

## **A History of Early Rock 'n' Rock Recording**

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Recording technology and techniques have changed the way rock music sounds. This was partly due to the willingness of artists and sound engineers to experiment with recording techniques and equipment. This willingness stemmed from a desire by engineers and producers to give their artists, songs, and record label an advantage over the competition. In rock music, a song is judged by how many records it sells and how innovative it is. In other words, if a song hits number one or influences the way other rock records are made, it has secured its place in history. This gives rock producers and engineers tremendous freedom to incorporate whatever they feel improves their artist's chances of commercial success; therefore, rock 'n' roll is constantly changing and incorporating the latest technology and trends. This makes rock 'n' roll one of the most dynamic and evolving musical genres in the 20<sup>th</sup> century. In essence, producers, artists and engineers are redefining rock 'n' roll every time they create a hit record. This paper will discuss the most innovative people within the recording industry and how they have changed the sound of rock 'n' roll by taking advantage of technologies as they became available. It will start with an overview of technological developments that led to the birth of rock 'n' roll and then look at how specific studios used these technologies to shape its sound.

There were several technological and economic events in the 1940's that led to the development of rock 'n' roll and helped revolutionize sound engineering. According to Mark Chanan in *Repeated Takes*, One economic event was the rise in cost of shellac. This prompted some large labels to pull back from producing and distributing race records such as blues and

country music.<sup>1</sup> They wanted to focus on more profitable types of music like pop music. This left a vacuum in the market that new independent labels such as J & M, Universal, Sun, and Stax records rushed to fill in the late 1940's and early 1950's. These smaller labels were more sensitive to local styles and were actively looking for the next big act to boost their sales. This left them perfectly positioned and open minded enough to capture the new sound of rock 'n' roll as it emerged in the early 1950's.

A major technological development was the invention of magnetic tape as a studio recording medium. According to Michael Chanan in *Repeated Takes*, Magnet tape recording was developed by Fritz Pfleumer in Germany in the late 1920's. It was made commercially available in Germany by AEG in 1934. The tape was manufactured by BASF, a German company, and the recorder was manufactured by AEG.<sup>2</sup> At first, it was a very crude recording system with low frequency response and a great deal of noise in the recording. It was not suitable for professional sound engineering. Magnetic tape was marketed as an office dictation system. As the sound quality improved, the Nazi regime began to use magnetic tape to record Hitler's speeches and broadcast propaganda. This brought it to the attention of the U. S. military during World War II. Military officials noticed that clips from different speeches by Hitler in Munich and Berlin were seamlessly edited together into a single high quality radio broadcast, which was difficult to do with "traditional" equipment. During the invasion of Germany, these tape recorders were captured by U. S. troops and brought back to the United States. A. M. Poniatoff was one of the troops who discovered the German tape recorders.

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<sup>1</sup> Michael Chanan, *Repeated Takes: A Short History of Recording and its Effects on Music* (New York: Verso, 1995), 98

<sup>2</sup> Chanan, *Repeated Takes*, 112.

Upon his return to the United States, he started a small California company called AMPEX. This company produced high quality reel to reel recording equipment. 3M, another U. S. company, manufactured magnetic tape for these machines.

These new magnetic tape machines made it easier for independent labels to get started because they were portable, cheap, easy to edit, and didn't require a great deal of skill to operate. Their portability made it possible to record events in the community and make a little extra money. The motto of Sun Studio was "We Record Anything – Anywhere - Anytime". The recorders were cheap compared to the equipment needed to cut a record directly to disk. For a few thousand dollars an entrepreneur could purchase a tape recorder and start his own record label. These tape machines were also easy to operate because if you made a mistake, you could simply rewind and start over. If a mistake was made on a lath, the record would have to be thrown out and the machine reset. With tape, it was possible to splice together the best portions of several takes to create a single song. It was also easier to master an LP with tape because songs could be spliced end to end and edited to produce the best final product. As a result, magnetic tape became the life blood of rock 'n' roll for the next thirty years.

The next significant development that influenced the sound of rock 'n' roll was Les Paul's invention of the multitrack tape recorder. Les Paul and others had been experimenting with multitrack recording on records for years. The process involved recording the first track on one record and playing that record back through studio monitors while the next track was recorded with it on to another disk. The problem was that as successive tracks were added, the quality of the original track would degrade with each generation of duplication. Les Paul pondered this dilemma over a few drinks with a friend. He realized that if you could simply

mount a second head next the first record head, it would be possible to record in multi-tracks without degradation of the sound quality. According to Mark Cunningham in *Good Vibrations*, he approached AMPEX with his idea and they came up with the first multi-track recorder. Les Paul began producing high quality multi-track recordings that astounded the industry and jumped to the top of the charts. Les Paul said that he was really the only person for years who understood how to use the machine. In *Good Vibrations*, Mark Cunningham quotes Les Paul.

The real fun of the early multitrack recording period for me lasted only about five years. . . I was out there all by myself with no one trying to copy my ideas or follow me. . . I remember walking down a hallway with an engineer and saw a plastic bag over the top of an eight-track tape machine, he recalls. He said, 'Look what you started, Les.' And I saw this machine and said, 'What's it doing in the hallway?' He said, 'what are you gonna do with it?' He didn't think there was anyone else out there that could use it apart from me and Mary.<sup>3</sup>

It took several years for multitrack technology to become widely used. Once it was adapted by sound engineers, the studio became an instrument. In other words, it was possible to create sounds in the studio that were not possible in a live performance. Artists were able to work on a song in multiple sessions instead of a single take. They could create a wall of sound with multitracking and balance the sound of individual instruments in the ensemble.

Another technological development that led to the rise of rock 'n' roll was the availability of high quality microphones. During World War II, the U. S. military purchased a large number of microphones during for their radio broadcasts and live shows to entertain the

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<sup>3</sup> Mark Cunningham, *Good Vibrations: A History of Record Production* (London: Sanctuary Publishing Limited, 1998), 31-32.

troops. These microphones became available as military surplus after the war. They were purchased by independent studios on the cheap. This made it possible for fledgling studios to afford the equipment they needed to compete with large record companies.

Another important development was Neumann's U47 microphone. This was a top-of-the-line microphone that Neumann, a German company, developed in 1947. It was the most advanced microphone of its day. It was capable of recording low and high frequencies with great fidelity and a high signal-to-noise ratio.

The high cost of shellac, the development of magnetic tape, multitracking, and high quality microphones created the perfect conditions for the rise of independent labels and the birth of rock 'n' roll. Many entrepreneurs started record labels around the country to take advantage of this opportunity. They opened their studios in cities where the music was happening like Chicago, Memphis, New Orleans, and Los Angeles. This meant that they were better positioned than the large labels to know what was hot and would sell. According to Michael Chanan in *Repeated Takes*, independent labels produced twenty-two of the top thirty records in 1954. They produced ten of the top nineteen records in 1956 and twenty-nine of the top thirty-four records in 1957.<sup>4</sup>

One of the first labels to take advantage of these innovations was J & M Records in New Orleans. According to Cogan and Clark in *Temples of Sound*, In 1945, Cosimo Matassa opened J & M Records at the age of eighteen in the back of his family's shop on Rampart Street in the French quarter. His father, John Matassa, and Joe Mancuso ran J & M Entertainment, a business that installed jukeboxes in local restaurants. They also sold used records and

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<sup>4</sup> Chanan, *Repeated Takes*, 112.

appliances to the public out of the front of their shop on Rampart Street.<sup>5</sup> It was a natural extension of the business for Cosimo to open a recording studio in the back of the family shop.

Cosimo's studio was primarily used by out-of-town record labels to record local New Orleans talent for distribution. The first label to use Cosimo's studio was Deluxe records in New Jersey. They came to New Orleans looking for rhythm and blues musicians at the famous Dew Drop Inn which was part of the chitlin' circuit. Cogan and Clark wrote that instead of paying extra money to bring the talent to New Jersey, Deluxe paid fifteen dollars an hour to Cosimo and a few bucks to the talent to record in New Orleans.<sup>6</sup> It was cheap and they liked the studio that Cosimo had built. In 1947, Deluxe discovered and recorded Roy Brown's "Good Rockin' Tonight" at Cosimo's studio. In 1949, Imperial Records recorded Fats Domino's "The Fat Man." *Temples of Sound* states that Cosimo used a brand AMPEX 600 tape recorder on this particular song instead of the old fashioned disk cutter. In 1954, Cosimo recorded Little Richard's "Tutti Fruitti" (otherwise known as "Tutti Fruitti, Good Booty") for Specialty Records. The quality of this record is remarkably better than "Good Rockin' Tonight." This is due to improved microphones and better tape machines.

Cosimo's studio was like many independents in the early history of rock 'n' roll labels. Cosimo's studio was primarily focused on the recording equipment and the natural acoustics of the room. In the beginning, most studios used very few tricks such as tape loops, reverb patches, or splices. They simply tried to get the best equipment they could afford and the best room acoustics. Then they recorded live performances in a single take on mono tape. They

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<sup>5</sup> Jim Cogan and William Clark, *Temples of Sound: Inside the Great Recording Studios* (San Francisco: Chronicle Books, 2003), 98.

<sup>6</sup> Cogan and Clark, *Temples of Sound*, 100.

acoustics of the room, equipment, and microphone placement gave each studio a unique sound.

It took one year to build Cosimo's studio. According to a quote in *Temples of Sound* by Jim Cogan and William Clark, Cosimo said

[The studio] was air-conditioned. The room was state of the art, and the reason was because the architect made some effort to get the very latest. The floor was floating, there were double walls, staggered studs. They put noise reduction in the ducts. It had some bass tuning. The room wasn't bad at all. It was tiny, which meant that the primary resonance was high enough so that it wouldn't destroy the low ends. It was carpeted, so you didn't make a lot of noise. It was at the back of the building, which meant you had the front wall, the building itself [to help shield street noise]. Then there was two solid wood doors, and the inner one had solid lead sheeting on it.<sup>7</sup>

Cogan writes that the equipment Cosimo used on "Good Rockin' Tonight" was a Duo Press recorder made by Presto, a New Jersey company, and Telefunken microphones. Cosimo used a Grampion cutter head made in England with a custom built three-input mixing board courtesy of Bill Putnam.<sup>8</sup> The trick with this equipment was to get the loudest recording possible without making the needle jump off the record. That could be tricky if percussion was involved. In order to avoid this, drums were either not used or placed far enough away from the microphone that they would not impact the recording. Once independent labels made the switch to tape, this was

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<sup>7</sup> Cogan and Clark, *Temples of Sound*, 100.

<sup>8</sup> Cogan and Clark, *Temples of Sound*, 98.

not an issue in the recording studio. Needle jump could be a problem in the final mix down to disk from tape. Most of the big recording studios had disk cutting sound engineers who knew how to mix a disk so that it was clear and loud when placed on a turntable without needle jump. One trick of the trade was to boost the treble when the record was mixed to disk. This was necessary because most turntables were designed to suppress the high end of a record to cut down on record hum and needle hiss. The treble needed to be boosted, when mixing to disk, in order to avoid a flat dull sound and overcome treble suppression on the final product.

Many large record labels had their own record pressing plants, and they were willing to press and produce records for anyone as long as they could pay. They also had the expertise to mix the record to disk. This made it possible for independent labels to record and produce their own artists, even if they could not afford their own pressing plant. Often, independent labels would let the large labels distribute the recording, too. This was a slippery slope because exclusive distribution rights could lead to a record label takeover. This is often what would happen in the industry. An independent label would discover a new song or artist and create a hit record, only to find themselves bought out by a major label. It was almost as if large labels used the independent labels to take the risk and do the leg work then buy the artist's contract or the entire record label.

Some record labels went beyond simply mixing their songs for disk. There were often multiple mixes created for each song according to the playback format. It was important to have a mix that would sound good on disk, radio, and tape. For example,



Berry Gordy mixed his recordings to sound good on transistor radio. According to Mark Cunningham,

. . . Gordy made his music for transistor radio, which by 1963 had almost totally replaced the tube format, and it was important to Gordy that Motown's records sounded outstanding on portable radios and in cars. To this end, Gordy invested in a vinyl disc cutting machine and ordered an average of twelve slightly varied mixes of each new title before "auditioning" them on a small transistor radio system in Hitsville's quality control department.<sup>9</sup>

Multitrack recording made it easier to create a variety of mixes because different groups of instruments could be placed on separate tracks and their volume could be controlled separately from the other instruments. Additionally, Berry Gordy invested in the latest equalization equipment. This gave him more control over the bass, middle, and treble parameters of his recordings. It also gave him the ability to create the best mix possible for transistor radio.

Multitrack recording also made it possible to have multiple sessions on the same song with different artists in different cities. For example, Berry Gordy often did this with his Motown recordings. According to *Good Vibrations*, in 1963, Gordy purchased a mansion in Hollywood. He would often go there for Motown recordings and take advantage of Los Angeles session musicians. He used many of the same musicians that Phil Spector used on his

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<sup>9</sup> Cunningham, *Good Vibrations*, 72.

recordings. Drummer Earl Palmer and bassist Carol Kaye were both members of Specter's "Wrecking Crew" and played on many Motown recordings.<sup>10</sup> Earl Palmer said,

My first association with Motown was through two guys, one who is still producing for them now, Hal Davis. We used to do an awful lot of Motown, but we didn't know who the artist was going to be on it. We heard these records and tapes come back and knew it sounded familiar, but we knew we hadn't recorded with The Temptations or with Diana Ross. We were doing a lot of tracks out here (Los Angeles) and two girls by the name of The Lewis Sisters were singing on them . . . in an old ramshackled house behind Sunset Boulevard.<sup>11</sup>

This is a good example of one of the major advantages of multitrack recording. Berry Gordy was able to take his tapes to two different studios, one in Los Angeles and one in Detroit. He was able to get some of the finest session musicians in the business to record for his Detroit label even though they did not live in Detroit. He didn't even have to hassle with the expense of flying them to Detroit, paying room and board, or feeding them. He simply brought the tape to where the musicians were, Los Angeles. This gave him a distinct advantage over the competition. This is not practical with disk recording.

Phil Specter was a major influence on many record producers in the 1960's. He scored over twenty-five top forty hits from 1960-1965. His recording of the Righteous Brothers "You've Lost that Lovin' Feeling" was one the most played records on the radio in the 20<sup>th</sup>

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<sup>10</sup> Cunningham, *Good Vibrations*, 72.

<sup>11</sup> Cunningham, *Good Vibrations*, 73.

century.<sup>12</sup> The sound of his recordings is often referred to as “a wall of sound.” He used a large number of musicians and instruments on many of his recordings. He did not worry about separation of the instruments on a recording. He felt that if the sound of the drums bled over into the horn section, it didn’t matter. Spector felt that when different instruments blend together they create a new improved timbre. His recordings also created a bigger sound because the whole stereophonic field could be heard at once. To get the balance right, Spector spent a great deal of time getting the placement of microphones and volume set just right before he started to record a song. He brought up each instrument and section one at a time until he heard the sound that he wanted. According to many musicians that worked with Spector, this made his recording sessions long and grueling. Sometimes there were even musicians who were not close enough to the microphones to be heard. Spector felt that these musicians contributed to the overall timbre of the other instruments even if they could not be specifically heard on the recording.

Brian Wilson of the Beach Boys brought together the recording tricks and techniques of both Phil Spector and Berry Gordy. He apprenticed with Phil Spector and used his “wall of sound” technique when he recorded “Good Vibrations” and the album *Pet Sounds*. Like Spector, Wilson brought in each musician to get the microphone placement and balance just right before a recording session began. After carefully balancing and recording the instrumental tracks, Brian Wilson bounced them to a single mono track of an eight track tape. This left seven tracks available to mix the vocal parts. It also meant that the instrumental track was second generation and the all important vocal parts were first generation. That is one

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<sup>12</sup> BMI, “BMI Announces Top 100 Songs of the Century,” <http://www.bmi.com/news/entry/232893> (accessed 27 July 2010).

reason why the voices sound so clear and rich. In addition, he used some of Phil Spector's session musicians such as Carol Kaye, Hal Blaine, and keyboard player Larry Knechtal. He also took Berry Gordy's multiple studio technique to the extreme. According to Jim Cogan and William Clark, *Pet Sounds* was recorded between January and April 1966 at United Western Recorders Studio Three, Sunset Sound and Gold Star studios in and around Hollywood.<sup>13</sup>

On "Good Vibrations," Brian Wilson drew upon every trick and technique he knew of to create this song at a cost of approximately \$50,000 to \$75,000. The recording began at Gold Star Studios on February 18<sup>th</sup>, 1966. There were sixteen more sessions at Gold Star, Sunset Sound, Western, and Columbia between April 9<sup>th</sup> and September 1<sup>st</sup>.<sup>14</sup> It was recorded in three layers. The backing tracks were recorded first. Then the strings, Theremin, horns, and wind instruments were recorded next. Finally, the Beach Boys were brought in from the road and their vocal parts were recorded. Basically, it was recorded with studio musicians from Phil Spector's Wrecking Crew with Glen Campbell or Barney Kessel on guitar. Spector's wall of sound technique was employed again with no regard for instrument bleed or separation. Here is Brian Wilson's acid soaked explanation:

All we did was separate the musicians into two different categories: one positive and one negative. I then took the whole thing and crammed it into one. The first part of the record was done exactly like that. There was no real isolation between the musicians. A lot of people thought I was pulling some kind of magic trick, but it really wasn't like that. People were also telling me that I shouldn't be doing a record like this, you know, it was too modern, too long, not commercial.

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<sup>13</sup> Cunningham, *Good Vibrations*, 76.

<sup>14</sup> Cunningham, *Good Vibrations*, 79.

But it was like I had tunnel vision, I had to keep going until I was, was fulfilled. I was very Spector-influenced at the outset of “Good Vibrations.”<sup>15</sup>

Beach Boy vocalist and Guitarist Al Jardine said that he was disappointed with what he heard in the backing track. “I heard flaws in the tracking, EQ changes that I didn’t think belonged there and without the vocals it is very noticeable,” he says. “But it’s really because different parts were recorded at different studios, on different boards.”<sup>16</sup> Despite any flaws, this recording set a new standard for pop and rock recordings by which other songs would be measured.

Brian Wilson and Phil Spector’s recording technique was a departure from what had happened before their influence on the industry. One good example is Norman Petty and his work with Buddy Holly at Norman’s Clovis, New Mexico studio. Norman usually recorded late at night because it was quiet and his parent’s auto repair shop, next to the studio, was closed. He wanted to create the cleanest and most live records in the industry. To this end, Norman liked to record very close to the instruments to create separation and capture their natural sound. For example, he liked to mike Buddy Holly’s guitar at the amplifier and the pick-ups. With this technique, it was possible to hear Buddy’s guitar pick as it raked across the strings. This created an extra percussive sound and made it sound as though the listener were sitting right in front of his guitar. The development of eight track recording technology made it possible to dedicate a microphone to Buddy Holly’s guitar pick-ups. The sound of Buddy’s pick on the strings is very prominent in “Peggy Sue.”

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<sup>15</sup> Cunningham, *Good Vibrations*, 8.

<sup>16</sup> Cunningham, *Good Vibrations*, 82.

The use of an echo chamber was very common in studio recordings. Norman Petty used an echo chamber on Buddy Holly's recordings to create more depth because the close-up mike technique that he used often created a recording that was flat and dry. Norman created an echo chamber in the attic above his studio. He ran speakers up to the attic and placed a microphone at one end to capture its natural echo. He could adjust the amount of echo by moving the microphones closer to the speakers or farther away. Other studios had their own techniques for creating echo. Some used stairwells, air-conditioning ducts, echo plates, spring echo, or commercially available echo chambers.

At Stax records, they used the natural echo of the studio instead of an echo chamber. *Temples of Sound* states that in 1960, Jim Stewart opened Stax records in an abandoned theater in Memphis. It had very high ceilings and the stage floor was slanted toward the audience. He kept the stage curtain drawn to cut the room in half and absorb some of the sound. Since the floor was slanted and the curtains absorbed some of the sound, the studio was asymmetrical.<sup>17</sup> Rooms that are not perfectly square make better echo chambers because the sound waves are less likely to collide with one another as they bounce off the walls and return to the center of the room. Mr. Stewart built a control room on one side of the stage and used the theater's powerful speakers for playback. He used an AMPEX 350 tape machine that he purchased with money from a second mortgage on his sister's home. His first record was "Cause I Love You" by Rufus and Carla Thomas. It sold five thousand copies which brought it to the attention of Jerry Wexler at Atlantic records. Wexler signed Stax to an exclusive distribution deal. Stax later scored hits Carla's "Gee Whiz" and "Last Night" by the Mar-Keys. They also scored hits with

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<sup>17</sup> Cogan and Clark, *Temples of Sound*, 68.

“Green Onions” by Booker T. and the MGs and discovered Otis Redding who was the bus driver for Johnny Jenkins and the Pinetoppers from Macon, Georgia. Jim Stewart was not impressed by the Pinetoppers during their first session at Stax. With forty minutes left in the session, he gave Otis a chance to record a song he had written called “These Arms of Mine.” Otis drove the bus that day hoping to get a chance to record his song.

At Sun Records, Sam Philips had a different approach to creating records. He liked musicians to play loud because he wanted to capture the raw excitement that they had on stage. Sam believed that the dimensions and configuration of his studio acted like a natural compressor to attenuate the excessive volume that the musicians produced. In other words, the loudest sounds were compressed, while the softest sounds were amplified. In order to achieve this, Sam covered the room with asbestos tiles and the floor was cement. He created a V-shaped configuration with the tiles in the ceiling. This created an asymmetrical surface for the sound to bounce off of. Then Sam filled the room with volume until it began to act like a compressor. During the recording, he added echo with a technique called slapback. With slapback, the signal is routed back into the recorder a second time a split second after it went through the first time. This created a very quick tight echo effect. This type of echo works well with loud fast music like rock ‘n’ roll. Sam’s slapback technique can be heard on recordings like “Great Balls of Fire” and Elvis’s cover of “Good Rockin Tonight.”

One of the most influential sound engineers in the early history of rock, jazz, and pop music was Bill Putnam (1920-1980). He was an influential designer of recording equipment and studio acoustics. Temples of Sounds states that in 1946, he started Universal Audio (later became UREI) in Chicago. This company supplied custom built recording equipment to studios

across the country including J & M in New Orleans. Some of his innovations included the modern mixing board, half-speed mastering, and vocal booths. Later, Putnam opened Universal Recording studio above an opera house in downtown Chicago. Universal scored a hit with “Pet o’ My Heart” by the Harmonicats. This song sold over a million records and featured a very unusual and artistic use of echo.<sup>18</sup> The echo was created in a downstairs restroom in the opera house. Bruce Swedein (Putnam’s assistant) said, “Bill would put up a sign saying Wet Paint or Men at Work outside the rest room, so they could use it as a chamber . . . Sometimes they’d be recording, with a speaker and a mic in there, and people would ignore the sign, and you had the sound of a flushing toilet on a take.”<sup>19</sup> This record brought Putnam to the attention of many in the industry and popularized the use of echo chambers.

In 1955, Putnam built a new state-of-the-art studio on South Michigan Avenue in Chicago. According to Swedein,

Those studios were built with some incredible technology. For instance, the studios were built on four or five inches of cork. A cement slab was then floated inside the building that did not touch the walls of the building, and then the wall of the studio was supported by that slab. There was no physical contact between the outer walls and the inner walls. This was all Bill’s design. I think [famous acoustic architects] Bolt, Brannick, and Newman, ‘borrowed’ his designs. A huge studio, about eighty feet by sixty feet, with a thirty-foot ceiling, it had variable acoustics with rotating panels. Magnificent room.<sup>20</sup>

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<sup>18</sup> Cogan and Clark, *Temples of Sound*, 127-129.

<sup>19</sup> Cogan and Clark, *Temples of Sound*, 128.

<sup>20</sup> Cogan and Clark, *Temples of Sound*, 129.



Before Chess and Vee-Jay started their own studios on Michigan Avenue with talent and technical knowledge from Universal, they recorded most of their talent at Putnam's studio. Chess recorded Muddy Waters, Little Walter and Bo Diddley at Universal. Vee-Jay recorded Jimmy Reed, Gene Chandler, Jerry Butler, and the Four Seasons at Universal. Mercury/Verve, Okeh, and One-Derful labels also recorded at Universal.

In 1957, Putnam moved to Los Angeles and started United Western studios, the studio where Brian Wilson recorded *Pet Sounds* and part of "Good Vibrations." The list of artists that Putnam recorded is extensive. He recorded Bing Crosby, the Mamas and the Papas, Frank Sinatra, Quincy Jones, and 250 sides for Duke Ellington, etc... In the late 70's, Bruce Swedein left Universal studios to team up with Quincy Jones. Swedein recorded *Thriller* for Michael Jackson. He was Jackson's sound engineer from 1978 to 2001.

Each of these engineers had his own approach to recording music. They developed their own approach through trial and error and borrowing ideas from other engineers. Their goal was to create a unique sound and a hit record. If they did, the money and artists would flow into their studio. In the early history of rock 'n' roll, engineers had a limited number of resources to achieve this goal. The main resources that were available to them were the studio space, echo chambers, microphone placement, double tracking, multitracking, and slapback. The sound engineers who learned to combine these resources in a creative way changed the sound of rock 'n' roll and influenced the next generation of sound engineers.

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