

John C. Liebeskind History of Pain Collection

**Oral History Interview
with
Ainsley Iggo**

Ms. Coll. no. 127.17

Conducted: 16 August 1994
Interviewer: John C. Liebeskind
Duration: ca. 2.5 hours
Pages: iv, 57

History & Special Collections Division
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Los Angeles, California 90095-1798

2005

Biographical Sketch

Ainsley Iggo was born in Napier, New Zealand, in 1924. He studied physiology with John Carew Eccles at the University of Otago in Dunedin, NZ, graduating with a B.Sc. in 1947, and then received an overseas scholarship, which allowed him to take postgraduate training under David Whitteridge at the Universities of Aberdeen and Edinburgh. After receiving his doctorate from Aberdeen in 1954, he taught physiology at the University of Edinburgh School of Medicine. From 1962 until his retirement in 1994, he held the Mary Dick Professorship of Veterinary Physiology at Edinburgh. Dr. Iggo is best known for his work in recording electrical signals from the “small” non-myelinated nerve fibers (“C-fibers) associated with pain sensation, an achievement he first reported in 1955. He was elected to Fellowship in the Royal Society of London in 1987 and to the Royal College of Physicians in 1985. He was a founding member of the International Association for the Study of Pain (IASP) and served as President 1981-84.

Interview History

Dr. Iggo was interviewed at his home in Edinburgh, Scotland, by John Liebeskind on August 16, 1994. The interview lasted approximately 2.5 hours. The transcript was audit-edited by Marcia Meldrum and reviewed by Dr. Iggo prior to its accession by the History of Pain Collection. The tape and transcript are in the public domain, by agreement with the oral author. The original recording, consisting of two (2) 90-minute audiotapes, is in the Library holdings and is available under the regulations governing the use of permanent noncurrent records. Records relating to the interview are located in the offices of the History & Special Collections Division.

Topical Outline (Scope and Content Note)

The interview is organized as a loose chronology, with several topical digressions. The conversation begins with Iggo’s education, postgraduate training, and success in recording from C-fibers; it moves on to discuss his marriage and family, his research of the 1955-72 period and views on the gate control theory, his travels and work with various collaborators; his experiences as a member of IASP and presidency of IASP; his retirement and his children. Major topics of interest include reminiscences of John Carew Eccles, David Whitteridge, and Hans Kosterlitz, whom Iggo knew in Aberdeen; the specificity *vs.* pattern debate and receptor bimodality; the gate control theory; the attributes to be admired in a scientist, with comments on Eccles, Denise Albe-Fessard, and Patrick Wall; and acupuncture.

Access to the Interview

This oral history interview, in its audio and transcript forms, is held by the History & Special Collections Division. Those wishing to use the printed transcript (which is available through Interlibrary Loan) or the audiocassette version (which is available by appointment only) should

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Citation Information

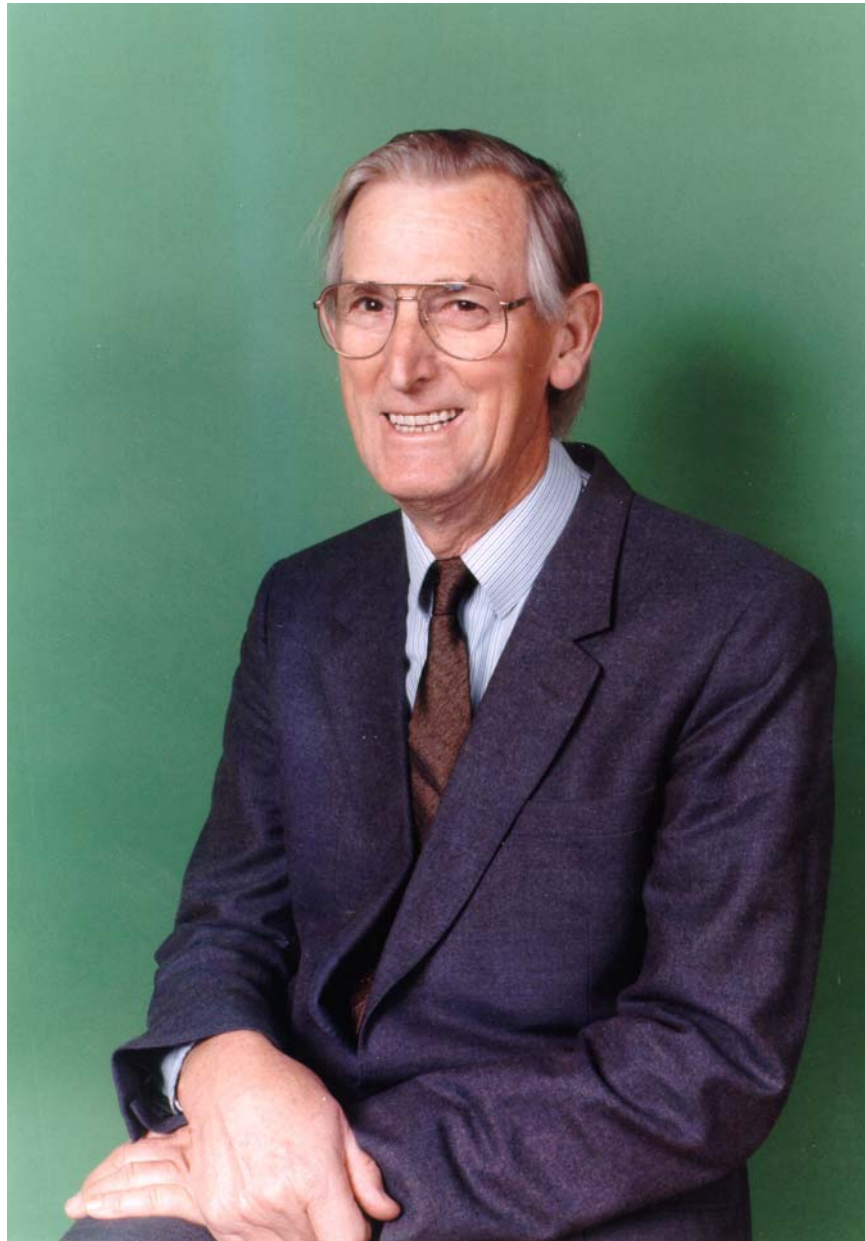
The preferred citation for excerpts from this interview is: *Oral History Interview with Ainsley Iggo*, 16 August 1994 (Ms. Coll. no. 127.17), John C. Liebeskind History of Pain Collection, History & Special Collections Division, Louise M. Darling Biomedical Library, University of California, Los Angeles.

Related Materials in the *John C. Liebeskind History of Pain Collection*

The researcher is referred to the following related materials: International Association for the Study of Pain Records (Manuscript Collection no. xxx).

Acknowledgments

Continuing support for the John C. Liebeskind History of Pain Collection and Oral History Program comes from the American Pain Society and the International Association for the Study of Pain.



Ainsley Iggo, DSc

Physiologist

AINSLEY IGGO INTERVIEW

TAPE ONE, SIDE ONE

JOHN LIEBESKIND: All right, Ainsley, let me hear you say something there. Anything at all.

AINSLEY IGGO: Well, spontaneously, should I just make a remark?

LIEBESKIND: That's it.

IGGO: Normally it's the p's which are a problem. They plop. [both laugh] That's what I discovered once on BBC when they -- when I was doing a broadcast.

LIEBESKIND: I see.

IGGO: They went to a lot of trouble to get [rid of] the pop, the plop --

LIEBESKIND: The problem of the plopping p's. Well, let me note that it is 10:30 in the morning, on August 16th, 1994, and we're in the home of Professor Ainsley Iggo, and conducting an oral history interview. Ainsley, thank you for participating in this. I'd like to start with just a few personal facts just to kind of get your ancient history here. I understand that you celebrated a seventieth birthday this year.

IGGO: Three score years and ten.

LIEBESKIND: Three score and ten. When was your birthday?

IGGO: Second of August.

LIEBESKIND: The second of August, so now we know all about your birthday.

IGGO: That's right, yes.

LIEBESKIND: Did you have a nice celebration here?

IGGO: Yeah, we -- The family turned up. Yes, it was a very happy occasion, very unexpected. Perhaps the most surprising feature of it all was the present which I was given, which was a lawn mower. [both laugh]

LIEBESKIND: A lawnmower, I see. Was that a "tend your garden" kind of present?

IGGO: That was a "save my sweat" kind of present.

LIEBESKIND: I see. Is it an electric one or gas powered?

IGGO: It's a powered machine, a self-propelled, powered lawnmower. A curious birthday present.

LIEBESKIND: Ainsley, as you know, I'm interested really in the development of ideas and how people found what they found and did the kinds of experiments they did and so forth; but I would like to get just a little bit of your kind of background in terms of how you happened to come into the field and so forth. So perhaps you could tell me just a little bit about where you were born. You were born in New Zealand.

IGGO: Yes, I was born in New Zealand [in 1924] with New Zealand-born parents, so I guess that makes me a third generation New Zealander. Originally, the idea was that I was going to go into agriculture.

LIEBESKIND: Really? Everyone out there was --

IGGO: Well, it was an agriculturally based country. And in fact, I followed my father to Lincoln College, which was an agricultural college outside Christchurch on the South Island. And after I'd completed a degree in agriculture, I felt that somehow life could be more interesting and decided that I would try to move into physiology. And at that time John [Carew] Eccles [1903-97, Nobel Laureate 1963] was in the chair of physiology at Dunedin [the main campus of the University of Otago], and I --

LIEBESKIND: That's not Canberra?

IGGO: No, no. No, he was in Dunedin before he went to Canberra.

LIEBESKIND: Oh, okay.

IGGO: Dunedin was the only medical school in New Zealand at the time.

LIEBESKIND: Oh, in New Zealand?

IGGO: And he was in the chair of physiology there.

LIEBESKIND: Oh, I didn't know. How do you spell that?

IGGO: D,U,N,E,D,I,N. It's a Scottish settlement in the south of New Zealand. Anyhow, he agreed to sort of take me on as a student and I spent several years working, doing a degree in physiology. And by that time I had a post-graduate award, traveling fellowship, on which I came to Britain. And in my innocence, I went up to Aberdeen, not realizing how remote it is when you actually get to Britain. And then I came down to the medical school in Dunedin -- sorry, in Edinburgh, where David Whitteridge was in the chair [Whitteridge (1912-94), a leading researcher on the visual cortex, was later Waynflete Professor of Physiology at Oxford]. And as it happened, David Whitteridge was a student of Eccles, so it was one student of Eccles and another student --

LIEBESKIND: All in the family.

IGGO: It was keeping it in the family.

LIEBESKIND: Let me get some years here now. So you did your -- What degree did you do with Eccles first in New Zealand?

IGGO: I did a B.Sc. in physiology, and completed that in 1947.

LIEBESKIND: Forty-seven, yeah.

IGGO: According to this [his C.V.], it was '49. And then I came over and enrolled as a Ph.D. student in Aberdeen and completed that degree in Edinburgh in 1954.

LIEBESKIND: You started in Aberdeen and then came down here with Whitteridge.

IGGO: Transferred down, yes. I was, at that time, a lecturer in physiology in the Edinburgh medical school. And I really -- The Ph.D. thesis was on reflex control of gastric movements in sheep. And this -- The technique I was using was recording, or trying actually, trying to record the discharge of impulses in the vagus [the vagus nerve, the longest cranial nerve, connects the brainstem to organs in the thorax and abdomen], and following the changes in activity of both sensory and motor axons which are in the vagus. It happened that these fibers in the vagus are rather small, small myelinated and non-myelinated. So I was faced with the task of trying to record from these very small fibers. And that's really where I sort of developed the necessary skills in recording, and that then subsequently led on to later work.

LIEBESKIND: Well, more than developed. I mean, you really probably invented them at that time, right? I mean, you were the pioneer in this, in the field of recording from small fibers.

IGGO: Well, I well recall a visit that Whitteridge had made to America about 1955. And he visited, among other people, Herbert Gasser [Gasser (1888-1963), a pioneer in electrophysiological recording from nerve fiber and a Nobel laureate in 1944, was director of the Rockefeller Institute until 1953, and subsequently a member emeritus]. Gasser had just at that moment applied the newly developed electron microscope to peripheral nerves and found the structure for the first time of the non-myelinated fibers. It turned out that although the myelinated fibers were single axons, the non-myelinated fibers were always grouped together with a Schwann cell [A type of glial cell of the peripheral nervous system that helps separate and insulate nerve cells], which was the sort of mother cell for this group of fibers. And maybe there would be eight or ten of these small axons in that sort of a single tube.

And when David Whitteridge came back he said to me, "I think you're onto a loser here, because how are you going to isolate and separate these small fibers when they're bound together?"

So I just said, "Well, I don't know."

Anyhow, David then went off on a visit to India and Australia, and on his return I was able to present him with electrophysiological evidence, based on nerve stimulation and conduction times, that really I was actually recording individual c-fiber activity. And that --

LIEBESKIND: This again is what year now? In 19--?

IGGO: It's about 1955.

LIEBESKIND: 1955, yeah, gosh.

IGGO: Now, that led to a report to the International Physiological Congress in Leiden [Netherlands] in 1956, at which I reported that I was recording from single c-fibers. And it was quite interesting, given the subsequent history of this subject, that the audience, as I recollect, comprised seven people, including the chairman. [both laugh] So this particular development was not initially paid much attention.

LIEBESKIND: Do you remember who any of those people were? Were there any prominent people? I mean, someone like [Yngve] Zotterman [Zotterman (1898-1982), Professor of Physiology at the Royal Veterinary College in Stockholm until 1963, was a pioneering neurophysiologist and a leader in the field until his death] who had been --

IGGO: Well, I don't actually think -- I would certainly have remembered had Zotterman been in the audience, because I had a meeting with Zotterman which I can tell you about in a moment.

LIEBESKIND: Yes, I'd like to hear about that.

IGGO: But Sybil -- I remember Sybil Creed, who was a physiologist from Oxford, so it was a sort of friends turning up to provide this kind of support. But I don't recollect that there was anybody that I now can name, apart from Sybil.

LIEBESKIND: Was that your first presentation?

IGGO: That was my first international meeting. I had -- Before then I had reported on these afferent fibers in the stomach and bladder, which was what I -- was while I was learning the techniques. But that really was the first exposure internationally and it did not make much of a stir, I have to say.

LIEBESKIND: How did you feel about it at that time? I mean, it must have -- You must have been stirred yourself, knowing that this was really a first and that -- I mean, did you have a sense then of what you would have now, thinking back on it, of the significance of it?

IGGO: Well, I was aware that Zotterman, in the 1930s, had attempted to explore the characteristics of these very small sensory nerve fibers. And there's a paper of his published in 1939 in which he deduces that these things must be from small axons [Zotterman Y. Touch, pain and tickling: an electrophysiological investigation on cutaneous sensory nerves. *Journal of*

Physiology (London) 95 (1939): 1-28.] But my work was the first definite proof that that was the case.

But did I realize that? Well, I realized, certainly, that it opened up a whole new ball park. But I also remember, actually, presenting this material at a Physiological Society meeting in Cambridge and one of the doyens of physiology was Alan Hodgkin [Alan Lloyd Hodgkin (1914-1998), received the Nobel Prize in 1963 for his studies of the giant axon of the Atlantic squid; he was appointed Plummer Professor of Biophysics at Cambridge in 1970].

And Alan Hodgkin got up and said that, “Well, do you really know that these are non-myelinated fibers? What is the evidence? Have you made measurements on current flow and so on?” And I had to say, “Well, no, I hadn’t done that.” My conclusions were based very largely on conduction velocity measurements. And he sat down, I think half convinced, that perhaps these really were c-fibers.

So those really were the early days of obtaining -- with some difficulty, I have to say -- access to the group of sensory nerve fibers which outnumber the myelinated by maybe four times to one. And so here, really, would appear to be an enormous field for exploration. Up until that point, I had been working on gastric or visceral reflexes. And then it was at that moment that I thought I should really switch to looking at cutaneous sensory fibers and hopefully do something about pain mechanisms.

LIEBESKIND: Well, let me ask you about that now. So why did you make that decision? Was it -- I mean, was there any sense of the clinical problem of pain that kind of motivated you in some way?

IGGO: Well, I think I was aware of the fact that most of the previous studies on pain mechanisms had been done by psychophysical methods and using techniques of differential nerve block. And certainly there were some quite significant papers, including some by Gasser, on trying to discover what were the properties of these pain receptors. So my interest was really a sort of fundamental interest in the mechanism of the pain receptors, what we have since, of course, learned to call nociceptors. And largely because the previous evidence was conflicting and it was always indirect, and so this seemed to me to offer, for the first time, an opportunity for the direct sampling of the properties of these particular sensory receptors.

LIEBESKIND: Now, switching from visceral to cutaneous, was this in order to be able to compare your work with the known psychophysical work that had gone on? I mean, presumably there are nociceptors in these visceral afferents as well, but I guess there hadn’t been any of the psychophysical work. Is that -- Was that part of your thinking?

IGGO: Well, one of the puzzles was that in the viscera there was even the view at the time -- among, for example, surgeons -- that the visceral nerves really had no sensory component.

LIEBESKIND: Oh, yes. I see. That’s right.

IGGO: And patients were having the vagi [vagus nerve] cut in order to provide relief from gastric ulcers and such like.

LIEBESKIND: That's right.

IGGO: It turned out that there were a large number of sensory fibers in the vagus, but it was very difficult to establish a control which was sufficiently noxious. It was known from earlier work that if you distend the viscera sufficiently you can -- you may cause pain. But it was always rather indistinct. And I thought that the cutaneous fibers offered a much more or a much simpler approach to this question of are there nociceptor pain fibers and how do they behave?

So that really -- It wasn't so much with a thought of the clinical application. It was more a curiosity, if you like, about the properties of the sensory receptors.

LIEBESKIND: Yeah. Well, let's come back to this. I want to go back over a little bit, some of the earlier things just to get a little more of a sense of who the man, Ainsley Iggo, is, was, how he came to this point where we are now talking. So you mentioned just very quickly that you had been destined to go into agriculture, and actually did your first degree in that. But then that wasn't very exciting for you. I mean, was there -- I don't know, was there something that -- an event you can point to, or perhaps a teacher, or a class that you took? Something, some reading you had done that kind of opened up this world of physiology to you, that, "Oh, gosh, this is much more fun than milking cows or whatever?"

IGGO: Yeah, well, I think -- I guess I just became aware of the company in which I found myself in the agricultural academic world and did not really find it sufficiently attractive to stay there. I suppose actually your question, was there a particular teacher -- There was a teacher of what was grandly called veterinary science who led one into the endocrine mechanisms, which are sort of physiological. And this -- I suppose it was partly -- here was a way of trying to understand something about the body. And maybe it was that that caught my mind. But --

LIEBESKIND: It was this particular class that you took?

IGGO: Yes. I had also, of course, done an advanced degree in agriculture that was called a master's degree, which was a year of post-graduate study; and that was the topic suggested by the man who had actually done biophysics at Cambridge at one time. So that led me into reading about physiological mechanisms of gastric control and so on.

LIEBESKIND: Was this part of the normal course that an agriculture student, or an advanced one, such as you were at that time, would normally take? Would it be something veterinary that related to -- ?

IGGO: Well, it was to do -- Well, that's an interesting question, because there was a strongly held view that -- actually put to me by the head of the school, who was one of the more stimulating teachers -- that to go into the animal science was not the thing to do, that animal science really was the province of the vets and I shouldn't really view that as a suitable career. Interesting in hindsight that I retired as the dean of a veterinary school [at the University of

Edinburgh]. [both laugh] Anyhow, I chose to do this animal science option, and that was the one that sort of led to physiology.

But I think that the really critical moment, probably, was when I, on my way through Dunedin on the train, got off and telephoned Eccles to ask him if he would take me as a student, and he did.

LIEBESKIND: Tell me about that. You were on a train?

IGGO: Well --

LIEBESKIND: It sounds like a dramatic story; let's not lose it.

IGGO: Well, the New Zealand railway system was narrow gauge, and there were no restaurant facilities on the train. The trains instead would stop for twenty minutes or half an hour, at stations where there were restaurant facilities. I was going from Christchurch, where I had just finished my agricultural degree, to my home in Invercargill, in the very south of New Zealand. And the train went through Dunedin and stopped there for refreshments for twenty minutes. And so I got off the train and instead of having something to eat, I went to the telephone and put in my penny and telephoned the professor of physiology in the medical school, knowing that he was John Eccles, and asked him would it be possible to do some physiology, since already I was in possession of a post-graduate overseas traveling award. So this project was now sort of to further develop my physiological knowledge. And Eccles is the man, really, who turned me into a physiologist.

LIEBESKIND: Yes. Well, now, was this -- I mean, you make it sound like this was an impulse, like you were heading for the hamburger stand but then you had a sudden impulse and said, "Well, instead of eating, I'll call John Eccles." Did you know who Eccles was at that time? Was his name known to you?

IGGO: Well, clearly I must have had some hazy idea or perhaps even had had some discussions at Lincoln College about who did physiology in New Zealand, and he was the only man. His department was the only department. So if I really wanted to expand my physiological knowledge, his was the only place. But I of course was --

LIEBESKIND: It was the only show in town.

IGGO: But I was quite unaware of his international standing.

LIEBESKIND: Did he have that much international standing at that time?

IGGO: Well, he was already a fellow of the Royal Society of that time. So you know, that's the acme of science in Britain. And he was elected, I think, in 1941.

LIEBESKIND: I see, yes.

IGGO: That's true, because I went to his fiftieth party [the 50th anniversary of his election] at the Royal Society in London, because they do this for fellows who've been elected for fifty years, so I think it must have been 1941. And so -- And Eccles was a neurophysiologist, but also a very good general physiologist. And so that's where my interest in neurophysiology really sparked off, because up until that point I didn't know much about it.

LIEBESKIND: Still, this seems a watershed moment in your life, certainly, and really in the field of pain, that here's this young chap named Iggo just --

IGGO: This green young man.

LIEBESKIND: -- this green young man, and stopping at a railroad station.

IGGO: Green's the word.

LIEBESKIND: I mean, had you thought of it in advance? Was this a planned phone call or was it really impulsive or what?

IGGO: Well, I must have had a penny. [both laugh] So I was prepared to invest.

LIEBESKIND: Yeah.

IGGO: Yes. On my retrial [retirement], which is looking a long way ahead, Eccles wrote a little piece, which he calls "Ainsley's Introduction to Neurosciences," and it starts off, "On an evening in the late 1940s, I had a telephone call at home from an agricultural graduate who was interested in coming to Dunedin to learn some neuroscience. He was passing through Dunedin on the train to Invercargill and spent a penny calling me from the railway station. So on the return journey we met, and it was arranged that he would come;" and so on and so on.

LIEBESKIND: What is this that you were reading from?

IGGO: That's a compilation [of my and my research colleagues' papers] -- It was a meeting at Edinburgh called "The Edinburgh Connection" on my retiral [in 1990].

LIEBESKIND: Oh, I see.

IGGO: And instead of -- it was a three-day symposium -- and instead of publishing the symposium, the people who organized it thought that instead they would put together reprints and offerings from people with whom I had worked.

LIEBESKIND: Lovely.

IGGO: And so that's what that is.

LIEBESKIND: Let the blind auditory record show that Dr. Iggo is manfully hefting what looks like a ten pound book there, an enormous volume. How many pages? It looks like five hundred, a thousand pages?

IGGO: It's not paginated because most of it is copies of articles.

LIEBESKIND: Beautifully bound.

IGGO: Yes, and then at the back is the table of contents, starting from 1961 with an article on Renshaw cells [spinal cord cells that cause postsynaptic inhibition of spinal motor neurons, mediated by the inhibitory neurotransmitter glycine]. How far from agriculture can you get?

LIEBESKIND: Well, tell me about your time with Eccles then. I mean, that must have been quite an exciting adventure for you. What was it like working with this man?

IGGO: Well, of course, I was there as an undergraduate student learning physiology. I had suggested to him that perhaps I might do a Ph.D. And his response was, "Yes; you should learn some physiology first." [Liebeskind laughs] And so I was put into his B.Sc. honors course and, in fact, did an honors degree. I never actually worked directly with him there, although I did work with his daughter, Rosalind [Rosamund Eccles, a long-time collaborator with her father]. And that's when I first started trying to do electrical recordings. We were looking at ganglionic transmission. At that time there was the big question, was it electrical or was it chemical? And there was a very big debate. Eccles was always promoting the idea very vigorously of electrical transmission. And his daughter and I started doing some experiments, but I left before it really got anywhere.

LIEBESKIND: Was there also -- Her name was Rosalind? Was there a Rosamund also or am I confusing something here?

IGGO: No, it's the same girl.

LIEBESKIND: Yeah, I'm sure it must be the same.

IGGO: Roz, or Rosamund.

LIEBESKIND: Rosamund, yeah. She had quite a career in her own right, didn't she?

IGGO: She worked for quite a long time. She came over to Oxford for several years and then joined Jack [Eccles] in Canberra, when he moved to Canberra [in 1952, as Professor of Physiology at the Australian National University]. And then when he left Canberra to go to America [to join the Institute of Biomedical Research at the University of Chicago], she remained in Canberra and really rather at that point took up domesticity and gave up science.

LIEBESKIND: Oh, really?

IGGO: She married an English-Japanese historian and they still live in Canberra.

LIEBESKIND: Do you keep up with her at all?

IGGO: Yes, whenever the opportunity arises. We certainly exchange Christmas cards and things like that, and if I happen to be in Canberra we look her up, yes.

LIEBESKIND: Is John Eccles still alive? Or no, he died a few years ago, didn't he?

IGGO: John Eccles had a ninetieth birthday party last year, and a symposium was organized from Germany.

LIEBESKIND: He lives in Switzerland now?

IGGO: Eccles lives in Ticino, Switzerland. And so there was a gathering of quite a lot of his Canberra and post-Canberra colleagues at this ninetieth birthday party. But he is now, I think -- Even at that time he'd been in hospital for several weeks and had just come out three weeks before. But he was still remarkably lively. So that was Jack Eccles. Anyhow, he was the man who really switched me on, if you like.

LIEBESKIND: You had a sense at that time of the excitement of his work. You probably, as you worked with him, came to appreciate what exciting things he was doing and the attention that his work was getting.

IGGO: Well, he was a very vivid and powerful intellect. And I think I was responding to those aspects.

LIEBESKIND: Sort of in contrast, almost, to the -- as you were saying before, those in the agriculture field?

IGGO: Well, I think that a man of such ability is a contrast to most other people.

LIEBESKIND: Exactly.

IGGO: So there would be the same contrast in any group that you might go into. I mean, he was one of those people who really stood out.

LIEBESKIND: He was a giant, yeah, sure. All right. Was it with his advice and blessings, then, that you came on to Scotland? Aberdeen was your next stop? Is that right?

IGGO: Well, I was -- Because of the scholarship I had, I was more or less a free agent. I didn't have to find somebody in the U.K. who was prepared to fund me. I came with my wherewithal, modest though it was, and because of my interest in agriculture and my work on gastric reflexes, I thought that it would be interesting to go and do a Ph.D. in Babraham, an agricultural research institute outside Cambridge [founded as the Institute of Animal Physiology in 1948, today the Babraham Institute], the director of which was Joseph Barcroft [1872-1947, noted especially for

his research on prenatal development]. By that time, I was aware of his standing in physiology, and so I thought I could sort of safely put myself in his hands.

As it happened, he had retired from the chair of physiology in Cambridge and was getting on a bit. And one day the bus came a little sooner than he expected, and so he ran for it and had a heart attack. I think that's the story. Anyhow, he died. And his successor at the head of Babraham, was a chap called [Ivan] de Burgh Daly [1898-1974, researcher on the pulmonary vasomotor nerve], who had actually been -- had moved there from the chair of physiology in Edinburgh, as it happens.

LIEBESKIND: Daly, is it?

IGGO: De Burgh Daly. His son, Michael De Burgh Daly, is in the chair of physiology at St. Bartholomew's Hospital in London. So I said to Eccles that I was thinking of going to work at Babraham with Daly, and he was rather uncomplimentary about Daly and he said, "You know, tubes." Daly was working on respiratory mechanisms. And so I had decided to follow the man who was in Babraham doing gastric reflex work, a chap called Phillipson, Andrew [A.T.] Phillipson. He, by this time, had moved up to the Agricultural Research Institute outside Aberdeen.

LIEBESKIND: I see.

IGGO: And so I thought, "Well, I'll go up there." If you look at the map of the world and you are in Dunedin, New Zealand, you can find Aberdeen on the map of the United Kingdom and it doesn't seem very far away from London and the major universities in the south of England. And it's only when you get to Aberdeen that you discover that there's an element of remoteness. And also, of course, as it turned out, the sort of milieu was quite restricted. There were only two or three physiologists. So I was quite happy, eventually, to have the opportunity, through David Whitteridge, to move to the physiology department in medical school in Edinburgh, which is what I did.

LIEBESKIND: Hans Kosterlitz [1903-96, discoverer with John Hughes of the first endogenous opioid in 1975] wasn't at Aberdeen then, was he?

IGGO: Yes, yes, yes.

LIEBESKIND: Oh, was he? Did you know him at that time?

IGGO: I remember visiting Hans in Aberdeen and he was working on analogs of the catecholamines [the catecholamines are epinephrine, norepinephrine, and dopamine], and he was pouring them in and out of -- I've forgotten the name of the actual pharmacological device he used, containing strips of smooth muscle.

LIEBESKIND: The guinea pig ileum [this isolated tissue preparation is often used to detect whether specific compounds are agonists or antagonists of known drugs].

IGGO: Guinea pig and such like. And I sort of viewed this in my innocence very much askance. It didn't seem to me very interesting. So it was quite a surprise when years later Kosterlitz discovered the enkephalins.

LIEBESKIND: That turned into something good.

IGGO: It turned something in cards.

LIEBESKIND: What was he like? Did you get to know him at all at that time?

IGGO: I actually got to know him better after I'd moved down and come into the pain field. And he was quite an attractive, friendly sort of person, who was a refugee. And he and his wife [Hannah] lived on the outskirts of Aberdeen, and I found them both, as I got to know them over the years, a charming couple.

LIEBESKIND: Really?

IGGO: Yes.

LIEBESKIND: I only met him a couple times. He seemed very lovely. In fact, one time when I met him he had had the first -- or maybe not even the first -- of many small strokes and was in Los Angeles, and stayed there in the hospital for a while. And I was sort of transporting his wife back and forth. Were they Jews who came from Germany or -- ?

IGGO: Yes, from Europe. I guess from Germany [from Berlin in 1934], although the details, I don't know. But what was interesting was that the enkephalins story broke when he was about seventy.

LIEBESKIND: Yes, that's right.

IGGO: As I sit here I cannot see myself doing a Kosterlitz. [he laughs]

LIEBESKIND: That's right. Yeah, he really became famous at that age, didn't he, and achieved international -- ?

IGGO: He persisted, you see, with his techniques and he eventually brought it all off.

LIEBESKIND: And he's still alive, I believe.

IGGO: To the best of my knowledge, yes.

LIEBESKIND: I think he is. I've heard of -- Maybe it was a ninetieth birthday they had for him a year or two ago. One of my former students, Huda Akil [now Gardner Quarton Professor of Neurosciences at the University of Michigan], keeps up with Kosterlitz, and every once in a while I speak to her about him.

IGGO: Well, I've certainly not seen him for a few years. I suppose really since I've sort of in the last few years, I guess, dropped out of the pain circuit a bit.

LIEBESKIND: Yeah. Well, that's -- You've kept some pretty impressive company here along the way. All right, so tell me about Whitteridge? So what was that all about? I actually don't know very much about him. Of course, I know the name.

IGGO: Well, Whitteridge was a student of Eccles in the 1930s [at Oxford]. He also can claim to have assisted [Charles Scott] Sherrington [1857-1952, pioneering neurophysiologist and Nobel Laureate 1932, best known for *The Integrative Action of the Nervous System* (1906)] in one of his last demonstrations, teaching demonstrations, in Oxford. And Whitteridge was the sort of the whiz kid of the thirties in Oxford, as was Hodgkin the whiz kid in physiology in Cambridge. First of all, he was a medical graduate. I'm not sure where he did his medical training [King's College Hospital, London], but he then went back to Oxford and his life revolved around Magdalen College in Oxford.

And he worked on -- After the war he was working on spinal injury and spinal injury studies at Stoke Mandeville Hospital [in Buckinghamshire, England]. But he was also developing an interest in vagal afferent fibers from the lungs and heart and interested in respiratory mechanisms. But he did his first research project in the thirties under Eccles' supervision on the ciliary ganglion [small parasympathetic ganglion in the orbit behind the eye].

LIEBESKIND: That's in the eye?

IGGO: Yes. And this, I think, must have given him some kind of an interest in the eye and visual mechanisms, because he subsequently developed an interest in not so much retinal physiology, but in the projection from the eye to the brain. And he did that work. But he then actually, in 1946 -- no, it must have been around about 1950 or '49, he was elected to the Chair of Physiology at the Edinburgh Medical School. And I had turned up in Aberdeen in 1950, and immediately began to realize the task ahead of me, when there was absolutely no electrophysiological apparatus of any kind and so on. In fact, I made or started to try and make some equipment. In fact, I had a piece of equipment made in Aberdeen by a man who was an electronic engineer who was making radar for fishermen. [he laughs] So he didn't know much about physiological apparatus, either. And this was when I first came into contact with Whitteridge, when I came to sort of get a bit of help. And he was quite amiable and directed me to a little book called *Electrophysiological Technique* [1950], written by a student of his called [Christopher J.] Dickinson, who subsequently became a professor of medicine in London.

LIEBESKIND: Is that any relation to Tony Dickenson [Professor of Pharmacology at University College London]?

IGGO: I don't know. That I don't know. Anyhow, this little book was a savior as far as I was concerned, because it listed circuit diagrams which could be made up. So I spent time trying to -

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LIEBESKIND: System bridges and all that stuff.

IGGO: Yes. I tried to make up amplifiers. Cathode follower amplifiers were the great thing at that moment.

LIEBESKIND: Great. So you were making your own equipment at that time?

IGGO: And I was making my own equipment. And then I was actually doing these recordings from the vagus of the sheep, and that was a herculean task in the first place. And of course, the afferent fibers from the stomach, which I was interested in, were mixed up with all the afferent fibers from the thoracic viscera. I would get to a certain stage, and everything would be going, and then everything would die. It wasn't until after I got to Edinburgh that I discovered something called grid current which, if this passes through the nerve preparation, kills it. And there I was just happily killing all my nerve preparations.

LIEBESKIND: I see.

IGGO: But that was Whitteridge who knew something about these things and had a very good electronic technician called Jock Austin. And so I came down to Whitteridge, who was already established in Edinburgh, and he certainly --

LIEBESKIND: What year was this when you came down?

IGGO: I moved down in 1952.

LIEBESKIND: So you were what, two years in -- ?

IGGO: I was two years in Aberdeen.

LIEBESKIND: Two years in Aberdeen. And you didn't have a degree by then. You continued your studies with --

IGGO: No, that was the lifetime of my post-graduate fellowship, two years. And Whitteridge took me on as a lecturer and also to finish off my Ph.D. project. But he certainly -- He took over the department from a man called Newton who only lived about a year after he was appointed. So DeBurgh Daly went to Babraham and Newton succeeded him in Edinburgh, and then Newton died very quickly and Whitteridge was then appointed [in 1950]. And Whitteridge certainly transformed the physiological scene in Edinburgh over a long time, but very effectively. He put me to teaching honors students. Now, these honors students were intercalating medical students who had done the first two years of a medical course, and then they took a year off to do advanced physiology.

LIEBESKIND: This is like Alan Brown that you were telling me about in the car?

IGGO: Yes, that's right. And these students were a very carefully selected bunch, and were really highly scholastically able. And I well recall on one occasion demonstrating an experiment, taken out of the Oxford mammalian physiology handbook, to do with bladder

reflexes, and Whitteridge happened to blow -- pass by at that moment, while I was trying to teach these students something about these bladder reflex mechanisms, and he took me aside rather abruptly and said, "You don't know what you're talking about. Come with me." And he took me off to the library, and took down a journal, and said, "Read that." [both laugh] Yes, and "that" was to do with the recordings of pressure and volume changes in the bladder. So, you know, he was not beyond correcting you if you were wrong. But he was also a man of powerful intellect.

LIEBESKIND: And he was the one you were saying was at Oxford before --

IGGO: He was Eccles' student at Oxford.

LIEBESKIND: -- at the same time that Hodgkin was at Cambridge, right.

IGGO: And he came to the physiology department here as a fully fledged physiologist.

LIEBESKIND: When you came just to -- Let me get another personal note here. When you came from New Zealand to Aberdeen, were you and Betty already married at that time, or did you meet here in the United Kingdom?

IGGO: No, Betty was a biochemist and teaching biochemistry in the medical school in Dunedin, and we shared the same coffee room, the physiologists and the biochemists. So that's how I got to meet her, I suppose. And then I came over here in 1950 and she came over in 1952, to Oxford, with the intention of doing a D.Phil. And somehow or another, the D.Phil. got put on one side and she came up to Edinburgh. We were married in Oxford in 1952.

LIEBESKIND: About the time you went to Edinburgh.

IGGO: Well, that was in July. Actually, it was July the 18th, 1952. And I was at that time still in Aberdeen at the Rowett Institute [The Rowett Research Institute, established 1913, is a center for nutrition research].

LIEBESKIND: Yes.

AINSLEY IGGO INTERVIEW

TAPE ONE, SIDE TWO

LIEBESKIND: Yeah. Honeymoon on the Commons.

IGGO: Well, the wedding was actually in [the University Church of] St. Mary the Virgin in Oxford, and there's quite a story connected with her ability to get married in that church, because there are almost no domestic residences where she could have done the three weeks' necessary residence. But among other things, she recalls very vividly asking the vicar how -- the order of procedure. And he said, "Well, now, it's quite straightforward. You come in through the Virgin porch," which was on the High Street, "and you go out through the other one." So she rather wondered what was supposed to happen in the interim. [both laugh]

LIEBESKIND: That's wonderful.

IGGO: So we had our honeymoon on a shoestring. In fact, in order to get some money for foreign travel, you had to get a special foreign exchange allowance. I think it was forty-five pounds. And we got this because there was the Biochemical Congress in Paris which happened just to follow the wedding, so Betty could get forty-five pounds of foreign money. And we did our -- We had our honeymoon on forty-five pounds, starting at the Biochemical Congress.

LIEBESKIND: Right, and you've been traveling and vacationing to congresses ever since, like we all do.

IGGO: Yes, there's been much of that sort of travel subsequently. Anyhow, she then went back to Oxford and I went back to Aberdeen.

LIEBESKIND: Yeah.

IGGO: And we came together in September in Edinburgh. And she then proceeded to do a Ph.D. in clinical biochemistry.

LIEBESKIND: I didn't know that. Wonderful.

IGGO: Then the children began to appear.

LIEBESKIND: Do you have brothers and sisters?

IGGO: I have a surviving sister. I have one brother who had a very serious motor accident and became incapacitated and spent the rest of his life, actually, in hospital.

LIEBESKIND: Yeah, oh gosh.

IGGO: So he was not -- That happened to him when he was, I think, around about twenty.

LIEBESKIND: That was in New Zealand?

IGGO: That was in New Zealand. My sister is a spinster.

LIEBESKIND: She stayed there in New Zealand?

IGGO: She's older than I am and we visit her from time to time.

LIEBESKIND: So you do still go back? You have these connections there.

IGGO: Well, these last few years I've developed an interest in non-pain related sensory mechanisms in the Australian monotremes, the platypus and the echidna. [Monotremes, egg-laying mammals found only in Australia and New Guinea, are so named because only one body opening serves the urinary, rectal, and reproductive tracts.]

LIEBESKIND: Oh, yeah, really?

IGGO: And started a collaboration with [Uwe] Proske [holder of a personal chair in Physiology] at Monash University in Melbourne [Australia]. And among -- One thing that we turned up there was that the platypus, as a mammal, is very unusual in various ways, but in particular, it has electroreceptors in its bill.

LIEBESKIND: It has electroreceptors? Is that right? It's the only mammal or near-mammal to have electroreceptors, do you think?

IGGO: Well, it's -- The other surviving monotreme relative, which is the echidna -- that's the spiny anteater of Australia, which is a terrestrial animal -- also has electroreceptors just at the tip of its snout. But for the platypus these are -- that's the duck-billed platypus -- and it has quite a large bill and this has hundreds, perhaps even hundreds of thousands, of these electroreceptors.

LIEBESKIND: Well, what are they there for? Is it for electric fish or something that they detect?

IGGO: Well, the experiments have been done by other people that show that in the water where it feeds, the potentials generated by invertebrates and so on are sufficient to be detected. And so this -- If you put one of these platypus in an aquarium with some goldfish and go away, when you come back, the goldfish have disappeared. And since it is not fishing by the aid of sight or sound, presumably it's using these electroreceptors to detect and then -- but there are also tactile receptors. It's this combination. So for that reason, I have been going out to work in Monash and take the opportunity of visiting New Zealand at the same time.

LIEBESKIND: And Betty, I suppose, also has family there or friends.

IGGO: Yes, she has a sister. But we are the only -- Our children are the only descendants of our particular grandparents, or our particular parents, I meant.

LIEBESKIND: What did your family think of you not going into agriculture and going into physiology? Was that in any way a disappointment to them, or were they pleased that you -- ?

IGGO: I think I just did it. I'm not sure that they were really concerned one way or another, I think. It was my life.

LIEBESKIND: Well, you had very understanding parents, then. I had a battle with my father to go into my field. He wanted me to go into his business.

IGGO: Yeah, well, by the time I had sort of got into sort of academic age, university age, my father had already left the family, so he was no longer paying much attention.

LIEBESKIND: I see. All right. Well, let's see, we've got you coming through your agriculture training early on and switching over, and now you're -- Let's see, by 1952, you've moved on to Edinburgh and you've come under the influence of Whitteridge, and you've become an instructor, and you've read a few things about bladder pressure. [he laughs] You're now teaching and taking on students, and beginning your own career. So really, your whole professional career -- I mean, once you've finished your training -- has been here at Edinburgh and you've stayed on right here. Is that right?

IGGO: Well, if one looks at the chronology of publications, then one sees that I was publishing on my own until 1959. That was when I was -- By that time I had moved into single-unit analysis of cutaneous receptors with c-afferent fibers. And that actually was about the time when I met Zotterman. And that was a quite interesting meeting.

LIEBESKIND: Tell me about that. Where? When? So that was where? In Stockholm?

IGGO: No, no, that was in my laboratory in Edinburgh. How Zotterman came to be visiting Edinburgh, I don't know.

LIEBESKIND: Would he have -- At that time would he have known of your work with c-fibers?

IGGO: I think he must have gotten some wind of it. And he came into the laboratory and we were sort of chatting away. He had already published a paper with [Bo Ernest] Gernandt [1915-], I think, in 1946, on visceral afferents in which he was, among other things, commenting on the rate of firing in these fibers, and that they could fire at quite high rates. Several hundred a second, I think it was. And from my single fiber work, by that time, I knew that it was unusual for c-fibers to fire at more than one or two hundred at the most. And so I was trying politely to suggest to him that perhaps his conclusions were based on recording [from] more than one fiber at a time. And he got really quite excited, I remember. He was by nature -- He could be quite an excitable person. But we became friends and I remained a friend of his until he died.

And in fact, on one occasion he, in 1959, organized a CIBA Foundation study group. The CIBA company had given the money after the war to set up the foundation in London, and they -- And so this was a CIBA Foundation study group on pain and itch.

LIEBESKIND: I remember the volume well. I think I have it on my shelf. [Wolstenholme GEW and O'Connor M. *Pain and itch, nervous mechanisms; in honour of Y. Zotterman*. London: Churchill, 1959.] That's a real pacesetter --

IGGO: Right. Those were the days when the whole question of specificity and temporal-spatial pattern was controversial. [A. Graham M.] Weddell was actually, I think, at that meeting, too.

LIEBESKIND: [D.C.] Sinclair, yeah. [Sinclair was actually not at the CIBA meeting. He and Weddell, from the Department of Human Anatomy at Oxford, challenged the specificity stimulus-response model of pain with their spatial-temporal pattern theory model, cited in 1965 by Melzack and Wall. See: G. Weddell, D. C. Sinclair, and W. H. Feindel. An anatomical basis for alterations in quality of pain sensibility. *Journal of Neurophysiology* 11 (1948): 99-109.] [JM] Ritchie and you and -- Yeah, I remember some of those.

IGGO: But that was when I was invited. Zotterman was one of the organizers. I think he invited me along because he'd become aware of what I was doing.

LIEBESKIND: Where was that held?

IGGO: That was in London.

LIEBESKIND: In London. Well, that -- I mean, that's a very historic occasion, isn't it? I mean, you stop to think about it now in the context of things, and we can talk about our more modern IASP meetings and so forth, but really that meeting was in -- What year was that again?

IGGO: That was published in 1959. [The CIBA study group meeting on Pain and Itch was held on March 10, 1959.]

LIEBESKIND: Fifty-nine, so the meeting was either in '58 or '59, presumably.

IGGO: See, that was at the end of the fifties, when I'd been working away on the visceral and then cutaneous single unit recording. And that's when I sort of found myself in disagreement with Graham Weddell with the temporal spatial pattern. And I was quite satisfied that I'd put it to sleep completely. It was difficult, as always, to persuade the person who'd had the other idea that he might have not got it quite right. And I remember in a bar on that occasion -- I think Vernon [B.] Mountcastle [1918-, leading American neuroscientist and Director of the Bard Laboratories at Johns Hopkins until his retirement] was there too -- suggesting to Graham, maybe he ought to just take this opportunity of sort of publicly announcing that maybe he hadn't gotten it quite right.

LIEBESKIND: How many single malts had you had by then?

IGGO: Well, that perhaps is an indication of my personality that I would do that to the fellow.

LIEBESKIND: What was he like, Weddell, as a man? Did people like him?

IGGO: Well, he was, I think, actually, a neurohistologist. That was his -- He was developing techniques of neurohistology. I never really had more than casual acquaintance with him, so I don't know. I couldn't speak about him as a person very much, I don't think. But it was clear that, you know, on the basis of the evidence that he had -- He had combined it with a bit of electrophysiology. And he's not the first person to have been misled by electrophysiology.

LIEBESKIND: But the battle lines were pretty clearly drawn already by that time, and the specificity and pattern theory, and so forth, and most of the major proponents were right here in the United Kingdom. So that must have been, again, a very exciting meeting for you to be at. You were a young fellow at the time just coming up in the ranks. What do you remember of that meeting? The feeling, tone, and --

IGGO: Well, I know the other -- Well, I suppose I felt, you know, I was pretty secure in my knowledge of the fact that these non-myelinated fibers were accessible to investigation and I had already begun to collect evidence about the diversity. Because that was the other aspect of all of this, that in the first big handbook of physiology published by the American Physiological Society [Dill, Fenn, Hamilton, Renold, and Code, *Handbook of physiology : a critical, comprehensive presentation of physiological knowledge and concepts*. Washington: American Physiological Society, 1959], there was an article by John Gray in which the conclusion was that the non-myelinated fibers were the pain fibers and they were a sort of uniform group.

LIEBESKIND: Oh, yes. This is that three volume work, Fields, et al, or whatever?

IGGO: It was the first of them. There was another later. But it was already clear from my very early experiments on the cutaneous c-fibers that there were sensitive mechanoreceptors.

Another exciting moment was the thermoreceptor story. And that actually was just coming through at that meeting, because [Herbert] Hensel [then Director of the Institute of Physiology at the University of Marburg in Germany] was there, and he had done work with Ingrid Witt in his laboratory in Marburg, again recording from cutaneous afferent fibers. And they had just published a paper or were about to publish a paper on the dual modality of mechano- and thermoreceptors in cat skin [Hensel H and Witt I. Afferent impulses from the skin of extremities of cats in thermal and mechanical stimulation. *Pflugers Archiv* 268 (1959); 582-596.] And I'd already got some inkling of thermoreceptor activity, by which one meant afferent fibers which were excited at different cutaneous temperatures and seemed to be indifferent to mechanical stimulation, which was the basis of it. And he mentioned this at that meeting, the CIBA meeting, so that was one of the other sort of new things which was opening up. And at that meeting also were Douglas and Ritchie with their interesting technique for multi-recording of c-fibers. [Douglas WW and Ritchie JM. A technique for recording functional activity in specific groups of medullated and non-medullated fibres in whole nerve trunks. *Journal of Physiology* 138 (1957): 19-30. Douglas and Ritchie were British researchers working at the Department of Pharmacology at Albert Einstein College of Medicine in New York.]

LIEBESKIND: Where were they? Where did they come from? Were they from the U.K. or from the States?

IGGO: Douglas was from Aberdeen. Was Ritchie also from Aberdeen? Anyway, by this time they were working somewhere in London. I'm not sure of -- I'd have to look up to find it, to remind myself exactly where. They subsequently both went to the States. But they had this rather interesting technique by which they reckoned they were able to reveal the characteristics of the c-fibers. But again, it was insufficiently precise, I think, in the end.

LIEBESKIND: Was Ed Perl [neurophysiologist who did pioneering research on nociceptors, now Kenan Professor of Cell and Molecular Physiology at University of North Carolina in Chapel Hill] around at this time doing any work in this area, or Pat Wall? Did you know either of these people back at that time?

IGGO: No. Up until that point I really had been U.K.-bound. I'd been to the meeting in Leiden, where I had this rather unexciting first presentation of single unit c-fibers.

LIEBESKIND: With seven people present.

IGGO: Yes, with this audience -- And Cuy Hunt [C. Cuyler Hunt, now Professor Emeritus of Physiology at Washington University, St. Louis] organized a symposium [in 1960] at Brighton in Utah; it's a ski resort. And it was at that meeting that I met, I think for the first time, Ed Perl.

LIEBESKIND: Who was at Utah at that time himself?

IGGO: He was at Utah. And I subsequently paid several visits to his laboratory. And I met Vernon Mountcastle. And I think on my way back -- I'm not sure whether Pat [Wall] was at that meeting or not. Douglas and Ritchie were. But I then stopped at MIT and called on Pat, I think. So I met with all these people about that same time, because by that time Pat was at MIT.

LIEBESKIND: And so when would this have been?

IGGO: This was 1960.

LIEBESKIND: Sixty, so just a year or so after this CIBA meeting. So things were really starting to happen then. I mean, you -- Did you have a sense at that time that there was a field of pain coming together? I mean --

IGGO: Well, it was clear that there was now a way of looking at the characteristics of the sensory receptors, and I think it was partly a question of consolidation. If you look at the papers that I wrote about that time, it's remarkable how cautious I was in ascribing function to these things. Because, of course, these were only the afferent fibers. You could only argue that they had something to do with pain. And so I really perhaps was unduly cautious in my descriptions of these things.

LIEBESKIND: Was the word nociception and nociceptors current? I mean, these are after all -- we attribute to Sherrington --

IGGO: Yes, sure.

LIEBESKIND: Were people using those terms at that time? Was that a way around the problem of not having to say pain?

IGGO: Subsequently that was, yes, but at that time, I think, I probably among those papers commented on the possible role in nociception, but didn't call them nociceptors. I think it was actually Ed Perl who took the plunge and called them nociceptors, the so-called polymodal nociceptors. And as it happened, at that time I'd also found evidence for a specific mechanoreceptor, which subsequently I called the slowly adapting Type I, because we also had found a second one, that floated up in Type II. And that then became another avenue of activity. And that's the one, actually, that Alan Brown [Brown is in the Department of Preclinical Veterinary Science at Edinburgh] has followed through.

LIEBESKIND: Well, you know, one of the themes that comes up in so many of these interviews that I've conducted is that, you know, I try and -- One of the things I'm interested in is the coming together of the field of pain and what effect that has had on promoting scholarship and interest in the field and so forth and so on. But a lot of the individual people that I've talked to -- A number of them have kind of resisted being enclosed by that designation and want to say, "Well, look, you know, pain is only one of the things I'm interested in and, you know, I'm not a pain person. I am a sensory physiologist or whatever, and I've done work on this, I've done work on that. And pain is just part of that." And that's certainly true for you.

IGGO: Well, I certainly was trying to find a way at that time of identifying pain fibers, pain receptors. And I actually had a girl working as a research student, called Nancy Fjallbrant. She was an English girl who married a Swede and then didn't finish the work, went off. But we published on, for example, the effect of histamine, 5-HT [serotonin] and acetylcholine [the first neurotransmitter identified, which tends to trigger excitatory action in the brain] on cutaneous afferent fibers, and this was really trying to use algogenic agents.

LIEBESKIND: Now, what year was this? This is way back at that --

IGGO: This is -- Well, the first of these ones was actually in 1959.

LIEBESKIND: Yeah. So you really were after pain.

IGGO: Oh, yeah, sure.

LIEBESKIND: I mean, there's no question of that, yeah.

IGGO: No, but that -- The whole drive into the c-fibers was this question of pain mechanisms, you see, so I was looking, if you like, at the peripheral origin of pain. And I was reading into the literature and trying to find out about people who did psychophysical experiments and used chemicals and so on to stir up pain from the skin. And then using these same chemicals, for example, by close arterial injection, to see if I could then, from this array of c-fibers, which by now were not all the same, identify those ones which might be the pain receptors, if you like.

Well, it turned out that these chemicals that I was using were really not very selective, that they might cause pain, but they didn't cause pain by exciting only nociceptors. That might have been what caused the pain, but they also excited mechanoreceptors. And so as a method for identifying the nociceptors or the pain receptors, these particular chemicals didn't work. And so I retired, in a sense, a little frustrated by that experience.

And I think subsequent pharmacology and developments have certainly made it more sensible to, perhaps, go back again. For example, bradykinin, which -- I was given some impure bradykinin, which was a polypeptide, by a chap, Horton, who was working in the pharmacology department in the medical school. And when I tested this bradykinin, which was known from the work of [R.] Smith and [Cyril A.] Keele on the blister base to be quite painful, so you can see my interest was in looking for chemicals which would help me -- This turned out to have an excitatory action on the mechanoreceptors as well. [Keele at Middlesex Hospital did extensive research on chemicals involved in pain response from the 1930s through the 1960s] So there was a further compounding of my disillusionment.

Well now, many, many years later we now know about the fact that bradykinin works on bradykinin receptors on the cell surface and then gets into the second messenger business inside the cell, and this eventually causes the discharge of afferent fibers. But all of this was a closed book at that time. And so the use of those so-called algogenic agents to identify nociceptors was a bit of a flop, I think one has to say. However, yes, I was certainly interested in the pain mechanisms. But at that moment, as I said, I found that I was looking at a -- also at an identifiable cutaneous myelinated mechanoreceptor. And that was another whole story that went another way.

I did mention Hensel, and in 1960 I see I had a paper, "Quantitative Study of Sensitive Cutaneous Thermoreceptors with C-Afferent Fibers." [Hensel H, Iggo A, and Witt I. *Journal of Physiology* 153 (Aug 1960): 113-26. Now, Hensel and Witt had worked on myelinated fibers and thought they were bimodal. And if you have a look at that paper by [Cuyler] Hunt and [Archibald K.] McIntyre [1913-2002], they also have the idea of bimodality for temperature reception [Hunt CC and McIntyre AK. An analysis of fibre diameter and receptor characteristics of myelinated cutaneous afferent fibres in cat. *Journal of Physiology* 153 (Aug 1960): 99-112.] There were various other ideas floating around. Hensel, as a consequence of meeting at the CIBA group, suggested I might visit his laboratory. I remember discussing it with Whitteridge and he said he didn't think it would be professional suicide to go and work with Hensel.

LIEBESKIND: He didn't think it would be. And where was he at that time?

IGGO: He was in Marburg, in Germany. So I put Betty and the children -- two of the children at that time -- onto a boat to go to Australia, and went to Marburg for three weeks over Easter, part of which time, of course, was at least a holiday, so that the opportunity for doing experiments was pretty limited. Anyhow, by the time I had left -- I remember working with Ingrid Witt and with Herbert looking in from time to time, dissecting saphenous nerve in the cat and finding a cold receptor on non-myelinated fiber, insensitive to mechanical stimulation. I said, "There, you see. There's the cold receptor." And so she said, "Well, yes, I suppose yes."

LIEBESKIND: Now, who is she again?

IGGO: Witt. But she said, "There aren't any warm receptors." So I didn't say, "Wait." I said nothing. And then I think the same or next experiment, I said, "Here's a warm receptor." So in that brief visit, the cutaneous thermoreceptors, the non-myelinated afferent fibers in cat, were established, upsetting a bimodal story on mechanoreceptors.

LIEBESKIND: Well, that was a profitable vacation.

IGGO: And then after that I flew out to Australia to Eccles' laboratory, working on the spinal cord.

LIEBESKIND: I see. [laughter]

IGGO: But the visit there was actually aimed at developing experience in techniques of spinal cord recording, so that I could then come back to Edinburgh and use these techniques. The time was ripe now to follow the specific nociceptors because we had techniques of stimulation which allowed us to provide selective excitation of thermoreceptors, nociceptors, mechanoreceptors, and study their spinal cord actions. And that's where we started to find ourselves sharing a difference of opinion with Pat Wall.

LIEBESKIND: Yeah, exactly. Speaking of the field coming together, one thinks of this meeting that Bonica, whose death yesterday we noted coming over here, the meeting that he put on in 1973 -- now, that's a full decade later -- and things, many things, I'm sure, happened in between. Were you at that meeting in Issaquah [Washington State]?

IGGO: Well, it's interesting that you raise that meeting. Looking down through my publication list, I notice here in 1972 at a meeting organized at a physiological congress, the Munich Physiological Congress, I think it must have been, at a satellite, I've got a little article here entitled, "Critical Remarks on the Gate Control Theory."

LIEBESKIND: Oh, yes.

IGGO: Now, the gate control theory and I had very early disagreement. And so here in 1972, I was already mixed up in the sort of spinal cord mechanisms and we were certainly --

LIEBESKIND: Yes, yes. So that's a lot of what happened in this decade, this previous decade after going to Eccles there, and bringing back those techniques.

IGGO: Yes, then I came back, and then -- When did I get started on the spine? Oh, I know. There was a physiological congress in Washington in 1968.

LIEBESKIND: Oh, okay.

IGGO: And I went to that and then went on to New Zealand. And at that meeting I also visited Vernon Mountcastle and saw what he could do with a computer in terms of data acquisition and

analysis. And I decided that was the way ahead. So I -- From that Washington meeting I then went on to Wellington in New Zealand, and I remember writing a research grant application in my mother-in-law's drawing room overlooking Wellington Harbor, which was then submitted to the Science Research Council [in the U.K.].

LIEBESKIND: In whose drawing room?

IGGO: My mother-in-law's drawing room in Wellington. [both laugh] And that, when it got polished up, was put in for a research grant and that bought my first proper computer. So that, again, was also geared at going into the spinal cord.

LIEBESKIND: That's right.

IGGO: And so it was really quite, quite interesting to go to this Issaquah meeting that John Bonica had organized, bringing -- I don't know by what means he scoured the field. I don't know what assistance or what other people he had giving him names and suggestions, but he certainly brought together at that meeting quite a group of people -- probably most of the people at that time in the world -- who were interested in pain on a broad front. Not just from my personal, narrow interest of the receptors and perhaps spinal cord mechanisms, but also right through to the clinic.

LIEBESKIND: That's right.

IGGO: So that was probably the germinal meeting, I think, which somehow brought together for the first time such a comprehensive grouping of people. And that then led to the establishment of IASP [International Association for the Study of Pain] and to the journal, *Pain*. And I think that -- Those events certainly provided a very powerful stimulus to subsequent investigation and probably brought people into the field who would never have come in otherwise. So I think if you're looking for a really significant moment in the study of pain and the alleviation of pain, pain mechanisms, that was the moment.

LIEBESKIND: Well, there have been many important moments. That was certainly one of the most important.

IGGO: Well, that certainly brought a lot of people together.

LIEBESKIND: It did that. For the first time, I think, many of us met each other. That's probably where I met you for the first time. I remember it's where I met many people, Howard Fields [Professor of Neurology and Physiology at the University of California San Francisco, former editor-in-chief of IASP Press] and lots of other people. Ron Dubner [Chair, Department of Biomedical Sciences, University of Maryland School of Dentistry, former editor-in chief of *Pain*], John Loeser [Professor of Neurosurgery at the University of Washington, IASP President 1993-1996], so forth and so on.

IGGO: Well, see, the -- I don't know that there was an American Pain Society at that time. In Britain, there was certainly an association called the Intractable Pain Society [founded in 1967].

LIEBESKIND: Already at that time, was there?

IGGO: Yes, that was already in existence, but the Intractable Pain Society's membership was restricted to medical consultants.

LIEBESKIND: I see, clinicians.

IGGO: It was definitely a clinical -- And there was no non-clinical pain group that I can recall in the 1950s, 1960s.

LIEBESKIND: Well, there was no American Pain Society prior to the international forming. There was -- I think Bert Wolff [Berthold B. Wolff, New York psychiatrist, first president of the American Pain Society] had a group of people who used to meet on and off in New York [the Eastern Pain Group, later the Eastern Pain Association]. I'm not sure how organized they were. But the American Pain Society definitely got started as a chapter of the IASP. I mean, it was inspired by that.

IGGO: I guess we were individuals, and not many of us for that matter.

LIEBESKIND: That's right.

IGGO: And I just -- It's passing through my mind is, when did Ed Perl -- But of course there was Pat Wall, who Ron Melzack had -- I don't know where his interest in pain originated, but it was already well established by that time.

LIEBESKIND: Pat's?

IGGO: Pat's. And, you know, he had -- In '65 he put out this gate control idea.

LIEBESKIND: Which certainly caught a lot of people's attention, I think, for better or for ill. I mean, it probably caused a lot of people to begin working in the area.

IGGO: Well, it was very provocative.

LIEBESKIND: Very provocative, yeah.

IGGO: And although I was -- From my point of view, right from the outset, I could see that it was seriously flawed. But it seemed to gain particular acceptance among neurologists.

LIEBESKIND: Yes. Clinicians in general liked it, didn't they?

IGGO: They did. I can remember going to international meetings years later in which some young man would be presenting a paper which he said was consistent with the gate control theory of pain, and when you asked him what did he mean, he was floored. [Liebeskind laughs]

Why flog a dead horse? That was my view. I didn't see anything to be gained by just continuing to disagree. But the truth would out, as I thought.

LIEBESKIND: What -- I mean, when you saw that, what about it did you quickly recognize were the flaws?

IGGO: Well, it was to do with the patterning process. It was to do with the inputs coming from the periphery, coming in, nonspecific activity as the sort of almost the Weddell kind of idea. And already there was evidence of diversity from the periphery. And so I was disinclined to accept it at face value.

LIEBESKIND: I mean, its first premise really was that we didn't need specificity, that it didn't exist and that rapidly became clear that that was not so.

IGGO: In fact, again, this turned on experiments which were in the event not as good as they needed to be. Pat's interpretation of afferent discharge in peripheral nerves -- and the experiments stopped short of penetrating into the full depth, pretty much the same kind of problem that Graham Weddell had, because he was recording from the long ciliary nerve [supplies the ciliary muscles, iris and cornea] and dealing with the eye. And he based all his -- not all of it, but he based some of his ideas on the fact that there was a nonselective system [of corneal sensitivity] there. When you looked at his results more carefully, you'd discover that he probably was only recording from some of the afferent fibers and none of the small ones. And I think that was also Pat's unfortunate experience. But that, in a sense, was part of the basis of his ideas, nonselectivity.

LIEBESKIND: Do you have any sense from years of where Melzack fit in with that? I mean, you know, so much of this came from the physiology that Pat had been doing, but then Melzack had these -- I guess the ideas of a psychologist.

IGGO: Well, I suppose so.

LIEBESKIND: Did you know Melzack at that time?

IGGO: I don't think I had met Melzack. I may have met him at Issaquah. Well, he was working in a completely different ball park, and I had no scientific reason for following his --

LIEBESKIND: That's right.

IGGO: I think, you know, one of the -- I think I probably first became aware of Melzack, if I have got it right, from the experiments that he did with puppies which were kept in a very sheltered environment so that they had not had experience of the nasties and sort of real life, and when they first experienced it, they really went to pieces. [See: Melzack R. The genesis of emotional behavior: An experimental study of the dog. *Journal of Comparative Physiology and Psychology* 47 (April 1954): 166-168.] And so that's, I think, how I first became possibly aware of Melzack.

LIEBESKIND: Sensory deprivation. That was the whole concept at that time.

IGGO: But I think -- You see, he was working at a completely different level of the system. He was working at the top end, if you like.

LIEBESKIND: That's right.

IGGO: And then interpreting everything from what he found at the top end.

LIEBESKIND: But he went and worked -- After he finished his degree he went and worked with Livingston [William K. Livingston (1894-1966), Chair of Surgery at the University of Oregon, an early pioneer in interdisciplinary pain research].

IGGO: Yes.

LIEBESKIND: Was it Bill Livingston?

IGGO: Bill Livingston.

LIEBESKIND: Bill Livingston in Oregon, I think, and they recorded from the brain, didn't they?

IGGO: Well, I think that, you see, was -- He was presumably clearly aware that pain is in the brain, so he was going to find it there. I think other people eventually did find some evidence for pain in the brain. But I think you needed more than electrophysiological techniques to make very much progress.

LIEBESKIND: More than nerve stimulation.

IGGO: So yes, and I had met Pat, as I say, in 19 -- I think it was in 1960, on my way back from the Utah symposium. And then in '65 out came the gate control theory, and I remember having a -- I had also on my way back -- I took five weeks to make my way back across America, visiting different places. Actually, by that time I was a Locke Research Fellow of the Royal Society, so I no longer had teaching assignments, but I'd gotten my knuckles rapped by a circular letter that came out from the Royal Society, saying that these research awards were intended to be worked out in the U.K., not abroad. [both laugh]

LIEBESKIND: How parochial of them.

IGGO: Yes, but somebody in George Bishop's -- I met George Bishop [George H. Bishop (1889-1973) was one of the leading neurophysiological researchers in the US from the 1930s through the 1960s; as a young man, he worked with Joseph Erlanger and Herbert Gasser.]. I must say that was another group of people that were relevant to my own search at that time on the vagus and the afferent fibers, was Bishop, [Peter] Heinbecker and [James L.] O'Leary [at Washington University St. Louis]. And I remember George trying to organize a dinner party at which those three and I would have a meal together.

LIEBESKIND: In St. Louis?

IGGO: In St. Louis. Unfortunately, I think it was Heinbecker -- Heinbecker had married a wealthy shoemaker's heiress and I think he was not in a state that would allow -- that would enable him to attend the dinner. And that was bad luck, because I was also very interested in their early recordings of the compound action potential. But there was somebody else in that lab and I regret to say I can't remember his name.

But I remember he and I exchanged letters when the gate thing came out and he said, you know, "What's this baloney?"

And I said, "Yes." [both laugh]

LIEBESKIND: Bishop and O'Leary and -- Yeah, there was somebody else.

IGGO: Well, there was. Bishop, Heinbecker and O'Leary was one collaboration. Then there was the Gasser and Erlanger group, and I had also called in on Gasser to look at his --

LIEBESKIND: Was he there or he was in New York?

IGGO: He was at the Rockefeller.

LIEBESKIND: The Rockefeller, yeah.

IGGO: On that occasion there was -- What's the name? The man who wrote the telephone book. [Rafael Lorente de N6, 1902-1990, on the cybernetic neuron circuit] --

LIEBESKIND: Who wrote the what?

IGGO: Telephone book on the physiology of --

LIEBESKIND: Halothane [an anesthetic gas]?

IGGO: No, no, the telephone.

LIEBESKIND: Oh.

IGGO: But he blew through while I was chatting to Gasser. So it was an interesting meeting, too.

LIEBESKIND: Ed Perl said he was very influenced by Gasser when he met him early in his career, and fell under his spell. I guess he was very --

IGGO: Well, I think in my case, Gasser was largely c-fibers. The compound action potential studies -- The whole question of, when I started doing this and was challenged, are they single

unit, or are they multi-units, and so on, was partly Gasser's very detailed analysis of the longitudinal structure of the nerve and the fact that the c-fibers went from one Schwann bundle to another. Yeah, well, that was certainly key reading at the time.

LIEBESKIND: I had no idea when you mentioned earlier today that they had electron microscopic techniques at that time. That amazes me. I just assumed that that was much more recent.

IGGO: This was in the very early days of the electron microscope and I think the Rockefeller must have laid their hands on one. [The electron microscope was invented in 1930 but did not come into wide use until the 1960s.] And Gasser then -- But, you see, it was a whole question of slide mounting techniques. And I think there were people in the Rockefeller Institute who were early into these techniques, and cutting thin sections and so on. Yes, there were certainly pictures of cross sections of the nerve way back at that time.

LIEBESKIND: Going back to Issaquah, what do you remember of the feeling there? I mean, was that a fun meeting for you? Did you enjoy seeing all these different people? What'd you think about all those clinicians and what they were saying about pain? I mean, did you recognize that this was all relevant and potentially relevant to your interests?

IGGO: I think the answer I would give there is nothing to do with Issaquah, but it's a question of what you happen to notice. My sort of awakening, if you like, was when I went to a Physiological Society Meeting here in the U.K. at which people would, you know, there would be a ten minute presentation and then questions from the floor. I remember the sort of excitement of actually seeing some of the great names standing up and asking questions. For example, Hodgkin or [William A. H.] Rushton [1901-1980, important British researcher on the physiology of vision], you know, the physiologists -- established physiologists -- of the moment.

If you asked me what about Issaquah? What do I recollect about Issaquah? I think I recollect that it was in a disused convent out in the sticks and that there was no sort of, that it was a very dull place socially, and so we were driven in upon ourselves and on the company who was there. And I guess that that probably meant that you did meet people, but I can't say that I have much recollection of that meeting. I was aware, you know, that this was quite an interesting group of people brought together, but if you ask me did I come away from that -- Usually I would come away from a meeting, a) having made one or two new friends and b) having picked up some kind of an idea of what was going on. But I don't know that that happened at Issaquah, except that there was the -- I think the significant memories I have there are of the decision to proceed --

AINSLEY IGGO INTERVIEW

TAPE TWO, SIDE ONE

LIEBESKIND: See if that's wound on. Yeah.

IGGO: I think one of the things I remember is the discussion about setting up a journal.

LIEBESKIND: Yes, Bonica sort of had these little smaller meetings with a few people or something. I'm not sure I was at -- privy to many of those.

IGGO: But when it came to setting up a journal, he was -- John was very keen to get a publisher to carry the can, if you like.

LIEBESKIND: That's right.

IGGO: And I knew from the *Journal of Physiology* that if the society owned the journal, that in the long run it could be financially very beneficial.

LIEBESKIND: Yes.

IGGO: But the decision was taken to go to a publisher.

LIEBESKIND: A very bad mistake, I understand.

IGGO: And I think in the long run, that was not -- Well, my view was that it should be the property of the society, although I guess there would have to be the uncertainty of who was going to pay if it didn't succeed. And so Elsevier was given that responsibility or that risk, and they, in the end, have very greatly benefited.

LIEBESKIND: Yeah.

IGGO: As to the -- At the same time, you know, an editorial board was dreamt up. And I don't know how it was that I came to be put onto that board.

LIEBESKIND: What -- Where were you on that board? You had a -- You were in like a physiology section?

IGGO: No, it didn't have those things. It was -- Initially it was just an editorial board.

LIEBESKIND: Just a board, I see.

IGGO: There was Pat and there was myself and there must have been some other people.

LIEBESKIND: [Willem] Noordenbos [1910-1990, Dutch surgeon and author of the classic 1959 monograph *Pain*], probably.

IGGO: But I know it became very clear very quickly that Pat sort of saw the journal as something which he could make a success of, and he became the editor. I think we actually did have one or two editorial board meetings long before the IASP Congress, where there were more regular meetings. Anyhow, that -- Setting up the journal was something that I do recollect. But in terms of people and particularly in terms of the clinical element of the meeting, I can't say that I had much -- I think by that time the pain clinics were already becoming -- at least the Seattle group had these pain clinics. Years later, actually, one of my sons invited himself across there while he was a medical student to do his anesthetics, I think it was, course.

LIEBESKIND: It must have been. [both laugh]

IGGO: I suppose that was partly because I by then knew the people.

LIEBESKIND: Yeah.

IGGO: Now that -- Thereafter, the next major gathering in terms of bringing people together was the First World Congress in Florence [1975]. And I remember the program committee, chaired by Denise Albe-Fessard [1916-2003, first IASP President 1975-78], meeting at the Marey Institute in Paris [Research institute founded 1898 in honor of French physiologist, surgeon, and pioneering cinematographer Etienne-Jules Marey (1830-1904)]. Somewhere or other I've got a photograph of all of us out in the garden.

LIEBESKIND: Well, I have a copy of that photograph and you must have taken it, because you're not in it. [both laugh]

IGGO: Well, that's right. I took the photograph.

LIEBESKIND: And I was -- I think I happened to be in town or something. I was not a member of the committee, but having been her former student, I was visiting and somehow got invited to that lunch, so I'm sitting there.

IGGO: Well, I think I must have felt that it needed to be recorded.

LIEBESKIND: Yeah, I think I looked at it recently, that photograph and --

IGGO: I'm not sure I could find it, but --

LIEBESKIND: Well, I had it on my bulletin board for many years and I recently looked at it, and I believe it has everyone named on it, and it has, "photo taken by A. Iggo." I think that may have all been in your writing.

IGGO: But the -- One of the interesting features of that meeting, in terms of the pain scene, was that we had a large number of submissions from people working in acupuncture.

LIEBESKIND: Yeah.

IGGO: And I know we sort of had to try and decide, in organizing the -- because I think on that occasion we presumably didn't reject submissions -- [how to] organize the program. And I think it was decided there were so many of these acupuncture people that they should really be given the main auditorium all to themselves. And at the main auditorium it almost became like a football match [both laugh] with the pros and the antis.

LIEBESKIND: That was the hot issue of the Congress, hey?

IGGO: Well, it was an issue. But I think that group more or less disappeared.

LIEBESKIND: Yeah.

IGGO: It's quite interesting. By the next Congress, acupuncture did not feature much at all.

LIEBESKIND: Well, I remember -- I wonder if you do -- from the Issaquah meeting, that there was a series of maybe two or three papers on acupuncture, at the end of which Pat stood up and shouted that these were terrible and that these should be excluded from the book, that the manuscripts should not be included in the volume. Do you remember that? I was a very young man then and was very taken aback, I mean, that someone -- My god, you know, thank the lord I had already given my paper or I would have been terrorized that he would have done this to me or something.

IGGO: I actually recall not that one, another incident altogether with Dan Kenshalo [Neurophysiologist, formerly a researcher in the Pain and Neurosensory Mechanisms Branch at NIDCR].

LIEBESKIND: Yeah?

IGGO: He was at an International Physiology Congress, I think it was, and Zotterman and I were in the audience, and he was presenting his idea about how he thought thermoreceptors worked. And of course, I knew. [both laugh] And I remember being a bit unkind to him.

LIEBESKIND: I see.

IGGO: But then the three of us got together subsequently and sort of decided we might just talk it out. [he laughs]

LIEBESKIND: Instead of slug it out, eh?

IGGO: Yeah, there wasn't -- I certainly didn't throw fisticuffs in his direction. But no, I don't recollect -- But Pat is quite able to do that sort of thing.

LIEBESKIND: Yes, he can be quite --

IGGO: I remember once when he was very unkind to Fernando Cervero, a research colleague of mine [Cervero, formerly at the University of Alcala in Spain, is currently [2005] Professor of Physiology in the Anesthesia Research Unit at McGill University and IASP Treasurer]. It was put to me by somebody else that Fernando was my hen, and Pat was attacking Fernando to attack me. But that was --

LIEBESKIND: That sort of thing can happen.

IGGO: That was when we were having our disagreements about spinal cord, and substantia gelatinosa, and these sorts of things.

LIEBESKIND: Well, I can remember a few meetings where Ed Perl and Pat really had at it, you know, and were sort of a bit nasty to one another.

IGGO: Yes, I don't know quite how Ed got into the pain game, because when I visited him in Salt Lake City, he was working on mechanoreceptor systems, I think, and the pain came with the paper with [Burgess N.] Christensen [Christensen BN and Perl ER. Spinal neurons specifically excited by noxious or thermal stimuli: marginal zone of the dorsal horn. *Journal of Neurophysiology* 33 (March 1970); 293-307. This paper was published when the authors were working at the University of Utah. Christensen is now at the University of Texas Medical Branch at Galveston.] I think it was partly that here was evidence now of diversity and, if you like to call it, [of] specificity in the cutaneous receptors, which made it sensible to try and analyze the central mechanisms in terms of what was done with this peripheral information.

LIEBESKIND: That's it, yeah.

IGGO: And I think that may be where Ed started on that. So I don't think in 1960 he was doing much.

LIEBESKIND: I don't think so.

IGGO: But anyhow, you'll have Ed's story.

LIEBESKIND: Yeah. All right. Let's see where we are here.

IGGO: So what happened to life after that? I spent quite a few years, having got this PDP-12 computer [a Digital laboratory instrumentation computer introduced in 1969], which I think was the first or second one that ever came into the United Kingdom, working on spinal mechanisms.

LIEBESKIND: Yeah, getting those bins organized.

IGGO: Yeah, so that's when I was lucky to have Fernando Cervero, who invited himself here to my laboratory. Years later he told me he'd really come because he wanted to work on the non-myelinated fibers, and it wasn't until he'd left the department that he did. [both laugh] He got caught up in the spinal cord.

LIEBESKIND: He was with you for a long time, wasn't he?

IGGO: About five years.

LIEBESKIND: Speaking of students, I mean, you mentioned in the car coming over, Alan Brown, and I know Arthur Duggan and you have worked together some and so forth. [Duggan is currently in the Pain Management Research Institute at the University of Sydney, Australia.] He was your student also? Is that right?

IGGO: No.

LIEBESKIND: No, he was from over there, I guess, from -- With Eccles also, was he?

IGGO: No, Arthur was at Canberra. No, I'm sorry, a Brisbane medical graduate who had to go do his three years in the bush, and then he went -- I think, then went on to Canberra.

LIEBESKIND: But working with students, I mean, has that been an important part of your career, would you say? Something from which you've derived special gratification? I mean, who were some of the students that you would mention?

IGGO: Well, that's rather interesting, you see. When I look through the publications, until 1959, they're all single-author. Then there was Nancy Fjallbrant, who had decided not to go into medicine, but had started to do medicine, and we worked on the algogenic story.

LIEBESKIND: Right.

IGGO: But then she went off. And then it was largely working not with students so much as with collaborators. For example, with Geoffrey Walsh, a colleague here in Edinburgh, and Martha Vogt, the pharmacologist. And then there was that three weeks in Marburg with Hensel and Witt.

LIEBESKIND: Right.

IGGO: And then I went out to Canberra. And then -- There were quite a few papers from Canberra, which was the way they do it. And then I think the next one was a chap called Alan Muir, whom I finally persuaded to come across to the anatomy department in the veterinary school [at Edinburgh]. He was an electron microscopist and we did work on combined studies on structure and function of the cutaneous mechanoreceptors [Muir is now at Cambridge]. And then Alan Brown, who -- And he went right through a Ph.D. and then moved off onto his own field, following up things. And then there's another spell mostly of single-author publications. Then there's another research student, a chap called Leek, Barry Leek, and that was on gastric activity. And then little Margaret Chambers and Don Franz. And in fact, this book, this volume here [his retrieval commemorative book] was the publication of my own work and contributions of others, of people who had worked with me either as research students or as collaborators.

LIEBESKIND: Visiting scientists and such.

IGGO: Visiting scientists or --

LIEBESKIND: I remember Giselle Guilbaud [French physician and pharmacologist, at the physiopharmacological unit for the study of the nervous system at INSERM] came and worked with you and that started a whole back and forth, didn't it? I mean, you went to France, and --

IGGO: Well, that grew out of a sabbatical. I went up to Ulf Lindblom [Professor of Neurology at the Karolinska Institute, IASP President 1990-93] in Stockholm and started on the joint nociceptor story. That's where that started. That model was chosen because of the work already going on in Paris.

LIEBESKIND: Oh, the inflamed -- Yeah.

IGGO: The Freund's adjuvant.

LIEBESKIND: Freund's adjuvant, yeah.

IGGO: A rat with an inflamed joint. And so that actually is still continuing with a colleague here in Edinburgh [Daniel S. McQueen] and we're still continuing on the pharmacology of that. So -- but that was a meeting at which -- I've forgotten the total number of people, but that was a two and a half day retreatal symposium. That was a very jolly and a very happy occasion.

LIEBESKIND: Yes. When was that? What year was that?

IGGO: That was -- Well, it was called -- The title was, "The Edinburgh Connection."

LIEBESKIND: I see. [he laughs]

IGGO: The Edinburgh Connection was a symposium, a seminar almost exclusively of people with whom I had worked or had close scientific associations. And really we had --

LIEBESKIND: I mean, it was a festschrift, really.

IGGO: It was, sure. It really was a festschrift. We had some wonderful parties, I remember. And interspersed through it was the symposium. I guess I've got its program somewhere.

LIEBESKIND: And what year was this held?

IGGO: That was in 1990. That's when I formally retired from my position.

LIEBESKIND: Has retirement changed your life very much? You've given up the mantle of the chair, and also the deanship, did you, at that time?

IGGO: Yes, I had two spells as dean, and the second time I decided the only way to escape was to retire, so I retired. [he laughs]

LIEBESKIND: You still work in your laboratory, I assume?

IGGO: And they made me an honorary fellow of the department, and they have given me a lab and an office, and I've got this continuing collaboration with Danny McQueen on the ankle joint preparation. But this was rather interrupted a couple of years ago when I was diagnosed as having prostatic cancer.

LIEBESKIND: Yes, I heard that. But you've obviously beaten it.

IGGO: And that sort of laid me up for a while.

LIEBESKIND: Yeah, you've beaten that. You look terrific.

IGGO: Anyhow, I seem not -- And in fact, last year the university gave me an honorary degree in veterinary medicine.

LIEBESKIND: Is that right?

IGGO: Which, you know, I told you my story about Burns, the principal at Lincoln, saying, "Don't go into animal science."

LIEBESKIND: That's right.

IGGO: The vets had that all wrapped up. Well, I ended up as their dean here in Edinburgh and even in the event they gave me an --

LIEBESKIND: -- an honorary degree.

IGGO: Probably one of the first non-vets to get one. [Liebeskind laughs]

LIEBESKIND: Well, you've had a number of honors. You of course, were made a member of the Royal Society early on, were you not?

IGGO: Well, that was in 1978. After I'd been working for about eight years in the department of physiology and I'd got onto these small fibers and so on, an opportunity came up to have a research fellowship -- a Royal Society research fellowship -- which would give me the same stipend and freedom. I had to take the risk that I wouldn't have a job at the end of the five years. And so I did.

LIEBESKIND: And so you had to sort of resign your academic post, I see.

IGGO: Oh, yeah, sure. They were not keeping it warm for me for the five years. No, I had to resign.

LIEBESKIND: Well, that's sort of nasty. They don't do that in the States. In the States, if you get some fancy thing like that, you keep your academic post and can go back to it.

IGGO: Well, sometimes it happens, but not at that time. So I had to take the risk that, you know, I would end up unemployed with a young family.

LIEBESKIND: Yeah, sure.

IGGO: So that was the first sort of bit of recognition. And then in 1976 I was elected to the -- No, in 1964, I was elected to the Royal Society of Edinburgh, and of which I am a present Councilor. And in 1978, I was elected to the Royal Society. And then in 1990, I think it was, I was elected to an international European Academy called the Academia Europaea.

LIEBESKIND: Oh, I haven't heard of that. Wonderful.

IGGO: Well, you get a little lapel badge.

LIEBESKIND: Yes, well, you've got quite a few of those little badges now, then.

IGGO: And actually on the way along I've picked up a -- to my great astonishment, I think I have to say -- an honorary degree from the University of Pennsylvania.

LIEBESKIND: Is that right?

IGGO: Yeah.

LIEBESKIND: Did you have good colleagues there among those -- [James M.] Sprague [1916-2002], [William W.] Chambers, that ilk? That sort of neuroscience group there?

IGGO: Well, I don't quite know. It was the centenary of the veterinary school.

LIEBESKIND: I see.

IGGO: And I remember among some of the other people who were being honored was a Rothschild. And on that occasion I heard how her husband, when he needed -- I don't think it was a haircut -- I think when he needed a suit, he would fly his London tailor across on the Concorde. [both laugh]

LIEBESKIND: Now, that added a little bit to the cost of the suit, didn't it? Not that he would have to worry about that.

IGGO: Now, I'm not sure quite who lay behind that honorary degree. That's not true. I'd had - - There's a system of inspection of veterinary schools and medical schools, like the AVMA [American Veterinary Medical Association] and the AMA [American Medical Association] and so on. They have to accredit the schools. And I think for the veterinary accreditation they sometimes like to have a sort of an outside, honest broker. And the vet school invited me to join

-- nominated me to join the AVMA inspection team. So the honorary degree may have partly been a consequence of that. But they then subsequently followed me when it came to --

LIEBESKIND: If they were looking to honor someone, you know, in veterinary education who had excelled in science, they couldn't have done better than bring you over.

IGGO: Well, I think it was partly that; it was also having somebody from the U.K. with veterinary associations.

LIEBESKIND: And then for honors, let us not forget your tenure as president of the IASP.

IGGO: That's right. And my -- The Paris Congress [1993] when they made me an honorary [member of IASP]. Well, as a consequence of being president, I was already a life member, but then they made me an honorary member, which was rather -- And I think, actually, it was rather touching that three of the physiologically related people were Melzack, Wall and myself. [both laugh]

LIEBESKIND: That's right. The old soldiers.

IGGO: So you might say it was honors even.

LIEBESKIND: That's right. [he laughs] Do you see Pat at all?

IGGO: As it happens, I've just been down to a teaching course for post-graduates on the neurobiology of pain in Madrid, organized by Fernando Cervero, who's now --

LIEBESKIND: He's back there, is he?

IGGO: He holds a chair of physiology at Alcala University.

LIEBESKIND: Isn't that wonderful? That must make you very proud.

IGGO: And so I was put on the program. The structure of the program, in a way, was interesting because Fernando and I -- They had two lectures each day. Fernando and I spoke on the first day and then the afternoon was a sort of round table discussion, and Pat spoke on the last day, and so the meeting was bracketed between us. [he laughs] So that's the most recent time that I've seen Pat. That was just --

LIEBESKIND: You two get along? I mean, you're cordial and so forth?

IGGO: We don't actually sort of spend our time on the telephone.

LIEBESKIND: Yeah. There's been a lot of water under the dam since the sixties now, but -- Well, he's now a member of the Royal Society, I believe. Is that right? He was accepted to that?

IGGO: It would be unkind to say that he was the thirteenth supplicant.

LIEBESKIND: I see. [he laughs]

IGGO: It took thirteen exposures before he was elected.

LIEBESKIND: Yeah, right.

IGGO: But, true, he is a Fellow of the Royal Society.

LIEBESKIND: Do you see it all -- Just thinking of Pat here for a moment, or people like him -- I mean, one of the questions I want to ask is -- Maybe I'll do it this way and I'll ask a formal question first and then we'll come back to this. What are the attributes in a scientist that you really admire? I mean, if you had to build your perfect scientist, I mean, what would those attributes be?

IGGO: That's a very difficult question.

LIEBESKIND: Or as you think of scientists that you most admire, whether that be Gasser or whoever, you know, what about them?

IGGO: Well, I think first of all they have to have a more than fair share of scholastic ability, academic ability. I think they've got to have, however you define it, they've got to have originality, that they've got to be able to have themselves led by ideas, and at the same time, in experimental science, they've got to expose these ideas to experimental test. And I think then the problem is that they've got to be fortunate to be able to use adequate tests. Now, I guess they're always going to be limited by the bounds of present knowledge, but I think they've got to be able to seize on the unexpected things which are perhaps not what they might have hoped to find, and that is, I think, what has been called the well-prepared mind.

LIEBESKIND: Yes, that's right.

IGGO: I think also they've got to have a streak of honesty about their work. And I think they've got to have a measure of humility and to be able to acknowledge when they've got it wrong.

LIEBESKIND: That's often the toughest, isn't it? I mean, one gets one's ego involved.

IGGO: Oh, sure. It's like a child.

LIEBESKIND: E,G,O, you understand.

IGGO: It's a child, you know. You can't have your -- Parents don't take kindly to having their children criticized. Sometimes, as was reported in the news just the other day, the parent turns up and more or less assaults the individual to the point of death. That did happen just the other day. And so, you know, there's an element of that in scientific ideas. I said earlier on about my

rather intemperate suggestion to Graham Weddell, that maybe he ought to go public, but it's very difficult and maybe that is a sign of a great man, that he can do that. And that's something for which I must give credit to Eccles, because he heavily promoted and sought evidence for electrical transmission in the nervous system.

LIEBESKIND: That's right.

IGGO: And he came to a physiological society meeting in the 1950s at which he was going to recant. And I remember sitting next to him at this physiological society meeting just before he was to read his paper of recantation, and he recanted, but he recanted on the basis of experimental evidence. But he wanted it to be his own experimental evidence. [See Eccles JC. *The Physiology of Nerve Cells* (1956=7)] [he laughs]

LIEBESKIND: Fair enough.

IGGO: So those, I guess, are some of the marks of a -- I mean, there are all -- I guess, also there are presumably a whole lot of personal and interpersonal relationships which might be significant, but I don't know that they're central. To be able to have amicable relations with people -- and I can't say that I stand up very well on that one, since I don't -- I'm not always on the telephone to Pat.

LIEBESKIND: Some people get into -- have problems with lots of other people. Pat may be one of those.

IGGO: I think it's -- One of the problems is -- not in relation to Pat, but one of the problems is being able to tolerate less able people. And that does -- It can be quite difficult, I think, sometimes. It's sort of an intolerance of suffering fools gladly.

LIEBESKIND: Suffering fools gladly, yes, exactly.

IGGO: But I don't know whether that would provide a very well- rounded scientist. I guess the individual has to be open to ideas, not closed off in his own self-made world. But I guess that a primary requirement is intellectual ability.

LIEBESKIND: And certainly Eccles would be someone who would embody most of these traits that -- is someone that you would come up with as --

IGGO: Well, yes, I would say he was a great scientist. I mean, he had his, no doubt, weaknesses. He fell out with people. But I think, you see, going back to Eccles, he left a trail of people who didn't care for him. And I think the misfortune, in a way, was that he realized the significance of something that they were doing long before ever they did themselves, or if ever they did. And so there are people who feel that Jack pinched their ideas.

LIEBESKIND: Yeah. I think Madame Fessard was not very fond of him, as I recall.

IGGO: I don't know what association she had with him. Well, she of course, would, I suppose, have had some kind of an idea of Eccles through her husband [Albert Fessard], who was a Cambridge electro-physiologist. And so I don't know whether they ever crossed swords. But I don't quite know how Denise would come to have a view on Eccles.

LIEBESKIND: She had quite a long list of enemies, I guess.

IGGO: Well, I don't know. I probably -- I have still to accept her invitation to have a soufflé made by her. She reckoned that she could make a cheese soufflé and then I said, "Well, you must give me the opportunity to taste this."

LIEBESKIND: Now, Giselle is a good cook.

IGGO: Oh, now, Giselle, yes.

LIEBESKIND: It seems to me that we had dinner one time, you and I, with Jean-Marie [Besson, Director of the INSERM Physiopharmacology of the Nervous System, IASP President 1996-99], and Giselle, and perhaps a few others crammed closely together in Giselle's little apartment.

IGGO: There's a photograph from those days of Denise and I dancing.

LIEBESKIND: Is that right?

IGGO: Which was regarded as quite an achievement, to get Denise to dance.

LIEBESKIND: That's right.

IGGO: Yes, I've had -- I've shared her hospitality a number of times and yes, she is a good cook, without doubt.

LIEBESKIND: What do you recall from your years as IASP president were the significant issues during your tenure there?

IGGO: Well, I guess it was sort of in the formative days. There was the question of sort of the - - of having the -- getting the headquarters up and running properly. And I think Louisa Jones certainly made a good job of that.

LIEBESKIND: Yes. Did this issue of the journal, ownership of the journal, did that come up during your --

IGGO: No, no. I think that --

LIEBESKIND: That came up later, I guess, again.

IGGO: Yes, I thought so. I'm not sure whether they've now managed to buy it or not.

LIEBESKIND: I believe they have, yes.

IGGO: Have they? They were intending to. I don't think -- my recollection of that period was that it was largely concerned with setting up a congress and running a congress.

LIEBESKIND: You were what, the third president? Is that right?

IGGO: I was the third, yes.

LIEBESKIND: After Denise and then John Bonica.

IGGO: Yes.

LIEBESKIND: So when the congress -- The congress in Edinburgh, that was at the beginning of your term or the end of your term?

IGGO: That was '81. That was -- I think I subsequently became -- Maybe at that meeting I was elected president. But there were two issues at that time which were quite interesting. One was an attempt by [R.] Rizzi in Italy to set up a sort of European federation of IASP chapters. And he actually organized the meeting in Italy.

LIEBESKIND: He was a very entrepreneurial fellow.

IGGO: But I just don't -- I regret to say I can't recollect exactly where it was; somewhere in north Italy.

LIEBESKIND: Yes.

IGGO: And that was a very acrimonious affair. And I remember writing chastising letters around to the presidents of the European chapters over the way they behaved in that matter.

LIEBESKIND: You saw it as weakening IASP should there be a European federation or something?

IGGO: There was certainly, if you like, a kind of political element in that the view was taken, I think -- and not necessarily by me, but by headquarters anyway -- that this wasn't a good thing. But Rizzi wrote around and got support of the various people who then in the end didn't support him. And so he had -- But he did have a meeting and he did publish a book. But I remember that as a sort of rather unpleasant, acrimonious aspect of it, and interesting to find that, again, there was a similar movement, sort of *not* by Rizzi. I think it was partly Rizzi as the entrepreneur, but some people felt unhappy with it.

And the other interesting episode was my idea that it would be just ideal to have a congress in Japan.

LIEBESKIND: Oh, yes.

IGGO: And so we actually had a council meeting in Kyoto.

LIEBESKIND: Yes, I was at that. That's where Betty and we were talking, yeah.

IGGO: That's where Betty found me trying to enter her bedroom through the window.

LIEBESKIND: What was that? [both laugh] That episode I don't remember. You got locked out?

IGGO: Well, for some reason we decided we wanted to sleep in a Japanese-style bedroom, and this turned out to be the hotel's bridal suite. And it was in a wing remote from the main hotel. And there was -- There must have been a business meeting, you know, the sort of thing that kept the men together, and so Betty had gone off to bed. And finally I decided it was time to go to bed and so I went out of the hotel and closed the door behind me to discover that it was then locked. And then discovered, furthermore, that I had no key to get into this. [both laugh] And I remember sort of walking -- it was in a garden -- and walking around in this very nice Japanese-style garden, finding a way of breaking into the bridal suite.

LIEBESKIND: Your own bedroom. [laughter]

IGGO: But that attempt to have a congress in Japan was, of course, followed -- The decision to be taken on the venue was the responsibility of the next president.

LIEBESKIND: Yes.

IGGO: This was just the sort of preliminary stages. And the president took the view that there was too much internecine strife in Japan.

LIEBESKIND: Yeah, Melzack that was, I think.

IGGO: I think it was probably.

LIEBESKIND: He succeeded you, I think.

IGGO: And so the meeting was held elsewhere. So it's interesting that now, so much later, that the president elect has probably just now come back from Japan where they have been discussing the possibility of the venue in --

[BRIEF INTERRUPTION]

IGGO: But the -- So it is interesting that there should now be this attempt.

LIEBESKIND: Yeah.

IGGO: But this time, apparently, they are faced with considerable funding difficulties.

LIEBESKIND: Yeah, it's awfully bloody expensive over there, I guess, isn't it?

IGGO: Well, it's expensive everywhere.

LIEBESKIND: Yeah, it's getting to be so the United States is the only cheap place to travel these days.

IGGO: Well, I haven't tested that premise, so I don't know. [both laugh]

LIEBESKIND: Well, I'll have to bring you over and convince you.

IGGO: My visits have been over to the other side of the world rather than the other side of the Atlantic.

LIEBESKIND: Do you have any favorite examples of blind alleys or areas that just haven't gone anywhere, that seemed so promising and didn't take off?

IGGO: Well, I think in my own sort of experience was the blind alley of the algogens. And this was based on a naive premise that the chemicals would excite only an individual kind of receptor. So that turned out to be, at the time -- and as you can see, I dropped it -- a blind alley. So that's, in my own personal experience, a blind alley.

The blind alleys which are provided by ideas which turn out to be no good -- I mean, if you like, those are blind alleys. Again, in my own sort of field is the temporal spatial pattern hypothesis, you see, which is quite an attractive idea and at the time for development of digital computers, which seemed to be just the way the system might well work, that it was really acting as a kind of system which took a pattern of inputs and from that pattern could extract meaning. I'm not sure -- And that pattern idea was also at least part of the gate theory.

LIEBESKIND: Yes, that's right.

IGGO: So that's a blind alley of an idea. And that -- It had to have an origin and the origin was in the experiments which turned out to be -- what's the word? -- flawed, I think is the word.

LIEBESKIND: [both laugh] I think it's the word. Well, of course, some blind alleys open up later, too. And that may not be a good example of one, but sometimes we think things -- I mean, for example, what about electrical synapses? I mean, they've sort of come back into their own a bit, haven't they? Was John Eccles right after all in some sense? Partly?

IGGO: There's a blind alley, but is it blind because of instrumental, or technical, or theoretical limitations?

LIEBESKIND: Yes, that's right.

IGGO: But if you say “electrical synapses,” his electrical synapses idea was based on electrical recording of pre- and post-synaptic potentials, attempts, at least, at pre- and post-synaptic activity, and then constructing a model. Well, in its context it certainly was wrong, because it turned out that the synapses that he was working on are all chemical.

LIEBESKIND: Those were not electrical synapses in fact, yeah.

IGGO: There are other examples of electrical synapses, so the idea of an electrical synapse, you might say, is there, but it was in the wrong context.

LIEBESKIND: He didn’t have the right example. Ainsley, who else should I interview? Do you have any recommendations to me?

IGGO: Well, I was wondering how you managed to draw up your list in the first place.

LIEBESKIND: Well, I just sort of -- It’s partly opportunistic. If I am going to be somewhere and there is someone there -- Because, you know, it’s otherwise very costly to go traveling around, so knowing I was going to be in England -- or the United Kingdom -- I picked on you and Peter Nathan this year.

IGGO: Well, you see, there’s a chap who’s just about to retire in Belgium.

LIEBESKIND: Oh, is that Jan Gybels [Professor Emeritus of Neurosciences and Psychiatry at the Catholic University of Louvain]?

IGGO: You see, I’ve had a request to make a contribution to a little publication for his retirement.

LIEBESKIND: Is this Gybels you’re --

IGGO: And it’s Jan Gybels, you see. Well now, he --

LIEBESKIND: What a delightful guy. I do know him from the days when I was in Paris and he used to visit.

IGGO: Well, see now, he was one of the people who was not the originator, but attempted to use the microneuronography technique. But if you want to talk about microneuronography and has it any impact on pain mechanisms, then I think you’ve got to pick on some of the people in Sweden.

LIEBESKIND: Yes, Eric Torebjork, and people -- And Ulf himself, I suppose.

IGGO: Well, Ulf’s the grand old man. I think a probably wise grand old man, but at the sort of sharp edge at the present time is [H.] Erik Torebjork [Professor of Clinical Neurophysiology at the University of Uppsala. He worked with [Rolf G.] Hallin, but Hallin has got some secret weapon which, like other secret weapons, you never quite get to know about, which was going to

make recording easier. [See: Torebjork HE and Hallin RG. Recordings of impulses in unmyelinated nerve fibres in man: afferent C fibre activity. *Acta Anaesthesiologica Scandinavica Suppl* 70 (1978): 124-129. Hallin is Professor of Clinical Neurophysiology at Huddinge University Hospital in Sweden.] But you see -- Well, the chap who started all of that was [Karl-Erik] Hagbarth [b. 1926]. Hagbarth and [Åke] Valbo. Now, Hagbarth was, and maybe still is, a Professor [Emeritus] of Clinical Neurophysiology at Uppsala.

LIEBESKIND: Is he still alive, Hagbarth?

IGGO: I don't know. I don't think he's a member of IASP.

LIEBESKIND: No.

IGGO: I never ever run across him. There are a lot of people, you see, who will take advantage of a congress or something, or not be members so that they will be invited to give the papers and then would be paid to come along. There are some people that do behave that way. But Hagbarth -- He's not there.

LIEBESKIND: He would be certainly a grand old man at this point, right?

IGGO: Well, he ought to be, yes, because he was a grand old man long ago. But Valbo was his colleague at the time. Valbo is now in the chair of physiology at Gothenburg [Göteborg; now Professor Emeritus]. But somebody from that group -- See, Valbo actually moved away onto muscles and things like that, but Torebjork has, I think, persevered.

LIEBESKIND: He's still a young man, Torebjork, I mean, relatively.

IGGO: Yes, relatively a young man.

LIEBESKIND: He must be in his forties or something.

IGGO: Inappropriate to be interviewed perhaps. Well, I wouldn't suggest Jose Ochoa [Professor of Neurosurgery at Oregon Health Sciences University].

LIEBESKIND: No. [he laughs] What a lightning rod he always is, isn't he? But Gybels would be a lot of fun, wouldn't he?

IGGO: Well, as you said, he's just that right age with this -- why did he get into this and what did he make of it?

LIEBESKIND: That's right.

IGGO: Because he tried to make a sort of physiological attack on the problem. But he's retiring as a professor of neurosurgery.

LIEBESKIND: Well, he's relatively young, too, isn't he?

IGGO: Well, he's retiring. I don't know, they may retire at sixty.

LIEBESKIND: That's right. Do you have any suggestions or thoughts about this interview process? I mean, were there inappropriate questions I asked, or were there appropriate ones I forgot to ask? What advice do you have for me, because I'm relatively new at this?

IGGO: I think actually, I've been aware, in the vet school setting, of the fact that, you know, there's not much of a history. And I've tried to encourage other people to do something about it.

LIEBESKIND: Good.

IGGO: Not that -- They're weak vessels in the end. So I think this is a way of getting a record. It's a question of what on earth you can do with it once you've got it, but, you know, it might provide a source of information that would otherwise be difficult to get just because of the nature of the setting, the informality of it all. And I think that certainly is quite significant.

AINSLEY IGGO INTERVIEW

TAPE TWO, SIDE TWO

LIEBESKIND: Yeah.

IGGO: So in a way, what you're trying to do, I suppose, is to find what makes the system tick. How did it happen that the individuals who are in a particular field actually got there? And so I think, you know, you asked about how did I happen to get involved? You see, I think maybe there's the question of what was it about the individual that gave him the motivation.

LIEBESKIND: Yes.

IGGO: Well, in my case, I guess, I was among my contemporaries a clever boy. But I do recollect having in my bedroom, a little notice on the wall saying, "Iggo's Academy." [Liebeskind laughs] Now, that must have -- I must have put that up when I was, I don't know, eight or ten years old. So --

LIEBESKIND: And what did that mean? Where did that come from?

IGGO: Well, goodness knows. But it was that a child could have that sort of -- Well, I'm not sure that one would call it an aspiration, but sort of even in a kind of light-hearted vein have that kind of attitude.

LIEBESKIND: So you made this yourself? This was a -- something that you --

IGGO: Yeah.

LIEBESKIND: This was your school that you were going to found or what have you.

IGGO: Yes, that's right.

LIEBESKIND: I see.

IGGO: So I think the difficult task is to move to the early stage in the formation.

LIEBESKIND: Yes, that's right.

IGGO: And I think that then you can only speak from personal experience, there was a sort of an awareness of certain intellectual or academic ability. And so that --

LIEBESKIND: A sense, well, I've got a gift here, I might as well make use of it.

IGGO: After all, we have to make our way in the world, and so you have to develop -- Like some people are good at hop, skip and jump, and so they develop that talent. So I guess it's a case of making -- of developing your talents, if you like, and perhaps being encouraged to

develop your talents, and I suppose, in the sort of academic framework that turns on individual teachers. And one thing I haven't mentioned is that there is -- I was very strongly encouraged by a secondary school teacher.

LIEBESKIND: Oh, really? Oh, I'm interested in that.

IGGO: And so that's when I was a secondary school boy. And when I go to New Zealand, I take the opportunity, still, of visiting him.

LIEBESKIND: Is that right? He's still going strong, is he?

IGGO: Oh, he's now in a retirement home and I guess he must be well into his eighties.

LIEBESKIND: Did he direct you in a certain direction or, I mean, did he inspire you in a certain direction or just in academics generally?

IGGO: Well, he was the agricultural specialist. And he encouraged me.

LIEBESKIND: What's his name?

IGGO: His name is McKinnon.

LIEBESKIND: McKinley?

IGGO: McKinnon.

LIEBESKIND: McKinnon.

IGGO: And so if you -- When you push the inquiry back, you begin to see that there are -- And I think what you might do in these things is try pushing the inquiry earlier than the moment when the chap starts dissecting c-fibers.

LIEBESKIND: Yes, that's right. Well, I've been encouraged to do that, but I'm always a little reluctant because I'm a little -- I'm hesitant to be too pushy on personal matters and some people don't feel comfortable with that.

IGGO: Well, I guess you have to open it up in a way which lets them say what they want to, if they want to.

LIEBESKIND: That's right, yeah.

IGGO: So that, I guess that, you know, there was the encouragement of a latent, recognized, academic ability.

LIEBESKIND: Yes, yes.

IGGO: And then that has to succeed by its own efforts.

LIEBESKIND: Yeah.

IGGO: Because I don't think -- Although in Edinburgh there were three anatomy professors spanning more than a hundred years, father, son and grandson -- [Alexander Munro "Primus", "Secundus" and "Tertius", 1720 -1846]

LIEBESKIND: Is that right? [both laugh] Wow.

IGGO: I don't know that any longer patronage -- Patronage has its part, but I think you've got to have something there to be patronized.

LIEBESKIND: You certainly do.

IGGO: Well, I trust that you've given me an opportunity to talk about my academic life.

LIEBESKIND: Well, these things are never really ever, you know, over completely. I mean, one other question I'd like to ask -- I don't know whether you have the strength to go on for a few minutes more -- would just be to ask you, you know, you just said, well, your academic life. I mean, how do you feel your academic life, your professional life, has related to your personal life? I mean, has it been a sacrifice for you to have worked as hard as you have? How would you comment on that?

IGGO: Well, I have often said that I was very lucky to be paid to do what I enjoy doing. I can't account for the fact that I was prepared to spend eighteen hours at a stretch and get nowhere, and do it again and get nowhere, and do it again and get nowhere. Was it because I had a lack of imagination which would enable me to go and do something else? But I think, you know, that a little bit of success, if you are aware of the significance within the setting, helps to keep you going. And you're certainly -- And as Jock Austin used to say, "Success breeds success." And so you've got to have that, so you're feeding on your own success in a way. And if you have failure, then of course you get turned off.

LIEBESKIND: Certainly in Betty, you had a spouse who understood about academics and about science and the work that was involved.

IGGO: Well, Betty became an academic and she chose to marry me, so I think -- And she didn't marry me on the spur of the moment. We'd known each other for several years. And she has certainly been a tower of strength in enabling me, I suppose -- She reminded me the other day, that, when we moved to this house from somewhere else in Edinburgh, I was away. [both laugh]

LIEBESKIND: Conveniently.

IGGO: And you can imagine, house moving, you know what it entails. So she coped with all of that, and she brought up the family. She brought up a family who have in themselves had academic aspirations.

LIEBESKIND: You have one son who's a physician.

IGGO: One son who's at the present stage is in Oxford in a hospital there.

LIEBESKIND: What's his name?

IGGO: That's Neil.

LIEBESKIND: Neil, yeah.

IGGO: He's got --

LIEBESKIND: Is he the anesthetist?

IGGO: No, he aspires to be a nephrologist.

LIEBESKIND: A nephrologist.

IGGO: A consultant nephrologist. [Dr. Neil Iggo currently practices nephrology at the Royal Sussex County Hospital in Brighton, England.] And he is currently a senior registrar, which is on the step below. He's the eldest. He's mad keen on skiing and just -- In January he managed to rupture his Achilles tendon, so that's rather put him back a bit.

LIEBESKIND: Oh, god. Yeah, well, that'll keep his nose to the grindstone, anyway.

IGGO: And then the second one is an inorganic chemist.

LIEBESKIND: What's his name?

IGGO: That's Jonathan.

LIEBESKIND: Jonathan.

IGGO: He has a lecturing post in the University of Liverpool. He went through Cambridge and did a Ph.D. there and is now married to a Spanish girl, and has just been to Japan, and is about to go to Barcelona, and so on. So he's sort of developing international connections now. And the youngest one is Richard.

LIEBESKIND: Richard, yeah.

IGGO: He was the one who was in Seattle.

LIEBESKIND: Oh, yes. He's a -- Well, he was in medicine, but now he's in molecular biology, is that right?

IGGO: Well, Richard was the gold medalist at Bristol Medical School.

LIEBESKIND: Yeah, wonderful.

IGGO: And started out on his clinical training program, and decided that it was not the life for him, so he bought a book on molecular biology and did a Ph.D. in molecular biology. He's now running a cancer lab in Lausanne. [Richard Iggo is senior scientist at the Swiss Institute for Experimental Cancer Research in Epalinges.]

LIEBESKIND: Isn't that terrific?

IGGO: So, you know, I think my personal life has been quite satisfying.

LIEBESKIND: Well, you must be very proud of those three.

IGGO: But I've also got very itchy feet. I took opportunities to travel. I've dragged the children around the world. We went out to Nigeria for about three months once to help them, actually, during the Biafran war [1967-70, the attempted secession of the southeastern provinces of Nigeria], to try and help to set up a pre-clinical veterinary department. Did some experiments with Betty as my assistant, from which we published a paper.

LIEBESKIND: You published a paper with Betty?

IGGO: Yeah.

LIEBESKIND: Wonderful.

IGGO: On primate thermoreceptors. And then I was in -- took a sabbatical in Japan in 1970. Took the family with me, and was there for five months. They went to a Japanese middle school. So they got dragged around the world in my wake. So you know, I think, by and large, my scientific efforts have been supported by my domestic setting, and with a fairly tolerant wife, I would say, who is also quite a good hostess. So all in all, I think one can't complain too bitterly.

LIEBESKIND: And now that you've passed the first three score and ten, what do you see ahead? You're obviously not hanging up your hat as a scientist. You're keeping going.

IGGO: Hanging up my boots, I think is the expression. [both laugh]

LIEBESKIND: That's the end, when you hang up your boots, I think.

IGGO: Yeah, well, I think, again, it's the lack of imagination, you see? Last year or the year before, I had a Japanese working -- Actually, when I retired I decided that I would follow up the Merkel cells, which were the mechanoreceptor system in the skin, and that I would try and isolate Merkel cells because they were -- at that time we didn't have much real idea about what,

if anything, they did. And got myself invited out to Japan to the laboratory of [Harunori] Ohmori.

LIEBESKIND: Oh, yes.

IGGO: Who at that time was at Okazaki [the Japanese National Institute for Physiological Sciences]. He's now in the chair of physiology at Kyoto. With the idea that I would pick up his techniques and bring them back here, get a research grant and proceed. Well, I went out there and I picked up techniques, and I came back. While I was out there I put together a research grant proposal, which was really quite difficult to do without any secretarial assistance. Anyhow, the research grant proposal was not supported.

LIEBESKIND: Well, you didn't do it in your mother-in-law's apartment, you see, or dining room or whatever. [both laugh]

IGGO: I chose the wrong setting for that.

LIEBESKIND: Chose the wrong setting.

IGGO: So in the event that fell through, but in the meantime, there was this chap from Japan, Tasaki, who wanted to come and spend a year on sabbatical. And at the moment I'm busy trying to complete the data analysis and finish writing the paper which I have set the end of this month as the target date, but it keeps on slipping. So I'm still doing that sort of thing.

What I'll be doing if I get to seventy-five, only goodness alone knows. I may be boring myself to the back teeth with the garden, because I spend quite a lot of the time in the garden. But --

LIEBESKIND: Betty's still going. She's enjoying her work, is she?

IGGO: Well, that's largely why we're still here in Edinburgh, I think, because she's tied here. She's super active that way. It's very hard to get her to go to France to our cottage and have a holiday.

LIEBESKIND: Yeah. You still have that cottage over there, do you?

IGGO: Yeah. We'll be going there the beginning of September. It's getting a bit a late in the year, but --

LIEBESKIND: Whereabouts is that?

IGGO: It's in what I would call the Marches. It's on the border, actually, that's more or less the case. The village has a chateau and the present-day chateau is rebuilt from a chateau built, I think, by Frances I to defend the Territory of Maine from the advancing English.

LIEBESKIND: [he laughs] How significant.

IGGO: And there's a little -- That's on the -- There's the river. The Sarthe River is on one boundary of the chateau grounds, but on the western side there's a small river which then runs inland and we're on that little river. But I think that was chosen as the defensive line.

LIEBESKIND: Pretty soon you'll cross the river and assault the castle, will you?

IGGO: We're actually on the same side of the river as the castle.

LIEBESKIND: I see. Okay. [he laughs] Making the assault all the more easy.

IGGO: Yes, no problem. Anyhow, we've had that place since 1972, and it was -- we've reconstructed an old building to make a kind of a cottage. But whether we would go and live in France, I don't know. Or whether we're going to go back to New Zealand. But you see, we have almost no family out there, and --

LIEBESKIND: Your children have not given you any grandchildren yet, is that right?

IGGO: No. There's -- Well, Johnny's wife is in her twenties. Johnny's in his thirties. She's just completed a Ph.D. and has got a job in the soap industry. So they're not taking -- They're not hastening to produce a family.

LIEBESKIND: See, I have these two twenty-year-olds and they're so wrapped up in theater they haven't bothered to get married or have children, so I had to produce my own grandchild [Liebeskind's third child, Ben, is more than ten years younger than his older brothers]. [he laughs]

IGGO: Well, I suppose you might say that. That's an alternative. That's a possibility that's beyond my reach now.

LIEBESKIND: That's right. [he laughs] I had to change wives to do it. That might be pretty costly for you.

IGGO: Well, yes, you might say, did you never think of changing wives? Well, I suppose, in the reality of life, that these thoughts happen all the time.

LIEBESKIND: You haven't met Julia [Liebeskind's wife] yet, have you? Or did you meet her? Oh, you must have met her when -- I think perhaps during the Congress here. Well, you were so busy you probably didn't -- She did come up at that time, for the Edinburgh Congress, briefly.

IGGO: She may well have done, but I don't recollect.

LIEBESKIND: She's English. Well, you know.

IGGO: Yes, I know. Yeah, well, okay, so you produce your own grandchildren, that's enterprising.

LIEBESKIND: [he laughs] Needs must.

IGGO: Yeah, well, I've got two bachelor sons and they don't show much sign of climbing in and out of bed with anybody, so that I guess is the first step.

LIEBESKIND: Well, Ainsley, I feel very satisfied with this interview. I think it's been very engaging and interesting. We've gotten to see a bit of the science and something about where that's come from and at least a little glimpse of the man behind it.

IGGO: I guess -- I don't know quite how you'll go about making -- forming an opinion, if now a third party listens to this in ten years time. What will they make of it?

LIEBESKIND: Well, I'll tell you about my plans in that regard. We can do that off tape.

IGGO: Yes. Okay, well --

LIEBESKIND: Thank you very much.

IGGO: Not at all.

LIEBESKIND: End of interview.

END OF INTERVIEW