Interview of Martin Riddiford and Show and Tell with Jim Fullalove

Interviewed by:
Marc Weber

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Martin Riddiford: Industrial product called the HC [?], we did the MC [?], and then the Series 3. That was the order we developed it in. Everything up to the MC went to the—everything since then, it's around somewhere, or lost.

Marc Weber: Okay, anything like that, certainly, we'd be interested in, copies or originals, or—

Riddiford: We have an archive, which we can go to, and it's being filtered and filtered and filtered. There may be some interesting stuff, but generally it's not that old. The original Series 3 stuff might be there, for instance. The Series 5 stuff generally is. We've got quite a lot of models of the Series 7.

Jim Fullalove: I imagine the V&A [Victoria and Albert Museum] has got it. It's already been digitized.

Weber: Yes, that would be great. There will, by the way, also be a side—well the museum's collection now, there's 50,000 objects searched via the web, and the exhibit is going to have the cyber to go with it. Anything digital is also great to be able to linked to.

Riddiford: Yes, right.

Fullalove: I'll make a short list, then, because I'll be following up on—

Weber: Yes, that would be great. At this stage I'm just trying to get an idea of what is out there, and what needs to be preserved. Estimates of how many boxes, how many hours of tape, how many hours of—

Riddiford: Yes. We're talking minutes and small boxes. *<laughs>* Well, the good thing is most of the stuff is handheld. Obviously, if you're looking at the complete history of computing, you've got computers that are the size of the room. Our computers are something that fits in the hand, or in your pocket, so it's a bit easier.

Weber: That's true. The entire historic trail.

Riddiford: As I've said, I develop my thinking in sketchbooks. So there's—

Weber: Can you hold that up?

Riddiford: Yes. I'm always sketching into sketchbooks, and every project I'm working on has got—it's a historical thing. I'll get through these every couple of months. I've kept all of those from '93.

Weber: Prior to '93?

Riddiford: I didn't work that way.

Weber: Wow, how did you work?

Riddiford: I didn't work in books, we worked on sketch pads, and put things into files. Anyone who was working on the project put their sketches into a file, and because it was a previous company, I don't know what's happened to those files. We had a good sort through those files when we found all the stuff for the V&A. I don't know what's happened to those files. It's quite interesting, because different people hold information in different ways. A couple of people here do work in sketchbooks, but most people do work on a project-by-project basis sketch pad and then rip out the pages that are appropriate and put it into a folder. Then there's less and less hand writing, sketching, and what have you. At the beginning of a project, nice young designers these days jump straight onto the computer and start working on the computer. You could argue there's a trail there, but generally you just keep the latest thing that is the presentation. It's not a very good way of keeping your original ideas, because the original ideas are continually worked over until you end up with what you're going to present. Yes, it's quite difficult to catalogue that stuff.

Weber: One other basic thing I'd like to do today is get a sense of the role that design played at Psion, which was huge, and kind of really just start from the beginning. Maybe just a little bit about your background. Where you were born, where you were educated, and—

Riddiford: I was born in Brighton, and my dad was 50 when I was born. He was a Superintendent for ShellMex and BP [Shell-Mex and BP, Ltd. was a joint venture between Royal Dutch Shell and British Petroleum]. He was very keen on making things, so he had a workshop in his garden. He used to make furniture and things like that. I was exposed to that level of creativity, if you like—using your hands to make something—from an early age. I used to go out there and make lots of models, generally to my own design, rather than making [them from] kits or out of Meccano sets, which I liked to tinker with, but I never worked off the plans; I was always making my own thing. That was a history of why I always liked making things.

Weber: How old were you when you started?

Riddiford: Oh, my mum has got some models that I made, probably when I was eight. Relatively young. Model making was always the form of creativity that I enjoyed. I was always good at starting a model, but often poor at actually finishing it. I liked [the] creative process of developing an idea, but I wasn't one of these people that spends hours and hours and hours, doing the final painting. It was finished when it was built and looked like something and worked or didn't work. Anyway, when I was about 10 to 12-13, I was at a boarding school, and there was a very good art teacher and his second in command. The second in command was a really nice guy who was trained as an architect, but he was quite young. I think he was just teaching in the school for a few years, before he went off and pursued a career in architecture. He had a connection with his brother, who was running the theatre at another school, and I got involved in the theatre department, and stage managed a number of shows. I built the sets for the shows. Because of this connection with this other school, they had rotating turntables, which was very unusual in those days, to put on a stage. We designed a whole bunch of sets which changed through this rotation. Basically it was usually three-sided; you had one set facing you, then you turned it round, you had another set, and then another set, using different layers. It was an early exercise in 3D thinking with time as an element. That’s fascinated me through my life, because a lot of the things I do are mechanical solutions to problems, whereby you use something in one way at a certain time, and you use it in another way at another time. It's the transformation between the two, which is interesting and there's a time

element there which is always interesting as well. There's a transformation from an object that goes in your pocket to an object that you use, and you can change the shape of something to make it easier to use, during that transformation. I think that early experience, doing these sort of moving sets, probably was influential in developing that thinking. I then went on to senior school, and followed an academic path. I quite liked painting and sketching, but I wasn't generally particularly good at it. I did maths, physics and chemistry at A-level. Then I left school, and didn't really know what I wanted to do. I always knew I wanted to make things, and I found a course called industrial design, and went to foundation course first. Then I went to the best industrial design course in the UK at the time, which was at Central School of Art Design, now Central St. Martin's, and spent three years there. That was the foundation of my skill set. The interesting thing with Central St. Martin's, in those days, was that the course was called industrial design engineering, and it tried to bring together the art and the science. Some students obviously favored the arts, some favored the science, and I tried to bring the two together. In fact, I really pissed my tutors off, because I was always trying to make things that worked. You're not supposed to do that, really, you're supposed to make something that looks good, and you pretend, or you get someone else to make it work. But I was allowed to challenge myself to get this mechanical thing to work, so—

Weber: You think your interest previously in math and physics, kind of grounded on the technical side?

Riddiford: Yes. I've never been that good at precise, at getting the answers right, if you like. I was quite good at physics, but in a slightly intuitive way. I'd always get quite good marks for my exams, because of the approach I took to solving the problem. Often I'd get the answer wrong, because my skill set, in terms of—I was too quick, I was trying to work it out too quickly and would get a decimal place in the wrong place, or just do an inexact—<*laughs*> because I cut it—I'd worked out my way to get to the answer, and the rest of it was kind of theoretical. I'm still like that. I thrash through at the beginning to try to get the answer, and then it's not that I lose interest, but I don't have the patience for working through that last little bit, and luckily we've got a whole bunch of people here who are very good at that, so—

Weber: I'm sure you share quite a bit of that with people who invented hypertext. All the great pioneers.

Riddiford: Yes. I was lucky enough to win a scholarship in my last year at university, which allowed me to… a bursary of traveling—it was a traveling scholarship—so I decided to go to the 'States and Mexico for nearly five months. I worked out an itinerary, visiting universities, design companies, and manufacturing companies around the 'States. It was long to journey from—I started off on the West Coast, and worked east, and had a fantastic time. I went to a whole bunch of really good universities and good companies and learned a lot on the way. When I came back, I got a model making job with a couple of consultants, hen guys at college with had got a job in a very small consultancy. I joined them to do some model making, and potentially to do some design. There were only four of us at the time. It was a company called Fraser Designers; they're still in existence at the moment. Stephen Fraser was doing an awful lot of early electronic games and toys, and so we were known for doing electronics. Probably in those days, a number of companies wouldn't have been known for electronics.

Weber: And when did you—?

Riddiford: I joined in '79. One of the projects I designed at college was a calculator. It was an unusual calculator because the keys were in the shape of the numbers. If you could imagine, each of the numbers is a cut out, and it was a big fat type face. The idea was for kids. I did this at college, and Stephen Fraser

had a connection, and we managed to take it to market. That was also my first entrepreneurial taste of taking my own idea, and for it to happen.

Weber: You got some—?

Riddiford: Unfortunately, it was launched just when a recession happened, and there were a number of recessions in those days. I think they sold 50,000. It was copied by a few people, and interestingly, the people who were making it went to one of the factories in China, that was making one of the copies, and persuaded them that they shouldn't be copying it, and they should be paying us a royalty. We allowed them to carry on making it, but we got a royalty on the back very well. The royalty stream carried on for a little bit longer than it might have done. I think I've got one of those upstairs, if you want to go and have a look at.

Weber: Yes.

Riddiford: Right, so where were we? I'll shut the door.

Weber: Then you got the Chinese factory to pay some royalties. You got something out of it.

Riddiford: I got some royalties from the original design. Then we did the Mark 2, which wasn't as good as the Mark 1, really. Then a couple of times, it was copied, and at least once, we got the royalties from it. It was a reasonably successful little venture, and it sort of opened my mind to the fact that you could do something with your own ideas. A few years later, we did another entrepreneurial job where we were doing some experimentation on barcode readers, and I discovered that barcode readers that use infrared light—if you scan a barcode reader over a printed standard bit of litho printed paper, you would expect it to respond to dark and light areas, but it doesn't. It only responds to the carbon black ink. Basically, you can create a dark color by mixing the other three colors which appears dark to your eyes, but not to infrared. Having made this discovery—

Weber: Secret barcodes.

Riddiford: Yes, but I was thinking in terms of much simpler things. I thought you could hide things in standard print. We created a range of children's books with right and wrong answers hidden in patches of color. Carbon black was a right answer; 20 percent carbon black was the right answer, and no carbon black was a wrong answer. You pressed the pen, which had an emitter and a detector in the tip of it, against the book, and it would read the level and tell you whether you got the answer right or wrong. We made a whole series of books out of this. I think it was probably in 1982, or something like that. In the ‘States, for the children's books of one particular month, we had nine out of ten of the top ten bestselling children's books, using this technique. It was very successful. Of course, in two or three years, because the technology was pretty simple, it died off a little bit, and the company was sold from one to another. Also, at the time it was being sold, I moved away from that company, and founded this company. It was just on the way, if you like, but that was an interesting exploration in coming up with an interesting bit of technology. It wasn't really a bit of technology, it was an observation of someone else's technology. Interestingly, this has been pointed out a couple of times recently; as spotting what would otherwise be seen as a problem by someone who's wanting to create barcodes, and saying, “Well actually, that's a

phenomenon that you can use somewhere else to your advantage." That's the kinds of thing that we often do. You turn a problem into an opportunity.

Weber: We've heard that <*inaudible*> other transform—

Riddiford: Yes, they're a small consultancy. We were never going to be developing the technology, any fundamental technology, but we can basically look at what other people are doing, and find a new opportunity for that technology, but often in a slightly unusual way.

Weber: Say how you first heard of the Psion project, and got—

Riddiford: In those days, Psion was a software company, and they had a number of successful products out. They had just done a collaboration with Clive Sinclair to put their software onto a small home computer.

Weber: Which was?

Riddiford: The Spectrum, was it, or the XL? They had this suite of software, and they debated internally. I think they got what they wanted together, to plow their own furrow kind of thing and not rely on someone else for the hardware.

Weber: Did you know them through, you said that—

Riddiford: No, they went to the Design Council, which, in those days was quite a strong organization in the UK, which basically connected people who wanted design with the right designers. Obviously these days, you do that through the internet, probably, and look at recommendations, and look at websites, so you can do that all from your desk. In those days it was quite difficult to find the connections to get the right designer. You could look at them, find a directory or whatever, but you didn't have the faintest clue what a designer would be good at. To get a short list of people who were working in your sphere, was probably quite tricky. Anyway, the Design Council set themselves out to be this link. Psion went to the Design Council, they recommended three or four design companies that might be suitable and we were one of them. We may have worked in parallel with one other company at the time, but we certainly felt like we were on probation for the first period of the project. They came to us with a brief, which was a keyboard. It wasn't a QWERTY keyboard, because, interestingly, in those days, the type of person that you were trying to appeal to, had never seen a QWERTY keyboard, or would never be interested in a QWERTY keyboard. Basically, the typing pool had the QWERTY keyboards, and you just wanted to pick out some letters. They had this array of keys, which they imagined were going to go on the product, and a small display, and they imagined it was going to go in a tablet type product, a single layer. The traditional thing would be a single layer, with some batteries at one side. We did some designs following that kind of layout through, but the problem was you could end up with a book sized product Carrying a book around with you all the time is not very convenient. I thought, "Well, how do you make this a bit smaller, to make it a bit more pocketable?" I ended up suggesting that we break the board in two, and stack the two boards on top of each other.

Weber: To make it thicker.

Riddiford: To make it thicker, but narrower, and smaller. Smaller plan area, and the batteries were already driving the thickness anyway, so that actually you weren't making it any thicker than it was going to be, probably. It was just an exercise in repackaging the components, to make it into a more convenient shape. That's what this [Organiser II] was. This was a calculator style, if you like, with a screen above the keyboard. This was Mark 2.. The original one was probably less easy to read, but a bit more stylish.

Weber: But otherwise similar except for the one line display?

Riddiford: Yes, it had a one line display, the coloring was different, but the same format.

Weber: Form factor, design.

Riddiford: Yes, the Mark 1 didn't have a socket out of the top, so you couldn't connect it to anything, but it had memory cards, just like this. This was a very new kind of thought about having portable storage. Not new, actually, because I think the Sinclair had dabbled with it, but they hadn't used solid state storage.

Weber: Do you want to hold it up?

Riddiford: Well, unfortunately these are actually just blank covers, but essentially—just hang on, I'll get—these are just blank covers, but you can see there's a connector in there. This was designed to be assembled together so you had a board in there and a connector on the end, or it just existed as a cover, so that you could sell the product with no memory, with these things, these ports covered over. Then you could exchange that blank cover for a fully loaded pack. “Data packs” they were called.

Weber: Who came up with the idea of the—?

Riddiford: We came up with that way of doing it, and with Andy Clegg. We kind of came up with the format, and the connector type. We were basically using a standard off-the-shelf connector in a slightly unusual way, which is what we ended up having to do all the time.

Weber: What was that connector made for?

Riddiford: This was really just an internal board to board connector, called a box header, which isn't really designed for putting in an externally seen product. It was robust, cost effective and off-the-shelf. Psion was very good at doing serial connections; basically reducing a number of connections between things. It was one of the things that drove what they were doing here. It only has 16 connections, whereas a lot of other people who were using memory devices would be looking at many more connections. It had the same connection at the top here. Basically it's got three ports which are identical. This one was used for interfacing with another computer, and—

Weber: A serial port.

Riddiford: Yes. Because this was a pocketable device, we considered that the keyboard needed covering; firstly to protect the keyboard, secondly to stop you inadvertently turning it on. We kept the display uncovered, because we considered that if you covered this display, you've got this rather blind object. There's something quite intriguing about seeing part of it open, and then seeing the rest of it when you come to deploy it. We decided it to, having got this cover on here, to keep the cover on the product, so that you—

Weber: So it wouldn't get lost.

Riddiford: Well, you don't lose it, but you also don't—it helps the holding of it, using your thumbs. The idea of it going into two states was quite intriguing. You can take it off as well, to replace the battery. It was quite interesting, because whenever they showed a picture of the device, because they wanted to make it look small, they always showed it without the cover on. <*laughs*> All the advertising was done like this, whereas we always assumed that many people would use it like this.

Weber: In fact, did people?

Riddiford: I think it was even-handed, yes.

Weber: The transparent cover around the screen, you've got a protected window?

Riddiford: There's a bit of a protected window over the display, which is made in acrylic, which is good for anti-scratch. In those days, we didn't know about coatings so we had to use a native plastic. Then it's got an anodized label, which is shaped over the display, which was quite tricky at the time. Not many companies were doing cosmetic and mechanical labels. The original design was to have that so that it stuck on, but no one could do that successfully. We ended up having to make it so it clipped on, which was a bit of a shame, because you can always just see the clips just down the side, from my point of view.

Weber: The lines around the cover, just decorative?

Riddiford: These are just decorative, yes.

Weber: This would have been at least the second calculator type that you designed personally.

Riddiford: Yes.

Weber: The story that I heard from Charles is that the calculator was becoming the assumed baseline.

Riddiford: Yes, it was. I remember we did these two presentations of these two different formats. One was this vertical design, and the other was much more of a landscape thing. Similar sort of keyboard, but it was quite a lot bigger. They basically said what size circuit board they wanted. The circuit board was dictating the size of the product, and then you had to lay the batteries next door to it, so you ended up with a product which was bigger than you wanted. By challenging that and saying, “Well, why not do it this

way," they sort of jumped onto that, and said, "Yes, let's do it that way and make it a handheld thing." Also, if it's a handheld thing like this, you use it in a slightly different way to a book type of thing. A book type of thing, you probably put down to use. This, you probably use in your hands. There's always an assumption, because you don't always know how people are going to use things. In the early days of these sorts of things, there was always an assumption that you held it in one hand, and pressed the buttons with the other hand. Fine, works quite well, but quite quickly—and you see this more and more these days, with people with mobile phones—you adapt to the device, and you find that without even thinking about it, you hold it in different ways, and use it in different ways. You can hold it in one hand, and press the buttons with one hand. You can hold it in two hands and use both thumbs, or you can use it like this—. You find, by watching people, they instinctively just pick it up and use it in whatever way they feel is right. Quite quickly, as a designer, you understand that even though you think they're going to use it in one way, they work out their own way of using it. You've just got to go along with that and understand those principles.

Weber: When you were coming up with the design, other than the calculator, were there any other inspirations or models?

Riddiford: Not really, but what I have always tended to do is to make a model. You can make very rough models, and there are stories of the Palm CEO doing the same. It can be very rough, it's just got to be something you can carry around with you, and just get a feel for, "Is this going to be comfortable to use and hold?" we made some models of the vertical formats and the horizontal format and fiddled around with them. There were a whole bunch of unknown features in terms of keyboard layouts and things like that. It was quite in my own mind, as a young designer, I didn't know how to present those options. I devised this presentation board which had a picture of the product in the middle, and it had clear flaps on either side. Those clear flaps had Letraset letters on them, so you could flap one thing over, and then flap another thing over, and get one set and then you could flap something else underneath to give you a different color. You could basically create a trial and error thing, in terms of what's most legible, and what features you want. I think that went along to one of those early meetings with Psion and they really liked that because it's an interactive—we're not trying to make a decision for them, we're trying to give them the wherewithal to make the decision themselves. They really responded to that. Anyway, we got the job, and we ended up designing the final product.

Weber: That particular thing, the transfer and overlay is long gone?

Riddiford: Oh, yes. That was just the right thing for the right job. We continued to end up doing that kind of thing. "What does this job need in order to get the information across in the best way?" We've never had a formula for doing that. We basically do what we feel is right for that particular job and that particular client, using the technology we've got.

Weber: The keyboard, could you hold it up so—This is pretty similar to the first one, right?

Riddiford: The first Organizer had thinner keys. We didn't know how easy it was going to be to print on the keys, so we put the print all on the back surface, on the label, with the keys sticking through.

Weber: But the actual keys, right—

Riddiford: No, on the Organizer I, the keys, which is the single line display version that we're talking about, the keys were much skinnier, and all the graphics were in the background. It didn't have a grid here, it just had lines.

Weber: Oh, sorry. They did the same thing.

Riddiford: Oh, yes, but there was an issue here, that if you were people putting names and addresses into these products, you've got a name and address and a phone number, it's a combination of letters and numbers continually. If you've got a shared keyboard with letters and numbers, and you've got a shift key, which is basically shifting between them. It was called, Bastard Mode, because you don't know what the hell you're doing. You're pressing the same button and you're getting different functions out of it, compared with a computer keyboard. Also, you've got to contend with the fact that it's laid out in letters, in alphabetic format, rather than QWERTY. Computer users were used to using QWERTY, but the kinds of people that this was aimed at weren't necessarily computer users. This would be their information device, and that's why the original one never plugged in to anything. What the hell do you plug it into, unless you're a geek?

Weber: The original users you were conceiving as some scientific and math, but also businesses?

Riddiford: Yes, mainly the business side, because the software that Psion had written was a business suite of software—. That was one of the interesting things about what they were able to do; it was an integrated suite. You didn't have to quit a program to start a new one; they could be alive at the same time, so you didn't have that sort of booting up.

Weber: Multi—

Riddiford: Multitasking, yes. That was exploited in further products much better than it was here, but the same thinking was still evident.

Weber: The design for the shift keys and all that, was more from them or from you, or a combination?

Riddiford: This grid design was from us. This product was aimed at two different markets, but they wanted to make the same product. The original product, the Organiser I, was a pioneering product which just went out on the market. Various people bought it, and they found that some of the people who were buying it were corporate customers. It was a relatively cheap computing device which you could program to do different tasks. It could be a repetitive task, which you then give to a worker to do. One of the first uses was for someone who was trialing the system, and was interested in it: a retailer called Marks and Spencer, who is in the UK. You've probably heard the story. They were thinking of launching a credit card, or were launching a credit card, and they wanted to have a checking system to make sure that the owner of the credit card had some money and wasn't fraudulently using it, and it hadn't been stolen, etcetera. How the hell do they do that? They had their stores set up, and they had a fantastic network of vehicles running between the stores at night, replenishing the stores. They were going to use this distribution system for using data packs. Basically every night, they would program a whole bunch of data packs. One would go to every store, to go in the back of this device, which would then have all the credit card numbers which were not deemed to be valid on there. Whenever a credit card came in, you checked the number and that would tell you immediately whether or not to honor the credit card.

Weber: Wasn't there price information?

Riddiford: When the Mark 2 came along, they started using it for all sorts of other things. It suited them a lot, because they did have a lot of dedicated tills, but they also were quite pioneering in the fact that they had mobile tills, especially at Christmas time, which were battery powered. They basically had a whole till which wasn't connected up to the mains, or anything. To have a battery powered computer was quite important to them. Obviously you could, if you were connected to the mains, you could have a mains powered computer, more powerful, etcetera. This was basically a mass produced product coming out at a nice low cost for them, battery powered. They could then, put their bespoke software onto it, and do whatever they wanted, and that suited them to their ends. We were aware of this going on, and the brief was to do a much more easily readable keyboard. The original one we did was quite stylish, but actually, quite difficult to read. This was trying to be as clear as possible, and so that's why it's got this sort of quite—

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START OF TAPE 2

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Riddiford: —themes that run through a lot of the design I do here and that is I like to create neat looking hinges. This is a hinge which when it's shut isn't really a hinge.[Psion MC laptop]

Weber: Wow, could you open it again?

Riddiford: A lot of designers find it difficult to create things which hinge without having a bloody great cylinder running through them. This is basically a pulley styled and shaped and it looks good when it's open as well because all of the gaps close up.

Weber: And the actual—okay. There's just a—

Riddiford: There's also an interesting thing that these pop up and there's an adjustment screw here and here which allows you to adjust the tension on the—

Weber: Oh, neat.

Riddiford: If this gets too loose, you can crank it up. That's something which we—

Weber: And the user manual tells—

Riddiford: Yes.

Weber: Boy, that's something most laptops haven't—

Riddiford: No. Well, we were concerned because we didn't know how much that was going to wear and then in true history of pioneering companies, you get a product out there and you find out how it performs in the field.

Weber: You created millions of <*inaudible*> for Apple later on.

Riddiford: Yes, we did.

Weber: <*inaudible*>

Riddiford: Yes and there's this notion that it's very smooth on the outside, but also we wanted to promote the fact that this was designed to be carried. It's got this hand grip running around the back and we had pictures on the packaging of someone holding it like this. In those days laptops weren't laptops, they were portable computers that you carried.

Weber: Something's—ah. Yes, it's getting a little better, sorry. Okay.

Riddiford: Yeah, so—

Weber: <*inaudible*>

Riddiford: Previous to this, laptops were computers you could carry with you but they always went into a bag and they always went on the table because they were just too heavy. There was a Sharp product I think that came out around about the same time, or it might have been NEC. It was a Japanese product which was trying to be neat and light. We were trying to do the same thing, to show how light and neat this is by saying, "Here you are, you can carry it just like you do a portfolio or a book."

Weber: You were saying it was advertized showing—

Riddiford: Yes, [on the] the packaging, there was a very nice pack that was done to this and basically that was the pack shot; someone sort of carrying it like this.

Weber: <*inaudible*>

Riddiford: Yes. It was quite a strong identify for the product.

Weber: You had seen <*inaudible*>?

Riddiford: Doesn't ring a bell. Yes, the Grid was very brutal. <*laughs*> This is slightly less brutal. It was also in the days when it's quite difficult to design when you're using drawings and tracing paper to define these parts. Putting curves on things is much harder than designing in straight lines. This had quite a complex, in those days, curve here because of the way the hinge worked. Defining that as a 2-D drawing is quite difficult. You have a time scale to work to so you don't tend to get—you might think, "Oh,

I would love to have some curves in here," but defining those curves so they all meet together is quite a bit of effort. In those days, it was assuming that you designed in straight lines and radiuses. That probably sets quite a lot of the design style of this kind of era for this kind of product.

Weber: It was really an issue of technology.

Riddiford: Yes, if you make the model, you could put curves all over the model, but how would you define those curves—

Weber: For manufacturing.

Riddiford: —for manufacture? If those curves are two things that have got to come together—in other words, if you design this split line here with curves, you've got to define them so they come together perfectly otherwise it'll look really terrible. Also you've got to put draft on everything, so everything has got to come out of the tool. You may or may not know much about plastics, but each plastic component is made in a mold and for it to come out of the mold it has to have tapered sides otherwise it can't come out of the mold. Typically you have to go three degrees, sometimes it's typically even more than that.

Fullalove: Unless you're Apple.

Riddiford: Unless you're Apple where you have lots of side actions. You have a mold tool which splits apart in all sorts of different ways. It's very expensive, but it allows you to have a bit more design freedom.

Weber: Apple would do that?

Riddiford: Apple will spend whatever it—yes.

<inaudible>

Fullalove: To make it pure.

Riddiford: Yes. A typical plastic waste bin has got tapered sides. There're a couple of companies that have tried to do parallel sided ones and it's a technical nightmare, but it looks great. You try and make it cost more because the tool costs more. You have to trade that off. You have to design all of those considerations in, so you find that there're slight changes in surface because of those technical requirements for getting plastic moldings to come out of the tool.

Weber: Would you make—here you would also make models that you would—?

Riddiford: Yes.

Weber: —play with and handle and—

Riddiford: Yes.

Weber: You would make the whole thing in wood or in plastics?

Riddiford: In the old days we would have used a very fine grain wood to do block models, but then for all of these things we've made hollow plastic models which actually behave like moldings. In the old days, for this product—I'm unusual, I think. Most people like to define something completely on paper and then start making a model. I'll get a sort of rough idea of what I want to do in sketch form and then start making the model from the basics that I know about. In other words, I started here, I knew I had to get some batteries in here and there was a certain thickness of hinge. I started making a model of this and the rest of the product just grows from it. Before you start, you don't know exactly how big it's going to be, it just evolves out of the sizes that various bits have to be. There's a battery, there's a symmetry and then there's a clip that holds the battery in and then there's these pods which we define the size of and then there's an edge detail and that sort of almost defines the width of the product. You're doing that as you're defining that width and catching up on paper as you were making the model; that's the way it evolved.

Weber: But this was a huge project for—

Riddiford: Yes.

Weber: —you as a first laptop.

Riddiford: Yes. Well, they always are. <*laughs*> It's just a bit of plastic screwed together to make a hinging box with a whole lot of electronics inside and some neat features and whatever else we put in.

Weber: Then after that was the beginning of—?

Riddiford: Of that Series 3.

Weber: Who made—this came from a decision, for instance, to go for a laptop or were you involved in that?

Riddiford: Yes. Laptops existed, albeit they were huge; this type of product [Psion Organiser II] didn't exist before Psion made it, other than the calculator. That innovated in this space. The obvious place to take this was to say, "This becomes a portable computer." A portable computer was actually seen as being the smallest you can get a full-size keyboard device into. You start with a full-size keyboard and how small you can make the product around that. That defined the idea of the portable computer. This kind of product [Psion Series 3] wasn't envisioned because this genre didn't exist. The idea of making that [Psion MC laptop] into this [Psion Series 3] and making [it] functionality the same wasn't on anyone's mind at the time. No one was working in this space, other than—there was one company, Sharp that were doing—very interestingly—Charles might have told you this story. Probably two years after this came out, Sharp then sent 25 marketing and engineering people over to London for a week to find out what this was all about.

Weber: No, he didn't. Tell the story.

Riddiford: Sharp sent this delegation over to find out what was so special about this product. They went away and came up with their own personal organizer type products and they did these very nice folding big screen devices. They came out at about the same time as the original one of these.

Fullalove: Sharp was the the IQ, wasn't that the Sharp?

Riddiford: Yes.

Fullalove: I think you ought to just interject here, that is another example of—that nothing before—pioneering—

Riddiford: Yes.

Fullalove: The pioneering nature of Martin and what he's done has rolled on in world consumer electronics. This thing here which is the original goal for TomTom, this is another example of reassessing the paradigm for what has become these very simple to use single button navigation devices.

Weber: What year is this then?

Fullalove: 2002 or something, or 2003.

Weber: Why don't we do that? We'll go—

Riddiford: Yes. We'll keep going in sequence.

Fullalove: It's just another example of creating new—

Riddiford: Yes, it's obvious when you look back on it, why jump from that to that without going there first? But actually, that didn't exist. This is where computing was and they basically saw this size box, you could just about lug it around. They're basically saying, "How do we make that sized box into something which is truly useable as a computer and that's—

Fullalove: Portable.

Riddiford: Portable, yes. That's what the MC was all about. Then they had written some software for this, which had a comfortable user interface. The Series 3 was all about—we got the straight software, unfortunately no one's writing any software for this. We've got to develop more and more software so the software team got bigger and bigger and they ended up writing a full suite of really good software for this.

Weber: Which would also run on the MC.

Riddiford: Yes, exactly. These were parallel platforms.

Weber: Describe the beginning of the 3's project.

Riddiford: Series 3 was my attempt to turn these things into physical and mechanical—

Weber: But I mean from your side of the—

Riddiford: Yes. The idea was to take this product with a keyboard, a quality keyboard, and display which folds into a handheld device.

Weber: You were not looking at a model particularly?

Riddiford: At a?

Weber: You were not looking to other products.

Riddiford: No, because not much existed. We don't tend to do that because you get—we looked at what was going to power the device as battery and *<phone rings>.*

<interruption in audio>

Weber: Okay.

Riddiford: Essentially, this program came out and the brief was really to take a quality keyboard and a display and put it into a folding clamshell device. The big challenge there is—from the physical point of view—what kind of battery do you use? We did some research and we weren't going to use rechargeable batteries because they were nothing like as efficient as alkaline batteries in terms of holding charge. They're heavy and Psion had got a heritage of using alkaline batteries to good effect in this product and in the HC product, which was the industrial version of this. They found that alkaline batteries are quite interesting because they have quite a lot of usable energy for running the display and processor but they have a lot of background energy which you can't use for running this device but you can use it for keeping RAM alive. You can shut down the product but keep the RAM alive with a very small amount of current. That amount of current comes naturally out of an alkaline battery but you don't get it naturally out of a rechargeable battery. This device could last for months on a set of alkaline batteries and it would just not work for anything like that long on rechargeable batteries. That was always kind of—it wasn't a decision. We looked at the options but it became pretty obvious that we've got to use the best alkaline batteries we could find. Duracell were making a flat battery at the time, but it was very difficult to get hold of. It was only used a small number of—

Weber: A disposable flat battery.

Riddiford: Yes. It was for specialist applications. It wasn't generally available. From a design point of view, you think, "Ah, it would be great to use that." We quickly ruled it out because the whole idea of device like this that you're using all the time is that if the batteries start going flat and it's giving you a battery warning, you want to basically go out to any shop where you can find replacement batteries. It

became obvious when we were designing this that we had to fit AA alkaline batteries in. AAAs are nothing like as efficient even if they're smaller and at the time they cost just as much as a AA. For the user's point of view, much better to bite the bullet and have these large diameter cells. The difficulty with the large diameter cells was that if you've got a keyboard and a display lying on top of each other, where do you put the cells? If you've got the cells underneath the keyboard, you end up making this product very thick. The obvious place to berth the cells is down back of the product and—

Weber: The hinge.

Riddiford: On the hinge edge. But then if you open around the hinge as you do here, you end up with quite a big sort of lump in the center—which is okay—but if you scale it down to this kind of product, you end up with this very obvious hinge line going across the product and we didn't want to do that. After this came out, there were some laptops that had this very obvious hinge and it just didn't feel right in my view to do that. I looked at doing an alternative design, where the battery's along the spine here, but when you open it up, the spine moves to allow the main hinge—it is forward of the spine and the spine moves out of the way and props the device up.

Weber: <*inaudible*>

Riddiford: Can you see that?

Weber: <*inaudible*>

Riddiford: Okay.

Weber: Well, yes, perfect.

Riddiford: It's probably not—

Weber: <*inaudible*>

<*inaudible*>

Riddiford: We designed it so that the batteries went down the spine behind the keyboard and display. If you want to open the display up—I wanted to get the batteries out of the way. The batteries are hinged in such a way that they move out of the way when you open it up and they give you additional benefit of propping the device up and moving the keyboard towards you. It makes it much easier to type on a surface. It gives you an additional function. It gives you this ridge on the back which allows you to hold it in a slightly different way and in a much more stable way to get your fingers on either side. Suddenly you feel quite comfortable that you got hold of that.

Weber: Could you hold it that way and type?

Riddiford: Oh, yes, very much so. This was nicknamed “squirreling” by Psion aficionados.

Weber: <*inaudible*>

Riddiford: Just, you know, using two hands. <*laughs*> It becomes a very easy, natural way of holding—and the fact that you've got it between your fingers it means you're not worrying about it falling out of your hands; you're not really having to hold onto it very hard. In the first week of the project I've made a model which had this hinge in it and this was another sort of classic thing that happens when you do this kind of thing. I rang up Ken Carmine who was in charge of the program and said, "I've got something to show you, I think this is quite interesting." I went to see him and I showed him this thing opening up. It had this area in the middle and he said, "Hey, that's brilliant; we wanted to have some fast keys to allow you to get to applications with one hit. Let's put them along the middle now." Turning this slightly awkward area which was part of the hinge into a very positive attribute of the product was the kind of thing that happens when you make the model and you talk to people who are seeing things from a different point of view to the way you are.

Weber: Hold it up; I'm going to zoom in on that.

Riddiford: Yes.

Weber: So you've got a fast keys right—

Riddiford: Yes. The fast keys and the way that they're drawn and the icons and things became a very strong part of the product. This basically signals the applications that the product has. We put these icons on the outside of the packaging as part of the GUI obviously, on the display. The way they're drawn gives a flavor of a high quality graphical element which is exactly how this product works. It has this proper GUI rather than DOS or whatever other computers at the same time had. Psion were quite pioneering in this multitasking GUI practical user interface. This became a hallmark of the product and it became a hallmark of the genre; the idea of fast keys.

Weber: What year did it actually come out?

Riddiford: Right. This is the third—no, the second version. Series 3 had a very small—not a very small screen—screen and it used a particular type of technology for the screen which meant that the chips had to be on a circuit board and they were quite big chips. We had basically a glass in the center here with a flexible cable or a flexible connection to a circuit board and it had four driver chips down the side here and that drove the size of the display. The display could only be that size with getting those driver chips in the lid. That was always a bit of a compromise, but that was the display technology that was available when we launched. Very quickly—

Weber: What year was that?

Riddiford: That was probably '70—

Weber: Eighty—

Riddiford: Eighty-two, eighty-one.

Weber: Now you're talking about the Organiser II or no? I'm sorry

Riddiford: Sorry, '90…

Fullalove: Ninety-two.

<inaudible>

Riddiford: Sorry, late eighties, early nineties.

<inaudible>

Weber: But the 3 was quite a long development, right, you started working on the design—

Riddiford: Series 5 was the one that was long in development. *<laughs>* Now because this software already existed and it was being added to because basically there were already two products out on this platform, this was all about getting the hardware done. I think the development of this was only about a year probably. Whereas the development of the 5 was about hardware and software in tandem; it was a whole new thing of software. There was a whole lot of testing that had to happen. This was a relatively quick development. This had two SSDs [solid state drive] in the base here. This was set using a similar technique to here, you open the door and it pulls the SSD off the connector. Can you see that?

Weber: Yes. You pull them out. Oh, wow.

Riddiford: It pulls it off the connector so you don't have to pull it very hard to get it out. Another little—

Weber: Beautiful.

Riddiford: This did very well for Psion and there were various other—Psion is slightly different to other computer companies at the same time because a lot of their competitors were Japanese who were used to producing a new design probably every year. They had a churn of designs and they had some wins and some losses with those designs. Psion and the whole ethos of how products were developed—there was a lot of effort put in to the original design. The product design was loved to death, the graphical user experience was loved to death, et cetera. It wasn't designed for a year in the market and with a view to changing it again. It was, “This is a well thought out design, we're just going to improve it.” The next generation had a different screen technology again, which gave you a slightly bigger screen and faster processors and a better speaker. There were incremental changes within the same basic footprint. More like a car upgrade from one year to the next; you change a couple of bits but essentially it's the same product. The Japanese would tend to basically probably have the same guts but put a new casing on the outside every year.

Fullalove [?]: 1991.

Riddiford: '91.

Weber: So you would have started in maybe 1990 and—

Riddiford: Yes.

Weber: Well given you were central in Psion's products, did they try to hire you?

Riddiford: After we did the Series 3 and we won some awards for it, we started getting in discussions about what we ought to be doing in the future. This is where—again, the original Series 3 was designed on paper, but we had dabbled with computers in design but just 2-D drafting computers and found they weren't very reliable. We were aware that computers were obviously going to be in the future and when was the time to jump. The difference between the cost of a drawing board and some tracing paper and pencils and a computer workstation and 3D software was enormous. The investment and the training in getting up to speed with 3D CAD design was not to be taken lightly for a small consultancy. We started talking with Psion about the need to get on this 3D CAD stepping stone and they suggested helping me set up a company and investing in the hardware to have two CAD terminals and they would get two CAD terminals themselves.

Weber: Given that they were ready to take on things like manufacturing themselves, why wouldn't they want to simply bring you in as a—?

Riddiford: Oh, I persuaded them that it wasn't a good idea, that internal designers typically work for short periods but then they get too ingrained in internal politics and firefighting to actually do good creative work from one project to the next. I persuaded them that it was a good idea to keep the design external, and they bought into that as the thinking. Many companies were doing similar kinds of things, using it. They invested in us as a company, they had 40 percent of our company when we founded it.

Weber: That's this company?

Riddiford: That's this company. David Potter was oversaw our books, and then he came to our board meetings, which was great. <*laughs*>

Weber: Those board meetings; you were here or somewhere else?

Riddiford: No, we were somewhere else. We were actually in one of their earliest buildings, which had been empty for a while.

Weber: Do you remember where that was?

Riddiford: Yes, 2 Huntsworth Mews. They'd basically been using it as sort of a packaging place; they'd been storing stuff there. It was an old mews building, old stables, previously, very characterful building.

Fullalove: The movies that we just showed you beforehand, are all the mews buildings, so you get the visual context.

Riddiford: Yes. We did it up over the years, but unfortunately it was only a leased building, and they wanted to change the use, and so we had to move out last year.

Weber: We were at Series 3; which awards did you win?

Riddiford: The Design Council Awards, it was basically—What were they called, Jim?

Fullalove: Well, it was Millennium—

Riddiford: No, it was before then. No, the Design Council Awards, what were they?

Fullalove: Just Design—

Riddiford: Just Design Council Awards? Yes. They were seen as being—because the Design Council was very strong in the UK, design hadn't got a very strong voice anywhere else, really, in terms of government support. Everyone was looking at the UK and saying, “Well this is a thing to copy,” and it's interesting that all the awards—like the iF [International Forum Design Award]. I can't think that they were existing—well, maybe they were just about starting out, I don't know. We did start entering them, actually, at about that—anyway, the UK design awards were seen as being pretty prestigious.

Weber: Yes, they were good designs.

Riddiford: Yes. David Potter had helped us start the company, and the idea was that we would concentrate on more of the front end and the creative thinking, and they would build up a development and engineering team, so we wouldn't be taking so much responsibility for the plastic engineering. The interesting thing is that, because these are so intricate<*laughs*> products, that actually, it's quite difficult to let go of that engineering bit. You end up still doing it, but having to tell someone else what you're doing. They're basically doing the CAD modeling, from your thinking. A lot of these projects would be done from making a lot of models to get the mechanisms right, the form factor right, making hollow models to put things in, to get the structure right, and then having CAD models. The Series 3a, was slightly modified from the Series 3, and we did some of that in this new CAD system. Their CAD engineers actually ended up copying the tracings into CAD from the original Series 3, so they had a full record of the product, which was quite an interesting experience. I'm sure lots of companies were doing the same at the time. As soon as you got the CAD, you think, “Well, I've got to get all of my past designs in there,” even though you're not actually going to use that data for anything.

Weber: That was largely 3, 3a.

Riddiford: Yes, well that was a crossover. I designed some of that when I was working at Fraser's, and I finished off in the first month working at Therefore.

Weber: Can I ask how your firm got its name?

Riddiford: It was an idea I had. The way that problem solving and design happens, is that you think about all the options, and you present to the clients, here's the background, and the reason I'm doing this is because. The therefore is the link between the thinking you've done before, and you're then explaining why you're doing it the way you're doing it. It's saying it's a rational process, but it's also creative. It's a nice word. No one else was called Therefore and it has a logo which is instantly recognizable: three dots. Any technical person knows what three dots mean. You're not having to invent a logo.

Fullalove: <*inaudible*>

Riddiford: <*laughs*>I talked to Graham, who was a colleague from college, and he had gone on to be a manager. He managed a big UK design company called, SeymourPowell. I approached him, and I said, "I'm thinking of setting up a design company, do you want to come and manage it?" He said, "Great." We talked about it, we had a couple of names, and, interestingly, his name is Brett, and I'm Martin Riddiford, so the other name was Riddiford Brett. Just at the same time, there was another Riddiford—it's a very unusual name—there's another design company, just being founded, called Brewer Riddiford. We thought, “This is bizarre.” It's a graphic design company. We thought, “We don't want to go there.” Also, I'm a firm believer that it's good to have a name which isn't associated with any particular person. It's a much better thing to say; it's to do with our company ethos. We belong to a company, not working for Martin Riddiford. We're all working together for this company. It was a better thing to have it under a slightly unusual name, rather than a couple of—

Weber: Explain the three dots for people that don't know.

Riddiford: Three dots means “therefore,” in mathematical formulae. It becomes a very easy logo. My first idea was to have these very shiny three dots, chromium plated, but we moved on a bit.

Weber: So the 3 was a huge success.

Riddiford: Series 3 was a huge success, and it was also Psion's pinnacle of software, because they had taken all of their knowledge from their previous products and put it into—

<phone rings>

Fullalove: It's one of those things that the Series 3 had two iterations, they did a higher memory one in '95.

Riddiford: There were three iterations, actually. High memory and faster, then they put another chip in.

Weber: So '95, that's where it topped.

Riddiford: Yes, there was the 3c, and the 3 MX.

Fullalove: And then in the interim, there was the Sienna, wasn't there?

Riddiford: There were two products after this that we did. There was an industrial handheld that was using the same software as this, and the Sienna. The problem is, they wanted to go tackle the Sharp organizer market, which was much cheaper, so we did a device without any removable media at all.

Weber: It was smaller?

Riddiford: Smaller, used smaller batteries, and it wasn't really—it was quite a hard project that never really gelled. What we've done in the past, we've always basically taken the elements and create a new bit of thinking. With Sienna, it was, "Here's a genre that exists already, which is basically the same kind of opening mechanism, but there's a format, it's got an offset screen, it's got a keypad on one side, and then a keypad on the bottom." It was already taking a format which existed, which felt a bit hackneyed. It didn't feel quite right, but it was basically what other people were doing. It never felt quite like a Psion product, because it was just taking those elements rather than thinking it through from scratch. We did a waterproof rugged handheld, but very low cost, which they sold for at least ten years, did very well with.

Fullalove: <*inaudible*>

Riddiford: Yes.

Fullalove: <*inaudible*>

Riddiford: Yes. So parking—

Weber: Parking, yes. Do you have any Simon Druze parking tickets? <*laughs*>

Riddiford: No. <*laughs*> No, I hadn't even thought about it.

Weber: You also have, and this, I don't know if you would want to tell us much, but there was wireless networking capability in the vertical labs in the early '90s, it sounds like. You were allowed to exchange data with a pager network, or something?

Riddiford: Yes, I wasn't really involved in that.

Fullalove: Then Series 5 was '97?

Riddiford: Right. We've got two early models of this [Psion Series 5]. There was a very early model—which was a shame I couldn't find—which was the proof of concept, if you like. As I was explaining, this product [Psion Series 3] has alkaline batteries along the back here, and they hinged out of the way in order to have this nice clean working experience on the inside. We wanted to do the same kind of thing but this time we had a touch screen. When you use this product, with a stylus, it just doesn't feel—it just tips a little bit. It was going to be finger and stylus operated, and it's just not stable enough. Sharp, being Psion's main competitor, had done a touch screen organizer. Sharp were generally slightly cheaper, slightly less powerful, generally slower processors, et cetera, and nothing like such a good suite of software. But they came up with some quite stylish designs; they did a clamshell which opens up like a

book, but when you touch on the display, it absolutely fell over backwards. It was a touch screen device, designed by engineers, a beautifully integrated, lovely flat package, lovely bit of styling, but it just doesn't work as a product. We were aware of that. This was just before the Newton came out, as well. Or just after? Must be just after. Touch computing, pen computing was in its infancy, and people didn't know what it was good at and what it wasn't good at. Newton rather steered people in slightly the wrong direction. Psion, although the feedback they got from their users was that a keyboard device was very, very important if you're entering data yourself. A keyboard, even though it's an old fashioned system, was the fastest way of entering data. You get the Newton; it's kind of seemingly fun and the future, but it's nothing like as efficient as using a keyboard. Psion wanted to do the best keyboard version of a portable keyboard product, and they saw their main competition as being the laptop. Laptops, in those days, were still quite big, still quite heavy. They were very useful for general work applications, but not so useful for work and home applications, and your personal information. There was a feeling that we could do a device which sat between a laptop and a home device which we could use either for work or for your household information. We needed to have a laptop feel, and this keyboard, although it was quite good, no one considered that to be a touch type keyboard.

Weber: Show them how you would use it.

Riddiford: There's a number of different ways that you can use and hold this device [Psion Series 3]. One is in two hands, and to press buttons with your thumbs. Another is to hold it in one hand and to hit buttons one at a time with your other hand. The other is to put it down on a desk, and to use two hands, as though you were typing on a proper keyboard. It's that application of being able to type with two hands, which this [Psion Series 3] didn't satisfy. There was a feeling that we could do better than that with laptop style keys. What we did in this product [Psion Series 5], we also left out—this has got one more row of keys down here than this did. We left out one row of keys in order to get keys absolutely as big as possible. This concept was all display in the lid, and all keyboard in the base. The keyboard is an interesting topic. We went to a number of far eastern keyboard manufacturers, to get them to make a keyboard for us. We gave them the spec of what we were trying to get to; nominally about six millimeters thick, with a proper full reasonable full travel, and a bridgeless design. We basically got blanks from all of them. Either they were wanting a very large amount of money for the development of it—essentially no one was producing a proper keyboard for this sort of size product, so they considered that the effort in developing this just for Psion wasn't worth it. It was off track of their roadmap, if you like. We ended up saying, "Okay, we'll go and design our own." We developed this from scratch, as a keyboard method. This is different to the way that other keyboards work. We see the bottom of the keyboard here. We have to make the whole of that keyboard as a module—as a keyboard module—which is exposed to the outside world. Most keyboards in laptops and things are a module, but you never see the back of them, and they never have to be strong and stiff in their own right. This has to be stiff and strong in its own right.

Weber: Did you see the big bad butterfly or was that later?

Riddiford: That was later, after this.

Fullalove: Houston was '93.

Riddiford: Yes.

Fullalove: It was pulled in '98.

Riddiford: Yes, that's right. Newton came out when the 3a came out. That was obviously pen computing. It was interesting that—as you'll see in the movie—that there was a version of this project that wasn't going to have a pen. They hadn't actually 100 percent committed to have a stylus touch screen on this product until a reasonable distance in. We were designing for it to have one, but it might not have had one.

Weber: The software already supported it by then.

Riddiford: The software supported it, but they—

Weber: <*inaudible*>

Riddiford: The use case wasn't necessarily 100 percent agreed on. Psion were always quite good at using the control keys for going around hot spots on the display and so you could navigate around a display relatively easily with the control keys.

Weber: Even though there was general support for pens, there was probably no handwriting recognition.

Riddiford: There was no handwriting; it was a navigation device. But it's obviously a bigger screen, more difficult to navigate around, more hot areas if you like, so it made more sense to have a touch screen. Obviously it opened up all sorts of opportunities because of it. The keyboard, we ended up developing ourselves, the display—we developed this notion of—it's got a black and white display in the center here, but we made the touch screen bigger so that we'd have some static keys. It was following on from this device with the icons. These icons are under a membrane keypad. These are part of the touch screen. We developed this system whereby we got an image, and then the words describing the image underneath it. The word isn't touch sensitive, but the image is.

Weber: So let me see you writing on that.

Riddiford: This is part of the touch screen; this area here. Then this is on the label which is below it. You're touching the icon, and not the word. In doing it on this screen colored background, it makes the screen look very big, which is another feature of what we were trying to achieve here. On the inside, we've got full keyboard, full screen. Because it's a touch screen, we didn't want the product to fall over backwards. If you look at it when it's in its open state, and you touch the screen here, it's pretty stable. It doesn't fall over backwards, whereas this does. That's achieved by hinging these two bits together. This third element slides out of the way. The relationship between these two elements changes as you open it; the center of gravity of the whole device shifts by moving the keyboard forward. This is still stable enough to be able to touch type on the keyboard without it tipping forward and touch the display without it tipping on the back. That forms the mechanism. Now, the other thing that we were interested in that we did lots of tests of—we hadn't seen any successful use of a touch screen over a keyboard. The big worry that we had, was—there's no pen in here.

Weber: That's one problem, isn't it?

Riddiford: Yes, they had to sell spare pens. A pen should have been in here. When we designed this pen, we put quite a lot of research into this. To use a standard pen, you tend to grip it quite close to the front, especially if you're writing.

Weber: But you can't use a real pen; you'll get ink on it.

Riddiford: No, but if you design a stylus like a real pen, then, as you can see, I'm holding this [normal pen] quite close to the tip, in order to control the tip while I'm writing. If I design a stylus like that, then my whole hand is on the keyboard. We were wondering about how to get over that as a problem. There was a notion that we could lock the keyboard up when you were using this, or we could flip something up so you could rest your hand on it. We made some rigs using an old Newton, and we cut up a laptop keyboard, and we tried various angles. We established that this angle was a reasonable angle. It's open enough to get your hand in there, and to feel like this is a surface you're happy to touch on. More vertical then you feel like you're touching against a vertical surface rather than a horizontal surface. We made these rigs, and then we made a whole bunch of different styluses. We devised this stylus where you grip it a long way further back from the tip, so you're holding it more like a dart. As soon as I'm holding that further back, my hand doesn't get anywhere near the keyboard. That's gotten over the problem.

Weber: There's no temptation to hold it closer?

Riddiford: No, not really. We made it long enough so that it was comfortable to hold here. We made a grip here. By making this feel skinny, you're not going to hold it there, and by making this tapered here, you naturally hold it further away. That got over the problem. Also, you don't have to touch very strongly at all on the display. You're literally just touching on it. I'm a terrible pen user; I grip hard and press hard. Other people are much more gentle. With this, you feel that you're holding it lightly and you touch lightly, so that was a kind of an innovation which basically got over some of these fears. We put that in front of Psion, we showed how easy it was, with a suitable stylus to get over that problem, and all those fears disappeared. On the keyboard, we commissioned a tool to mold a single key, and we made some models. Because these keys are more or less the same size, we made some models of those keys in different orientations in terms of the relationship between one row and the next. We were wondering, in terms of getting the best use of the space, whether it was possible to have a different relationship from a standard keyboard, from the QWERTY row, to the next row, to basically have that as a—typically, this is spaced off by a quarter from this row to this row, and then by a half from this row to this row. That's what happens on a computer keyboard, and that's all based on anti-jamming on a typewriter 100 years ago. Essentially, people are used to moving from one key to another through a vector, if you like, through a direction. The relationship between an F and a T key, through that angular relationship. By changing the stagger, you actually affect that relationship. We set up some keyboards with different staggering, to test this out. We were hoping, naturally, that you wouldn't notice a different stagger on these three keys, so we could make the keys that much bigger. We got various people to touch type on each one, and we had them connected up to a computer screen. We discovered that there were more mistakes in the wrongly staggered keys, and it was decided we must stick to the proper stagger. The whole point is that you're trying to get something which touch typists feel comfortable to touch type on. You have to do that test in order to establish whether you're thinking it right or not.

Weber: When touch typists used the final product, they get—

Riddiford: Very—you can't believe that it's actually very close to a laptop experience.

Weber: The mistake rates start to come back to close to normal.

Riddiford: Yes, even though it's a very shrunken keyboard. We've cut out a number of the keys, in order that the letter keys and the essential operator keys are the only keys on the keyboard. The other key functions are available through a function key and they're on the front of the keys here as secondary elements. We ended up as close as possible to a touch type keypad, on a pocketable device. This had all sorts of other features in there, which were sort of packing stuff that Psion liked to do. Because there's a microphone, there was a notion that you might want to use it as a Dictaphone. On the outside here, there's a cover, which locks out the Dictaphone keys, but you press the cover in, and it exposes the Dictaphone keys and you can then do voice memos using those keys from the outside, without opening the product. There's the usual memory device on one side, and on this side, there's a backup battery, as all the Psion devices have got.

Weber: Is that a back up card?

Riddiford: A backup battery; it's because it's got alkaline batteries. When you're changing the batteries, you need to have something.

Weber: To keep the RAM active.

Riddiford: To keep the RAM alive, yes. This product was very successful and ticked a lot of the boxes that people wanted. Other than the fact that it's got slightly bigger than this [Psion Series 3] product, and that's because it's packed full of stuff. There was always a feeling: shouldn't we be doing a smaller version than this? Palm came along, and they had a much more pocketable product; obviously didn't have a keyboard, but it carried all of your data with you, and it's thinner and smaller and more pocket friendly than this product [Psion Series 5] was. This was always a bit too heavy, because of all those bits of glass. This is more like a product you put in your bag, rather than carry in your pocket. There was a feeling that we needed to get back to that pocket friendly design.

Weber: How about synchronous with Palm, because it could sync with the PC. You did have synching, but it was not as easy.

Riddiford: The syncing was always—unfortunately, this [Psion OrganiserII] started off as a self-contained product. There was a cable to connect this to a computer, but you actually controlled the computer from this device. <*laughs*> You controlled your syncing and transfer of files from here. When you came onto Series 3, it was a bit of both, but you didn't really know what you were connecting to at the other end. It always seemed better to control it from this end. Then Psion started using a third party to improve the connectivity, but they never did it in house, really. It was never seen as a core competence, and that was always a bit of a shortcoming of the devices. They were fantastic at creating information on the move, all right at downloading information, but basically syncing and keeping your latest information and backing up and stuff was always nothing like as good as Palm. Palm started with the notion, “I've got stuff on my PC, I want to take some of it with me,” whereas, this is basically saying a very different thing.

Weber: Great.

END OF TAPE 2

START OF TAPE 3

Riddiford: It's a little bit like this in construction inasmuch as how the keyboards are quite thin and the computer is in the lid. You opened it in a slightly counterintuitive way. It's wedged from thin to thick at the back here and it came out as a flat tablet. That slightly gave me the feel that it was possibly a bit top heavy. Also, because of the inside arrangement, it had a very small offset display keyboard down the side—numeric keyboard down the side—

<break in audio>

Riddiford: —with less margin than they were getting from their other products. It actually didn't suit anyone because they're squeezing in the margin, in order to get a low price.

Weber: It was 269. Wow that's low.

Riddiford: Yes. I've got a couple of examples of connected devices here. There were a number of initiatives to try and get a connected device. The first iteration was actually to have a thicker back on the Series 5. Here's a Series 5 with a clear back molding and the attention—

<break in audio>

Riddiford: —on the GSM products. Interestingly, Psion abandoned that product, but we carried on with Siemens and we developed a product for them which went to a sort of beater trial set. They produced several hundred for a beater trial and it was launched at CBID [?] but never went beyond that.

Fullalove: They launched it as a technology—

<break in audio>

Riddiford: It was not unreasonable to do that—

*<break in audio>***Weber:** And the actual device looked like?

Riddiford: A bigger version; it had another mechanism. *<laughs>* I think there's a model upstairs actually. With the communications side of things; obviously mobile phones existed and they obviously were bigger than they are now but this is a significant size bigger. Can you imagine? Does it feel right holding this up to your head? No one felt comfortable with that as a way of use. Also there's the other thing that in those days antennas were quite sensitive to orientation and so if you were sending and receiving emails on a desk—especially if there was any metal around—there was a worry that—

<break in audio>

Riddiford: —or browse the internet just didn't work out in practice because of this difficulty getting the antenna to be sensitive enough. We developed a number of product ideas with antenna—with stub antennas, with mobile phone type antennas—and they're jointly presented to Motorola. This [Psion Hero] was a notion of a smartphone on the outside. We orientated the product into a landscape format so that when you open it up, assuming the traditional mobile phone format is portrait and then you've got to turn it round. We're starting from there and then we're closing it. Why don't we put BUI [browser user interface] in the landscape format on the outside? There were a number of issues here but you can see this was the traditional. It's the assumption in terms of the antenna always that we had to have a stub antenna on it. The stub antenna on any of these devices—the Nokia, et cetera—ended up originally having to orientate and you lose dB losses through the orientation. It's less sensitive because of the orientation change. It's a real struggle to get this kind of product to get the GSM approvals. That was always a big concern: where does the antenna go and how do you configure it?

Weber: Internally the antenna is how long?

Riddiford: This wasn't a pull out antenna. This was just a stub antenna on the outside.

Weber: Why couldn't you orient that in the other way?

Riddiford: Then it looked wrong on your head and basically there's all this scare about SAR [specific absorption rate]—radiation going into your head, the position of the antenna, the distance it had to be away from your head. There was a whole bunch of stuff going on about that because this was a hold-to - head device as well as being a data device. Here's a device that's just made out of foam core with paper stuck on the outside but it gives you a sense of the product, gives you a sense of the size, gives you a sense of the fact that you are opening it up and using it. It also has pages here of different applications. In one very simple model, you've got four applications and the fold out thing. These are what these applications are going to look like. Those are the key applications; quite an interesting way of presenting a product concept.

Weber: You used this for multiple—?

Riddiford: Yes, from time to time. Most of these products are not obviously function products. It's actually very difficult to get across in a model the breadth of the multifunctions. This was something we experimented with and it worked quite nicely because we were helping with the GUI as well so we were able to express what that GUI would look like.

Weber: It's the top of the first page.

Riddiford: Yes.

Weber: You can see it.

Riddiford: This [model] has got pages on the inside which express the multifunctions of the GUI. We would be able to show what various applications would look like in one simple model We've got four different screens here which you can flick through and just get a feel for what it's going to be like in each

one of those applications. Obviously, a lot of the GUI is about readability of text model which is very difficult to get a sense of from a CAD model or any other kind of medium. As soon as you get something in your hand you get a feel for this.

Weber: So that will be addresses, their agenda, also email. This is the browser?

Riddiford: Oh, I would imagine that's the browser. I can't see it from here. Yes, that's the browser.

Weber: That's it?

Riddiford: Yes. That's like a Google search but it's not quite a Google search. We had a big debate within Psion about the direction that these products would go into the next generation. What would a connective device look like? Psion is always working from the standpoint of a QWERTY keyboard—big keyboard and a big screen—saying, "How do we make this connected?" Obviously, you can make that connected but the trouble is that you've got phone people trying to do the same thing and there's something awful compelling about a phone which is a voice product as well; doing some of the things that you can do here; contacts and email and browsing. There was the conflict of an auto line PDA, which was what David Potter describes his vision as and what other people were trying to do which was basically a smart phone. We knew that Symbian were working trying to create smartphones and they tended to be large screen devices. X number of years later, the iPhone comes out and that encapsulates all the thinking that everyone was trying to work around into a decent device. Most of the devices in those days that were being envisioned were quite similar in terms of screen size. They were always too bulky, always too clunky, and software just didn't work well enough. They were always too difficult to operate. Using the touch screen just wasn't a joy. It was a trial. You ended up always feeling there was a compromise. We went away and developed an alternative compromise which we called Phone Book. Phone Book was based on the notion that many people who use signs had contacts as their most important feature application. Then they had diary as the next most important, et cetera.

<break in audio>

Riddiford: [Phone Book] opens up book style to be an organizer; same display. This is a very cost effective design that's got a bare window on the outside here. You see through to the main display but you then have an organizer keyboard which is folded in the center and we worked it out. We felt the best of both worlds that you open it up to use it like an organizer and you close it to use it like a phone. In later variants we actually dropped into a little bit of manipulation from the outside but generally you open it up which gets you out of having to have key locks and things like that which is quite nice. If you're trying to find a contact, you just start typing the name and your contact comes up. You don't have to go into an address book. It's already primed to find a name. For email it's very good, QWERTY keyboard. We patented it ourselves and probably had half a dozen very close attempts of getting it to the market. Psion was going to do it. Psion and Motorola were looking at it. Phillips were going to do it.

Fullalove: Siemens.

Riddiford: Siemens were going to do it. T-Mobile was going to do it. Eventually we got Infintech to invest quite a lot of money and produce working devices which T-Mobile were going to take on but they backed down on the deal and it didn't happen so it never came to market.

Weber: One you didn't mention is—well Symbian of course is just software though.

Riddiford: Symbian; we talked to them about it.

Weber: What about Nokia?

Riddiford: We talked to Nokia about it but we never connected with the right people. It's quite difficult for us because we're just a small design company—

<break in audio>

Riddiford: —software of how we thought it might work, tried to make it.

Weber: This is something to push to Nokia.

Riddiford: We tried and David Lippen—he became managing director of Symbian—we talked to him about it but they didn't have enough clout with the hardware divisions of the companies and they've all got their own roadmaps and their own way of doing things. It's really, really difficult. Then you've got the operators. We got a lot of the operators—Vodafone and T-Mobile in particular—very excited about it but getting someone excited and actually getting it to market is another thing. Anyway, it costs a lot of money. We've kept this patented for about ten years and we did quite a lot of development ourselves, but then we've let it lapse, unfortunately. It was a "nearly but not quite" product. Psion always saw themselves as pioneers and wanted to get into high value new markets. As soon as the organizer product that Palm were producing—and other people were producing copies—it became a commodity item and it was all about price. Psion decided to get out of the market then because they just could not compete on price. They didn't want to ramp up the bodies and their products were always going to be more expensive than the competition because they're always more sophisticated.

<break in audio>

Fullalove: It's called a Pick Communicator. It's a three part arrangement where the processor is in the back here. The screen was an adjustable element and keyboard out in the front.

Weber: Do you want to formally introduce yourself?

Fullalove: *<laughs>* Staffing officer.

Riddiford: *<laughs>*

Weber: Does it come out?

Fullalove: This was launched as a technology platform in 1999-2000. It's a fully tooled, half fully working thing. We lost that, sorry. We probably have got some somewhere which we could have the office send to you.

Weber: Okay.

Fullalove: It's been 18 months as a project and it was a very rapid project for Siemens because it was offline, a small hit team we were part of. We worked with a Malaysia-based hardware developer. It was leader beam [a leaner team?] and we produced all the software and parts. It was an interesting exploration but not a good solution in the end.

Riddiford: They never had the drive. Maybe it was our drive and passion with Psion to make the product as small as possible. It went over that threshold of what we considered. If you're going to go to that sort of size why not go to something this size and make it truly a much easier, better product to use. On this product [Psion Series 5], we have optimized this keyboard but because Psion were doing the software that was fine. We worked in tandem with the software guys in order. It didn't matter that we had less keys. If you work with Microsoft they tell you what keys you need. The Siemens device, as soon as we went to, rather than working with Psion, it was working with Microsoft. We ended up having to have a full QWERTY keyboard with two extra rows. The keys ended up being tiny and squished because they're ground into the space. The product got bigger and bigger because of the requirements but that drew some things like that. It ended up that you lost the control of making it as small as you could possibly make it. It was a usable platform but you were never going to fall in love with it.

Fullalove: I think it's worth saying, as well, that the story about where we've gone and all the experience and in recognition of being with Psion led us into lots of other interesting territories. Unfortunately, we can say that we worked with Toshiba for many years doing offline interesting mechanical R&D with them, both from their Irvine, California based management operation and the Japanese Tokyo Design Center. They beat a path to our door because of all the experience and the expertise we have in doing these things. Since then, a much more interesting proposition turned up, again through reputation and network. It's a current story for us which we're not allowed to disclose right now but hopefully in due course we will because it's significant. It is as big as it gets and it's a very important brand. We're doing fundamental R&D on the mechanical side which is beginning to already turn up in the world selling products but our hands are tied and we can't say anymore. But one thing leads to another so we're very pleased about that.

Weber: We'll see. We'll see the upshot.

<break in audio>

Riddiford: We set out to do a different type of smartphone. This [Phone Book] was something which was equally balanced between being a phone and organize the functions and also being able to email and text with a proper QWERTY keyboard. On the outside it looks like a standard phone but you can open it up book style to expose a fold. As you can see, the keyboard isn't compromised because you've got number keys as well as the QWERTY keys below so if you're putting names and addresses into the database, you don't have to shift to get numbers. It's a relatively small, compact product when it's closed and becomes a nice, wide keyboard.

<break in audio>

Fullalove: —choose the nature of the opening book style and the letters.

Riddiford: Yes, traditionally people have tried to do this kind of opening product. They accept that when you open it, you open it and turn it around and you have a second display on the inside display keyboard which is fine to a point but it's not intuitive. You end up having to have two displays which adds extra cost.

Weber: And weight.

Riddiford: This was trying to be very cost effective just as a phone, using the same components as the phone uses.

Fullalove: Obviously, in this space, this is a smart solution. We carved a niche where other phone players, including Nokia and Sony and many others, were trying to achieve this full QWERTY experience in a small form factor device and is therefore creating a bit of IP that we managed to secure and get an international grant on. We then protected it for a number of years. Along the way, we managed to encourage a number of good brands to look at the product and indeed nearly sold it three times to a cluster of the best of the brands in the mobile phone space. This is the product that nearly succeeded, that should have succeeded, that really does mark a moment in time. We virtually got to a place where we sold it to a big European mobile service provider. Indeed, at that particular moment it was felt that by then screen size was everything and the fact that we made this beautiful compact product with lovely action, with a fantastic wide keyboard for good texting was then being seen as compromised because they didn't look at the screen.

Riddiford: Actually the screen is as big as any ordinary phone is today. Smartphones obviously go bigger but this size screen is still pretty good. These were two products, two iterations, different flavors of the same design. This is actually a working unit. We have about a half a dozen working units made so you can actually make phone calls from this. There's a whole bunch of software written for it to deal with the contacts and things like that.

Weber: Who wrote the software?

Riddiford: *<inaudible>*tech.

<break in audio>

Fullalove: There was a different service provider in Europe that was saying, "We're pledging you so many hundreds of thousands as a first customer shipping order." On that basis we spent nearly a year developing the product to satisfy this particular end customer. It's a very interesting design story alone because the integrity of the design characterization of this—which is a lovely mechanical prototype—unfortunately gets lost along the way and we have without being shy about it a very obvious "Chinglish" design version which has been interpreted by the Chinese vendor who was our partner. They wanted to

do things a certain way and being pulled in another direction by the end customer who was getting involved and saying, “I want the design—

Riddiford: “I want it to be more Nokia-like.” Everyone was trying to sort of stand in. We should have stuck to our guns and said, “This is the way it is because that’s what we do as designers.” But it’s very easy to get—

Fullalove: It’s the classic design by committee.

Riddiford: You end up with something which isn’t quite right but it’s a hopefully reasonable attempt. The same thing happens on the inside. There were two versions being looked at. One is the QWERTY keyboard that runs across the hinge—

Weber: Oh, be still for a second. Let me get it.

Riddiford: Yes.

Weber: Hold it up so you can see it.

Riddiford: Yes. One had a QWERTY keyboard running across the hinge, which is what our preferred design was. The far eastern vendors were finding it difficult to get someone to make that technology, even though we managed to do it in the UK. They preferred to do it their own way by splitting the keyboard. We had two designs which were running and being tested.

Fullalove: Here’s the beautiful, original keyboard.

Riddiford: Well, this was basically an upgrade.

Fullalove: An upgrade, but even so the quality and integrity of this design—which was fully within our control which we had manufactured here—they could not reproduce. Now, there’s only so much time in the day and if we sat with them in China and sat with all their suppliers we would have achieved that but it was just an infeasible, impractical proposition at the time.

Weber: You didn’t put your own idea to this or you did?

Fullalove: Yeah, we did, yeah. They developed a pre-production prototype. It was born by the vendor who saw a big opportunity.

Weber: Can you say Infintech—

Fullalove: Infintech.

Weber: The carrier?

Fullalove: The carrier we won't talk about.

Riddiford: They didn't put any money in.

Fullalove: They didn't put any money in and they were—

Riddiford: They reneged on the deal.

Fullalove: They were a complete pain in the bum and they walked away ultimately from a development that everybody worked very hard on. Then through a lot of extra cajoling we ended up talking finally with Vodafone who approved R&D in the UK. It got board-level interest and we worked with them to produce a very interesting package of material that was going to a convention where annually they bring all of these chiefs together and talk about their pet projects. We were at that point where the product was being presented. It was potentially going for final corporate approval when they completely stripped out all the management at a high level. All these potential projects were just pulled in overnight. That probably was where we felt that the end was nigh for dear old Phone Book.

Riddiford: The trouble is you have to deal with manufacturers and you have to deal with the network operator. With both of those types of companies the churn of personnel is enormous. You can have a personal rapport going with someone and then a year later they're doing something else.

Fullalove: The effect of that is that you are seen to be a small but very smart little business that has IP, is prepared to protect it and it actually helps you win business. It also creates new opportunities for you because people look at patents. They look at the smartness in those things and they think you can do it for them in other ways. That's a very good thing for our business because we continue to pick up quality interesting work.

Weber: So that's punching above your weight.

Fullalove: Just a bit, yeah.

Riddiford: <*laughs*>

Weber: Can I ask how much money you put into this?

Fullalove: Hundreds of thousands; of our own money, hundreds of thousands. I mean the patent alone cost us—

Weber: Counting your time.

Riddiford: That is counting our time as though we were charging it to a client.

Fullalove: Our cash on the patent was about £130,000 sterling.

Riddiford: Over a ten year period.

Fullalove: And that's all of the bottom line. Now along the way we've had some money from various interested parties to help develop prototypes and cost fees, et cetera.

Riddiford: Yes, it wasn't all our own money but other people were trying to make it happen and paid us for our consultancy time. It's one of those things—

Fullalove: Little known.

Weber: Tuition is expensive.

Riddiford: Yes.

Fullalove: That's it?

Weber: Well, thank you so much.

Riddiford: Well, hopefully you've got some stuff there that's useful and I'm sure David will give you—

Fullalove: Oh, David will tell you another story.

Riddiford: <*laughs*>

Weber: This is fascinating work here. It's a side you really don't see much.

Riddiford: Yes, exactly.

Weber: Thank you.

Riddiford: Thank you.

<break in audio>

Fullalove: Over the years we've had two or three significant projects with Siemens. Martin already talked about the Pick Communicator which was the Windows CE integrated PDA device. However, one probably was in the early 2000s. We won an international tender to provide mechanical design concept thinking and industrial design consultancy to Siemens for their Vodafone division. There was about a dozen international design agencies that were asked to pitch and we won it. We did a very interesting round of new QWERTY-based mechanical, ingenious mechanicals, smartphone and mobile solutions.

Riddiford: It's all about entering text into a standard phone: how to do it.

Weber: A QWERTY type keyboard on a phone.

Riddiford: How did you do that in a standard size phone?

Fullalove: We did our typical thing. We kept it fairly tight. We did a range of new mechanical ideas and we sketched them and presented and made some models. Then there was a pre-selection and then there was kind of a refinement of some of the better ones and then we handed it over expecting to hear. We were part of this new tender where we won through and we were going to be doing mechanical development work with the guys and it all just disappeared from us which was a bit disappointing but, hey, that's life. They got what they wanted. We got paid. Everybody was happy until eventually what turned up in the market was the product which was quite a significant concept really; the SK65, which is this bar phone that has a front and a back and you rotate and you create this handheld. You have a QWERTY keyboard split in the side of the bar phone with a screen in the middle.

Weber: You have the model?

Fullalove: We do have the model. Actually, Martin will get that.

<break in audio>

Fullalove: This [Siemes SK65 phone] is the finished product that showed up in the market and it's indeed our original thinking. It wasn't ultimately designed by our team. It was finally carried through by Siemens currently preferred or then preferred design department. I think it was Phoenix, wasn't it?

Riddiford: Yes, Phoenix.

Fullalove: This is a very good example of good quality. That's not quite the way to describe it. Just a bit of simple, ingenious thinking.

Riddiford: We did two devices. One we had game controllers for the youth and then QWERTY for adults. It's quite a nice product to use. It's a little bit big as a phone which is a bit of a shame.

Fullalove: Compared to that thing? Well, actually it's reasonably acceptable.

Riddiford: It's quite big in your pocket. It's quite fat so it's not quite something that's going to go in your pocket. I used it for awhile and it was swell.

Weber: And this was approved by the Vatican?

<laughter>

Fullalove: It's a Japanese, it's a martial arts thing.

Weber: Ninja phone.

Riddiford: <*laughs*> Yes. Where this design came from and where does it end? As Jim says, we did the original concept of this and then another industrial design company took it on and turned it into this as a product. They won an iF award which is a big design award. We thought, "Well, this is a bit strange; we feel we designed it."

Fullalove: In fact, not quite issued a gagging order but we've been told that we haven't designed it. It's not ours, so please desist.

Weber: But this was the one that you showed me that—

Fullalove: Oh, no, no. That was the very interesting Psion concept Blue Sky project which won the CES [Consumer Electronics Show] innovation award. I've actually put the movie of that in the movies folder.

Weber: That never went beyond the concept.

Fullalove: No. But it attracted a huge amount of press interest because it was a series of screens that—

Riddiford: What we were trying to do is take the normal constraints of how would you get the biggest screen in the smallest product. Typically, the biggest screen you're going to get out of a small product is the same footprint as the product. You open up the product and there's the screen or the screen is sitting on the front so now you've got the screen. We got three times the screen area to the product area by folding it out in that way so that was a significant improvement in screen area compared to the size. That was just pushing the boundaries and seeing where we could take this.

Fullalove: Interestingly, we did two. We actually did a project where we looked at a number of Blue Sky phone ideas and the two that fell out at the end was Ace, which was the folding cards screens and Payload which was a very nice necklace or neck band, if you like; a wearable electronic device which on one side are two fat ends. One end of the product was an LCD projector. The other one was a camera so as long as it detected a surface— either your hand or a piece of paper—and it registered it, it would give you the virtual screen. It was a way of Martin conceiving, "Let's make the product light. Let's get rid of the screen."

Riddiford: The batteries weren't an issue then because you could have something in front of you which was a screen and we envisaged that the camera would be smart enough to change the position. As soon as the camera picked up a smart surface, it could then focus the projector onto it and scale it appropriately to the size of the thing that you had in front of you. You could then be reading a novel. If you opened up the paper again you could be reading a broadsheet paper or you could be looking up a single address with this very small credit card size thing before you've opened it up. So basically you have the smart paper in front of you and also you can project it onto a desk and work with it.

Weber: I'm sorry the e-paper basically, plus the projector?

Riddiford: It's just recognizing the screen to tell what position it's in. There's a camera which is looking at the thing and it's picking up a barcode if you like which is telling it what size—it's picking up this bar code which is saying that's the corner of what I am projecting to and then it's also saying what size am I going to project to. The other thing we were thinking was that because you are opening this up—like a map, if you like—you're starting with a small thing opened up once. It sees the thing that you've opened it up to and that is part of the UI saying, "Project me" to a thing that's appropriate to that size. You start off with an address, maybe it's the news and it's a map so in other words it's always appropriate to the size it opened up to.

Weber: You would have this that you're carrying with it.

Riddiford: Yeah, it's a piece of paper and you basically bring it out and it works but it can work with other services as well.

Weber: But then you have to manually decide what size you want?

Riddiford: Yes.

Weber: I mean a smart paper is only—

Riddiford: Yes. Anyway it's interesting that X number of years later, I've got a phone that has a projector in it.

Fullalove: I'll send you some pictures. They're not there. But again it was something we did as a Blue Sky concept in 2000 and it got a big wow. Here we are ten years old, less than ten years old and it's becoming a reality, good for designers. Do you want to talk about the Communicator?

Weber: You did go with the later laptop the netBook, is that right?

Riddiford: Yes.

Weber: And that term was then picked up by other people?

Fullalove: Yes, it's become a generic term.

Riddiford: Interestingly, Psion, because they've been first to produce a number of different product genres so they coined the original "organizer" and organizer stuck as that type of product. They basically have the trademark for the genre of product. PDA was obviously named by a journalist, whoever he was. That differentiated to a certain extent to what Psion were doing and what Apple were doing. Psion—the first laptop they did they called a "mobile computer," thinking that that might become a generic name and "mobile computing" has but in a slightly different space to laptops. Then the Series 7 was called the netBook and again that was trying to be the generic name for that type of product and that has stuck. Lots of people are now referring to that type of product eight or ten years later as a netbook.

Fullalove: It is a registered name and they do own the rights to it so they're now deciding that they want the property again and they're trying to stop the industry from using it as a generic term.

Weber: So they're actively defending.

Fullalove: Currently asking politely people to desist from using it.

Weber: Sorry, that was a tangent.

Riddiford: Yes.

Weber: It was when you said Communicator; Nokia used the term Communicator.

Fullalove: Yes, this was also a Communicator because this indeed was the first of the Windows CE combined devices.

Riddiford: It was one of many actually, to be honest. <*laughs*> This was born out of a project that was a joint project with Psion. We introduced this [Psion Series 5] and It was, "How do you turn that into a communicator?" Initially, we had to envisage that this could have extra electronics in the back but it's all about how to deal with the voice side of things. We did a long project looking at how to get voice into a bigger product that you don't really want to hold up to your head. We tried to make the product smaller, but that makes it less usable from the computer point of view or you accept that you're not going to hold it to head. Eventually, this product here was what we ended up designing with Siemens. We had to avoid all of the stuff that we'd done with Psion. We had to develop some new mechanical systems so that's what we came up with here. This is a product which opens in a different way. It was always going to be bigger than the traditional Psion product, more desktop and a product you bring out of your bag and put on your desktop. It opens up. Here's the keyboard. There's a pen installed in the keyboard. The display, then lifts up from the back, so you end up with this tablet with an articulating display.

Weber: Bring it up a little bit.

Riddiford: It was never intended to be used in your hand.

Weber: How about in the lap?

Riddiford: Yes, it's good in the lap.

Weber: What about the screen angle adjusters.

Riddiford: Yes. very good adjustable screen. Interestingly, when we were working on the Psion products, we did a lot of research into screen angles and these were using black and white screens which need light in them to get the full contrast. You find that you lose the light very quickly if you bring the screen up because you basically start reflecting yourself and depending what you're wearing will depend what will reflect; whereas, generally, if you're reflecting above over your head—in other words you're

looking obliquely at the screen—you get more light into the screen. We found that actually that angle between the keyboard and the screen was pretty similar for lap use, desk use, and handheld use. The actual requirement for angling the screen was pretty minimal. People feel that they want to have the screen like a laptop facing you like this, but actually it becomes unusable and even more so when you've got a pen because if it's facing you like this it just looks wrong. You're looking on top of it and the pen is coming at this angle. If you're using a pen you're more likely to be used to using a pen or stylus on a flat surface like writing on a pad so you want it to be as fast as possible. We found there was this kind of angle that was universal on your lap, on a desk and in your hand within probably five or ten degrees. It would always be the same angle. Hence, the reason why we had a fixed angle on most of the Psion products. It's only when we got to the Series 7 where there's a bigger screen—more like a laptop—then you start needing the adjustment. Anyway, this had adjustments and has a very big battery.

Weber: And the connectivity?

Riddiford: Yes, it has its own universal kind of connector, their proprietary connector, but obviously because it was a GSM product, most of the connectivity is through wireless.

Weber: What was it using for— was it GPRS?

Riddiford: No, GSM.

Weber: Just 14.4 [kbps] over the phone line?

Riddiford: Yes.

Weber: So pretty simple.

Riddiford: Yes, pretty slow.

Weber: Without a browser?

Riddiford: Whatever was bundled into it, well not even bundled.

Weber: This actually was released.

Fullalove: This went a full tooling.

Riddiford: The notion was that if it was right that there were enough employees within Siemens—Siemens had—

Fullalove: —350,000 employees and they reckoned that 50,000 employees were to use this as a device. That justified the business case but indeed it was then shelved as a technology study. They learned a lot from the relationship with Microsoft on working with them to integrate.

Riddiford: The integration just was very cold. It just didn't integrate between the GSM side, the Windows CE side so it became not a slick product that you wanted to use.

Weber: For software; this is not hardware.

Riddiford: Yes.

Weber: Have you seen the Siemens smartphone?

Riddiford: Yes.

<*inaudible*>

Riddiford: Siemens was a screen-only device. At Psion, most of our experience was in the keyboard arena. We picked up on all the bad press that those products got when actually we were doing the right kind of thing in continuing with keyboards. We have done some LCD only products but that's always been a problem with an LCD-only product because on a touch screen it only activates when you take your finger off the screen. You get the equivalent of the key click when you take your finger off, not when you put your finger on. It always appeared to be a little slower. If you've got a slight processor as well, it just seems incredibly sluggish. In those days, slow processor plus the action, you put your finger on and nothing happens, take your finger off and something eventually happens.

Fullalove: But you've made the wrong selection. <*laughs*>

Riddiford: It's just immensely frustrating and you're not going to [be] getting any feedback in the process. All of the stories about the Newton, it was all slightly counterintuitive. You weren't quite getting the feedback you wanted because of the way touch screens work or people decided that touch screens should work. In other words, you can always get it to work on first touch—that's fine for big buttons—but you don't get any tactile feedback while you're pressing it. There's a problem there. Obviously, with these hands-on devices, you're trying to cram as much as possible in to as small a space as possible so things aren't finger-sized anyway. They're too small for your finger. You're not getting the right feedback so there were problems.

Weber: Palm's touchscreen was what?

Riddiford: They had a touch screen, but they basically said stylus. Phone people were saying, "Hard devices, the one hand devices; stylus: out." This is where the iPhone has won through; by making it a finger-centric device, making it work properly with fingers and thumbs of the gestures and things that Newton had tried. Obviously, they had a history of trying those and some of them worked and some of them didn't. The iPhone stuff worked very nicely.

Weber: To go back a little bit, what was the feeling around Psion and your firm when the Palm came out?

Riddiford: We were intrigued by it, but it was coming from a different area. It was coming from a thought that this is a satellite. This is almost like what would be now seen as a USB stick carrying the data with you and then being able to review it on the move and maybe modify a little bit but very little data input. Psion always came from the view that it was all about data input. They didn't originally think it was—obviously, looking at the technology and saying, "Oh, God, eight-bit processor. That's not the capacity to us." Interestingly, the rest of the world sees it in a different way. They don't see it in terms of input or processor speed. They're seeing it as this electronic assistant. It was grouped together with the Psion as being the solution to the same problem. Because it looked simple, because it's not using 100-year-old technology in terms of the keyboard, you believe it. It had graffiti, handwriting recognition, lots of colors. "Oh, wow that sounds cool." Interesting stuff but actually, when you get down and use it, you can learn to use it and you struggle and then you kind of think, "Oh, Christ, was it worth it? I'm never getting up to the speeds that I used to get with my typing." Interestingly, that whole notion of handwriting recognition has sort of dissipated a little bit. People are saying, "Well actually, a keyboard is better." Psion unfortunately, had to weather that storm and the sexiness of the screen-based input destroyed their mark a little bit. They had lost very, very influential and key users who loved their products but breaking into a broader market was always going to be difficult. It was always a bit of a techie's product. It worked very well, had very rich, deep software. Palm came along and suddenly they have a device which is shallow, does a little bit quite well, but it's flashy and people think, "Well I'm going to get that." Palm got into an area which was a much wider audience than Psion ever managed and also they started in the 'States. They got the American audience where Psion always struggled to get any kind of traction in America.

Fullalove: And then there was Blackberry.<*laughs*>

Riddiford: And then there was Blackberry, yes.

Weber: And is.

Fullalove: And is, yes.

Weber: Well, thank you.

END OF TAPE 3

START OF TAPE 4

Riddiford: This is the Psion that I <*audio break*> Psion started making and designing hand-held products with the Organizer I—which isn't shown here—in about 1983. This [Organiser II] was a refresh of it with a new keyboard, bigger display and connection to the outside world. This is the Organizer II, which was [made in] '84. This is a couple years later. This [Psion MC laptop] is bizarrely taking the same software <*laughs*> and putting it onto a new format. This is challenging the size of laptops, which were enormous devices at the time, This is shrinking it as much as you could but keeping a full size keyboard. Here's the circuit board inside. You can see it's a miniaturized circuit board compared with most computers at the time. It's all solid state with no moving parts; no hard drives or anything. It's got removable memory devices, which we called SSDs, solid state drives. Those are in this device [Psion HC] as well in the back. This also has expansion packs. This has two ends here—one of them is missing—which allows you to configure what happens connector wise at each end. A lot of times you can have

RS-232; all sorts of different connection options, printer connections, et cetera, by plugging in different modules. That software was taken away from this industrial product and turned into a consumer product [Psion Series 3a]. It had to be a QWERTY keyboard; that was really important at that stage, and we tried to get the biggest display technically within this package. It's got AA batteries around the back which fold out of the way when you open it. It props it up as well. That technique has been adapted and used for the products. The same software, 16-bit software, was then turned into a lower cost industrial terminal [Psion Series 3 Workabout], which shared some of the thinking with this as well. You can obviously see that key shapes and things are similar. The progression in terms of development—we tend to start with foam models which you can use in your hands to get the ergonomics right. This is based on a reasonably realistic space package in terms of what happens inside. We've already done that development, and then we flesh it out using other models into the fully fledged unit you see here. This [Psion Series 3 Workabout] is a waterproof device and a rugged device. It's constructed as a five sided box which, interestingly, Apple use now in their extruded iPods, and we have all the electronics out in from one end. That was the end of the 16-bit technology. Some of them invested a lot of software effort in developing a 32-bit technology, and this [Psion Series 5] was the first product that came out with it, the Series 5. It's a re-vamp, if you like, of a Series 3, but everything in it is new and better; better keyboard, better display, much faster processor, much better applications, pen-based navigation. Because of the pen requirement, it has a different mechanism, which we've called a pen stable mechanism, so that when you open it up it doesn't fall over backwards when you press on the screen.

Weber: What year roughly?

Riddiford: This was...

Fullalove: '97

Riddiford: '97.

Weber: And this generation here—

Riddiford: This generation—

Weber: This goes with that, but what year did the rugged version come out?

Riddiford: This was—

Fullalove: It was '95

Riddiford: '95. Then there was an experimentation with different formats and some skunk works teams. Out of that came the Revo which was, essentially, a shrunk down Series 5. Again, a different mechanism, it's taking the best features out of the Series 5 and making it as portable as possible.

Fullalove: There is a gap because the Revo fits in between those two which is not demonstrated.

Weber: What year was that?

Fullalove: '98

Weber: Do you have images?

Fullalove: Yes, I've also just linked you to that website which gives you the information on Psion.

Riddiford: From this point on, Psion were starting to investigate online connections—wireless connections to the devices. This [Hero model] is part of a number of studies we've done.

Fullalove: It was called Hero.

Riddiford: This is called Hero, and this is a form of showing the multi-function nature of this type of product in a very simple model. It is paper stuff onto board, but it gives you a semblance of what the product might be like. After Revo, the last in the line of Psion products, we experimented with a larger format. This [Psion Series 7 Subnotebook] has got full PGA [professional graphics adaptor] screen and much closer to a laptop keyboard. It's a tap screen and stability is very important on a screen this big. Battery power is very important. The screen particulates so that its open position—it's further back and then it moves forward in it's closed position. There's a battery pack <*laughs*> which pulls out of the back here. It allows the product to last, even as a color screen, eight hours.

Weber: Wow.

Riddiford: Let's go around to the other side. That was the last of the Psion products that came to market.

<*crew talk*>

Riddiford: We were experimenting with Psion on some future concepts and this [Psion Blue Sky Concept design] was one of them. This was displayed quite widely in exhibitions around the world in the year 2000. Interestingly, it won an innovation award at CES. It was named best new innovation of the year. It's a small device which allows you to either open up a single screen—you get an experience like you would with a mobile phone—but it also allows you to turn and open up three screens. In other words, you've got three times the screen area to the product which is unheard of. This area here, we've shown in the video presentation could be used for all sorts of things. Wide screen video is one of the scenarios we were looking at. This is obviously a future concept. There was also a notion that these leaves, if you like, could be removable and store data as well as images. You could share your pictures and things with people by unclipping this.

Weber: Oh, wow.

Riddiford: It was a concept <*laughs*>. This came out of a joint project that Psion and Siemens were doing. Eventually, Psion backed out of it and Siemens wanted to carry on, so we carried on doing the design.

Weber: What year was that?

Fullalove: 2000.

Riddiford: 2000. This was '90?

Fullalove: '97, '96 we started.

Riddiford: We developed our own concept which is—

Weber: And this <*inaudible*>

Riddiford: Yes, this is—Psion were interested in making a data device that connected. We were interested equally in tackling the idea of making a phone more like an organizer. This [Phone Book] is basically a phone which converts into an organizer just by opening it up. You get a very good keyboard for the size of the product; much more useable than a Blackberry or similar device. Exceptionally smaller as a device than they generally are, as well. It also has a single display which is a very cost effective way of arranging the parts. This is the SK65; tackling the same kind of problem. This was part of a number of concepts we did for Siemens which was actually designed by another design team, but we did the original concept of this. The product opens up to give you a QWERTY keyboard on either side which allows texting and internet.

Weber: 2005, okay.

Riddiford: Then we've got a little sequence here of three products. We've done a range of half a dozen products for TomTom. This was the first integrated GPS navigation specifically for cars. It is designed to be used out of the box, so you don't have to connect it to a computer or anything; you can just plug it in and go. In fact, it was called "Go." We basically took the conventions and threw them out the window by saying, "If you've got a device that's going to be used in your car, why not make it as big as it needs to be?", because it's not going to go in your pocket. You're not using it in your pocket. This has got a 3 ½ inch screen and at the back here it's got a huge two inch speaker, very deep, big magnet and a large battery makes the volume. It's also got an internal antennae which is facing on a board here upwards. This is basically a fully integrated device with no articulating antennas like the competition tends to have. That basically took TomTom from nowhere to being a big player, and they built on that in the subsequent generations. This is a big seller. This has been around for a few years. It's a bit big—not this one, this was part of a drop test <*laughs*>.

Weber: How does that one attach?

Riddiford: This one has a clipping thing here, and we devised a very small sucker as well. It's just a single press sucker which I haven't got with me here. We tried to simplify this—and also there were

patents and things floating around other people's attachment methods—so we devised a new way of doing it. This one is the latest low-cost, low-end device that we've added some clever thinking to. As the devices get smaller and also as devices get more ubiquitous, PND [portable navigation device] devices have been stolen out of cars. The thieves are now recognizing that if you've got a sucker mark on the car, then you might have left a—if you've left your sucker mount on the windscreen, then you might have left the device in the glove compartment, so let's break into the car and try and steal it. We came up with the idea to remove the whole lot in a neat package. This to your windscreen or to the dashboard you can take the whole lot with you in a neat package. You can even put that in your bag or your pocket until you get home. That's in a low-end device and that's just one innovation award of CES.

Weber: That's a current product?

Riddiford: That's a current product.

Fullalove: It's current product. It's also just won the iF Germany design award.

Weber: Great.

Fullalove: That's a good resume.

<crew talk>

Riddiford: We probably should have done that from the beginning, but we didn't have all the bits.

Fullalove: Well, we didn't know we were going to be that extensive, did we?

Weber: Frankly, I thought it would be an interesting hour or two.

Riddiford: *<laughs>*

Weber: But this I hope is—

Fullalove: It's just a moment in time from the last 20 years.

<break in audio>

Fullalove: We'd like to work with you. We had to make a big decision, because we were working with these boys and—

<break in audio>

Riddiford: —machine shop kind of equipment, and then we've got craft based equipment. Pantograph is an old fashioned technique of—

Weber: Wow, that I'm not familiar with.

Riddiford: You can scale down from a patent and create on machine here. We've a patent coping router. A lot of models in the past have been made here. You can machine flat sheets very easily. Then we've got a small CNC machine here, and then a much bigger CNC machine here. It's straight from data that the guys are creating upstairs; we can machine stuff. This one can machine metal and we can quite quickly produce prototypes. We often use outside resources as well to do things and other processes.

Weber: That's some <*inaudible*> over there.

Riddiford: That's a very clever machine which uses a laser to cure a resin. It has a bed—you cure the top down resin and then the bed drops .1 of a millimeter, cures another layer, and all of those layers are fused together and you end up with a resin model which comes out of it. That equipment is quite expensive so we tend to use outside people to do it. The ability to do handcraft stuff, stencils, hand saw—

Weber: Dremels, I see

Riddiford: Dremels and all that kind of stuff. As you can see, we're putting together prototypes here; working electronic prototypes with switches and what have you with our own made case. This is a radio, as you can see <*laughs*>, and one of the guys here does exhibition work, so this is for an exhibition <*laughs*>. Around here there're a few computer terminals so we can take data from upstairs, the guys here do some work on it curing parts and things for the CNC machines or curing 2D shapes which they can work around and print out. A lot of the detailed work is done here in terms of making models. We also have a spray room through here so we can finish the models. We work in a number of different materials. We do fully finished work in prototypes in metal, or we can do foam models which are very quickly made. They are often made by the designers themselves, so it's not just model makers down here, because designers come down here and use the workshop. You'll probably find me down here most of the time <*laughs*>.

Weber: The plastic sort of models that you've got—

Riddiford: Plastic where you're using—here are the plastics. This is quite a hard plastic. We build a lot of stuff build a lot of stuff in PVC in black or gray. It's not a very nice material, but it's actually very cheap material to use as a stock model making material. It's quite stiff and most of the models I've shown you have been made out of PVC. You cut it up, sand it down with the sander, filing, a bit of hand work and then you can spray it with paint on the top product.

Weber: Great. Thank you. Perfect.

END OF TAPE 4

START OF TAPE 5

Riddiford: It's that board in the back there. It's all keyboarded throughout this board here with these interconnections here and here to the expansion ports. Then those touch panels right on the top of that. That's the computer board in this product [Psion MC laptop].

Weber: Wow, quite small.

Riddiford: Yes.

Weber: Now that's why you put the touch screen in the back.

Riddiford: Yes. In fact, looking at this, this is the connection here. Why don't we just—there's another board under this actually. I think it's just a memory board that went over here.

Weber: Because that's another board. Then what about the IR-visual, is that—?

Riddiford: That's all of part of the same one. Yes. They started from small brass and went up.

Weber: True.

Riddiford: <*laughs*>They had a nice space here.

Weber: <*inaudible*>.

Riddiford: I'm not the right person to ask. This was a 16-bit.

Weber: Right.

Riddiford: It started off as an eight-bit.

Weber: Because the Series 3 ran in 16 and then the 32 came—

Fullalove: Is that the MC you're talking about?

Riddiford: Yes.

Fullalove: <*inaudible*>

Riddiford: Yes. The Series 3, MC and the Workabout and anything with the SSDs were all 16-bit. . They went 32-bit for the Series 5. This was what I'd call the HC. It has the same concept of—in fact they were in interchangeable boards. The board that went into here [Psion MC laptop], that same board went into this product here [Psion HC].

Fullalove: That was Intel processor.

Riddiford: Held in by that plastic piece. That plugs in here to enable this handheld device to have the same functionality as this. These were designed together using—

Weber: You would be transferring the memory card with all of the programs—

Riddiford: This [Psion HC] has the two SSDs here. Two memory cards here. This [Psion MC laptop] had four. This has got two expansion packs in different plastic but the same boards plugging in to here and here.

Weber: The handheld device; that was the one that used for the vertical applications?

Riddiford: No. That was after the Organiser established the fact that there was a market for vertical applications. This then was the 16-bit version which was intended to be—all of the people who wanted to do the vertical applications wanted to do their own custom interface to other things. The rationale behind this was that this had this huge amount of customization. You're able to customize these expansion packs on the end. —We had lots of third party people making custom plug-in units. We even did a printer on the top which was using the second expansion port. This keyboard is also a module which slides off and you can put in a numeric only keyboard or any other custom keyboard. It was like a LEGO kit of various plug-in elements which enabled it to be very versatile for whoever wanted to use it. That was the difference between this and the Organiser. The Organiser was just a fixed box, if you like.

Weber: What were some of the notable apps—what sorts of things?

Riddiford: Stock control. —They put—one of the outputs here was RS-232s so it could do barcode reading. Did we have an integrated barcode reader on this? I think the barcode reader was too big to put an integrated one here but later devices had integrated barcode readers. As I said, a printer and the plug on top. You could do ticketing.

Weber: Trafficking.

Riddiford: Yes, type of thing. So quite a wide range of applications.

Weber: If you could pull it up so I can zoom a little bit more. So it's pretty much the standard keyboard?

Riddiford: Yes, compared with the Organiser, rather than have the number keys as part of the letter keys, these are now separate. It's a bigger array of keys but a bigger product could allow that. That got rid of what was called "bastard mode." In other words, you could type letters and numbers easily without having to press a shift and remembering to press a shift. It was also configured—there's a microphone at one end and a speaker at the other end. It was configured but never used for any kind of telephony.

Weber: *<inaudible>*

Riddiford: Yes.

Weber: Was it—some of these were hooked up to wireless?

Riddiford: This was pre-wireless networks. Oh, no! Good point. We did a plug on top—which was developed with Motorola, actually—which was called the RLAN [Radio Local Area Network]. Then the US—I think it was the New York police—used it for a while. It was their communication device. They could exchange information from the streets to the precinct.

Weber: So the voice—

Riddiford: Mainly data. I'm not sure if the voice ever properly worked <*laughs*> because getting the duplex kind of two-way voice was quite tricky in those days.

Weber: Yes. When you swapped, you're basically running several applications on either one.

Riddiford: Yes.

Weber: Would it automatically resize the screen?

Riddiford: The software was configurable. I'm not sure about how. These took similar memory cards called SSDs. I can't remember whether those SSDs—if you had, as it were, a picture on an SSD which appeared on screen here, whether it reset—I don't think it did. Again, that's a software thing which I'm not totally sure about.

Weber: Okay. But the main thing is you could run the same programs on both.

Riddiford: Yes. Because all of this had this version of BASIC which allowed you to write your own programs on the unit, people found us very easy to configure to their own applications. They had this almost like a hobbyist following of people who were programming the computers to do what they wanted it to do. Also, because of this versatility, you've got a whole bunch of hardware people making it do the things that they wanted to do, as well. A combination of the software and the hardware is quite a powerful thing. It was low in cost because it was using essentially the same electronics as this product [Psion MC] and then the Series 3. All of these shared, essentially, the same basic electronics. Then we came up with a lower cost version of this [Psion Series 3]. This is all in the 16-bit category. A couple of very old bones here. This [Psion HC] was designed to be immensely versatile with all of these plug-on modules. Obviously, that meant that it was more complicated and more costly than a lot of people wanted. There was a desire to do a lower cost alternative. That's where this product [Psion Series 3 Workabout] came in. This is a product that was designed from the outset to be waterproof and rugged, but in a low-cost form factor. We created a five-sided box into which the electronics slide from the top here and that was your seal point. When you locked this down, there's a single seal there which seals the product. When you open it up you get access to SSDs—there're some bits in there—and batteries. You put batteries in here; just double As. Access to your SSDs, and then you slide that home and locks out. I had two custom connectors. One is a custom connector and the other is a RS-232. There were some other variants at the bottom here but very small.

Weber: How did you waterproof the connectors?

Riddiford: The custom connector we designed to be waterproof. In the RS-232, we had to buy a waterproof version which was quite expensive but obviously necessary.

Weber: This could literally be dropped in the water?

Riddiford: Yes, it was puddles and rain rather than an ocean, but designed for using outdoors. We found this product [Psion HC] was trying to be as waterproof as possible and we got it through some of the standards. Because it's got so many openings, you could get a beautifully made one to pass. You knew that most of the ones that went through the factory weren't going to be as good as that. It was perfectly fine for most of the applications it was used for but quite—in this time people were trying to come up with these amazingly rugged waterproof devices. Psion felt the need to do our version which was waterproof enough for most of the applications without burdening it with huge cost. This [Psion Series 3 Workabout] was a very cost effective product, because it was using—

Weber: What sort of price range was for all these? How was the relative—

Riddiford: This was £300 or something. Obviously this one is using the same electronics as this, but a different keyboard and different display and obviously a different set of—

Weber: Series 3 sold around £100, right?

Riddiford: No, the Series 3 was 2 or £300, I think.

Fullalove: I'll find those prices for you. The MC was launched in '89. The laptop the number £695—

Riddiford: Yes.

Fullalove: <*inaudible*> in those days.

Riddiford: Yes.

Fullalove: I'll check on that one.

Weber: These were all contemporaneous at a certain point.

Riddiford: These were all using the same 16-bit architecture.

Weber: There was a time when you could order any of these?

Riddiford: Yes. Probably this [Psion MC laptop] may have been abandoned because this market really didn't materialize.

Weber: How many did you sell of that?

Riddiford: Again, I don't know.

Fullalove: *<inaudible>*

Riddiford: Yes. The time count is this [Psion MC laptop] was done first, then this [Psion HC]. These shared the same basic architecture in terms of all of this expansion. These were done almost as part of the same project. Then we went to the full consumer product which is this one [Psion Series 3]. Then, expressing that and taking this [Psion Series 3] forward and then becoming an industrial thing [Psion Series 3 Workabout]. That [Psion MC and HC] was generation one, if you like, and this [Psion Series 3 and Workabout] was generation two.

Weber: And those are approved markups?

Riddiford: Yes, all markups. This [Workabout foam model] is made in foam plastic and it's easy to carve. We stick printing paper on to just give it the appearance of a product. Obviously, it looked much better when it was not so beaten about but you get the feel for what it's going to be like.

Weber: Yes, it gives you an idea of how you did your—

Riddiford: Yes. This [Workabout plastic model] model was more about how everything was assembled together and understanding how bits fitted inside. You can see it's designed a bit like—that should come right out.

Weber: *<inaudible>*

<break in audio> <loud drilling noise>

Fullalove: You can hear the woodshop.

Riddiford: *<laughs>*

<drilling noise>

Weber: *<inaudible>* The oral history policy is to explain the program. So you had two copies of the release. *<inaudible>*

<drilling noise>

Fullalove: You have six movies in one folder. When you're done, I'll explain it again to you so that you know what it's all about.

Weber: *<inaudible>*

Fullalove: *<inaudible>*

Riddiford: *<laughs>*

Fullalove: —just for your interest because we don't just design—you probably don't know what we did for your design product. We've done loads of things.

Riddiford: Yes. Products. Many products. We do quite a bit of UI [user interface] and stuff like that.

Weber: Do you? Okay. But you didn't for Psion.

Riddiford: We did the GUI. We did the graphical icons and things like that.

<break in audio>

Weber: All right.

Riddiford: The way that we tended to do the design in the early days was, "This [Psion Series 3 Workabout] is the end product, but how do you get there?" The first task is, from sketches, to get a feel for what you're trying to do. We would do a whole bunch of cross sectional views to work out how things fit in to give you an approximate space package. We'd then go and make some hand-held models and stick paper graphics on the front and make it feel like a product. Because it's a handheld product, you don't get any kind of feel for the product until you've got something in your hands. You don't get a scale of the drawing. You don't get whether it's ergonomic or not through the drawing. You have to make things to get the feel for how it's going to handle. A lot of this product is about where the keys are; the clustering of the keys. The idea here is that you grip the product. The main keys you use are the numeric keys. In the center here, there're navigational keys on the top which are all accessible with your thumb. The thumb is very dexterous, very easy to reach things. You can use this one-handed and do something else with the other hand that's quite part of this type of industrial product. If you want to enter text then it's more complicated, but probably you use it like this; venturing the text so it's more of a two-handed operation. Sometimes you want to do it that way.

Weber: And the narrowness—

Riddiford: The narrowness is all about—

Weber: Hand feel.

Riddiford: Hand feel. We wanted this to have the appearance of ergonomics and also be as ergonomic as possible. If you squeeze as much as possible in the center here, that runs counter to how the product was going to be made. We had this idea of this representing a five-sided box. This is looking a bit like a boat with bits missing. Essentially, this is a hollow shape. We've made this skeletal framework so you

can see what's going on inside when you plug the bits together and to give you a feel for the kind of shaping you can get on the outside. So this is the model that goes on the inside. The piece that the LCD sits on is this surface here. The PCB [printed circuit board] sits on this surface here. This piece here slides in and out gives you access to the batteries. The SSD is here. It has an interchangeable top to give you the possibility of different connectors. You've got a barcode reader and things on the top. It's still relatively flexible. Essentially, this idea of making all of the computer on this central element and plugging it just through this top orifice was—people didn't make products like that. We had to work out how that all of that went together. To get all of the components in, we made the sort of the see-through model.

Weber: You send out to have that made?

Riddiford: No, no. We made it all. I made all of that myself in the workshop. Yes. Then, in fact, a lot of these products started by rough paper drawings trying to get things to scale and then starting to make a model. I knew what I was trying to do with this slide element—I started making a slide element and bits. I know approximately sizes for the SSDs. Then the detail of how the plastic moldings and things went together evolved through making the model and sketching.

Weber: How would you actually make it; like counting sheets?

Riddiford: Yes, this is made all through sheet material glued together. It's come unglued in some places.

Weber: A huge amount of work to make. This represents—

Fullalove: Lots of detail.

Riddiford: Yes, weeks of work. But you're always working with the problems as they come up and having to solve the problems. You can't skirt around the problem if you're doing something like this. You know it either goes together or it doesn't. If it doesn't, then you've got to find a solution immediately. You can't say, "Let's let someone else do it." It means you had to deal with all of the problems when they come up.

Weber: By the time you got a working model, you're pretty close or a good portion of the way towards a working design.

Riddiford: Yes. This is completely the other way around where most people develop things. In doing it this way, we handed this over to a CAD engineer who was working at Psion and he digitized—he basically used all of these principles and measured where necessary to get a CAD model of all of this internal. The good thing with that is when you're—especially in the old days when CAD was quite slow—you had to work in a fixed way. The person who's working in the CAD—it's very difficult to think about design issues when actually you're just trying to think about, "How the hell do I get this feature into the CAD sensibly without it falling over?" It's very difficult designing in the computer because your brain is having to do two things at once. In my experience, it's easier to tackle these three dimensional problems in model form much easier than you can do in the CAD. CAD is getting better now and people are getting

more used to it. You can start to design 3D things, quite complicated 3D things in the CAD. But in those days it wasn't—

Weber: When you say this was atypical, do you mean of the period or other designers?

Riddiford: Other designers tend to like to do what you were saying; you get it down on paper accurately, and then give it to someone else for them to make. Then a couple of weeks later, you get the bits back, put them together, and it doesn't fit or it's not what you wanted. Then you've got to go through that cycle. It's a very long winded cycle if you're trying to do experimental design work. Rather than doing the paper stuff and then going into model making, we do tend to try and do the model making at the same time as the paper stuff and overlap the two. You're developing in 3D and 2D at the same time, using the 3D to inform the 2D.

Weber: You did this with all of the Psion products?

Riddiford: Yes.

Weber: <*inaudible*>

Riddiford: Because of the history I had with enjoying making models—

Weber: Being a model maker.

Riddiford: Being a model maker. It always seemed to be a natural thing to do. It enabled me to do some more interesting experimental stuff than you would have been able to on paper. That's quite a good snapshot of that process.

Weber: If there are any of those that you're willing to consider donating to we're certainly—

Riddiford: Yes, we'll have to talk about that. Right. The Series 5—I'll just go through and clear the desk so it's not—the Series 5 was the natural progression of the Series 3 and having designed the Series 3, we all were interested in taking this internal area and making it work even better by having a bigger display and a better keyboard, but generally in the same area. We wanted to build a laptop style keyboard here. We wanted to get the display as big as possible. We also anticipated this would be a touch screen and the product would fall over backwards. Right at the beginning of the project—

Weber: We did some of this—

Riddiford: Yes, we did. I've just found another couple of models. Quite quickly into the project, this is a good way of working, where you think about the project, and you come up with a suggestion in terms of, "I thought about it, I put it all together and here's something which basically delivers on all of the points that we're trying to deliver on." What I'll try and do with the clients that I work closely with, is work that way because it cuts through a lot of problematic decision-making that clients often have. If you give them half-a-dozen ideas and get half-a-dozen different people in our company to do that work, you end up with a

very nice range of ideas but actually at the end of the day you just want to make one product. Often clients like to cherry pick from the ideas you've given them and it's not a very nice match of elements. They don't fit together very well. You end up often with a bit of a clutch of product whereby you've got features in there which are fighting with other features in terms of space. They're not as clearly thought out as they might be because the client wants to get as much in there as possible. The good thing with having one person thinking it through is that you can get a whole bunch of features which fit together nicely over a period of one or two weeks. You can work through a concept and it hangs together and makes sense. Then all of the details start to fit into that. That's what happened in this project [Psion Series 5]. I had this idea of redistributing the gravity so the product didn't fall over backwards. That's what this does. It opens up and moves the keyboard forward when you open it. This is the original model for the Series 5. This is made out of sheets of plastic. That's a sheet of plastic there. Another sheet of plastic here glued—it's the plastic that began to add…

Weber: <*inaudible*>

<*electronic background noise*>

Riddiford: It's a very simple three block thing with bits of plastic glued on the end. It's got some springs in there. You get a real appreciation of what the product might be like. It's just a black block on the outside. You're not going to get very excited about the outer form. It's all about the size and how the thing works and the utility of what it feels like in your hands that this model helped you with.

Weber: You would take this to meetings and everyone would play with it.

Riddiford: Yes. Almost this is the only thing you take. In those days, I was working so closely with them, I'd go away and work for a couple of weeks and come back and say, "I've got something. Do you want to see it now?"

Weber: You'd have it in your jacket pocket—

Riddiford: Yes, "What do you think of this type of thing?" There would be some supporting sketches and things like that as well. In the design business, often you spend more time doing presentation work than you do on the actual thinking. Some plans you have to present to a very high level for people understand what you're trying to set. You can put a lot of effort into that—taking things to that sort of easy-to-understand view and also going through a step-by-step reasoning why you've done something a certain way. Whereas, as everyone says, a picture tells a thousand words, a model tells a thousand pictures. Whenever we do a presentation and we produce a model, the pictures all get put to one side and it's all about the model. That's the closest thing to the reality of what you're going to get even though it's very rough. You're not going to buy that off the shelf because it's got no character yet.

Weber: <*inaudible*>

<*drilling noise*>

Riddiford: Yes, I thought <*inaudible*>. They're cutting these drain pipes.

Weber: <*inaudible*>

Fullalove: They started today.

Riddiford: Well, we can carry on. If you want us to record some more stuff then—Yes, using simple block models with paper elements stuck on you can get something which looks very like a finished product and gives the client a very easy thing to evaluate. “Are we going to invest millions of pounds, dollars, in developing this and bringing this to market?” We were able, because we had a previous product, we were able to say, "Does that look like the next version of this?" Bigger screen; much more useable keyboard. Suddenly, you think, "Well we're in the right kind of area here." This got the green light very quickly. In those days, we were just dealing with David and a few other key board members.

Weber: Did they direct you, do you think?

Riddiford: Not really, no. But basically lots of things get steered. In other words, you set out in a direction, and this direction will seem to be the right kind of direction. Then you start working with the electronics people and you start working with software and stuff moves. But you're essentially moving in that same direction. This set sort of the direction we wanted to go in. Then we did another model, which is in here somewhere. This is the second model in that development. This is all about setting the mood for the product; and this is all about how to make it.

Weber: Ah ha.

Riddiford: We developed the ID aspects of it more. We knew exactly what we were going to be doing with the LCD, in terms of size. Same basic idea of these two bits here. This is now mocking up a construction—there's an internal chassis. This is basically showing how that mechanism works. There's a wire spring here which the lid pivots off, and that gives you the over-sensor action as well. It was going to be a magnesium chassis. It was also going to do the shielding for the PCB. You can see where it's paraventing here with the—

Weber: The screen.

Riddiford: —cable parts. All of that is basically experimented with in a model form.

Weber: That's a valid model?

Riddiford: Yes, I soldered this out of tinplate and put some—you can see various bits of solder here. It needed to be stiff. This bit here needs to be quite strong, because it's got other forces on it, because of this spring. I was developing it for my own use, because then I know it's going to work, but also showing it to the clients; having gotten to that point and saying, "Here you are; here, look, it's nice and simple. This is where the PCB goes. Here's the cable flex." That's the cable flex part sorted. All of those things are critical because, if you don't solve those right in the beginning and you leave those to the end, you got nowhere to go. That basically was the second model I made. There was another model, which was the final thing, made up in lots of little bits, in order to help the CAD development. Typically that's the way that we use to develop. We're probably doing less of this front-end model making, in terms of making it

like the product. We tend to do a lot more rig building, to test out elements in the product, or the mechanism, often two-times full size, and then some block models to show the basic size. You use movies and CADs to show over the general idea.

Weber: You would have a full workshop at the design firm now?

Riddiford: Yes, we have a workshop downstairs.

Weber: Oh, okay. Is that similar to what you used?

Riddiford: Now we've got CNC but it's similar, yes.

Weber: That'd be great.

Riddiford: Yes, lathes, milling machines.

Weber: Yes.

Riddiford: Yes, a lot of people get quite excited when they see it. "Oh God, you got one of those. Love to have a go on that."

Weber: I must admit I would be one of them.

Riddiford: <*laughs*> The final thing ended up being quite, you can see, quite similar. This was not—this didn't end up being magnesium. It ended up being plastic molding and then plated.

Weber: What are the circular—on the back?

Riddiford: That's a speaker gets dropped into that.

Weber: Got it.

Riddiford: The battery tube is here. Then there're connectors and infrared, at this end.

Weber: That would take you how long to make, this one?

Riddiford: As a model?

Weber: Yes.

Riddiford: Probably two or three days, and this is probably—because you're developing and designing at the same time—this is probably two weeks of fiddling around, sketching, drawing, making bits, trying

them out, testing cable bars, modifying. Relatively quick. You're making a lot of decisions very fast, and you're getting towards the end goal quite quickly; maybe a little bit longer for this. You're gaining confidence. That's what I like to do; gain confidence that you've proposed this, what used to be called mad plans, mad ideas. You mitigate the risk as quickly as you can by making models.

Weber: To prove the concept.

Riddiford: To prove it, yes.

Fullalove: There's an expression, you "fail fast."

Riddiford: *<laughs>*

Weber: And that's what you're banging into? That's what your mission was?

Riddiford: Yes.

Fullalove: You're getting paid for your development, you go fast.

Riddiford: Yes.

Fullalove: You justify your innocence quickly.

Riddiford: Yes. In other words—

Weber: Makes sense.

Riddiford: —if you're going to fail, fail fast.

Weber: Why work on the weak points?

Riddiford: Yes, exactly. But we're putting a positive spin on it here.

Weber: Well, try and eliminate the weak points.

Riddiford: Yes, exactly. So, that's the Series 5.

Weber: That was a crack.

Riddiford: This was a sprayed up model of the keyboard.

<break in audio>

Weber: That's the capacity there?

Riddiford: This is the keyboard of the Series 5. Six millimeters thick. It's got a proper good travel. The interesting thing about this was that it had to be completely—

<break in audio>

Riddiford: This is a project that never happened. We were looking at taking the Series 5 keyboard—almost like a skunk-works project. This is a very slim, very nice keyboard, very easy to use. The Series 5 uses 32-bit architecture, but Psion still had the 16-bit architecture running in the background on other products. They were still able to sell these products.

<break in audio>

Riddiford: The Series 5 had taken quite a long time to develop because it was entirely new hardware and entirely new software. It took over two years, from the beginning of the project to launch. Psion were obviously spending a lot of time satisfying the demand for the device. They were also looking for where their next product was going to come from. At this time Palm was quite strong, strongly growing. The thinking was, “Let's do a screen-based device.” We did a number of projects of screen-only devices. There was always something a bit lacking; possibly because Psion was at its best innovating in its own space, doing its own thing. There was a feeling that if we did a screen-based device only, of a Palm competitor, then we were following someone else's trend. It was much more difficult to go one step ahead of what they were doing; other than through the technology. The Palm was an 8-bit product and Psion was already doing the 32-bit products. From the hardware point of view, we had a number of parallel little development exercises. They were almost like skunk-work projects—we were looking at, apart from doing the screen-based products, what else we could do to consolidate Psion's position as the world’s number one organizer maker. One of the strands of development was to take the Series 5 keyboard, which had proven to be very successful. It's a very slim, self-contained unit; only six millimeters thick, but it's got the proper press action to it. It feels like a laptop keyboard; completely self-contained. What could you do with that, if that was your starting point? It was a project that was close to a number of people's hearts; this ended up as being a very sophisticated product. The Series 3, that it superseded, was a much loved device in terms of the software; very easy to use, intuitive. Lots of applications were being written for it. That was there as a legacy. There was a feeling that shortly we should be following on with another product in the 16-bit category. We looked at taking this and combining it with Series 3 technology. We did a couple of models, and this was one of them. It was based on the original Series 3 display and battery tube; had a single SSD, plus this keyboard. There's the product. How do you make that work, and then how do you make that look interesting? We did this product here, which had tried to get some of the Series 3 form, in terms of as slim as possible, given the elements that you're putting into it. Let's try and also simplify the hinge, make a simpler product. This opens up in a slightly unexpected way; the computer is on the top, the keyboard is underneath. That allows you to have this stepped up appearance. To make it stable—this didn't have a touch screen; this was using Series 3 display—we had an infrared cord to the back here, which folded out and formed a prop to stop it falling over backwards. This ended up as quite a nice, interesting product. A lot of people reacted to it, saying that having just a thin keyboard, and all the way to the back, meant that it was difficult to use in your hands. That was really the reason why it wasn't followed through beyond a concept study, because of the weight; feeling like it was going to fall out of your hands.

Weber: Okay.

Riddiford: But it was quite a nice, elegant solution to simplifying the problem. This was taking the Series 5 keyboard. We then looked at it saying, "This kind of product is, compared to the Palm, pretty big to put in your pocket. Shouldn't we be looking at a smaller product than the Series 5?" We looked at shrinking the whole of the Series 5 and putting smaller batteries in. Essentially it's a similar kind of package; but simplified and less expensive. Hence, we came up with this product, which is 20% smaller. It's got a similar looking keyboard, but it's a fairly standard mechanism. It's just a rubber key mat with bonded keys. It doesn't have any guidance on the keys. You don't get the feeling that it's a proper keyboard. The thought was to take this format, but to reduce it in size; to compete much better, much more head on with what Palm were doing. Palm were doing products which were lighter and much easier to carry around. Psion always had this notion of wanting to make a product which you carry with you everywhere, so that it was always there for you. You didn't even have to think about it, you knew you were going to have it on you. The ability to make these products smaller and lighter is really, really critical to that. We took the same formula of screen and keyboard, and tried to shrink that by 15 or 20%, to make a more acceptable pocketable format, and rather than using AA batteries, to use AAA batteries; but this time rechargeable. This is the new product, this is the Revo.

Weber: Wow.

Riddiford: It's got a lot of similarities. It's obviously, 'Honey, I shrunk the computer'. This [Psion Revo] doesn't use the same technology for the keypad. This [Psion Series 5] has got a properly guided key, which has a proper amount of travel. This [Psion Revo] keyboard is literally just a bridgeless keyboard, with plastic keys stuck onto a rubber mat. It doesn't feel quite as good as this [Psion Series 5], but I think gives you the same appearance, and is more cost-effective to produce; and is also obviously a lot thinner. This [Psion Series 5] takes up a reasonable amount of space. We were trying to make a light product that is much thinner. We changed the mechanism in terms of how this works; again, something we like to do. This [Psion Revo] has a similar mechanism to the original Series 5 model; in as much as it's got two elements, which come apart and then come back together. This again throws the batteries out of the way, and rotates them as well. As always with these Psion products, we were working around the cylindrical batteries: your opening pocket around them. By, in this case, increasing the width of the base, you get the stability that we're after for using the pen. This is what has been coined a “pen-stable” design. All of the Psion products have this notion; when they're open, they're ready for use. You can touch on the screen and it doesn't fall over backwards; it feels stable. Again, one of the things that we try and do in our design work is rather than—it's quite easy to say, "I'm starting from here, and I want to open the product up." We equally say, "Actually, the product that everyone wants to use is in its open format, and what you're designing is that product, to close neatly." Thinking a bit in reverse is a really important thing, because you then don't accept shapes in this open form, just because the mechanism makes you have to create that shape. You say, "What shape do I want it to be in its open form?" Then you analyze how that can integrate with the product when it's closed. That's what happened here. We've ended up with more soft flowing lines products than previously. This was the result of having a team of designers working on this. The previous products were top-down design, if you like. There were two designers working it; therefore one looking after the styling, the other one looking after the engineering, and the two of them working together, with me sort of directing. I make an original model, which showed how the thing was going to work. This was a very interesting presentation we had. Psion had just got a new managing director, and we were meeting to discuss the screen-based product. At the end of the meeting, everyone disbanded being really disappointed, because it wasn't coming together as everyone would like; because of the software, because of all sorts of factors. The head of engineering at Psion and I got

together and devised this skunk-works project to do this small version of the Series 5. I made the model, again demonstrating a way of doing it and the sort of size. At the end of the meeting, I said to Harold, "We've got something else to show you. It's not anything you know about, but we've doing this work in the background. What do you think?" We handed down the model. After literally two minutes he said, "Okay, we're going to do that." A very, very powerful response. This came into being because of this skunk-works background development that various of us were doing.

Weber: When was that, do you remember?

Riddiford: Was that '98?

Fullalove: Yes, it was '98, because it was launched in '99.

Riddiford: Yes. That was quite an interesting—big company, you'd expect roadmaps and things to be adhered to. But every company is looking for what their next device is going to be. This was very, very straightforward for them because it's taking what they already had and making a smaller version. This was quite a departure, because the Series 5 was made in the UK, in their own factory. This was a device which went immediately to China to be made. They bypassed their own factory. We worked with a company that we've worked with many times since, a company called Infintech, in China—in fact it was in Taiwan in those days—and they did the final engineering and tooling and development on this product. That paved the way, in many respects, for a lot of the work we've done subsequently; not just with Psion but with other people. The formula is that the product is developed in the UK and production engineered in the Far East and manufactured in the Far East. A lot of clients now follow that process. In order to get an imitative product like this to happen, we had to take a lot of control over the engineering of the mechanics. The Far Eastern partners take more control over the way that it's assembled together, the procedure they want to take in terms of assembly order, position of screws, strength of screws, et cetera, testing the drop. The electronic side of things as well.

Weber: These were intended always for a hand-held job. You weren't designing for a lap or were you as well?

Riddiford: They've been used on a lap, yes.

Riddiford: Okay.

Weber: Yes. The touch typing on this one was still possible or borderline?

Riddiford: It's not really ideal. You can touch type, but it's actually probably more two-finger typing. At least you know where the keys are, and it feels like a laptop keyboard, albeit smaller. It's nothing as good an experience as this. Because you can carry it around with you, that's a compromise that you accept. It's a much lighter product and much smaller. This is quite similar to another phase in Psion's history a few years beforehand. You take one product and you turn it into two other products, which share a lot of the same characteristics. Having made this smaller product [Psion Revo], it seemed like there was a market for a bigger product [Psion Series 7 Subnotebook]. David Potter, Psion's chairman, his wife is a journalist, and the target audience was for a journalist. What would a journalist in Year 1999 need in an

electronic device? The notion was that it was a product that you could carry around in a bag. But just like the previous attempt at this kind of notebook or sub-notebook kind of size product, this was intended to be something which you carry around like a book. It has a leather outer cover, and it's got a big rechargeable battery, which allows it to last for eight hours use. It was trying to re-invent a laptop and make a laptop absolutely 100% useable. It was originally intended to have a built-in modem, so that you could, straight out of the box, communicate. Unfortunately, the first version that came out didn't have a built-in modem. The casework was designed to have a space for the modem.

Weber: It's a plug-in modem, yes.

Riddiford: A plug-in modem, yes. This had a very big eight-inch cover screen; touch icons down the sides, in the old Psion fashion, and a very nice laptop style keyboard here; full-size keys. This was again trying to be the smallest product you could get within this kind of format. Because it had a touch screen, we don't need a—

Weber: No pointing devices.

Riddiford: No pointing device.

Weber: Stylus?

Riddiford: No, it's not—we don't have a stylus. Big screen; stop it falling over backwards. We have a hinge which repositions the screen so that it's stable when it's open. For those that used it, it was a wonderful product. If you use this on a plane or on a train or whatever, when you're traveling, because of the long battery life; very good screen, very good keyboard, was a real delight to use. Psion suffered from the fact that third-parties weren't writing enough software for it, and connectivity wasn't as good as it probably should have been.

Weber: For printers or for—

Riddiford: Printers and things were okay. In those days, Psion would provide the printer drivers for it, and they would be sort of like generic printer drivers, rather than the other way around. It was always a little bit complicated to connect with other things. If you wanted to word process or manipulate spreadsheets, it was really, really good device. The sales of this, compared to the other devices, was tiny.

Weber: Hundreds of thousands, not tens of millions?

Riddiford: Yes. I think probably—

Fullalove: A few thousand a month.

Riddiford: Yes, a few thousand a month, yes.

Fullalove: That was £699 as an early product; it was launched in 1999.

Weber: It was not high for a laptop.

Riddiford: But, you see, because it didn't—it was their own proprietary—

Fullalove: It was proprietary. It was a small notebook—

Weber: <*inaudible*>

Riddiford: People would say, "On the one hand I can be running Windows, and on the other hand I've got this. I can't run any of my Windows applications on this. If I want PowerPoint, I can't do PowerPoint on it." Even though it had a built-in suite of applications; they were all right, but they weren't anything like the market leaders out there. If you wanted to do a small amount of things on your own, great product. If you wanted to do stuff in an office and share it, not good.

Fullalove: If you were to write a novel, and you like it to sit it on the arm, on a train, it's a neat way of very comfortably typing on a small device, recording all your thoughts. Journalists and authors, a very good proposition.

Riddiford: Yes.

Weber: It's a limited market.

Fullalove: Yes, it is.

Riddiford: There is still something in that notion; that the legacy applications you have in a laptop and all the legacy stuff—in terms of the number of different ways you've got of controlling a pointer or whatever—was just trying to strip all of that out and seeing actually what you need to get the thing to work nicely. I think there's still an argument that's a strong goal to aim at. Now the interesting thing is obviously this predates the Asus Eee PC, by seven years and it's a much more attractive—dare I say—a much more attractive looking product.

Fullalove: Just say that to Pamela Romera.

Riddiford: Yes. But it's a very similar size. This is a nice product to work with and the Eee PC is a nice cheap product. But—

Fullalove: Flexible product.

Riddiford: Yes.

Weber: There was no web browser though.

Riddiford: There's a web browser.

Weber: Trial.

Riddiford: Yes, it was using—

Weber: Oh, without the modem it was—

Riddiford: Yes, I think it was Opera.

Weber: You had nothing to do with the software user interface?

Riddiford: No.

Weber: Okay.

Riddiford: Interestingly, this came out using proprietary software, to begin with. Then Psion had taken over a Canadian company called TekLogix that made industrial handheld devices. They did a version of this for their own customer base, which ran Windows CE. There was a big storm within Psion to say that we're joining the enemy here.*<laughs>*

Weber: They go to the top scientists.

Riddiford: Yes. They had to keep it very secret while they were doing it. The difficulty with Psion at this period was that Symbian had been started. The software division of Psion that enabled this product [Psion Series 5] to happen was now owned by Nokia, Ericsson, Motorola and Psion. That form factor of display, then became irrelevant, because all of those companies wanted smaller display devices. They weren't interested in this kind of form factor; they just wanted to have smartphone software on a phone-like product. All of the developments that Symbian was doing was on much smaller screens and in the phone space. Producing this product—Psion had to provide its own software team to develop this, away from software, the Symbian. The amount of resources they had was now suddenly very limited. The Symbian team was the ex-Psion software team. It became more and more difficult for Psion to do their own development in software. In some ways, that really led to the fact that Psion's product development slowed down; and also because the notion of a device that wasn't connected started to disappear. Palm was seen to start to own that space, and Psion appreciated, during the development of these products, that a connective device was an incredibly important thing to develop.

END OF INTERVIEW

