

Interview

Tape, Prince, and the Studio: Interview with Susan Rogers 23 May 2016, Cambridge, MA

STEFAN HELMREICH AND PETER McMURRAY

Susan Rogers has lived many musical lives. As a faculty member at Berklee College of Music, she directs the Berklee Music Cognition and Cognition Laboratory, expanding her research in auditory memory, which she began during her doctoral studies with Daniel Levitin at McGill University. She also teaches analogue studio production, drawing on two decades of experience in recording studios. She is especially well known for her years working as Prince's staff engineer (1983–87), a period in which she not only encountered Prince's own unique uses of tape, but also created his now-infamous tape vault. In many ways, the immediate impetus for this interview was Prince's untimely passing on 21 April 2016. In previous interviews, Rogers had already emerged as a lucid commentator on Prince's work first-hand, but that context adds a certain emotional heft to this interview, conducted one month after the pop music star's death.

Just as substantial as Rogers' personal recollections of Prince is her deep understanding of tape as a kind of cultural and material force in the world. Working with tape generated and demanded certain bodily practices, as well as a constant awareness of the labour and limits of tape. For example, her evocative accounts of training the body – what Stefan Helmreich here reformulates as 'a gesticular repertoire' – suggest not only how an engineer (like her) and an artist (like Prince) may have interacted in a studio, but also how their physical gestures were mediated through magnetic tape in tandem with a mixing console and a musical instrument or vocal microphone. The technological 'play' she describes is not unlike that explored by scholars such as Roger Moseley in contexts that, like Prince's work, extend beyond but also engage critically with a more generic 'high' culture. Furthermore, for Rogers, tape is not simply a singular entity, but also a variety of brands and types of tape stocks that have very different qualities, or as she puts it, different 'tastes'. It is a multisensory experience that has left an indelible imprint on how music is recorded today.

SH: How did you start thinking about tape? How did you start playing with it? What did you think it *was*?

SR: I was a kid who grew up loving records. Like a lot of people, there are those who became musicians but that wasn't for me. I think I was drawn to make records – born to be a record-maker. In the late 1970s, I had the opportunity – I was twenty or twenty-one years

Emails: sgh2@mit.edu; mcmurray@fas.harvard.edu; serodgers@berklee.edu

old – to move to Hollywood, which wasn't far from where I grew up, and try to work my way into being some sort of studio personnel. And the way that turned out was just a bit fortuitous. I was a secretary at a little school, a one-room school, called the University of Sound Arts. And I overheard one of those instructors telling a student one day, 'If you always want a job, become a maintenance tech.' And that was a statement that changed my life. I started studying electronics and acoustics and magnetism, and the first book I bought was *Modern Recording Techniques*, which has an in-depth explanation of analogue tape and how it works.¹

SH: I remember that book. I took a recording class with precisely that book in the 1980s.

SR: Mine has fallen apart. I've used it for so many years. It's great. That was my entree, then I went to work for a company called Audio Industries as an MCI console- and tape machine-technician.

SH: So this is pretty obvious – but behind *records*, there was *tape*. How did you think about the physicality of tape as something that was *behind* the records that you enjoyed so much?

SR: There's a bit of a learning curve, especially when you're an autodidact and you're learning on your own. You read about it but that doesn't mean that it makes intuitive sense. So the tape itself was actually rather easy to understand. What took longer was understanding signal flow. How does the sound get there? Then what happens after it *gets* there? And how does it get *back out*? And you can't understand tape without understanding magnetic heads. If you really want to understand that, you really have to understand the principles of electro-magnetism. And you have to understand what on earth we are doing – tape is merely a storage medium, like a hard drive or anything else. Meaning that it is both malleable – you can erase it and write over it, just like a brain – and it is vulnerable to damage. If you have any responsibility with tape whatsoever, you'll need to be aware of that so you can protect it from damage and use it to its fullest capacity.

SH: Did you have favourite kinds of tape?

SR: Oh yeah, we did! Oh yeah. [laughs] I started as a maintenance tech but my first opportunity to actually be a recording engineer who is making these kinds of aesthetic choices was with Prince in 1983 when I went to work with him as tech. And since he gave me the position of engineering, I could choose. So I would choose tape types – just according to what I liked. At that time there was Ampex 456. That had a very smooth sound. And then there was Scotch 250. After Prince, in my independent career, I would choose the Scotch for rock 'n' roll projects because there was a *bite* in the upper mid-range that I liked. The Ampex was a little bit smoother and you'd use that when you want a better signal-to-noise ratio.

SH: What were some of the things that could go wrong with different sorts of tape? There were the things you liked that you thought were the useful affordances of the tape, but there must also have been the cons . . .

1 An earlier edition of David Miles Hubner, *Modern Recording Techniques*, 7th edn (Burlington, MA: Focal Press, 2014).

SR: Sure, there were sometimes systemic problems when a manufacturer would have a bad batch. You can think of tape as similar to, like, Coke and Pepsi and RC Cola and those kinds of things. There's a formula. It's a secret formula. And that formula concerns the mixture of the oxide particles, their makeup, and the binding material, and everything, the glue that holds it onto the backing. So it has to be manufactured in a big factory. *Occasionally* there would be a bad run – there'd be a bad batch. And that would turn users off to that brand until we knew for sure it was fixed. Fewer things would chill your blood faster than getting a perfect performance from a band, playing it back, having no high end, looking over at your machine, and seeing that the oxide has shredded off on the capstan, on the roller-guides, on the heads. You'd *freak* out, you'd call your tape distributor and there you go. You've lost a once-in-a-lifetime performance. And then you want to scrap that whole batch of tape and you'll have to buy new tape. Yeah, so brand loyalty *depended upon* the consistency of the product. Which most of the time, it was. But in the early days, not so much.

SH: So it wasn't just tape as a format, it was tape as a *thing*.

SR: Tape is *definitely* a thing. You'll develop a certain taste, just like you would for a cola. The engineer will develop a taste for tape. But it can be customized and manipulated to the user's choice. For example, biasing a tape machine is a technique that has to be done on every individual channel of the machine in order to improve the signal-to-noise ratio. And what bias does is it applies a high-frequency current to the input signal. And the effect that that has is to *reduce* the high-frequency response and to *lift up* the low-frequency response. It improves distortion and the signal-to-noise ratio. Left to its own devices, if there were no bias, the output of a tape machine would be 6 dB hotter for every octave. So between 20 Hz and 20 kHz there are ten octaves. So that tells you between 20 Hz and 20 kHz, that's 60 dB of gain. You have to level that off somehow. So we add bias – a bias frequency – and it *reduces* the high frequencies, allowing us to use a little bit less low-frequency EQ to bring the low stuff up. But what that means is you can either do the standard bias, which the manufacturer recommends, and get the optimum signal-to-noise ratio, or like many of us, myself included, you can be kind of rock 'n' roll about it and you can either *over-bias* to get that softer high end, or what I did a lot is *under-bias* to get that sizzle on the top end. And when you're doing horns, when you're doing background vocals, if you're doing twelve-string guitar or a high-strung acoustic guitar, you might *want* that *sizzle* on the top end, so you would under-bias a little bit less than the manufacturer recommended. Just to get that bite you wanted. I tell my students at Berklee [College of Music] in the analogue class, it's a lot like dialling in a guitar amp. You don't just buy a Marshall amp or Fender Twin or something like that and plug your guitar into it. You have *all* these options with your tone controls. Likewise with tape and a tape machine.

SH: So tape is like another instrument?

SR: It can be – especially today. Now we don't need to use it for storage, so now we just use it for effects. So the smart engineer today would know how to manipulate the tone of it to optimize its use as a sound effect device.

SH: So that's an interesting parallel with what eventually ended up happening with turntablism, right? This was another case where medium itself became the instrument.

SR: Right.

SH: So you developed all this incredible expertise. What was your encounter with Prince like in terms of *his* relationship to tape – your relationship to tape encountering his relationship to tape?

SR: Prince was, of all the artists I've ever worked with, perhaps the most hands on. Prince would sit behind the console because he didn't have a producer. All he needed was an engineer. And he would EQ and move faders himself. So the engineer's job was to prepare everything for him to give him as many options as possible and have them right as his fingertips. When I met Prince in 1983 – this was August of 1983 – he was already employing the technique of changing the speed of the tape machine in order to affect the timbre. He would change it to half-speed. Typically we worked at 30 inches per second. So if he wanted his guitar to be an octave up in timbre, he would switch the machine down to 15 inches per second, record the guitar part, and then play it back at 30. And you'd get that high, thin timbre that would effectively get rid of the fundamental frequency and just have the upper harmonics. It was called half-speed guitar. When I went to work for him, I showed him how it didn't have to be just [half] – you know, you can use vary speed. It doesn't have to be a whole octave. You have to be able to transpose, which he could do immediately. But you can put a tuning note at the top of the tape. Usually a bass or keyboard, something sustaining a C, let's say. And then you vary-speed it with the output of that tuning note fed into a tuner so you can see what pitch you're in. You know, take it from C down to A, or something, and then record your parts that way. That was *really* effective for backing vocals, really effective for guitar and bass – to get your bass *really* low, *really* funky. You could vary-speed it.

SH: And this was a technique used on 'Erotic City'?

SR: Yeah. When I came to work for him, 'Erotic City' had already been recorded and he was already using that technique. But we used it a lot for other things. And we began using more subtle techniques that wouldn't be that obvious: vary-speeding the machine *up* a little bit to get a lower timbre for the bass, which was fun to do.

SH: So you were really thinking of this changing of tape-speed as a compositional tool?

SR: Right, yes. And we're talking about multitrack tape here, but other techniques that we employed a lot were crossfades in mixing. When you sequence an album back in those days, we would mix to half-inch tape. And you know, you'll play the tail of one song and then let it roll, let it roll, let it roll, and then with a China marker I would mark the end of the tape where we wanted the next song to be cut in. And you just razor-blade edit and you cut the next song end. This is, remember, back in the days of LPs, where 17–18 minutes would fit on a side. So your sequence was *really* important, and you had to sequence it before you went to mastering. What Prince frequently did – and which was really enjoyable – was using three tape machines. We would have Song A on one machine, cued up near the very end of

the song, the fade out. Song B would be cued up right at its head on a second machine. A third machine would be in 'Record' mode ready to go. And then we might have an additional source, like from a turntable with sound effects or something like that, if we wanted another input to be the crossfade between these songs. So you would play Song A, just the end of it. It would start to fade out, fade out, fade out. You hit 'Go' on the turntable, you drop the needle down, then you take the faders on the console, push that up, so here comes your sound effects, and then at just the right moment, you hit 'Play' on the second tape machine, Machine B. That comes in, you pull A down, you pull your turntable down, you bring B up to unity gain, and now you've just recorded this piece that you cut-in between the masters of songs A and B. And you've got this beautiful crossfade. Sequencing was very, very important to Prince and we used that *a lot*. A lot.

SH: Thinking again about tape speed, you used tape speed to develop the Camille persona.

SR: Yes.

SH: And so there's an interesting gender-bending, gender-stretching, gender-compression story there. I mean, using the technology to make a social commentary, to amplify the range of artistic expression.

SR: Yes, exactly. I see what you're getting at. Prince was very happy with ambiguity. And I think his song 'Controversy' describes that really well. 'Am I black or white? Am I straight or gay?' He was fine with having people guess. He was fine with the right answer, he was fine with the wrong answer. He simply enjoyed that *more*. More than – more than . . . facts [laughs]. Which is fine. He's an artist. It's not good if you're a scientist, but as an artist it's fine. He had many alter egos. He was smart enough and accomplished enough to realize that he could create his own competition in the early days of his career. And that a *scene* coming out of Minneapolis would be more interesting than just one guy.

SH: Oh, I see.

SR: No one had ever done that before and I don't know that anyone will ever do it again. So The Time – the band, The Time – was one of his many alter egos. They were funny. They had street credibility. They were smart-ass guys. Vanity Six was another alter ego. They were sexy women. And I suppose for a lot of men that's a *fine* alter ego, [but one] that they probably wouldn't admit having. So he created the first two, Vanity Six and The Time, but as things went along, there were still opportunities for more alter egos. Camille is something that popped up after he had a disagreement with a former Time member, Jesse Johnson. Jesse left The Time and got signed to A&M Records. And Jesse did a record called *Shockadelica* and brought it over to the house one day. This would have been like maybe 1986 or 1987. And Prince was checking out the album and asked him, 'Where is the *song*, "Shockadelica"?' And Jesse said, 'There's no *song*, "Shockadelica". *Shockadelica* is just the name of the album.' And Prince said, erroneously, 'All great records are titled after one of the songs on the record.' Which is completely false. But Jesse said [stammering], 'Oh, no . . . I didn't . . . Uh, I didn't need a song called "Shockadelica".' So Prince sent Jesse packing and stopped what we were

doing and we wrote a song called ‘Shockadelica’ – he wrote a song, we recorded it together. The line in the song was: ‘The lights go off, the smell of doom / is creeping into your living room. / Your bed’s on fire, your fate is sealed / and the reason is Camille. Shockadelica!’ From that song was born this notion of Camille who might have been male, might have been female, it wasn’t really clear – might have been kind of ghostly, might have been kind of humanoid. And he began thinking of a record called *Dream Factory* and a character called Camille that would be an ambiguous gender maybe. So we did some things in a *slightly* high pitch – not double-speed – but a slightly high-pitched voice, and that would be Camille. I have to say that not all of that was achieved by vary-speeding the tape. We had a signal processor called the Publison Infernal Machine [laughter from all] – yeah, I love that thing! That Publison! [laughs more] We used that – I would use that frequently just to get a timbre on the voice that we liked. It was great – it was great at that.

SH: So tape was a way of multiplying personae and producing alter egos, in part.

SR: Yes.

SH: I found this Brian Eno quotation from 1973 in which he writes, ‘It’s just obvious, if you think of what the true function of a tape recorder is – if you think of it as an automatic musical collage device.’²

SR: Hmm.

SH: And I suppose one could think of Prince’s compositional practice – often bringing together very many different genres and styles within one song – as a kind of operation of controlled collage. It seems like so much of the way he did that was about juxtaposing instruments and styles. My question would be: was there any of that ‘controlled collage’ operation that he thought through and that you thought through primarily through tape?

SR: That’s beautiful. I like that imagery. And that brings up an important aspect of Prince in the 1980s. (I don’t know how long he continued this trend because I left him in late 1987.) But in the 1980s anyway, our canvas was limited to twenty-four tracks. He absolutely did not have the patience to wait to synchronize a second machine, which would give us forty-eight tracks. So we didn’t use SMPTE [timecode]. The other thing we didn’t use was automated mixing. We did it by hand. So if you take Eno’s collage notion, now think about having to make a collage within a limited frame. So you can make a piece of music or work of art that’s postcard size, but your gestures are going to be *optimized* for that small canvas. And you can make a piece of art that’s, you know, 8.5 x 11” or a larger frame. When we could synchronize tape machines, the temptation was to just add a second canvas to our painting and expand the painting. An important constraint on Prince’s work in the 1980s was, ‘We’re not making this any bigger.’ The gestures, all the parts, have to fit within this size canvas.

² Geoff Brown, ‘Eno’s Where It’s At’, *Melody Maker* 48 (10 November 1973), 41.

That was another way of going from the materials to the vision. These constraints helped channel his artistic output. So to answer your question about how much did the medium affect his arrangements: a lot! Because he knew in advance there's only so many tracks, only so many parts. And if I want to build up a chorus here, with a lot of voices, I'm going to have to either get a lot of singers in at once, or I'm going to have to track myself many times and then bounce to two tracks and so on. If you want a track for a solo, fine. Do your solo during the solo part of the song, but now you've got blank tape at the beginning and the end, and you can put a sound effect here or a sound effect there. So with each instrument you add, your arrangement is more and more constrained. If you can't get it done with those twenty-four tracks, he would scrap what he had done and redo it. A classic example is the song 'You Got the Look'. That was on the *Sign o' the Times* album. We typically did a song a day, in twenty-four hours or so. But that song: he *never* was happy with the arrangement. So we kept building up, building up, we'd be almost mix-ready – he'd scrap it. And many times we actually changed the tempo of the drum track. He changed lyrics. It took us *days*. It was Thanksgiving – the Thursday, Friday, Saturday, and Sunday. And so if that size canvas, that twenty-four tracks, couldn't effectively hold his ideas, tracks would be erased and more parts added. And *then* you could vary-speed the machine if you decided you wanted your tempo to be faster and slower. I'd have to redo everything because it would be in a different key.

SH: That's so interesting, the metaphor of canvas. And then, at some point, of course, the metaphor wears out and you have to throw the canvas away. You can't put any more on the canvas. And so that brings us to this capacity of tape to be *erased*. Erasability becomes an option – and a compositional tool. And a set of ghostly practices, maybe. Maybe that's rhetorically overselling it.

SR: That's nice, though.

SH: How do you think about erasability?

SR: Ahh. [Sighs, laughs] Those were some high-adrenaline moments, when an artist would be standing in front of you playing a guitar solo. If it was Prince, it was actually pretty easy, because he could replicate his gestures. But many recording artists are ok on stage. But on stage – talk about a big canvas – your gestures disappear into the signal-to-noise ratio, the noise of the ambience around you and all that. On tape, the signal-to-noise ratio is much better, so you've gotta be good. With today's digital tools we can easily fix mistakes. But back then you couldn't. So now let's go back to this scenario: you've got a nervous guitar player right in front of you. You've got a nervous singer out in the vocal booth. You've got a nervous keyboard player. Let's take the guitar player. He's coming along, and he played the solo. Let's say it's – let's give him sixteen bars. [laughs] And at the top of bar 10, made a mistake. But he likes bars 1–8 and he was sweating bullets to get it. So you roll back and now you have to punch in. You have to count. You have to count! He's told you where he wants to go in.

SH: And you want to punch in on the same track?

SR: Ooh, yeah! You have to repair this. And you will now be erasing his prior performance. But when you punch in, the time it takes your finger to hit that – well, you’ll be holding down the ‘Play’ button on most machines, you’ll hit the ‘Record’ button. What’s going to happen is it’s going to trip a relay – a mechanical relay in some machines or an electronic one in others – and that’s going to engage first the erase head, to start erasing what was there. And then a millisecond or two later, the record head will be engaged and you’ll start laying down new material. We’re talking milliseconds here. How’s his timing? If he’s behind the beat and you punch in right on the beat, then there’s going to be a little bit of that old gesture still left. And what if he wanted to go to a different note? Maybe he leans forward, he’s a little bit ahead of the beat. And then you’ve gotta go in a little earlier. So what the engineer had to do – we all got good at it – you have to track that musician like a leopard. You stop breathing, almost. And you internalize what you’re hearing so that you can synchronize your motions to be *just* the right number of milliseconds ahead of theirs. And it’s really a rush when you get good at it. Prince taught me how to do that. And I spent so many hours with him standing *right* in front of me. And we got good at it to the point – you notice my right hand keeps coming up as if I’m about to punch in! [laughs] But that was the gesture. You follow him and he would cue me where he wanted to go in. But after a while I knew him so well that I kind of know. And as soon as his chin would start to go up to say, ‘Here’s where I wanna go’, I would either punch him in at the pickup or right on the beat, where I knew the mistake had been. Because prior to that, I’m *reading* him. I’m reading his performance. I know where he’s turned left or he wanted to go right, so we roll back and I remember that spot. And I’m also counting: uh-two-three-four, two-two-three-four, three-two-three, so I can keep track and I don’t get lost in this solo. It becomes like a performance when you’re working with tape.

SH: Right, so again, tape as an instrument. And then also, you’re painting an amazing picture of tape not only as a material medium, but also as something that, through machines, summons forth a whole family of physical, embodied gestures.

SR: Exactly.

SH: A whole gesticulatory repertoire.

SR: Right. And you started by noting that it’s erasable. It’s that feature. It’s that feature.

SH: And so there’s also fear of erasing. In the gestures themselves.

SR: Oh, great fear! [laughs]

SH: The gesture is both anticipation and terror.

SR: Yeah, and then there becomes hubris and then you feel like you got this. And then the worst, the hardest, was when – sixteen-bar solo, let’s say. He was happy with everything except bars 3 and 4. So getting in is pretty easy. It’s getting *out* that’s really difficult. Here’s where you have to use auditory short-term memory. You have to listen to the part, you have to

count along, you have to imagine what those two bars are going to be like when they're not there anymore. And you know he wants to keep bar 5. So how did we get into bar 5? What's the phrase? How soon do I need to be *out* of record so that we can seamlessly replace this. That's partly what gave analogue engineers their swagger. You get boasting rights if you get good at it.

SH: So in addition to the gestural repertoire called up by the tape machine, you have the tape and the particularities of the speed and the material that then also shape your cognitive and perceptual habits in the studio.

SR: Right. Then there's another factor, and that's how hard you hit it. There's tape saturation and there's tape compression. You had to *know* tape to know how hot to make the level to get the tone you wanted. Another fear-inducing moment is when you're an engineer and you're working with a producer. And let's say you're working with session musicians, those folks who kind of just keep the meter running in the taxi because they're so good. They're going to come in, they're going to get it. Maybe they're getting triple-scale, but it's going to be great. So you're there and you're on input, of course, so they can hear themselves properly. So they're on input, you've recorded the performance, the producer says, 'Great, come on in the room, let's play that back.' You switch to playback and the tones don't sound like at all what they sounded like on input. Of course they don't! That's the beauty of tape! It's non-linear. The input and output don't sound the same. Which is why we have digital recording now, so that we'd have something that sounded the same on input and output. You needed to know the transfer function. You needed to *anticipate*, 'I need to add this EQ, I need to do this on this signal to get *that* coming back, because I know what the tape is going to do.' So you'd beg, just fingers crossed, you hope you get a moment that you can record the band while they're maybe just learning the part or something and then they'll take a bathroom break and you can play it back and you can *check*, how much compression do you have on your snare, on your kick? The whole tone of your kick is going to change on playback. Those were things analogue engineers just needed to – you *learn* from experience. Because you *cringe* if you were wrong. And then the producer looks at you and goes, 'What's going on with the kick? Doesn't sound like that out in the room.' And you're like, 'I know. I know. Give me a minute.' [laughs]

SH: And I gather that there's a lot in the vault that you were instrumental in putting together?

SR: Yeah, there's a lot in the vault. As far as I know, he kept going at that same pace for quite a while after I left.

SH: And what is the vault physically as a thing? Is it a room? Is it a library of tapes?

SR: It's a room. I haven't seen it since the early 1990s, so I'm going to have to go by memory, but it's not that different from this room we're sitting in. It's a rectangular-shaped room, like the size of what might be a large bedroom or something like that. And it's just rows of shelves, utility shelves. And back in those days it was all tapes, it was all two-inch tapes on some shelves, and half-inch tape on other shelves. I assume that it became filled with hard

drives after a certain point and I understand from friends of mine who continued to work for him that he was cataloguing everything. People knew how to get in and pull a tape that he needed, but man, I understand that it was so full at some point in the 1990s – twenty years ago – it was so full that they were afraid they wouldn't be able to get the door open because the tapes were just *stacked* up. It's a lot of material. And bear in mind, he didn't have multiple takes. It's not like one reel was six or seven takes of a certain track. Each reel would have several songs on it. Working at 30 inches per second, you'd get 15 minutes of tape. So that would be three songs, sometimes four songs if it was a short one, on a reel of tape. A lot of stuff. Plus he liked to record rehearsals. I had a recording console and a tape machine hooked up to a splitter snake, which was being fed from the stage at rehearsals. So we could record rehearsals, if he had an idea, wrote a song there, we could capture it, right on 24-track tape. And he liked to record live shows. Not in every city. But in the major cities, there'd be a mobile recording truck there and I'd roll tape and we'd record live concerts. There's *a lot* of that stuff.

PM: So you would tour with him regularly?

SR: I was his full-time employee, so whatever he was doing, I was doing. He was always recording, so yeah, I was on tour with him.

PM: And can I ask how the tape vault came about? What precipitated that?

SR: I came to work for him in 1983 and I wanted to do a great job and we were about to start the *Purple Rain* movie and many tracks for *Purple Rain* had already been recorded. And it was obvious I had a huge responsibility. It was daunting and nerve-racking to be asked for a tape in the middle of the night and not know where it was so one of my first things I wanted to do was to gather everything in one place. And I began doing that. I began collecting it all, wherever it was. And I began calling studios in Los Angeles – Sunset Sound in particular, which is where he liked to work – and saying, 'Can you send me this tape and this tape?' I just wanted to have everything in one place. And then his office staff set me up with a really crude personal computer and I started cataloguing it. Then I got too busy, and it got turned over to someone else. Then it became clear, we don't have space in his home in Chanhassen to hold all this stuff. It needs to be safe, it needs to be protected from tornadoes and floods and all the wild weather changes in temperature that Minnesota has. So we found a document storage facility that was in the neighbourhood. This was while Paisley Park, the studio, was being planned. So all of his tapes were in a document storage facility, locked and catalogued and accessible 24/7. And we kept them there – there were dozens, there would have been hundreds of boxes. Each bin held four rolls of two-inch tape. So the notion of the vault was in place before a physical vault was in place. When we were designing the blueprints for Paisley Park studio, the vault was an essential component down in this basement. And who thought of the bank door, I have no idea. But it's got this big door like a bank or vault door, with the round circular wheel in front. I'm told that he had let go of a lot of employees in 1996 and there was no one there who knew the combination but him. That may be apocryphal or may not be. But at one point I think he might have been the

only one with the combination. Because he'd let everyone go. Who knows how you get into that thing!

SH: Did he like to reach back into the vault pretty far back in time or just more recently?

SR: You know, it would depend on what the needs were. I had mentioned sequencing albums before and album sequences were *really important* to him. Each record – let's say it's a single album, not a double – each single record is going to have, back in those days, between ten and twelve songs on it. It's a foolhardy pursuit – and it's incredibly vain – to think that you're going to release ten or twelve great songs. No writer is. A great song is rare. So every record is built around a kernel, a seed, of three or four in Prince's case, it might be six – really good pieces. The other pieces on that record are chosen to complement the seed. And the seed forms the thesis of a statement. The statement is going to be supported with what you're wearing on stage, and with your look and your hair and, you know, think of the Rolling Stones and think of how they'd change their look. Think of Madonna. I'm sorry my references aren't more current. But think of Lana del Rey [laughs] and how you've got a profile with each record. You do. So the reason we would go back to the vault would be if we were sequencing a record and we needed a filler track that would complement the main songs. So a good artist, anyway, wouldn't take their most recent ten or twelve songs and say, 'This is my album.' You take this seed and then you take whatever else you've got to allow this record, this album, to be a stand-alone work of art. Works of art, I'm told by my sculptor friend – great works of art – should give the consumer a sense of the action that happened just before he encountered it and what's going to happen after you leave it. Think of *Breaking Bad*, the television series. Opening scene of *Breaking Bad* is that Winnebago flying down the desert. They start with action, with momentum. And they know that if you're interested enough, they'll give you the backstory. You'll figure it out. And this is the same thing with albums. You want an album to start with some momentum; you want it to have an overarching gesture that's 45, 55 minutes long. And you want it to end, leaving you wanting more. So a sequence – and the songs that go on an album become really important, if you're trying to build a fan base, if you're trying to build devoted listeners who will come to your records time and time again. And not just say, like many people did, 'Oh, I bought that album but it was terrible, there was only one good song on it.' And that's the kiss of death. That was, anyway, for an artist's career. So yeah, that's why we would go back to the vault sometimes. Other times would be if he's working with another artist, like The Time or Vanity Six, or if – I guess there was Sheena Easton and Chaka Khan and Kenny Rogers and a lot of folks would ask him for a song – he might go back to something unreleased and say, 'Let's pull that up and see what we can do with it and we'll send it out.'

SH: One final thing about reversibility – the reversibility of tape. In Prince's 'Starfish and Coffee', the drums are backwards. What do you think about tape as a material for thinking about time backwards?

SR: That's a *really* fun thing to do. That's a really fun thing to do, to flip the tape upside down and to play something back to front because your timbre, the temporal envelope, is reversed.

So anything that had a sharp attack and a long decay is now going to have a very slow, slow, slow attack and a sharp drop off. It can be convenient for getting timbres and things you want. It can also be convenient for reverse reverb. We did backwards reverb lots of times. That was a really fun thing to do, where you flip the tape upside down. And then, of course, your faders have to be reversed, because what was on 24 is now on 1, and so on. So you have to send . . .

SH: There are ways to make mistakes. [laughs]

SR: So now, if you want a reverse reverb on a snare, which was on Track 3, you now have to send it from Track 22 to the chamber, take the output of that and print it on a track. But it was all in good fun. And it's *completely* unnecessary today, because it's so much easier to do it with a digital tool.

SH: What's been lost with digital tools?

SR: What is happening is that with each advance in technology, we can push the record button earlier and earlier and earlier in our process. In the early days of mono recording, the arranger – let's say it's Duke Ellington – would get the arrangement perfect. Perfect, perfect, perfect. The engineer will get the sounds perfect – the position of the one mic or however many mics he's going to use. And the *very* last thing you did when *everything* was perfect is hit record. Stereo was kind of similar. But once we had 4-track, and once Les Paul invented multitracking and we could stack things, well now you don't have to have the arrangement complete, do you? Now you can do bass and drums and just the basic track, and write the lyrics later. So now you can hit the record button a little earlier in the process, when you just have the basic track. With each advent of new technology, we could hit the record button earlier and earlier. Now people can hit record before they even have an *idea*. And kids do this. They'll experiment with sounds and they'll be recording as a way of *facilitating* inspiration. This to me is one of the most grievous losses. I would like to see recording artists think in terms of the materials to the vision. Start with your materials, start with your ideas, start with your players. And wait! Don't hit that 'Record' button until you've actually got something to say. The same thing with writing or making a painting or something. The same with cooking. Don't just start throwing stuff in the pot – have a plan! Do some experimenting. And then I think you stand a better chance of success.

SH: And it's interesting how the digital recording has this kind of ghost – not a ghost – but a quotation of tape controls, right? You've got the 'Fast Forward' and 'Rewind'. And it's all there but you're not doing *those* things.

SR: You're not actually rewinding.

SH: Right. So it's interesting, this other carry-over that's ghosted into this new technology, which also adds the waveform, which one didn't have with tape.

SR: Oh, I know.

SH: Is that a useful addition, to see the waveform?

SR: Oh, it's great! Yeah. And the playlists and things like that. I've never made a record on digital because I left the music business in 2000. So everything I ever did was analogue. But I've watched the kids at school do it. And *that's* fantastic! For comping vocals, and the great things they can do. It scares me to think that you can have a track with 240 tracks. I would lose my mind if I had to manage that many tracks. I'm used to managing twenty-four or forty-eight. I remember when we'd have two 32-track digital machines and it'd be sixty-four, it would be really tough to work the way I was used to working. I'm talking about mixing now, mixing from tape. But they do it. It's just another way of – a new set of tools that will give you new options. But the imperative is the same: create a work of art.

PM: Can I close with a very different question? In the last year, including before Prince's passing, there was an upsurge of demo tapes that Prince had made, some being sold on Ebay, some just [online] discussion of these demo tapes. Did you ever encounter his demo tapes and if so do you have any insight into how he was making demo tapes even at that stage?

SR: When I was working with him we didn't demo anything. If we were recording, it was for real. So I don't know. It's hard to imagine him demo-ing anything because when he was recording, that's how he was arranging. And if he wanted to change the arrangement, he'd just erase the tape. So it's not like songs existed in a 'maybe' form, unless he still hadn't decided on the arrangement. The song called 'Strange Relationship' went through a lot of permutations before he finally came up with an arrangement that he liked. So I know there's stuff out there – when you say demo tapes – stuff out there that represent not-finished versions, but they're really more like alternative versions. He would in the 1980s, and I suppose in the early 1990s anyways, he'd get a cassette copy from rehearsal or just wherever and he'd drive around and listen to it in his car. We discovered tapes were *missing*, tapes were going missing in the 1980s. And it was a real mystery. It turned out they were going missing at the car wash. He had his dad's old 1967 Thunderbird, a beautiful car, and once a week Duane, his half-brother Duane Nelson, would take it to the car wash to be washed and detailed. And those guys were [laughs] yanking tapes left and right out of the back of that car. There were ways that stuff just ended up getting out there. Who knows how many other tapes were left at a girlfriend's house or just whatever? A lot of stuff circulating out there.

PM: Why would he listen in his car?

SR: It was just a good quiet place where the phone wouldn't ring and he wouldn't be bothered. You know how it is. People like to create in the bathtub, or someplace where you're just in a little bubble away from and insulated from your life. It's really hard to keep the world out of your way when you're a young person who now finds yourself a millionaire and you've got employees. And you've got lawyers and you've got accountants and you've got a record label and you've got managers. How do you keep the world out of your way so that you can think? That was one way. He was good at it.