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Malcolm Chisholm: An Evaluation of Traditional Audio Engineering

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Abstract

The career of longtime Chicago area audio engineer and notable Chess Records session recorder Malcolm Chisholm (1929-2003) serves as a window for assessing the stakes of technological and cultural developments around the birth of Rock & Roll. Chisholm stands within the traditional art-versus-commerce debate as an example of the post-World War II craftsman ethos marginalized by an incoming, corporate-determined paradigm. Contextual maps locate Chisholm's style and environment of audio production as well as his impact within the rebranding of electrified Blues music into mainstream genres like Rock music. Interviews of former students and professional associates provide first-hand accounts of core philosophies, approaches, and equipment preferences. Opposing recording techniques including isolation versus ambience, live recording versus overdubbing, and the overall tolerance of imperfection distinguish the modern and traditional approaches.

Keywords: Malcolm Chisholm, Chess Records, recording industry, analog recording, audio production, recording techniques

Introduction

At 10:57 a.m. on September 5, 1977, a Titan-Centaur expendable rocket provided Chuck Berry and Chess Records with Rock & Roll's first interstellar distribution deal. *Johnny B. Goode*, along with twenty-six other tracks, was engraved onto a gold-plated gramophone record and placed aboard Voyager 1 to serve as a window onto the best of human culture.¹ The record was the work of some of the greatest names in Chicago Blues and early Rock & Roll, but it would have been no more than a fleeting memory if not for the steady hand of a Chicago-based audio engineer named Malcolm Chisholm (1929-2003).² The study at hand argues for Mr. Chisholm as a historical figure whose significance merits recognition in the context of the twentieth-century recording industry. Not only can his impact be linked directly to the birth of Rock & Roll, but his experience allows us to confront core precepts of a traditional form of audio engineering

considered arcane by some modern approaches. This research demands a re-evaluation of the relationship between technological advancement and product quality. To what degree does the widespread belief that “newer equals better” reach from consumer electronics into professional audio? To what degree are artistic concepts like authenticity and empathy under erasure by the countervailing drives toward speed and profit? The purpose of this study is not simply to argue for greater visibility for Chisholm as a major contributor to what has become mainstream popular music, but to recognize a larger paradigm shift through his experience. Chisholm stands within the traditional art-versus-commerce debate as an example of the post-World War II craftsman ethos marginalized by an incoming, corporate-determined paradigm.

Methodology

What is known of Chisholm can be divided into five categories: his recordings; his resume and other personal notes; interviews of him; passing references in books and articles; and the recollections of his family, students, and colleagues.³ Given the fact that the first four of these categories comprise works that have largely been made available either as audio, digital, or print publications, this study adopts oral history as a methodology that allows for access to a largely untapped resource. Personal interviews of former students, colleagues, and family members provide a clear view onto Chisholm’s approaches, techniques, and experiences. Contextual analysis allows us to position this experience relative to historical, cultural, and technological forces acting upon the industry in which he worked. Together, these approaches allow us to recognize Chisholm’s specific contribution to popular music within the larger story of the Rock & Roll era.

The interviews were conducted using a questionnaire organized around three topics: Chisholm’s visibility; his approach and techniques; and his impact on the field.⁴ Respondents were offered the option of telephone interviews (that I transcribed and remitted for their approval) or filling out the questionnaire on their own via email attachment. Ten of the twelve respondents opted for the telephone interview. All interviews were conducted between August 2012 and May 2013.

Biographical Overview

Mr. Chisholm was a Chicago native best known for his work engi-

neering Blues sessions for Chess Records despite also recording some of the twentieth century's greatest Jazz and popular musicians.⁵ An obituary published by the Engineering and Recording Society of Chicago (EARS) reveals a curious, adventuresome type, "a true renaissance man" who added photography, undersea diving, and extensive travel among his exploits.⁶ Looking at his professional career, we can discern three phases. In the first period (1948-1955) Chisholm was a certified electronics technician (ET 1) and licensed radioman with the U.S. Coast Guard and United Airlines respectively. In his audio professional phase (1955-1977), Chisholm entered the recording industry under Bill Putnam (1920-1989) at Universal Recording and developed a wide skill set freelancing for Chess and other Chicago area studios.⁷ His academic phase (1978-2003) represents Chisholm's work as a professor of audio for Columbia College. Our study seeks an objective understanding of Chisholm's work as an audio professional (phase II) by interviewing former students and surviving colleagues, mostly from the period of his work at Columbia (phase III).

Interviews with Chisholm's students from this period show that he was a polarizing figure that weeded out uncommitted students quickly. They also reveal him as a champion of technologies that were rapidly becoming "old-school" in the face of the impending analog-digital divide. Interviewees indicate that Chisholm's successful history with older analog practices made him disinclined toward newer production styles. In the 1980s the program at Columbia reflected the state of the art incorporating MIDI and other computer-aided sound production. Although program administrators recall Chisholm "going along" with the curricular changes reflective of digital technology, most student sources indicate his resistance to it was evident.⁸ As we will show, it should be no surprise if he recognized a reduction in the role of engineer as craftsman in the very innovation of digital technology. Incoming digital technologies progressively meant less time and money spent on audio production as well as replacing people with machines (i.e., MIDI keyboards serving as string sections, drum machines, and so on).

In order to appreciate the terms of Chisholm's professional orientation, it is necessary to have a sense of the general state of the music business over this period, as well as a more specific idea of the development of audio engineering as a craft. Contextual maps will inform our understanding of Chisholm's particular case by revealing mid-twentieth-century audio engineering in terms of its terminology, its technological develop-

ments, and its larger cultural context. Because many of our interviewees knew Chisholm during his final career phase, our ability to understand his core engineering philosophies and approaches (acquired in his middle period) requires an expanded research chronology. Before looking directly at the interviews, let us outline the cultural and historical context informing our findings.

Recording the Rock and Roll Era: 1955-1975

It is important to understand Chisholm's audio career in relation to the larger forces shaping the recording industry. Chisholm's career provides intimate witness to the eruption of Rock & Roll out of marginalized folk genres. The importance of this backdrop is that it allows us to situate the craft of the audio engineer within the larger socio-cultural shifts implicating race, genre, and industry ownership. For their part, the sounds of black R&B arrived in the nighttime hours of the late 1940s and early 1950s to seduce mainstream American youth like a jive-talking pied piper.⁹ By 1953, white teens were the early adopters driving the rise of a rambunctious form of black popular music. The proverbial genie was out of the bottle and there was no way for the conservative 1950s establishment to stem the groundswell of this new sound and the ensuing musical and cultural revolution. From the limited perspective of his work for Chess, Chisholm stands at a sort of cultural crossroads. He was hired by immigrant record label owners to make recordings of southern black musicians that would fuel the British Invasion. The sounds he recorded operated a sort of racial and international translation. They spoke to mainstream youth audiences at home and abroad on topics like sexuality and revolt; topics often swept under the silence of taboo.

Chess and The Rise of the Independent Label

As parents raised on Victorian-era values bristled at the thought of their sons and daughters dancing to this sexually suggestive music, the white-owned music industry was equally ill prepared for the first stirrings of what was to become the Rock & Roll revolution. The conservative track of the major record labels has made them historically slow to respond to new trends in popular music. This is especially evident in the 1950s. After passing on Rock & Roll as a fad, the major labels found themselves playing catch-up from the second half of the 1950s through the 1960s.¹⁰ Initially unable to exploit this explosive new sound, the majors ceded to

legions of upstart labels pushing local talent through a largely unregulated promotions sector. The upstart independent labels used tactics like payola to access radio play and, by the end of the 1950s, the majors had lost about sixty percent of the market-share they had enjoyed at the start of that decade.¹¹ Newer and smaller labels like Chess, Vee-Jay, Modern, and Specialty could afford to gamble on fringe markets. By and large, they gambled and won. The majors regained some initial traction by way of rebranding race music with white artists—most notably through cover songs and RCA’s acquisition of Elvis from Sun. The major labels ultimately recovered through horizontal integration in time to profit from the post-British invasion era groups. But the records that would shape the direction of Rock were independently released.

At this time in Illinois, Chisholm’s fortunes intertwined with Bill Putnam, a luminary figure sometimes called the “father of music recording.”¹² Putnam’s Universal Recording studio had been in Chicago since 1947 and, by the mid 1950s, it was the premier recording studio in the Midwest. Various clients contracted Universal Recording, including Chess Records who made many of their classic Blues sides there before opening their own studio in 1958. By the time Chisholm worked his initial session for the Chess brothers, their label had eight years in the record business. Over that time, the label successfully exploited the electrified sounds of transplant Delta Bluesmen like McKinley Morganfield (a.k.a. “Muddy Waters,” 1915-1983) and Chester Burnett (a.k.a. “Howlin’ Wolf,” 1910-1976). A pair of number-one R&B records by harmonica ace Marion “Little Walter” Jacobs (1930-1968) also helped the label grow.¹³ In 1955, Chess was hitting on all cylinders with some thirty-two singles released and a roster of impressive Blues artists including Chuck Berry, Muddy, Wolf, and Walter, as well as Willie Mabon (1925-1985), Percy Mayfield (1920-1984), and Eddie Boyd (1914-1994).¹⁴ The label was entering into its peak period. As we will see below, engineering these sessions alongside of singer-songwriter and producer Willie Dixon (1915-1992) represents a significant part of Chisholm’s formation as an audio engineer.

In 1955 Chicago, Malcolm Chisholm stands at a unique place and time. His work for Chess would directly solidify the very links between many of these artists and the emerging white, mainstream version of their music that would be known as Rock & Roll. Chess recording artists are cited as major influences to both the Beatles and the Rolling Stones. Not only did Stones guitarist Keith Richards explicitly model his playing on

that of Chuck Berry, the band itself is named after one of Muddy Waters' songs. Legendary Rock and Roll groups who have covered Waters' songs include: Led Zeppelin (*You Shook Me*), The Rolling Stones (*I Just Want To Be Loved*), The Animals (*Louisiana Blues*), The Doors (*Close To You*), and The Allman Brothers (*Trouble No More*). The Chess catalog remains the crown jewel of the Chicago Blues discography. Before Chess sold its facilities to General Recording and Tape in 1969, they provided a platform for Malcolm Chisholm to capture and craft the specific sonic quality of recordings that served as beacons for many of the greatest Rock & Roll bands of the 1960s and 1970s.

Relevant Audio Engineering and Production Models

Referring to the larger context of audio production models in the twentieth century signifies core elements of the “Malcolm Chisholm Sound” validated by Chess, Universal, Dr. Sagan, the Rolling Stones, and many others. Geoffrey Hull divides the history of audio production into three general eras or “models”: the pre-industrial, the industrial, and the post-industrial.¹⁵ While these eras have significant overlap, they present a useful map to organize a century's worth of practice. Hull's depiction of the “industrial model” represents standard practices from the mid 1920s until the mid 1970s. The model is centered on the recording studio conceived as a large, fixed sound lab around which teams of specialists converge in order to arrive at a finished “master” recording. The advent of tape as a recording medium is important enough to subdivide the entire industrial era into two periods: one dominated by disc masters (1925-1950) and a later one dominated by tape (1950–1985). Success in this environment (limited as it is in terms of available tracks and ease of editing) requires talented artists as well as resourcefulness on the part of an engineer who may have to record several dozen musicians, often with somewhere between two and eight tracks.¹⁶ This resourcefulness refers to the craft of an engineer to successfully troubleshoot any problems threatening the session, including electronic repair of any and all related equipment.

Framing this image of the industrial model, Hull provides a “before and after” picture of audio production. The pre-industrial approach is based on an acoustic-mechanical model that spans from 1897 (the opening of Berliner Discs in Philadelphia) up to the advent of electrical recording in 1925. In the pre-industrial environment, recording machines were brought to locations that were convenient to artists such as a hotel room or

warehouse. Simplicity was key: the engineer set up the machines next to the performance and captured the sounds. There was no editing, and only one live take would be chosen for each song.

In the later, post-industrial model, this simplicity is threatened. In part this has to do with the decrease in gatekeepers and the demise of the commercial studio. From the late 1970s to the present day, access to the studio is progressively less regulated by gatekeepers like record companies with the means to pay for commercial studio time. The recording process is democratized due in large part to the advent of digital technology reducing the basic functions of a recording studio to fit onto a laptop computer. In a digital environment, there is virtually no limit to the amount of available tracks. Wires and cables are significantly eliminated, and numerous audio effects are easily available. The knowledge required to properly dial in complex audio equipment of the analog era is conveniently reduced to virtual pre-programmed settings. While MIDI, synthesis, DAW software, and plug-ins made post-industrial production convenient, the lure of its limitlessness opened the door to overproduction and illegal distribution.

In terms of his day-to-day experience as an engineer in the tape era, Chisholm worked either alone or with an assistant engineer to execute the vision of the producer. During the industrial era of audio production, a record company would typically finance the recording session. The company would turn over responsibility and a vision for the finished master to the producer. As the senior engineer, Chisholm would liaise between the producer and the musicians to select and connect microphones, arrange the live space, and ultimately operate the equipment to record and play the performance back for critique. Concerns voiced by the producer may require any number of adjustments in terms of the overall balance, how well each instrument is represented, or in terms of the tonal properties of any given instrument or group of instruments. Once a satisfactory performance is captured, the mixing process (called tracking in today's post-industrial model) is complete barring any dubs, and the engineering process turns toward a final phase called mastering.¹⁷ In the post-industrial model, producers would often shop the final mixes to mastering engineers before selecting the one whose work they prefer. In the case of Chisholm's work for Chess, there is cause to wonder if Leonard and Phil Chess gave him the go ahead to master his own work.¹⁸ With the master in hand and approved, the marketing and promotional functions of the label typically begin and the work of the engineer is essentially complete. The degree to

which Malcolm Chisholm exemplified this theoretical role depends on the contingencies of any one of the hundreds of sessions on which he worked.

Malcolm Chisholm: An Organic Model of Audio Engineering

At this point, Chisholm's profile as an engineer emerges in relation to both the various maps representing audio production as well as the larger cultural forces acting upon the entire recording industry. According to Hull's map above, Chisholm's career fits squarely into the second ("tape") phase of the industrial period of audio production. However, there are strong residual currents from the roots of engineering. Chisholm's resume reveals a multi-talented and active freelance engineer linking the pioneering of Putnam with one of the strongest independent labels of the 1950s and 1960s. We see the importance of his work during this period inasmuch as leaders of the British and American Rock movement later cite the recordings produced as highly influential.¹⁹ What was it about these often raw sounding recordings that captivated the artistic imaginations of these mainstream rockers? In the next section I will argue that part of the appeal of those records is the vital energy, naturalness, and simplicity with which these performances were captured.

So what is the "Malcolm Chisholm Sound" and what steps did he take to achieve it? The interview questions are focused on his approaches regarding both the live room as a performance space as well as his predilections on equipment types and use. Despite his preference of a limited number of microphones and recording equipment, we still find a wide spectrum of sounds he put to tape. A good example of this can be found in the divergent terms used to describe Chisholm's sound. His wife Ann uses the word "clarity," while authors Jim Cogan and William Clark used the term "gut-bucket" (meaning, raw, unpolished).²⁰ Certainly, we are dealing with the subjectivity of perception, but there are other over-arching factors including the pace of technology and Chisholm's own development—both of which vary over time. For example, when Chisholm was teaching at Columbia College, closer to the end of his career, his default recording model was based on how to record a big band rather than a small Blues or rock combo.²¹ The interviews however lead to some of the basic principals that Chisholm developed across his entire audio career before passing them on to his students. These include live room setup and a counterintuitive evaluation of both microphone bleed and performance errors.²²

Professionalism and Setting up the Live Room

Regarding Chisholm's approach to the "live room," the interviewees speak to issues of overall room size, acoustics, visibility, and issues related to the experience and comfort of the performers. Gil E., Jeff M., and Harrison C. all recall Chisholm's views on room size. "Big enough to throw a football pass, twenty to thirty yards in its longest stretch, with high ceilings" recalls Gil E.²³ Harrison C. also provides a rationale: "A big room like Abbey Road gets better isolation because the sound that does come back (i.e., reverberate) has lost so much of its energy, as a result of the distance traveled, that the amount of bleed into another microphone is negligible."²⁴ While a dozen engineers would likely have a dozen different opinions on this point, it reveals Chisholm's approach to be tolerant of a certain amount of noise. But what is the trade-off? Why accept unnecessary noise if quieter recordings can be achieved? As we will see below, interviewees indicate Chisholm's ideal for a performance that closely resembles a live show in its natural comfort and energy.

Attending to the artists' experience is an issue addressed by multiple interviewees that also has implications for the live room setup. Gil E. reports, "Everyone was set up in the same room, including the vocals. [...] I recall Malcolm emphasizing a need for the musicians to see and hear each other." Jeff M. adds, "Malcolm was big on the musicians not wearing headphones, if they needed foldback (monitors), give them a little and it would be OK." Harrison C. communicates the philosophy underlying this point:

Set them up as if they are playing a gig, and then you go from there. A band plays in a room, not a box. They play to and with each other. You could call this organic, I call it traditional.²⁵

This approach is certainly not new, but it has been marginalized in the post-industrial era. It is a traditional setup that produces a natural or "organic" sound of a group playing in a room. This may seem overly simplistic, and it should. This is in contrast to the post-industrial era in which engineers like to isolate each instrument in a different room. With several tracks and processors for each instrument, there is an increased chance for the collective sound of the group to get overshadowed by, or lost in, the complexities of overproduction.

The modern distinction between mixing and tracking was another theme in the interviews. In order to more clearly see operating in the earlier environment, it is important to preclude this distinction. Operating efficiently and professionally under time pressure is an overarching lesson that makes sense in the industrial model since studios were hired by the day or even by the hour. Jeff M. shows how Chisholm's insistence on efficient setup counterbalances protracted concern for the artist experience: "He didn't do a lot of production; he wanted to be up and running fast. How long to get a drum tone? Thirty seconds..." This is echoed by Harrison C., "Our assignment on the last day of class was to mix a sixteen-track, four-minute piece before it played out. The channels were unmarked and had to be memorized. It taught me to get the mic in the right spot, then mixing is a breeze." In other words, Chisholm's model does not distinguish between tracking and mixing.²⁶

Microphones and Bleed

With respect to Chisholm's recommendations on equipment and its use, interviewees addressed component types and brands, microphone types and placement, the related issues of bleed and isolation.²⁷ A common point addressed by many of the interviewees was the implications posed by recording a group live in the studio. Essentially, it throws out the post-industrial distinction between tracking and mixing. Setting up all instruments in the same room results in the process of mixing taking place before the record button is pushed. The mix is in the microphone placements because of the signals blending together. As such, Chisholm's engineering model requires a positive evaluation of bleed. A common example of this phenomenon would be when the sound of the drummer ends up entering (i.e., "bleeding into") the vocal microphone. By contrast, the post-industrial model offers a negative evaluation of this phenomenon. It moves to stop such bleeding by isolating instruments in order to make edits easier as in repairing errors in the artists' performance.²⁸ However, "Malcolm has a different evaluation of bleed," Gil E. recalls:

He presented it as something that glues the sound together. He believed it brought excitement to the record. When a band plays hits together, the bleed reinforces the cumulative effect of that shared energy.²⁹

Jeff M. recalls Chisholm approaching bleed “as part of the naturalness” of the performance he wanted to capture. Harrison C.’s recollection frames bleed in terms of a “common shared energy,” stating simply, “I record energy.” To allow for the circulation of that energy, former students reported that Chisholm did not rely on baffles or “gobos” (go-betweens or large panels to isolate noise sources from one another in the live space). Harrison C. goes on to state that at most, there may be “some little gobos around the drums, something like the cover of the Buzzcocks album *Singles: Going Steady*.” Interestingly, Nigel K. recalls increased use of “gobos” by circa-2001. In the context provided by our study, we see this shift not only as evidence of Chisholm’s versatility but as a suggestion of his accommodation of the modern approach common to the post-industrial model in place at Columbia College.

So how can the term “organic” enlighten a modern understanding of audio engineering? As we have seen, Chisholm’s model was based on the simplicity of the earliest recording practices: few tracks in the service of the musicians performing live as a group. He applied this simplicity to what Hull dubs the “industrial” model of audio recording. It is a sort of pre-industrial/industrial overlap not unlike remote recording. Only this time, rather than bringing the recorder to the show, you bring the show to the recorder. In other words, the studio setup should resemble a live performance atmosphere (to a reasonable degree) given the importance of the studio in the industrial model. The fact that Chisholm championed this simple model as the industry was favoring greater complexity works by way of contrast to make his sound stand out. At its core, Chisholm’s version of late industrial engineering invites us to see the performers as a single, living, breathing, and bleeding creature whether a fifty-piece orchestra or a four-piece jazz combo. In contrast to the trending digital technologies, Chisholm’s traditional approach is more oriented towards capturing a musical performance than generating a virtual facsimile of one.

Furthermore, the organic approach celebrates the creativity of the performers more than that of the engineers and producers on the other side of the glass. Reducing the amount of intrusiveness represented by the studio (and its representatives) favors the naturalness of the performance itself. There is none of the experimental engineering associated with the later Beatles records. Allowing the musicians to self-regulate in terms of their level (as opposed to asking or telling them what to do) is an example of this philosophy.³⁰ Another is recognizing the bleed between microphones

as a sort of vital interplay where energy and excitement passes between the internal parts of the living ensemble. The organic model encourages the recognition of musicians as parts of the same larger body. Chisholm taught his engineers not to sever those body parts but to encourage them to play together without modifying their natural ability to hear each other (headphones) or to see each other (isolation or sight-line restrictions).

Discussion and Conclusion

The relationship between Blues and Rock & Roll has been an overarching area of research for me over the last several years. My choice of this particular research paper comes in part from the recognition of Malcolm Chisholm as an important yet lesser-known player in the larger history of twentieth-century U.S. popular culture. Having grown up with his recordings as my impromptu textbooks for learning how to play and appreciate Blues music, these records and their place in the larger history of early Rock & Roll are subjects I have come to value both as a musician and a scholar. My decision to interview Chisholm's former students and associates was driven by some personal motivations, including the inability to fulfill my desire to meet or work with this figure I have grown to esteem. While my choice of questions is generally oriented toward the lack of scholarship on Mr. Chisholm, my evaluation and interpretation of the responses is colored by a strong appreciation for his work. In particular, my bias works to associate Mr. Chisholm's approaches and techniques with both the performances as well as the larger history of race, oppression, and voice all working to make many of these recordings so poignant.

Some of the work of this project has been to correct that bias and return to objective truths, locating them within shared reference points such as histories and conceptual maps. In this respect, I am reminded of Chisholm's adaptation of the famous fourteenth-century "razor" of William of Ockham. Chisholm used the acronym K.I.S.S. (standing for "Keep It Simple, Stupid") to apply Ockham's idea that the simplest approach to a phenomenon is usually the right one. This dictum resonates in various ways throughout these interviews of industry professionals who had been his students twenty or thirty years ago. Speaking of Chisholm's criticisms of digital technology (drum machines, synthesizer-instruments in the place of "real" ones), Scott Greiner observes:

While I sometimes found this dismissal of new techniques frustrating, every ounce of session wisdom he bestowed on us is still relevant today. Perhaps even more relevant today with the amount of nonsense and technical distraction available to us. Just because you can, doesn't mean you should.³¹

This strong point speaks clearly to the changing dynamic of how the same techniques are evaluated at different points in time. Chisholm's techniques were a matter of current practice at the time of his professional practice, but they were perceived as uninteresting and obsolete by the time he was teaching. From today's perspective, some thirty years into post-industrial recording, the older approaches regain their appeal for a variety of reasons. The true reach of Chisholm's shadow falls well beyond the commonplace music industry issues like trends, novelties of product differentiation, and the nostalgia cycles. The basic philosophy revealed by his approach is nothing more than realizing the ideal of faithful transparency: the successful engineer measures the limits of audio to recreate the performance or event as it was. This approach translates to the product itself—the term “hi-fi” or “high fidelity” started appearing on records in the 1950s. A “high fidelity” recording is one that is close to the original, like a transparent pane of glass through which the original may be clearly perceived. Spend an evening alone with Chisholm's recording of Ahmad Jamal's *Live at the Pershing* and it is not hard to see yourself in that Chicago hotel back in 1958.

Finally, let us underline the distinctly human dimension of audio engineering according to Chisholm. He discusses learning how to engineer the low-brow Blues sessions under the guidance of Chess Records' songwriter, producer, and bass-player, Willie Dixon.

With the assistance of Will Dixon, who would occasionally tap you on the shoulder—a sensation not to be forgotten easily—I learned about Blues rapidly. He trained his own engineer as it were. It got to an ideal situation where we didn't have to talk to each other.³²

The relationship Chisholm shared with Dixon reveals an essential, nearly telepathic quality to his apprenticeship recording Blues. This passage sig-

nifies the close friendship developed between Chisholm and Dixon as an ideal situation in which their tastes coincided to the point where Dixon did not need to verbalize what he wanted. Speaking of the “working standards” imparted by Dixon, Chisholm elucidates a key, human dimension to his own sound:

Will had pretty strict standards and would not put out a record *without* a mistake (emphasis mine). If the master take is perfect, Will has been known to do another take. I suspect [...] that it may be a trademark and I wouldn't be amazed if Will thought that a record should have, somewhere, a mistake in it to prove that it was played by human beings.³³

This seminal trademark, passed across the socio-cultural borders that would have otherwise separated Dixon and Chisholm, provides an overarching orientation to the career of the disciple. There is empathy in the preservation of the error as a specifically human quality; it makes the art human as well. It insists on the status of music as a form of human expression by requiring some small imperfection as a certificate of authenticity. Such an understanding refutes the virtual perfection of the post-industrial environment in which computer algorithms work to replace the craftsmanship of a trained audio engineer. As a result, Malcolm Chisholm is an important exemplar of an engineering ethic oriented towards capturing the excitement of a living, breathing, and bleeding ensemble, playing live in the studio. If the excitement of the performance is great enough to fracture the perfection of the arrangement, it is a keeper.

APPENDIX

Interview Respondents

The pool of interviewees consists of fifteen individuals including one family member (Chisholm's wife, Ann), two academic colleagues (Barney K. and Chris J.), four professional associates (fellow engineers and producers Demetrius B. and Peter K. as well as former Chess associates Ernest B. and Fareed M.), and nine former students, nearly all of whom have continued in the audio production industry and some of whom also became audio instructors. These students worked under Chisholm between 1983 and 2001 at what is now called the Audio Arts & Acoustics department at Columbia College in Chicago. The former students interviewed for this study include Gil E., Harrison C., Irwin G., Jeff M., Karl D., Lewis S., Mark U., Nigel K., and Oscar W. I was able to expand the contact list through the initial input of Barney K. and Gil E. who then referred me to others, and so on.

Endnotes

1. "Voyager Mission: Fast Facts," *NASA, Heliophysics Division*, accessed April 27, 2013, <http://voyager.jpl.nasa.gov/mission/fastfacts.html>.
2. Fred Rothwell, *Long Distance Information: Chuck Berry's Recorded Legacy* (New York: Music Mentor Books, 2001), 48. The session musicians included Fred Below on drums, Willie Dixon on acoustic bass, and Lafayette Leake on piano.
3. Known interviews of Chisholm include *Tape Op* and *Mix* magazine. Chisholm's wife, "Ann" was interviewed by *Living Blues*. Chisholm's personal notes have been posted online by his son, Collin (c.f.: www.malcolmchisholm.com). Passing references may be found in Jim Cogan and William Clark's *Temples of Sound* (San Francisco: Chronicle Books, 2008), John Collins' *The Story of Chess Records* (New York: Bloomsbury, 1998), Nadine Cohodas' *Spinning Blues into Gold: The Chess Brothers and the Legendary Chess Brothers* (New York: St. Martin's Griffin, 2001), and Rich Cohen's *Machers and Rockers: Chess Records and the Business of Rock and Roll* (New York: W.W. Norton & Co., 2004).
4. Information regarding the interviews may be found in the appendix.
5. His resume lists luminaries of these genres including: Jazz greats like Ella Fitzgerald, Dizzy Gillespie, Etta James, and Gene Krupa; Blues legends like John Lee Hooker, Muddy Waters, Howlin' Wolf, and Sonny Boy Williamson; popular musicians including Frank Sinatra, Chuck Berry, Jerry Lee Lewis, and Dean Martin as well as "legitimate" music like the Fine Arts String Quartet, Chicago Symphony Orchestra, and the New York Woodwind Quartet. These names represent about one-tenth of what appears on his resume as a "partial list of artists recorded as a music mixer."
6. "Malcolm Chisholm: 1929-2003 RIP," *The Eardrum* published by the Engineering and Recording Society of Chicago (online resource), accessed April 27, 2013, <http://www.ears-chicago.org/eardrum/2003.07.shtml>. Chisholm served as the president of EARS in the 1990s.
7. Chisholm worked most often as a "music mixer" and doing mastering. He also did some editing, quality control, sound system design, and installation as well as equipment maintenance. Jeff Mack pro-

vides insight into the perception of Chisholm as unorthodox: “A lot of people looked at him as a dinosaur. He hated digital. He never used overheads for drums. He would ask questions [to the students] and wouldn’t lead you, but make you sit there for thirty minutes and figure it out on your own. He weeded out a lot of students.” Jeff Mack, telephone interview by the author, March 18, 2013.

8. “Chris J.,” head of the Columbia program from 1985-2007: “Over the years we had to tell Malcolm that you can’t teach as many classes as you used to teach, or we’ve had to change the syllabus a little bit this way and that way, and he always responded with great graciousness and understanding. I always appreciated that about Malcolm.” Memorial (Audio) Doug Jones.mp3, published under creative commons by Colin Chisholm’s site Malcolmchisholm.com, accessed April 27, 2013, <http://www.malcolmchisholm.com/memorial-audio/>. On the other hand, Bernie Mack adds, “A lot of people looked at him as a dinosaur, he hated digital.”
9. This is a literal reference to AM signal propagation, often associated with the groundswell of black R&B among white youths prior to its mainstream appropriation under the brand of “Rock & Roll.” For example, see James Moody & Paul Dexter’s *Concert Lighting: Techniques, Art and Business* (New York: Focal Press, 2009), 4.
10. Albin Zak, *I Don’t Sound Like Nobody: Remaking Music in 1950s America* (Ann Arbor: University Press, 2010), 171.
11. These under-the-table cash payments to DJs in exchange for airplay were illegal and resulted in U.S. Senate hearings bringing the entire industry under greater regulation. For social, historical, and cultural reviews of the payola hearings of the late 1950s, see Michael Bertrand, *Race, Rock, and Elvis* (Chicago: University of Illinois Press, 2000), 84-91; Russell and David Sanjek, *American Popular Music Business in the 20th Century* (New York: Oxford University Press, 1991), 173-177; and Wes Smith, *The Pied Pipers of Rock ‘n’ Roll: Radio Deejays of the 50s and 60s* (Athens, Georgia: Longstreet Press, 1989).
12. Bruce Swedien, *In the Studio with Michael Jackson* (New York: Hal Leonard, 2009), 150.
13. Collins, op. cit., p. 45. Jacobs’ number ones include *My Babe* in 1955 and *Juke* in 1951.
14. “45 Discography for Chess Records,” *Global Dog Productions*,

- accessed April 27, 2013, <http://www.globaldogproductions.info/c/chess.html>.
15. Geoffrey Hull, *The Recording Industry* (New York: Routledge, 2004), 161-162.
 16. “Jeff M.” recalls Chisholm telling students they should be able to setup and get tone for fifty musicians in one live room with one compressor and two tracks, all in no more than five minutes.
 17. Since the recording is made with all the musicians live in the same room, the mix is done before the recording. This is an important difference between the industrial and post-industrial models, as well as a likely reason for using the name “mixing engineer” to refer to the process of setting up and recording the performance.
 18. “Lacquer mastering” is cited as the second duty for each of Chisholm’s Chess-related resume entries.
 19. An unverified story that has nonetheless passed into the lore of Beatlemania has Paul McCartney responding to reporters at the JFK airport at the start of the group’s first U.S. tour in 1964. According to the story, a reporter asks what the group wants to see in the U.S., “Muddy Waters,” replies McCartney. The reporter replies “Where’s that?” To which McCartney replies “Don’t you know who your own famous people are here?” See Victor Coelho, *Cambridge Companion to the Guitar* (Cambridge: University Press, 2003), 106 and; Jas Obrecht, *Rollin’ and Tumblin’: The Postwar Blues Guitarists* (New York: Backbeat Books, 2000), 13.
 20. Ann Chisholm, telephone interview by the author, March 19, 2013 and; Jim Cogan and William Clark, *Temples of Sound: Inside the Great Recording Studios* (San Francisco: Chronicle Books, 2008), 121.
 21. The big band model is a more effective teaching tool given the wide array of instruments and ensemble arrangements it provides, like brass, reeds, guitar, bass, drums, strings, vocalist, percussion, etc.
 22. “Bleed” is a production term used to describe sounds from a secondary source entering into a microphone dedicated to another, primary instrument.
 23. Gil E., telephone interview by the author, June 15, 2012. Jeff M. confirms this, indicating a size of “about 50 feet by 100 feet.”
 24. Harrison C., telephone interview by the author, March 25, 2013.

25. Ibid.
26. See note 16 above.
27. Jeff M. and others recall Chisholm insisting on Ampex tape machines and preamps as well as 1176 compressors, URI far-field monitors, and Tannoy near-field monitors. A typical 1950s system would have been tracking/mixing onto a 2 or 4-track tape machine, then mastering to 2-track quarter-inch.
28. The result can be independently isolating all noise sources, what Harrison C. calls “playing in a box.” Another effect of the ability to edit independent tracks for errors is that musicianship does not have to be as good in the post-industrial model.
29. Gil E., telephone interview by the author, June 15, 2012.
30. Harrison C. and Jeff M. shared Chisholm’s technique for this, namely to record a section of music after the group was set up, then inviting them in to listen and recognize any adjustments in terms of level that needed to be made.
31. Scott I., interview by written questionnaire, April 11, 2013.
32. Willie Dixon and Don Snowden, *I am the Blues* (New York: Da Capo Press, 1989), 95.
33. Ibid., 151.

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