

37 Abbey Road

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I'm Doug Fearn and this is My Take On Music Recording

I've had the privilege to work in some iconic studios over the years, mostly in New York, Philadelphia, Nashville, Memphis, and LA. And a couple in Europe. I have been able to visit quite a few more, and I find every studio to be fascinating.

Of all of them, I put the three days at Abbey Road Studios in London at the top. That was in 2008.

An engineer friend who used to work in my studio in Philadelphia called me one day and asked if I'd like to go with him for a project he was producing at Abbey Road. I just said, "I'll be there."

I had no official duties at these sessions, except to listen and make suggestions. That left me with time to wander around the building and try to learn as much as I could. The producer brought along his own engineer, which meant that the EMI engineer assigned to the sessions also had a lot of free time. I took advantage of that to ask him hundreds of questions, and he was very generous with his time and gave me access to a lot of the hidden treasures in that amazing complex.

First, a little history. The studios were never officially called "Abbey Road" until relatively recently. They were known as EMI Studios. I suspect that informally within EMI they were referred to as Abbey Road.

EMI was founded in 1931, and Abbey Road studios opened the same year. But the EMI company was formed from the merger and buy-out of two early record companies, which dated back to the late 1890s. Along the way, RCA was the majority stockholder for a while, and there was always a close relationship with Capitol Records.

EMI is best known for its musical products, but it was also a pioneer in several other technologies, such as TV, computers, and integrated circuits. In the 1930s and 1940s, EMI developed some of the earliest radar systems. One of my heroes, Alan Blumlein, was an EMI engineer back in that era. He invented an entire stereo system for recording and playback, many aspects of which became commercially successful after WWII, and are still in use today. Tragically, Blumlein was killed in an airplane crash in the early 1940s, while working on the development of an EMI airborne radar system.

EMI also developed the first CAT scanner.

The company ceased to exist in 2012, but some of its components continue in business.

Prior to around 1927, all recording was acoustic. That is, musicians played huddled around a large horn that was mechanically coupled to a cutting stylus of a disk lathe.

Eventually, vacuum tube technology advanced to the point where it was practical to use microphones to drive a cutting head to make lacquer master disks.

It was at this point that EMI decided to build a new studio complex to take advantage of the emerging technology. Prior to that, most recording was done on location, or in small spaces adapted to the requirements of acoustic recording.

When I research the history of EMI and Abbey Road, I find a lot of contradictory information, so I am not sure that some of these details are accurate in detail. I mostly used the sources that seemed most credible, in addition to what I learned talking with people at Abbey Road.

One story that seems reasonable is that the architectural firm hired to design the studios had recently completed an EMI project to build a pharmaceutical plant.

Remember, at this time, there were few studios designed for recording, anywhere in the world.

The Abbey Road project was very ambitious. EMI wanted a studio big enough to record an orchestra, with over 100 musicians, plus a choir of 200 voices. That requires a really big room.

Not only was Abbey Road Studio 1 a huge studio, it was the largest purpose-built recording studio in the world. And it still is.

Studio 1 is about 55 feet wide and over 100 feet long, with a ceiling height that must be 40 feet or more.

More on Studio 1 later.

Studio 2 is the place where many iconic albums were made, most famously, almost all the Beatles recordings.

It's smaller than Studio 1, but still substantially large at 60 by 38 feet, with a 25-foot ceiling.

There is also a smaller studio, number 3, which would still seem rather large to most of us used to working in smaller spaces. It was in constant use while I was there, so I did not have an opportunity to see it.

The studios are located in a posh residential neighborhood – one of the most expensive areas in London. It reminded me of Bryn Mawr, on the Philadelphia Main Line, with large individual houses and fancy brick apartment buildings, along with some churches and medical facilities. But no retail stores in the Abbey Road immediate area.

Abbey Road is a busy thoroughfare, with heavy traffic through much of the day. It is a few blocks walk from the St Johns Wood Underground station. That's how I got there each morning, from Cheswick Park, where I was staying with friends.

The iconic pedestrian crosswalk is a couple of houses down from the studios, and it looked pretty much like the Beatles album cover when I was there in 2008.

Well, maybe with one exception – the never-ending line of tourists who were there all hours, taking pictures of each on the crossing, and paying homage to the place where their idols once recorded. Even in the January darkness and drizzle, there were still fans there, even at midnight.

They leave thousands of messages on the columns at each end of a low brick wall along the sidewalk. Each month, the columns are painted over, ready for the next batch of messages. Pretty amazing, especially considering that the Beatles last recorded there over 50 years ago.

From what I have read, the Beatles were basically sick of each other by the time the Abbey Road album was recorded. They couldn't agree on an album name, so Abbey Road became the only thing they could all accept. And the cover photo was the only opportunity to capture all four of them together.

One of the most famous albums from the 1960s, and its cover photo were default decisions at the time. If it wasn't for that album, the studios would probably still be called EMI Studios.

When you face the building from the street, it looks impossibly small to contain these huge studios. The original home was only three rooms wide, and although it was quite an elegant residence when it was built in 1831, it certainly wasn't a manor house like those we think of from that era and before.

The predecessors of the EMI company chose the property because it had a huge amount of back garden. It goes almost all the way to the next block, a distance of about 250 feet. The property is about 150 feet wide. The neighboring houses are very close. The original house is about 64 feet wide and 45 feet deep, and two stories high.

The house is set back about 60 feet from the road, with a vehicle entrance and exit, and a handful of parking spaces.

It looks much too small to house those studios, but it's like a Tardis – bigger on the inside than on the outside.

The house sits parallel to the street, but the studio complex is at a slight angle, to maximize the available space on the property.

On the first day, I came in through the front door, which had guards and a couple of locked doors before you get to the studios. On subsequent days, we would use a side entrance.

It was a short walk down a hallway to the entrance to the control room for Studio 2. I first noticed that almost-square, relatively small window that overlooks the studio. The studio itself is at ground level, a floor below.

From there, we went down the wooden stairs into the studio. It looked just like what you see in all the photos. Indeed, the room is virtually unchanged since it was built.

Even if you had no idea of the music that has been produced in this room, it would strike anyone with studio experience as exceptional space. Just walking across the maple floor, you could hear just how good this room sounds.

It's big, and not particularly comfortable. It has an industrial flavor to it. Not fancy at all. This is practical working space, and Abbey Road has no need to dazzle you with fancy wood or multiple iso booths.

It's a rectangular box, made of brick. All the studios are. Looking at the brick walls, you realize that these are end-on bricks, not the sideways bricks you normally see. I learned that there are two layers of these end-on bricks, making a wall about 17 inches thick. And those studio walls are within the heavy exterior walls of the building.

With walls like that, the sound does not escape. It all remains within the studio.

This caused me to completely re-think how studios are designed. In most modern studios, there are no parallel surfaces, and there is a lot of dedicated diffusion. In Studio 2, everything is parallel, and there is no diffusion at all except for the stuff in the room.

And there is a lot of stuff in there: three pianos, several Hammond and other organs, along with their Leslie cabinets; rolling racks of folding chairs; other rolling racks with headphones; and a sea of mic stands.

But that stuff only takes up the lowest few feet of the space. Above that there is no diffusion.

For absorption, there are the brown hanging fabric stripes you see in photos. Originally, I was told, they were filled with dried seaweed, but after loud bands starting recording there, the seaweed turned to dust and it was replaced with some sort of cloth batting.

The absorber panels are not very thick at all, and take up far less than half the wall area.

The ceiling is covered with black cloth, in between massive cross beams. I never could get a good answer about the ceiling absorption, which may be because the people I asked really didn't know, or maybe they didn't want to reveal the secret. I have no way of knowing for sure, but I suspect that there are several feet of absorptive material above.

At the far end of the studio, movable panels were built sometime in the 1950s, I think for recording chamber music where the 1.5 second reverb time of the room was a bit too much for the intimate music. These panels are on large wheels and can be moved to block off about two-thirds of the room. It looks to me like the panels are made out of a substance similar to Transite, which was used extensively in recording and radio studios in the 1940s. It is a concrete and asbestos tile, perforated with small holes, with sound absorbing material behind. The panels might also be an early composite material, similar to Masonite. I really couldn't tell and the EMI folks weren't sure.

The panels are hinged and have windows. They can be arrayed in a variety of ways, but you rarely see photos of them in any configuration except along the side walls at the far end of the studio.

I suppose they add some absorption in the vicinity, but the reverberation from the rest of the room is still beautifully obvious.

You would think that parallel walls would be subject to flutter echo, but I heard none. The EMI engineer told me there are some places in the room that they avoid, but I did not find out where those places were. I have to think it is a highly localized phenomenon.

Another interesting feature is the floor. At first glance, it looks like a well-worn parquet floor, set in a herringbone pattern. The wood is maple and light in color, despite 90 years.

I learned that the floor boards are set on edge. In other words, what you see is the edge of a very wide board.

The EMI engineer told me that when the studios were built, EMI still did a lot of location recording, using the primitive version of a remote truck. To outfit and maintain the trucks, they could be driven into the studio. The floor had to be strong enough to handle that weight, so in addition to the floor, which has to be over a foot thick, there are massive beams sunk into the earth below.

And this may be another of the Abbey Road secrets. Under that floor is about a 4-foot crawlspace, and the earth below is mud. The neighborhood has a very high water table, and there is always water or very damp mud under the floor.

I got to see this because the floors in the studios have small hatches to allow access. I did not go down to the mud, but I did get inside there enough to see the construction.

During World War II, all buildings in London had to have a bomb shelter, and under the studio floor was Abbey Road's shelter. It would be a very unpleasant experience to spend a night down there, but the St Johns Wood area never had any significant bombing.

By the way, in the past some of the EMI engineers would drive their cars into the studio to work on them. Surely downtime at Abbey Road is minimal these days.

As I was looking at this construction, I was struck by how similar it was to the Academy of Music in Philadelphia, where I spent a lot of time when I was growing up. Both had massive, painted brick walls, a maple floor, and water beneath. Is this part of the secret to the sound of these rooms? I have no idea, but it is intriguing to think about.

And think about this: most concert halls built in the last century have taken decades of work to make them sound good. Even in the age of computer modeling and a deeper understanding of acoustics, it seems that no hall sounds good on opening night. Some, like Royal Albert Hall in London, have taken over 100 years of modifications to ensure that the room sounds good at the majority of the seats.

So how did the one of the first purpose-built studio complexes, designed at the dawn of electrical recording, manage to get the acoustics perfect on the first try? And with no major modifications in 90 years? It is astounding.

Unlike the studio, the control room for Studio 2 has undergone a lot of changes over the years. It is not a luxuriously large room to begin with, but it was even smaller when first built. It didn't have to be big, because most recording was done with one mic, or, at most, a few mics. The mixer could be small. There was no outboard equipment back then.

When built, all recording was direct to lacquer disc. It would be for at least 20 years before tape became practical.

Disc lathes are very noisy machines, with vacuum pumps used for several purposes in the process. There is a constant hiss of air. Most early studios put the lathes in a separate room, so the engineer and producer could hear the music without a background of white noise.

The engineer in the control room and the engineer at the disc lathe communicated through an intercom. The process required close coordination, because the start of the music had to be timed properly to ensure that the disc recording didn't start too early or too late.

When tape machines came into use in the 1950s, the same room was used for the tape recorders, even though those machines are not noisy like a disc lathe.

The disc mastering now could become a separate process, and it could be done later, in an entirely different room down the hall a couple of doors.

But there wasn't room for the tape machines in the control room, so they continued to be in the adjacent room, run by another engineer. Thus, the term, "tape op."

Now coordination between the two engineers became both less critical and more critical. The music could start with a good deal of tape roll, although wasting tape was discouraged.

But when punching in became a standard technique on multi-track machines, the coordination had to be precise within milliseconds. Rather than just starting, stopping, rewinding, and playing the tape, the tape op now had to be part of the creative process.

Eventually, the need for a separate room was minimal, especially with hard-disc based recording, and the wall between the two rooms was taken down and the control was much deeper. That was how it was when I was there.

But recording to tape was not over. The hallway outside of the Studio 2 control room is about 50 feet long, and all along its length are tape machines ready to go. Just about any machine you could want is there, from 1950s Studers to the last generation of tape machines from the 1990s. Every track configuration you can think of is available, from quarter-inch mono to 32-track on 2-inch tape. There are some oddball configurations, like 12-track on 2-inch tape, and 4-track on 1-inch tape. All the manufacturers are represented, including Ampex, Studer, Scully and MCI, 3M and Stephens.

From the early days of digital, there are Sony and Mitsubishi digital tape machines.

All the machines are cabled to massive multi-pin connectors. Any machine can be wheeled into the control room and hooked up in minutes. Of course, aligning the machine would take a bit longer.

Our session used ProTools, so no tape machines needed.

When booking time at Abbey Road, you specify the mics and outboard gear you want. The selection is enormous. The producer used mostly vintage Neumann mics, U47s mostly, and AKG C12s. We also used Coles 4038s, and some more modern AEA and Royer ribbon mics.

As best I can recall, the drums had an AKG D12 on the kick drum, along with a U47 farther out; a Shure SM57 on the snare, KM84s on the high hat and right-hand cymbals; Sennheiser 421s on the tom-toms; an AKG C24 stereo for the overheads; and a pair of Coles 4038s about 10 feet out for room.

I don't think all the mics were used in the mix, but we had them all recorded, just in case.

Personally, just the Coles room mics would have been my choice for many songs.

Once, during a break while we were setting up for vocals, one of the other players sat down at the drums and starting playing. The sound from the U47 vocal mic, about 20 feet away, through a D.W. Fearn VT-2 mic preamp and VT-7 Compressor, sounded so good, I asked the engineer to record a bit of it. Unfortunately, my copy was saved in some odd compressed format and I have nothing that will play it.

For bass, we took it direct with a D.W. Fearn Passive Direct Box plus an AEA R84 or Royer R-122 on the amp.

We tried a variety of mics on the Steinway grand piano, including pairs of U47s, Coles 4038s, and B&K 4006 omnis. I believe the 4006s were the ones we used.

We set up a U47 and a C12 for vocals. I preferred the 47 but I think the C12 ended up being used. Both sounded great, however, and it was just a matter of taste.

For electric guitar, a stereo pair of Coles 4038s ended up being the preferred sound on the lead parts. The rhythm parts used an AEA R84.

Background vocals used a U47 in omni.

All the vocals were recorded in small baffled areas, with one side of the space open to the room.

The control room had a Neve console and Quested custom monitor speakers, which I thought sounded excellent. The monitor system was one that immediately felt completely comfortable. The engineer mostly used near-field monitors, but he seemed to switch to the big speakers more and more over the three days.

The layout of the control room is a bit odd, with the window into the studio off to the mixer's left side and actually a bit behind him. That's the only way the big Neve console would fit. And you can see in published photos how the room arrangement was changed over the years. A small mixing console could face the window, but there really isn't room for speakers that way.

Along the right wall are racks of outboard gear, but just a few items are permanently mounted. Most of the gear is requested for the session.

In the permanent gear was a Fairchild 660 and a couple of Pultec equalizers, an LA2A, along with some more modern pieces. For this session, we had some of the EMI-built compressors, although we didn't end up using them, along with a couple of 1176s and another 660.

We also had a D.W. Fearn VT-2 mic preamp and VT-7 compressor. I told the crew to pick what they thought sounded best for the project and not to worry about hurting my feelings if they preferred something else. But to my delight, the VT-2 and VT-7 were almost always the choice. We used them on kick drum and snare, piano, all the vocals, and most of the overdubbed guitars, both electric and acoustic.

Studio 2 was also the studio used for the Goon Show in the 1950s. This was a comedy radio show aired on the BBC and most notably featured Peter Sellers. This show greatly influenced Monty Python, and it changed the direction of comedy.

The Goon Show used a lot of sound effects, many of which were made by classic mechanical sound effect devices, and others from recordings made by the studio. You can hear a lot of these wacky sounds in some of the Beatles songs.

The majority of the wind machines, clapsticks, whistles, thunder sheets, gongs, and devices to produce human and horse footsteps, were stored under the stairway in the studio. When I was there, almost all of that paraphernalia had disappeared, but some remained.

I was there in January, and the weather was not cold, but very damp with endless drizzle and occasional showers. Studio 2 has a musty smell, from all the dampness and the mud just below the floor, and it really isn't very comfortable. But you never notice that once you start working in there.

To warm it up and dry it out, there was a very large infrared heater at the control-room end of the studio. It was radiant heat only. The unit had no fans, for obvious reasons. It made no noise at all. I used a much scaled-down version of that type of heater in my studio in the winter. I do not have any dampness, however.

Back in one corner, I found several Leslie speaker cabinets, one of which had been modified by the EMI engineers with an XLR input. Some of the Beatles' vocals were recorded through those.

In addition to the Steinway grand, there was also a very old Steinway grand upright, and a smaller upright that had been modified to sound like a tack-hammer piano. All three of these pianos can be heard on recordings by the Beatles and others.

A feature that puzzled me was a thick, sliding cover on the studio-side of the control room window. It was obviously very heavy, with a pulley and weight system. I learned from the EMI engineer that this was installed during World War II for protection if there was a bomb blast.

The control room and studio are separated by only a single door, directly from room to room. It was obvious when the monitor speakers were muted that there was a lot of sound leakage from the studio.

But there was also a massive door that was held open all the time I was there. This door would improve the isolation significantly. It had weights and pulleys, to make it somewhat less difficult to open and close.

There can be a lot of traffic between the two rooms, so the heavy door would be a real pain to open and close all the time. The leakage through the door really wasn't a problem. Still, I was somewhat surprised by the low isolation.

Abbey Road is noted for its acoustic echo chambers. Even Studio 1 had chambers at one time, despite the long reverberation time of the studio itself

Studio 2 also has a fairly long reverberation time, but at some point, an acoustic echo chamber was built in a small space between the building and the neighboring house. It was surprisingly small, but obviously sounded great, as you can hear on a lot of records from the 1950s and 60s. The room is entirely lined with ceramic tile, very hard and shiny. Three painted concrete sewer pipes are in the space, to provide some diffusion. The pipes are about six feet tall and capped with a concrete disc.

When I was there, a Tannoy speaker sat on a chair at one end of the chamber. No mics were set up, but there were stands and lots of connectors.

It had about an inch of water on the floor and everything metal in the chamber was rusty, corroded, and moldy. It is only used on special occasions these days. Despite its block outer walls, evidently the sound bothered the neighbors late at night.

There aren't too many places to eat in the neighborhood, but the studios have their own canteen. It could probably seat 50 people or so. It has its own kitchen and a menu, although you could order almost anything and the chef would make it if possible.

It is a bright and comfortable space, a relaxing spot after a day in the studio. It even has windows, although it was dark by 4PM in January.

I should mention that the control room was quite comfortable, being on the second floor, and there was always fresh fruit, bottled water, and snacks available.

The hallways of Abbey Road are covered with beautiful black-and-white photos of many of the artists that recorded there. The studio had four staff photographers at the time I was there, out of a staff of 140. I doubt that they have that sized staff today.

As much as I could, I wandered the hallways looking at the photos. None were labelled, but they did not have to be. Almost every photo was of someone famous. And they were in what appeared to be a random order. You might see Mick Jagger next to Pablo Casals, or Frank Sinatra next to David Bowie.

I ran into a couple of guys who were mixing a film score in Studio 1 and we walked along looking at the photos and marveling. It was truly a history of 20th century music, in all genres, arranged in an egalitarian way. There were a few 21st century artists, and I am sure there are many more now, assuming they have kept up the photographic tradition.

Studio 1 is the huge studio. When I first walked in, it reminded me of basketball arena. It really didn't have much that said "studio" about the space.

The room is very reverberant, in a perfect way. The decay is uniform across the audio range, with maybe just a bit of brightness.

This is the studio where many great classical albums were made. But it is also known for the film scores that were recorded there. You can find a partial list on the Abbey Road web site. Among the most successful film scores recorded there are for Star Wars, Harry Potter, and Lord of the Rings.

On older films, you will see "EMI Studios" credited in the closing credits on many films. More recent scores will say Abbey Road Studios. But they were all done in this room.

It's difficult to convey just how big this room is. Fitting a 120-piece orchestra and a 200-voice choir in the studio, and still have room for mics, projectors, movie screens, etc. seems entirely feasible. There are choir risers at one end of the space, but mostly the room was empty when I was there.

Since then, one end of the studio has been modified to accommodate a couple of spacious iso booths.

You can hear the contrast of Studio 2 and Studio 1 on the Beatles Sgt Pepper album. The main theme on side 1 is from Studio 2, and the other version, on side 2, was recorded in Studio 1. The latter sounds enormous, with a very long reverberation time. The first reflections are long delayed. And they baffled the rhythm section as much as possible for that recording.

I would welcome the challenge to record in that space.

The walls have some diffusors, but I would call them token diffusors, since they seem too small to do a whole lot to change the sound of the room. And hanging from the very high ceiling are vertical rows of fabric, added in the 1950s, to no discernable effect, I have read.

Unfortunately, I did not get to see the control room in Studio 1, since a score mix was going on the entire time I was there.

I am still amazed that this studio complex, designed in the 1920s, is still highly prized for the sound of its remarkable rooms. I was told by the staff engineer that the studios have always been profitable since the day they started taking in outside business. The studio fees are eye-watering, but there is no doubt in my mind that this facility is worth every penny.

I feel enormously grateful that I had the chance to work there, even for just three days, and the opportunity to explore the building and ask questions. Let's hope Abbey Road Studios are around for another 90 years.

I've included photos on my podcast web site, dougfearn.com

Find them under "Extras."

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This is My Take On Music Recording. I'm Doug Fearn. See you next time.