

# An Incredible New Sound for Engineers

## Bruce Swedien comments on the recording techniques and production HISTORY of Michael Jackson's latest album

by Daniel Sweeney

### "HISTORY" In The Making

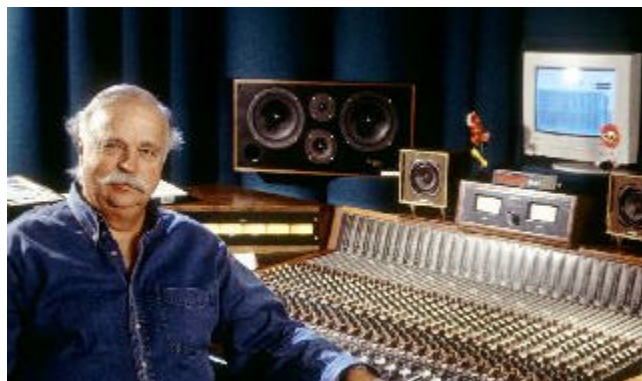
Increasingly, the launch of a new Michael Jackson collection has taken on the dimensions of a world event. Lest this be doubted, the videos promoting the King of Pop's latest effort, "HISTORY", depict him with patently obvious symbolism as a commander of armies presiding over monster rallies of impassioned followers. But whatever one makes of hoopla surrounding the album, one can scarcely ignore its amazing production values and the skill with which truly vast musical resources have been brought to bear upon the project. Where most popular music makes do with the sparse instrumentation of a working band fleshed out with a bit of synth, "HISTORY" brings together such renowned studio musicians and production talents as Slash, Steve Porcaro, Jimmy Jam, Nile Rodgers, plus a full sixty piece symphony orchestra, several choirs including the Andrae Crouch Singers, star vocalists such as sister Janet Jackson and Boys II Men, and the arrangements of Quincy Jones and Jeremy Lubbock. Indeed, the sheer richness of the instrumental and vocal scoring is probably unprecedented in the entire realm of popular recording.

But the richness extends beyond the mere density of the mix to the overall spatial perspective of the recording. Just as Phil Spector's classic popular recordings of thirty years ago featured a signature "wall of sound" suggesting a large, perhaps overly reverberant recording space, so the recent recordings of Michael Jackson convey a no less distinctive though different sense of deep space-what for want of other words one might deem a "hall of sound".

I found the spatial sense of "HISTORY" so unusual, so unlike the dry, closed-in acoustical perspective that typifies popular recording today, that I found myself browsing through the fifty page booklet accompanying the CD in effort to find some hint of how the effects were achieved. Technical data were sparse, but I did note that special thanks were extended to ASC (Acoustic Sciences Corporation) manufacturer of the Tube Trap, a sound control device frequently utilized to control room modes in the lower frequencies. Could ASC have devised some new product for otherwise modifying room acoustics that lay behind the sound of the album? I wondered. I decided to call up "HISTORY's" chief recording engineer, Bruce Swedien to try to find out.

### The Master Speaks

Swedien proved to be surprisingly approachable when I stated the nature of my call. I say surprisingly because his work for top selling artists such as



Michael Jackson, Quincy Jones, Barbra Streisand, Sergio Mendes, Herb Alpert and countless other major recording artists has made him one of the most sought after recording engineers in the world-and one of the busiest. Not unexpectedly, he was occupied with not one but several projects at the time I contacted him, but still he consented to take a good two hours out his crowded schedule to explain in detail just how he captured the acoustic space that pervades the performances on "HIStory". His explanations proved both intriguing and illuminating.

### **The Stage of HIStory**

Yes, Swedien admitted, ASC products did play a prominent role in the making of "HIStory" and in creating the strikingly wide, deep stereo image the recording projects over a high quality playback system. But as Swedien explains it, achieving those effects wasn't just a matter of throwing up Tube Traps in the corners of the room per the usual practice. To be sure, Tube Traps were employed - specifically the free standing Studio Traps which the company has been making for the last several years-but the method in which they were employed was somewhat idiosyncratic and ultimately rested on Swedien's own uniquely personal approach to the whole recording process.

### **"HIStory" Lessons**

By his own estimate, Swedien is both systematic and intuitive-a rare combination-and the course he followed in recording "HIStory" reflects both aspects of his creative personality. In spite of the meticulous orchestration and sheer polish of the finished product-surely remarkable in any circumstances given the complexity of many of the compositions-Swedien claims to have proceeded through the early stages of the album without fixed notions as to its final form.

"We spent a year in the studio on this one, and no, we didn't always begin with firm arrangements," Swedien relates. "Each piece of music, each song, had a life of its own, and each one was done differently. Each kept on growing through the recording process."

But if the collaborative process between and among artists, musicians, producers, and recording engineer was fundamentally unstructured, little was left to chance once the scoring was established and the performances began in the studio. Swedien proceeded from a very well formulated recording philosophy, and every effect included in the production was precisely calculated to be in harmony with that philosophy.

Swedien went on to explain that his overall approach to recording rests upon three basic tenets: The final recording must reflect a "natural balance" of melody, harmony, and rhythm. "Recording shouldn't be subject to fads or styles," he notes. "The correct balance is always the same. Music doesn't change fundamentally."

At the same time, Swedien believes that the spatial perspective-that is acoustical sense of the venue and performers' positions within it-associated with each individual track must also be consistent with the theme of the music.

"I try to avoid a monochrome stereo panoramic presentation. In orchestral recording, I always go for a very wide and dramatic, but accurate stereophonicsterephonic image. For instance, in the pieces with the full orchestra, "Have You Seen My Childhood?" and "Smile", I borrowed an orchestral set-up and stereo miking technique that I used in the 1960's recording some Mahler for RCA Victor Red Seal, with the strings of the Chicago Symphony Orchestra. From the conductors' point-of-view, I set up the first violins on the left, with the second violins on the right side. I set up the violas on the left behind the first violins with the celli on the right behind the second violins. The basses are in the middle to the rear of the room. This approach is just a bit uncommon. I then set up the main orchestral mikes 30 feet above the conductors' head so that these mikes will hear the orchestral balance in the conductors' perspective."

"In recording the lead and background vocals, on some pieces, I had Michael back off from the microphone for a sense of distance, on other songs the vocals are more up front. I try to keep 'em guessing." Finally Swedien insists that the recording be "true stereo".

"I always try to preserve a true stereo image. Most recordings today are what I call two channel mono, and for that reason they don't have much emotional impact. I use a basic 'X-Y' or 'coincident pair' microphone setup in many of my recordings. What I frequently do is to place a pair of my Neuman M49's or my B & K 1006's very close together, and that basic mike set-up then forms the core of the recording. They're so close-maybe a foot or less-that the the arrival time of the sound from the sound source hits the two capsules at essentially the same moment in time. This way there is virtually no phase difference. As a result the sonic image that you get has almost no left/right intensity, but you will get a wide feeling sound field. Also because the arrival of the sound at the two capsules is so close in time there are virtually no phase problems. I use a lot of accent mikes to pick up individual instruments, but that dramatic core of sound is always there."

### Space Explorations

Because the spatiality of Swedien's recordings is so uncharacteristic of popular music in general and so very characteristic of Swedien's own work as exemplified in "HIStory, it's become almost a trademark of his style. And because the sense of natural acoustic space is so startling in the context of a highly layered recording, a recording painstakingly built up over weeks of remixes, the usual reaction of his peers is one of incredulity. How does he do it?

As it turns out, it's a matter both of a broad, coherent approach and of well worked out techniques for various situations.

The overall approach might be termed one of audio verite. Swedien believes that an accurate sense of a



ASC - Quick Sound Field

real acoustical space is an essential component in an emotionally valid recording, and there is no limit to the lengths to which he will go to achieve it. His commitment is reflected in the quality of product. Any ambience or reverberation on his recordings are real; a delicate touch of electronic reverb is used to sweeten relatively dry sound-fields, never to synthesize a space for the entire performing ensemble.

As for specific techniques, several were used, all of them, interestingly enough, involving the deployment of Studio Traps within a large, naturally reverberant space.

"Many of the songs on 'HIStory' were recorded in Studio One at the Hit Factory which is a very big room with extremely good acoustical characteristics," Swedien explains. "It's been fitted with a lot of the RPG devices. Even so I use my own set of ASC tube traps to tame certain nasty little acoustical "Hot Spots" that remain. Without the traps, it's a just a little too bright with a bit of an edge. With the traps, it's just about right."

Swedien continues, "I like that room a lot, it's one of my favorite large recording rooms in the entire industry. In fact, I like it so much that some of the tracks that I hadn't recorded there initially,(like the synthesizer strings on 'Little Susie'), I played back over loudspeakers and then rerecorded in 'Studio 1' to get that big room feel. I love early reflections. They establish the character of the room. They're very difficult to simulate electronically. I prefer to record them in a natural setting rather than trying to synthesize them."

Pressed for more details, Swedien supplied some fascinating specifics as to how he placed mikes, performers, and acoustical accessories within the big room-specifics that reveal him as an unapologetic minimalist within the context of current recording practice.

"I started out doing classical recording for RCA Victor back in the late fifties. [RCA classical releases from that period are considered among the best sounding of all time by many audiophile record collectors.] I still use techniques I learned then, so when I worked with the orchestra in Studio One while recording 'HIStory', I put the 'X-Y' pair of mikes about thirty feet overhead just like I did back in the fifties. But what we didn't have then were Tube Traps, and they're a big part of what I do now. I placed them behind the conductor, like a little army."

Concerning this use of the Traps, Swedien mentioned that at first he tried recording the full orchestra without the Traps, trusting to the natural acoustics of the room. Unfortunately, the sound proved unsatisfactory regardless of microphone positions, and after several takes he hauled out the Traps almost as a last resort.

"The next take was perfect," he relates and adds that by sending the orchestra home earlier than anticipated he saved more money than the entire cost of the Tube Traps.

Swedien's concern for correct spatial perspective also extends to individual instruments and voices, and here again he finds the Studio Traps useful. When working at this level, he places the Traps around the individual instruments establishing a more or less uniform

acoustical space within the circle, thanks to the inherent diffusive properties of the devices (see below), and coincidentally he achieves from a single microphone position something very close to subjectively perceived sound of the instrument in a performance space. Thus way he can refrain from multi-miking a single instrument, thereby avoiding the time smear and image enlargement attendant on the practice.

"They're great on voice, too," adds Swedien. I place them around the vocalist when I record, in fact, I take them with me wherever I go along with my microphone collection so I can be sure of getting the effect I want." Indeed, Swedien used an array of Studio Traps in recording every one of the vocal tracks on the album.

Swedien finds the Studio Traps particularly useful for recording Michael Jackson "because he always dances as he sings even when he's recording." According to Swedien, the acoustic space created by the Traps allows for consistency of sound at the mike regardless of position shifts on the part of the performer.

Swedien revealed another trick he uses in recording Jackson's vocals, a hand-built plywood platform he places under the artist for an 8" elevation off the floor.

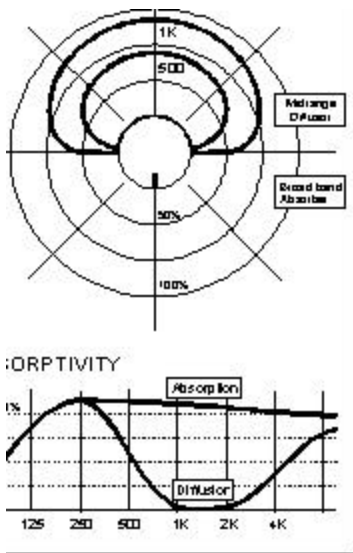
"I originally made the thing for recording drums, but by experimenting I found that it's good for vocals too. It's been especially useful on Michael's projects because I try to make the footsteps part of the rhythm track and at the same time to preserve a natural perspective on Michael's dancing. On this particular project I used the platform in conjunction with the Traps which helped to create a dense pattern of early reflections at the mike."

### **Further Space Explorations**

Fascinating as I found Bruce Swedien's account of the recording sessions for "HIStory", I found myself wanting to know more in a technical sense on how the effects were achieved-in other words, how the room acoustics are actually modified through the use of the Traps. What, precisely, was going on inside the Traps that engendered the remarkable combination of controlled ambience and superb intelligibility and room articulation that shone through on every track of the album? In an effort to arrive at some answers I contacted, Arthur Noxon, the President of Acoustics Sciences Corporation and the chief architect of the Tube Traps in all of their various manifestations.

"What Bruce is doing with trap placement is basically a variation of our 'Quick Sound Field' technique, said Noxon after I'd introduced myself and explained the nature of my call. "Granted it's a little unusual, but it's





valid. You see, here at ASC we find we can learn a lot just by giving master recording engineers a device and letting them work out applications. When we developed the product we certainly didn't envision all of the possible uses."

It pressed Noxon for details on the Quick Sound Field, and obviously eager for an audience, he launched into a lengthy discussion. As he talked, Swedien's recording strategies began to make more and more sense. According to Noxon, the Quick Sound Field is "quick" in two senses of the word.

First it is a means of achieving the desired acoustical properties within a recording or performing space through rapid deployment of portable acoustical devices rather than costly and time consuming structural modifications to the venue. "Think of it as a virtual room of highly predictable characteristics that maintains those characteristics despite widely varying external settings," suggests Noxon.

But if the Quick Sound Field is quick to set up, it's also quick in the sense of fast acting. "The RT-60 time of a quick sound field is typically under a tenth of a second," notes Noxon, "and the group of very early reflections that make up the decay packet are composed of random time offset specular reflections whose occurrence density is about one thousand per second. At that point you have an almost instantaneous and truly diffuse field with no obtrusive reflections or flutter echo."

Noxon proceeded to explain that the success of the Quick Sound Field technique is made possible by the highly unusual design of the Studio Trap, the building block of the Quick Sound Field, and that no other commercially available acoustical device has the requisite balance of acoustical properties.

Essentially hollow cylinders whose walls are composed of densely woven fiberglass, the Studio Traps, by Noxon's account, present impinging soundwaves with a steep pressure gradient between their highly acoustically resistive surfaces and their empty interiors. Such a pressure differential tends to maximize acoustical velocity through the fiberglass which in turn maximizes absorption, so that a wave front loses substantial energy as it passes into the low pressure interior space. (Actual energy conversion occurs due to sheer forces in the boundary layers of the fibers.) And, because the resistive element is dominant, which is not the case with acoustic foam, diaphragmatic absorbers, or even multiple helmholtz bass attenuators, absorption is wideband rather than being concentrated in narrow bands or merely in the treble range.

At the same time, the entire surface of the studio trap is providing bass range absorption, half of the trap is also providing treble range diffusion. The effect becomes clear if the Tube Trap is rotated on axis. As you speak the words "check, check, check, testing one, two, three," the fully absorptive section of the trap sounds perfectly dead as one would expect. Then the surprise. As you come into proximity to the diffusive side of the Trap, the sound becomes bright, fresh, and clear.

"This hybrid acoustic is made possible by the suspension of a thin, precisely weighted, and perforated sheet of limp plastic that covers the front half of the cylinder surface. The properties of the diffusor sheet are such as to make it an acoustical crossover, passing low frequencies into the interior but back scattering high frequencies.

Studio traps are free standing, tripod mounted, height adjustable devices intended for use in the nearfield. Because they are height adjustable they may be used with seated or standing performers. Furthermore, they are easily rotated to situate the perforated, limp mass reflective membrane either toward or away from the sound source.

When the limp mass is facing the source, the effect of the trap is predominantly diffusive toward that source, while when the limp mass is turned away, the trap's effect is primarily absorptive. In effect the trap is an acoustical diode, passing soundwaves in one direction and opposing them in the opposite direction.

By virtue of their dual functionality, absorptive and diffusive, studio traps may be deployed in an almost infinite variety of formations, according to the acoustical effects desired. But in the Quick Sound Field application, the traps are normally placed in a ring around the performer(s) with the diffusive surfaces facing inward toward the microphone. This is essentially what Swedien did in his recording sessions for History.

This arrangement has manifold acoustical consequences:

First of all, a pattern of specularly diffuse early reflections is scattered back toward the microphone, creating a repeatable and subjectively pleasing acoustical signature. At the same time, sound from outside the ring is attenuated by the outwardly facing absorptive surfaces of the traps, providing a considerable degree of isolation-and suppressing room resonances and flutter echoes as Swedien noted.

Finally, sound from the performance passing through the spaces between the traps is subject to some degree of diffractive diffusion which serves to enrich the reverberant field in the overall recording space.

Interestingly, the Quick Sound Field can also serve as a sort of gobo, an application used or endorsed by performers and engineers such as Sting, Gino Vanelli, and Roger Nicholls, among others. When individual Quick Sound Fields are established around each performer, they will serve to control spill to microphones assigned to individual voices and instruments and afford a high degree of isolation just as would a conventional plywood and fiberglass gobo. But unlike the traditional gobo, which isolates very effectively in the treble but has negligible effect at low frequencies, the Quick Sound Field achieves broadband attenuation while imposing a diffuse character on the leakage and thereby rendering it relatively benign.

The effectiveness of the Quick Sound Field in this regard may be clearly discerned on the tracks in "HIStory" with orchestral scoring. Vocals always remain clear and articulate in spite of the proximity of the orchestra.

Because individual traps are completely portable, the ring of traps can be of any diameter and can utilize any number of traps, and this utter flexibility in deployment allows for infinite variability in the pattern of early reflections and the degree of isolation from the external environment. The ring itself becomes a drive control, permitting the session engineer to vary the natural proportion of natural room ambience to the virtual room ambience created by the quick sound field itself. In the case of the "HIStory" sessions, the drive level of the room itself was turned way up by means of a wide, open arrangement of the traps. And for the vocal tracks of Jackson himself, some twenty Studio Traps were set around the eight foot square singers' platform.

There are other benefits as well. One aspect of the Quick Sound Field which endears it to Swedien and other recording engineers who've used the array successfully is the forgiving nature of the Sound Field in regard to the placement of the performers within the space enclosed by the Sound Field. Because of the density of reflections within the Haas effect, differences in the timing of these reflection arising from shifts in microphone position are largely imperceptible.

Furthermore, within Quick Sound Fields of similar composition, there's a very high degree of repeatability and predictability, regardless of the room in which it is placed. Finally, the density of early reflections tends to create a very convincing "sample" of the instrument and to override proximity effects that alter timbre and make microphone setups so ticklish.

And all this ultimately accounts for the enthusiastic endorsement made by Pete Townsend of the Who some five years ago. Townsend was one of the first persons to hear the Quick Sound Field and he quickly put it to use in his synclavier sampling booth at the EEL PIE studios in London.

### **Historical Perspective**

Aha, I thought to myself when Art Noxon had finally finished his oral application note. Now I grasped what was going on in the "HIStory" sessions, and I understood the secret of the remarkably airy, open sound of the recording.

It was all very simple really.

Broadband specular diffusion developing over very short time constants accounted for the amazingly natural voicing of the many acoustical instruments used in the recording.

Each instrument was essentially sampled within its recording space and the resulting sound came uncannily close to what a listener would have heard on the spot. The Traps provided a perspective that could not be achieved by conventional means but which nonetheless resulted in subjectively greater realism.

The expansive hall sound arose from real instruments playing in a room of large dimensions, but here again the Traps played a role by defeating flutter echo and



controlling low frequency modes. In essence the room was helped, but it remained in the equation.

Finally the traps provided a means of combining minimalist spaced omni miking with multi-track production techniques, allowing for both a cohesive, enveloping ambience not possible with shrouds or gobos, and at the same time a precision of localization normally only possible through separate recordings in booths.

When you realize that just one simple, passive acoustical device could produce so many subtle and sophisticated effects, you can't help but marvel. But then simplicity defines Swedien's approach and that's probably what led him to experiment with the Traps in the first place.

After all, he recorded most of the "HIStory" album on his own analog 24 track deck, and he placed a minimum of reliance on electronic processing. Real instruments in real acoustical spaces formed the musical bedrock for the production, and much of the drama of the actual performance arose from the now almost unheard of situation of a singer interacting with a full symphony orchestra. In such an environment the versatile and understated Studio Trap was a natural addition.

So thank you, Bruce Swedien, for sharing your insights, and thank you Art Noxon, for a timely science lesson. It's not every day that one learns something new in the recording business.

## **CLOSING THE CIRCLE WITH THE ATTACK WALL**

Long an advocate of ASC acoustical devices in the recording space, Bruce Swedien has recently come to appreciate them in the control room as well. Swedien became a believer when Art Noxon of ASC showed up at the home studio of Rene Moore, Swedien's co-writer and quickly outfitted the booth with a flying squadron of Studio Traps which Noxon likes to call the "Attack Wall". Swedien professes to be amazed at the results.

"I've never used Traps around the console previously," confesses Swedien, "but I was very enthusiastic about what I heard. The imaging was panoramic, and yet the clarity was phenomenal. I was so impressed that I decided to do the same thing in my own home studio."

During his initial encounter with the Attack Wall Swedien quickly took the measure of the system with the ultimate evaluative tool, his own low generation master recordings. Swedien often travels with a collection of his hits which he uses as a reference for sizing up remote recording locations.



ASC-ATTACK Wall

With the attack wall in place, he found himself re-evaluating the reference. "Suddenly I was hearing microphone placements that I knew I'd used on the recordings but which I'd never heard clearly on any system before. It wasn't a matter of making allowances for differences any more, this was the way the recordings were meant to be heard."

The deployment that Swedien experienced usually involves a dozen or more Traps, depending upon the size of the console. Closely spaced Traps are placed between the speakers, directly in front of console and flanking the speakers on either side, the entire arrangement forming a shallow arc. In addition, a shorter arc of Traps is placed behind the engineer's chair, with spacing between the Traps amounting to roughly a foot.

Front Traps will all have their absorptive halves turned toward the chair, while the rear Traps will alternatively have reflectors oriented toward the chair in deep spaces or away from it in shallower spaces. The arrangement provides an otherwise untreated control room with LEDE characteristics and also supports midbass output from the monitors by providing a virtual soffit loading (Traps only provide pressure relief damping below 100Hz when placed out in the room in this manner). Moreover, undesirable floor reflections are attenuated.

"It's really a midfield more than a nearfield monitoring environment," says Swedien, "but both the spectral balance and the imaging are excellent. I'll be using it a lot in the future."

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