interested in minutia, small sections, small segments, others with minds that tended to embrace the discipline as a whole and sometimes make contact with other disciplines; this, for me, is a variety or type of mind, whether it's brain, I'm inclined to think that there is a genetic base to that kind of performance, variation of performance, and I was interested to see whether there were any physical or chemical footprints that would correlate in any way to some of those types?

Dr. Knudson: Sounds like a tough problem.

Dr. Hartzell: Yes, yes, but I felt strongly that departments should have a variety of types of mind within the discipline because they are going to get students who come with the same variation of type of mind and some students will not find a professor with whom they resonate in the way they think.

Dr. Knudson: I think there is an extent it's almost formalized theoretical, I don't mean to say that that's equivalent to what you're saying because I suppose the theoretician would be narrow and the experimentalist would be broad, I certainly realize that. But when I think of conversations I had with say Max or

Yang, they were pretty broad, they were interested in a lot of things, way outside of physics. I guess that with the expectancies played an important role in the history somewhere, more likely to come the attention of people in decisions of appointment. Max, was, I always loved having him at a meeting because he wouldn't let you get away with some dumb statement that was unfounded. It didn't matter whether it was in his field or not, he could smell out an unfounded statement in any subject.

Dr. Hartzell: What about the faculty itself?

Dr. Knudson: The quality?

Dr. Hartzell: And the interpersonal relationships, did you have a community of scholars in the medical school?

Dr. Knudson: By the time I left we had new communities of a few people, I couldn't mention. They were still just beginning.

Dr. Hartzell: You hadn't graduated to first class then?

Dr. Knudson: No, no. We didn't even have any students.

Dr. Hartzell: I think you ought to come back and see what the place is like.

Dr. Knudson: Yes, I would like to, to see some old friends, also it would be interesting. I have another document here which would be of interest to see how it corresponds with what Ed had asked me to draw up an overview of curriculum
[tape goes dead]