An interview with SIR CLIVE SINCLAIR

by Paul Freeman-Sear

PFS: Were you actively encouraged to be inventive at school?

SCS: I went to a great many schools, about thirteen, in fact; my parents circumstances changed, so it varied a lot. One school I was at had a lot of equipment, a machine shop and so on, but that was fairly unusual, certainly at that school, I did a lot more at making things than at other schools. I was always interested in inventing things, particularly mechanical calculating machines and in radio and electronics which was radio to me in those days.

PFS: Do you have any brothers and sisters who are also creative and inventive?

SCS: My brother is an industrial designer and also designs end products and my sister is a psychotherapist.

PFS: Did your parents actively encourage you to go out into the workshop and build new inventions?

SCS: That's not what I did. In fact, I was more interested in the more theoretical side, but anything I wanted to do I certainly had encouragement in.

PFS: What is your company name and how does it differ from the past?

SCS: My company is called Sinclair Research, as it has been for many years, but we work in a very different way now from the way that I worked in the past because I don't want to get bogged down in the management aspect. So what I'm hoping to do in the future is to try and form alliances with companies that will come up with the idea and invent the product say and they take it on. I don't employ a lot of people – I leave that to others. I've got lots of colleagues who I can call upon to form teams for various projects.

PFS: What are your current developments?

SCS: We sell at the moment the Zeta (Zero Emission Transport Accessory), which converts the bicycle to electric power and that is our only product at the moment. We have developed, to the prototype stage at the moment, a unit for wheelchairs because we have a lot of people asking for that. It converts a conventional NHS type chair to electric power to help people push it and it can completely propel the wheelchair.

PFS: What type of battery does it use?

SCS: I'm sorry, it's a new product and I can't tell you. On that particular product, it's not been decided because the prototype uses a sealed lead acid battery but it's possible that we might use Nickel Cadmium, although it hasn't actually been decided.

PFS: And what about the motor, is it conventional?

SCS: I'm sorry, I can't say. All I can say is that it is a highly unconventional solution to the problem and I'm very pleased with it. Other people have tried to solve that problem and come up with some very cumbersome heavy units and this is very neat and light. It is a very nice solution to the problem.

PFS: The Zero Emission Transport Accessory (Zeta) which is sold through the Maplin catalogue (Order code DZ90X – Ed.) **is an aid to cyclists to help them transport themselves around. What type of battery does it use?**

SCS: A lead-acid battery

PFS: What is the range of Zeta, the transport accessory?

SCS: A journey of about 10 miles.

PFS: And it's a suitable aid to cyclists to help them go uphill?

SCS: That's right. It's when you come to a hill or encounter a headwind where it might normally require excessive effort to ride the bicycle and you just push the button and it's an easy ride, as it would normally be on the flat. So it takes the effort out of it.

PFS: How long ago was Zeta developed?

SCS: About three years ago.

PFS: Where is it being sold, other than in the Maplin catalogue?

SCS: Almost all the sales are by mail order. We take advertisements in the newspapers.

PFS: Is it selling well at the moment?

SCS: Yes it is, it's very popular and we've done a survey of the customers that have bought it and there's a very high degree of satisfaction. People use it in the way we've expected and hoped and we are very pleased with it.

PFS: You've been very keen on developing electric vehicles in the past, would you say that you are an environmentalist?

SCS: That's not how I would describe myself, I am an inventor, but as an inventor is concerned with problems and one of the problems is pollution, so I am concerned about pollution. It is an environmental concern that led me to this interest in transport and I do believe that electric transport is the sensible answer to cities – it's just rather a long time coming.

PFS: You're famous for electronic products in the past but have you invented any non-electric or mechanics-only products?

SCS: No, we have not marketed anything non-electric, but I spent several years developing a lightweight bicycle called the X bike. I didn't bring that to market because it didn't get far enough. Again, it's this interest in the pollution problem with the appeal that if anyone could have a bicycle that is as easy to carry as an umbrella say, then you would use it very much more frequently, particularly as it couldn't get stolen because it would be with you all the time. You could take it on the train and it would make a big difference to the degree and ease at which you could use a bicycle – something I would relish having myself. The reason that this is a

difficult problem is that bicycles haven't got lighter for a hundred years. The reason being that most of the weight of the bicycle is not in the frames but in the cranks, chain and heavy metal bits. Remarkably, these are standardised throughout the world, and everybody uses the same bits fundamentally, so the bicycles are not any lighter. The lightest bike you can buy is about 20lbs. So in order to change that, you've got to be very radical and you've got to redesign all the parts of the bicycle – a hell of a big job, which we did with the X bike, and we got the weight down to about 8lbs. But I decided it didn't go far enough, and I have been working on it myself on paper with a second generation which would be very much lighter still.

PFS: 8lbs is remarkably light for a bike!

SCS: Yes, but it's still not light enough, an 8lb umbrella would not sell very well! It one of those things where its a dramatic change, but not a sufficient one. People who like folding bikes would say great, that's a marvellous folding bike because its so light, but they are already using folding bikes so that's not a new market. In order to create a really new market, we have got to change a lot more and that's what I'm working on. That bicycle will be very much more radical even than the X bike when it has a new drive, and so on.

PFS: So have you moved away from using any metal in the next generation bicycle?

SCS: That's an interesting question. Not necessarily, the frame might well be metal on the first one. I would like to use carbon fibre, because that's the obvious material choice. It's not only expensive but it's quite difficult to use in some respects. The weight reduction is achieved to some degree by new materials, but it's fundamental redesign so it can be made in metal and still be light. It's complete rethinking of the whole thing from scratch – every single part and aspect, the drive, the wheels and steering system.

PFS: What sort of time to market is on this very radical change in bicycle technology?

SCS: A few years away yet

PFS: So do you see lots of people say in the city walking around with a portable mobile source under their arm in the future?

SCS: I don't how many there will be, but there will be enough to make a difference. It's not the solution, it's part of a solution – it's one of the elements. The other thing we need is local electric town cars, very different from the ones that are being designed at the moment. I think the trouble is, the ones that are being designed at the moment are really just petrol cars with the engine taken out and electrics put in,and that's a very bad mistake.

PFS: But some are hybrids – diesel with electric drive for about town use.

SCS: A hybrid is quite a good approach I think, and there you would end up with the same sort of body as an existing car. What is really needed, in my opinion, is a car for town use dedicated to local use with around 30 mile range. In which case, it needs to be very lightweight, then it will not need to use batteries and it won't need to be expensive. Then people will use it because it will be cheaper to use than an ordinary

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car we won't have twist their arms to use it they will be dying to use it. Trying to make pure electric cars that have a long range is a mistake because they will not replace the ordinary car – they will not do the same job, because of the charging problem. The thing is not to do that. We need to go down two routes, one is to make local cars which are for just 30 mile range, and a lead acid battery will do for this. The other extreme, if you want a car that is electric in the town but also has a long range, is the hybrid. Alternatively, you want the car with a fuel cell, which will no doubt be used in the next century. So there is very definitely a slot for a new concept of car to us that is an ultra-light one just for local use, and a lead acid battery will meet that need. Of course, if you can use Nickel Cadmium batteries, you will save some weight but the weight for a 30 mile range is not too bad either way.

PFS: No radical change to electric motor design then?

SCS: The electric motor is an extremely good device and does the job well. There are lots of different sorts of electric motor. Recently, there have been a lot of interesting developments. There are some highly efficient ones now, switch reluctance motors, for example, are a very exciting new development.

PFS: Have you any new developments in producing a good, cheap, powerful computer in the future?

SCS: I have got some ideas but again, it is not possible to talk about them.

PFS: What about the silicon wafer technology you were working on a while ago that could reduce the rejection rate at manufacture?

SCS: We put it into production but it was in the recession and the market didn't turn out right, and at the moment, it's on the back burner.

Back to the Future

PFS: In the past, on a television programme, you were quoted as saying that unemployment in the UK would rise dramatically in the long term and most consumer products would be made in third world countries.

SCS: That programme was a long time ago in the early eighties. I said then that there would be a very large rise in unemployment, but that we would get through it and it would decline again. A lot of people would be put out of jobs because of the computer revolution and that is exactly what has happened.

When I gave that talk, 21% of the workforce were employed in manufacturing and I said that would come down to 8-10%, which indeed, it is getting close to now.

We can only afford to pay the high salaries in this country from the manufacturing point of view if we are making things with a very high level of intellectual property involved with the product.

... it's the biggest-selling er in Russia today."

PFS: But doesn't making goods in the emerging countries lead to higher pollution and wasted energy if they are not made locally?

SCS: No, on the contrary. It's more efficient to transport the finished goods than the raw materials to make them. Mostly, we would have to import the raw materials, which would be bulkier than the finished goods. Manufacturing is performed where it's cost effective, so long as China has very much lower pay rate than us, then it will be cost effective to make products there, assuming the cost of transport is not too high than to make them here.

PFS: What is your current interest in satellite TV technology?

SCS: None, we had a company that we sold to SCI that made satellite receivers, but we are not involved in that at the moment.

PFS: How do you see the future of television developing?

SCS: That's very interesting. There's talk of very large numbers of channels – hundreds, in fact. It would be very interesting to see it happen, although I'm not certain that it's very good economics – but who knows? It's very interesting that despite all the satellite channels there are now, the ground base stations BBC and ITV still completely dominate and have an overwhelming chunk of the time; Sky TV has not managed to capture a very large percentage of the viewing hours.

PFS: What is your opinion of the Information superhighway and the Internet?

SCS: As it stands at the moment, rather like CB radio, it is a tremendous hobby for a lot of people – an exciting one. There's a small group of people, professionals, to whom it's a very useful tool, there's a very much larger number of people to whom it's a 'toy' and a very good toy. And I don't disparage that, but it is a toy, nonetheless. It's up against this awful problem of bandwidth isn't it, and I don't know how it's going to be overcome – we really do need the higher bandwidth into our homes. Clearly, that's technically possible at the moment with optical links, but there doesn't seem to be the political will at the moment for it to happen. Without that, the Internet can't really be what we would like it to be, but I think it is an exciting and dramatic development. It's one of things that at 20 years of age, I wouldn't have dreamed of – or didn't dream of!

PFS: But also, Sir Clive, a lot of electronics enthusiasts have turned to computer interests, something which you perhaps started the revolution in cheap home computers with your ZX80 and ZX81.

SCS: Yes, that's right, and that became a big hobby and sucked people away. There was a generation of people that would have dabbled in electronics and then dabbled in computers and now, of course, the Internet is the latest one.

I think integrated circuits have changed things as well, because in the days before integrated circuits, you'd make up a circuit and understand what was happening but if you are just connecting some ICs together, you don't know fundamentally what's happening, so it's taken the fun out of it.

PFS: Would you say that you have made your greatest discovery yet, or is it still to come?

SCS: Oh, it has still to come.

PFS: So, you think you might be even more popular in times to come than with the Sinclair Spectrum computer.

SCS: To design anything that has sold in larger numbers than the Spectrum would be quite a trick. Who knows? I had a letter from Russia the other day, and a chap there thanked me for coming up with the Spectrum, because it's the biggest-selling used computer in Russia today. There are lots of companies in Russia that make Spectrums illegally – not under licence.

PFS: One thing I remember on the Spectrum was the soft rubber keys. What was the original thinking behind using soft rubber?

SCS: Cost and reliability. We had to make the keyboard ourselves – we couldn't go and buy one off the shelves. That was a very cost effective solution. They were a bit wobbly, weren't they? We then tooled up at tremendous expense with the QL and we did a spectrum with hard keys later on.

PFS: Why do you think it is so difficult to get financial backers for innovative ideas in Britain?

SCS: It is certainly much harder than it is in the United States, though it is probably easier than in Europe and is becoming easier, but it is taking a long time for the city to gear itself up to backing high tech. It's a question of change – when I first knew Cambridge, there was virtually no industry at all, now there are hundreds of high tech companies there. As these succeed and people see them succeed, the urge to invest in high tech companies will grow because people will see that there is a quick buck to be made out of investing in the right company. That's what has happened in the States, and I think that's what is happening here now we have a lot of high tech companies starting and flourishing.

PFS: Finally Sir Clive, are you ready to retire yet?

SCS: No, no I don't plan to retire at all.

PFS: Thank you.