The Classic Sound of Rudy Van Gelder

An Investigation of the recording techniques used to create the iconic Blue Note Sound.

Dissertation by
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Abstract

The Blue Note Sound, a “classic sound” created by Rudy Van Gelder in his Hackensack home during the 1950s, is characterized by the techniques he employed in his recordings, imparting warmth, clarity, and precision. This dissertation explores and evaluates Van Gelder's techniques, their effectiveness, and their potential application in the modern era. This work aims to raise awareness and offers insights and comparisons regarding the unique aesthetics of recordings in jazz. This dissertation takes a self-reflexive approach as it explicitly examines the Blue Note Sound and its effectiveness. To support this, data was collected through critical listening analysis and a comparison of literature, articles, and media captions. The techniques used were based on exploration and experimentation, leading to the creation of the Blue Note Sound, which became the signature sound of the Blue Note Records label in the 1950s and 1960s. This label featured some of the most iconic jazz records of all time. The dissertation aims to demonstrate a clear understanding of the creation of the Blue Note Sound, the evolution of jazz recording sound, and the aesthetics based on specific techniques.

Dedication

This research study is dedicated to my mother, Prudence Mathebula, who constantly enlightens my vision to advance my education and is always at the forefront of my success. As a single parent, she always offers me her complete attention and love, which no one else can. I appreciate the teachings and inspiration she has provided me throughout my career. Her guidance has helped me to maintain focus throughout this study.

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Chapter 1. Introduction

This dissertation explores and investigates the unique Blue Note Sound attributed to Rudy Van Gelder. This study aims to scrutinize Van Gelder's jazz recording techniques and draw comparisons with contemporary recording techniques. The focus is on analyzing the importance and the creation of the Blue Note Sound and assessing the capability of present-day recording technologies to replicate it accurately. This study will explore the techniques employed by Van Gelder for identification and will question the techniques and rationale behind their use. As there is a lack of evidence, the study will not delve into the actual process of the techniques used. I will critically analyze Van Gelder’s techniques and delve into the depth of his creativity. The dissertation will be structured around the investigation and analysis of the techniques in Chapters 5, 6, and 9.

1.1 Background

Van Gelder was a prodigious figure in jazz recording, renowned for creating the classic Blue Note Sound. His ingenious use of microphones and unrivalled engineering prowess garnered widespread acclaim in jazz. He displayed remarkable elegance and played a crucial role in the development of jazz records, completely transforming their sound throughout the 1950s and 1960s. His contributions to the genre established his position as one of the most significant music recording engineers in history.

Van Gelder's recordings have made jazz transcriptions and listening easier; nonetheless, producing a great sound as an audio engineer in a jazz setup requires an excellent ear and state-of-the-art microphones to capture it successfully during recording sessions. Van Gelder has consistently positioned himself at the forefront of technological advances and has been among the first to embrace and fully exploit innovations as they appeared (Skea, 2001). His ability to adapt each new technology effectively to the recording of jazz has been an important factor in capturing stylistic changes in the art form over the last fifty years (Skea, 2001).

In my research, I have always been curious about the type of sound Van Gelder produced. When discussing sound, I am interested in understanding its significance and relevance to this study. Drawing from the contemporary literature I have gathered, and referencing the insights of

experts Huber and Runstein, they provide a comprehensive and explanatory definition of sound.“Sound is a concept that describes the brain’s perception and interpretation of a physical auditory stimulus” (Huber & Runstein, 2005).

The iconic Blue Note Sound integrated the art of jazz globally and sprung out new deviations. This is due to the techniques Van Gelder used. While examining Van Gelder's techniques, this study recognizes his elusive persona as a potential hindrance to understanding his techniques. Additionally, the study acknowledges that during the 1950s, jazz recordings were highly advanced. Nevertheless, Van Gelder pushed beyond the expected boundaries, leading to a groundbreaking revolution in the jazz scene. According to this study, Van Gelder's recording techniques significantly impacted contemporary jazz recording techniques.

During my analysis, I discovered that Van Gelder experimented extensively with his techniques. Even today, some engineers in jazz try to replicate what Van Gelder originated. As per this study, Van Gelder is widely regarded as a trailblazer in jazz recordings. His contributions have facilitated effortless listening and transcription of jazz music, allowing contemporary musicians to emulate the sounds of jazz legends he recorded, such as John Coltrane, Miles Davis, and Horace Silver.

In an article written by Marc Myers on JazzWax. Van Gelder is interviewed and asked the following questions.

JazzWax: What’s the biggest misconception people have about you?

Van Gelder: “Some people think I'm a producer. I'm not. I'm a recording engineer. I don’t hire the musicians, nor do I come up with the concepts for albums or how well musicians are playing. I'm there to capture the music at the time it's being created. This requires me to concentrate on the technical aspects of the recordings, which means the equipment and how the finished product is going to sound” (Myers, 2012).

In the aforementioned interview, it is evident that Van Gelder's emphasis lies in the technical aspects of the techniques. To validate this research methodology, I intend to explore the reasons behind his focus on the technical aspects, as they played a significant role in creating the Blue Note Sound. My investigation will also seek to uncover the significance of Van Gelder's exclusive focus on the technical aspects, and whether there were any other aspects that he did not

mention, or if there were none. Upon completion of this study, I will analyse and present my findings. It is evident that Van Gelder's accomplishment not only validated this aspiration but also established a standard for future engineers in the field.

1.2 Purpose of Study

The goal of this study is to describe, analyse, investigate and compare Van Gelder's technique and ethical approach to creating the Blue Note Sound. This study aims to evaluate the methodology employed by Van Gelder in the production of the Blue Note Sound and to determine the impact of his meticulous approach on the final output. This research seeks to provide an in-depth understanding of Van Gelder's approach to creating the Blue Note Sound and highlight the significance of his contributions to the field.

This dissertation is constrained by specific limitations due to the scarcity of available literature, videos, or information concerning Van Gelder's recording techniques. Van Gelder chose not to write a book or share his methods with others and maintained a high degree of secrecy regarding his work. As a result, a comparison will be made of Van Gelder's techniques based on contemporary literature and microphone techniques, as no one witnessed his recording process, given that he worked independently and maintained the ideology of his microphone technique a secret.

In today's world, testing or recording a jazz performance with the same microphones that Van Gelder used in the 1950s is a challenging task. This is mainly due to the vast advancements in microphone technology since then. Nevertheless, I am keen on studying Van Gelder's techniques because they created the iconic Blue Note Sound in the jazz realm. I want to determine whether it's possible to reproduce that sound using modern microphone techniques. Furthermore, I am intrigued by how other techniques are employed to achieve a distinct approach to the Blue Note Sound, and this is based on the technological advancements that have endured over time.

I am also interested in exploring other recording materials that are currently available to confirm and validate Van Gelder's techniques. It should be noted that this study has a limitation regarding the signal flow of modern recordings versus vintage recordings. During Van Gelder's time, the signal flow went from the analogue of microphones to the preamps and then to the consoles. However, in modern-day recordings, the signal flow goes from the microphones to the preamps,

the interface, and then goes to the final product of being streamed or produced in the form of a CD. It is essential to understand that this study mainly focuses on microphone techniques and does not account for the signal flow, which can impact the final product.

Lastly, the objective of this study is to delve into Van Gelder's microphone techniques and their applicability in contemporary recording. This includes examining the replication of the analogue chain from the 1950s and considering it a viable recording technique. Additionally, this study seeks to elucidate the genesis of the Blue Note Sound, which played a pivotal role in globalizing a distinct jazz aesthetic in terms of sound and microphone techniques.

1.3 Research Problem

The issue with this dissertation is the insufficient evidence regarding Van Gelder's techniques in creating the Blue Note Sound during the recording process. There is a lack of evidence regarding his thought process and execution behind these techniques. As mentioned before, he was very secretive about his techniques, even to those who wanted to learn from him. From my personal experience, I know that recording an album involves a tremendous amount of work. The central issue is understanding how he managed to create and utilize these influential techniques that have shaped the distinctive aesthetic of jazz albums and how modern contemporary recording techniques replicate the Blue Note Sound.

1.4 Research Aims, Questions, and Objectives

The objective of this research is to delve into Van Gelder's techniques, examining how and why he employed them. Additionally, the study aims to illustrate that while similar techniques are still utilized, the recording process has changed due to the prevalent use of Digital Audio Workstations (DAWs) in the modern era.

Two critical questions that I plan to answer with this research problem are: how did he use his techniques and why did he use them? These answers will be answered based on modern literature, which will also draw a comparison to see if the same techniques can be replicated.

1.5 Significance

This research is valuable as it will illustrate the significant influence of Van Gelder and how his techniques transformed the sound of jazz. Additionally, it will highlight the widespread appreciation among artists for Van Gelder's recording techniques, which have greatly impacted the language of jazz. The selection and placement of a microphone are critical considerations as they determine how the recording process will sound. “Choosing a handheld mic is more a matter of taste today even the inexpensive mics sound pretty good. Sound quality, clarity and handling noise are the major differences, and you'll have to plug one in to find out the recording process” (Robertson, 2009). The closed microphone technique is a well-known technique used by Van Gelder. This study will explore it as one of his famous techniques and, by assumption, it could be the pivotal technique that changed the sound of jazz. “Closed mics (such as a ribbon mic) eliminate this issue since they are bi-directional and only respond to the velocity of air particles. With tight front/rear pick up, they block out sound waves from the sides, creating a warm midrange that works well for acoustic instruments” (Kore Studios, 2023).

1.6 Limitation and Scope

This dissertation is limited in its exploration of how Van Gelder developed and utilized these techniques. Furthermore, there is a dearth of vintage literature or recorded artists who can corroborate the use of these techniques by Van Gelder. His continuous exploration leaves unanswered questions about his creative process in establishing and initially discovering the Blue Note Sound. Despite these limitations, this dissertation will address these issues based on contemporary literature.

1.7 Outline

This dissertation is extensive and consists of ten chapters. The first chapter is an introductory section, offering a concise summary of the study’s purpose, background, and research aims and questions. Chapter two provides a biographical sketch of Van Gelder. The third chapter conducts a literature review, comparing Van Gelder's recording techniques to modern recording techniques. Chapter four provides critically analysis of the methodology of this research. Chapter five offers an in-depth analysis of the iconic Blue Note Sound, including its creation and distinctiveness. Chapter six overviews Van Gelder's significant contribution to this distinctive

sound. Chapter seven focuses on his meticulous approach to microphone placement. Chapter eight delves into Van Gelder's studio setup and layout in Englewood Cliffs. Chapter nine provides a thorough explanation of the recording methods utilized to generate the Blue Note Sound and its futuristic aspect. Chapter ten is a thought-provoking discussion and analysis of the research. Finally, Chapter eleven summarizes the study's convincing conclusions.

Chapter 2: Biographical Sketch

Rudy Van Gelder was born in Jersey City, New Jersey, on November 2, 1924. He was born and raised in Hackensack New Jersey (Skea, 2001). His passion for music started when he played trumpet in school. "I wasn't very good, so I sold tickets instead!" While playing in the band (Rudy van Gelder, 2016). Van Gelder fascination with auditory phenomena flourished when he was twelve. Upon seeing an advertisement in the back of a comic book, he became interested in a device known as the Home Recordo.“When he was 12 he acquired a home recording device that included a turntable and discs. In high school he became a ham radio operator” (Keepnews, 2016).

Van Gelder was fond of the Home Recordo and loved how it worked. It worked well as a pantograph controlled by the user's home turntable. The horn recorded sound and then transferred to a blank lacquer-coated cardboard disc (Sickler et al., 2011). Van Gelder grew interested in amateur or ham radio, sending and receiving broadcasts with other hobbyists (Skea, 2001). In his spare time while in high school, he began creating mixers and amplifiers, and on Saturdays, he would go to "Radio Row" on Cortlandt Street in midtown Manhattan to acquire parts (Zand, 2004). He was in the high school marching band, but he rated his performance as "terrible" and ended up selling football tickets instead (Skea, 2001).

Throughout his high school years, Van Gelder clandestinely entered jazz clubs on East 52nd Street in Manhattan to see performances by jazz luminaries like Roy Eldridge, Billie Holiday, Art Tatum, and his ultimate favorite, Coleman Hawkins.As a beginner in music, Van Gelder was given the opportunity to record at a furniture store owned by the parents of one of his classmates. Along with several of his classmates, they formed a twelve-piece band and performed together on stage.

After graduating from high school in 1942, Van Gelder chose to pursue a career in optometry. He attended the Pennsylvania College of Optometry in Philadelphia, which is currently recognized as Salus University. However, his love for recording music never faded. During his studies, he brought a portable 78-rpm disc recorder to college and recorded live performances of jazz bands at various clubs in Philadelphia. Additionally, he played in a five-piece band and performed with them on stage. In interviews, Van Gelder has frequently described this incident as a defining

moment. He knew he wanted to be there when he saw the engineers working on the futuristic-looking technology (Cuscuna, M. 2004).

Still in college, Van Gelder would return home over the summer months to record. One summer, he drove to Manhattan to work at Nola Studio in the Steinway Building on West 57th Street (Skea, 2001). After graduating, Van Gelder returned to Hackensack and launched his optometry clinic. His passion for recording, though, would persist and blossom into a loved profession.

When Van Gelder completed college, his parents were constructing a new home. Sydney Schenker designed a one-story California-style ranch built of cinderblocks at 25 Prospect Avenue, at the junction of Thompson Street in Hackensack. Van Gelder persuaded his parents to let him record music there, and he designed the home with recording in mind. The living space was created as a room for live musicians, separated from a purpose-built control room by double-paned glass.

Chapter 3: Literature Review

The literature being presented aims to outline and discuss the recording techniques employed by Van Gelder. While the creation of the Blue Note Sound has its limitations, the literature seeks to explain the key aspects Van Gelder focused on and compare them in a modern context, as well as how they can be replicated. This literature will focus on the modern relevance of Van Gelder's techniques and will not delve into specifics such as signal flow or the specific timing of his techniques. Additionally, the aim is to capture the perspective of modern literature on the techniques used.

There is no specific genre in modern literature that can be directly associated with the techniques utilized by Van Gelder. However, based on the study and research, these techniques can be applied across the recording industry. This chapter aims to compare and contrast Van Gelder's technique with the literature that will be presented. This chapter acknowledges the absence of vintage methods or other techniques to discuss, as jazz recordings only began to evolve around the 1950s, and Van Gelder consistently had access to the latest technology. In the world of Jazz, Van Gelder's name is frequently cited, and according to the research provided in this dissertation, he was the renowned engineer who consistently explored and based on my assumption and research, contributed to the creation of jazz recording techniques.

The structure of my research will involve exploring the current literature on the research issues addressed in this dissertation. I will also begin by delving into the literature that provides in-depth context and content related to Van Gelder's techniques. Throughout my research, I have encountered a wealth of resources that have deepened my understanding of Van Gelder's creative process and methods. These resources, which include books, photographs, and online sources, will not only contribute to the success of this dissertation but will also offer detailed insights into his microphone techniques and the recording processes that contributed to the iconic Blue Note Sound. During my study, I discovered a YouTube video that provides a virtual tour of the Hackensack studio and a DVD interview with Van Gelder discussing his professional trajectory (Cuscuna, M. 2004). This interview has been essential in my attempts and has pushed my confidence to obtain a thorough grasp of his techniques and the studio where he worked.

It is worth noting the lack of online resources covering Van Gelder's microphone techniques. However, this problem can be solved by cross-referencing the online images with the literature. The literature will thoroughly explain the techniques, with the only difference being how they are used in the modern way, as there is no book or guide into how Van Gelder used them in the vintage way. There is accessible information to the public regarding the specific microphones he employed, his recording equipment, and the meticulous placement of his microphones. While online articles mainly consist of album reviews or press releases, Huber and Runstein's book is a highly recommended and comprehensive resource that will help address the aforementioned problem.

Huber and Runstein's book contribute to this study by comprehensively introducing various recording techniques, microphones, and critical features in a contemporary way. The book delves deep into the science behind microphone design and its practical applications, providing readers with a thorough understanding of microphone technology and recording techniques. The author covers essential topics, including frequency response, polar patterns, sensitivity, noise level, and distortion, while also exploring various fields in which microphones are utilized, including music recording, broadcast journalism, film production, live sound reinforcement, and scientific research. This literature corroborates the main argument of this thesis and Van Gelder's acknowledgment of his selection of microphones and their methodology.

3.1 *Modern Recording Techniques by David Miles Huber and Robert E. Runstein:*

Modern recording techniques have a specific approach. However, based on this publication, I intend to explain its significance to the research. This book is relevant to the study as it addresses and emphasizes the main theme, microphone techniques. Unlike vintage literature, this book explains microphone techniques. Experts Huber and Runstein explain microphone techniques, stating, "Each microphone has a distinctive sound character based on its specific type and design. A large number of types and models can be used for a variety of applications, and it's up to the engineer to choose the right one for the job" (Huber & Runstein, 2005).

From my viewpoint, the experts have highlighted crucial terms such as distinctive, sound, and application, which are closely associated with creating the Blue Note Sound. It appears to be commonly agreed that a variety of microphone techniques can be employed for different applications. This aligns with the secrecy surrounding Van Gelder's approach, as he employed various applications for recording and had the discretion to select the appropriate microphone for each task. During my investigation, I discovered that microphone techniques are closely linked to the microphone's placement. In my analysis, I also critically examined the microphone placement, which is a pivotal aspect of the microphone technique. Additionally, Huber and Runstein underscored the importance of microphone placement, stating "the placement of a microphone can play just as important a role, and is one of an engineer's most valued tools. Because mic placement is an art form, there is no right or wrong" (Huber & Runstein, 2005).

The quote above underscores the significance of microphone placement as highlighted in the literature. In my analysis, I thoroughly examine how Van Gelder positioned his microphone in comparison to expert opinions. It is essential to recognize that there is no unequivocal correct or incorrect method for microphone positioning which concurs with the literature and according to the extensive research done on Van Gelder.

Huber and Runstein contend that it is commonplace to modify a final master recording, including overall and relative levels, equalization (EQ), and volume dynamics, to achieve optimal sound and commercial quality. This task is typically performed by a mastering engineer in a specialized monitoring environment. However, there is a discrepancy because Van Gelder worked alone and handled the entire recording process by himself, while nowadays the mastering engineer is typically responsible for these adjustments to the final master recording.

This literature emphasizes specific points, and I appreciate how it explains various techniques. When recording a song, the first step is to choose a suitable microphone. This study focuses on microphone techniques by Huber and Runstein, and they provide an in-depth explanation stating, "Choosing the best mic for an instrument or vocal will ultimately depend upon the basic character of the sound that you're searching for" (Huber & Runstein, 2005:151). The statement is of paramount importance to the research as it underscores the necessity of choosing a high-quality microphone to achieve superior sound. The primary aim of this dissertation is to examine and pinpoint the origins of the Blue Note Sound created by Van Gelder.

The literature does not address peak limiting or tape saturation, but instead primarily focuses on various microphone types, including dynamic, condenser, ribbon, and tube microphones. Chapter 4 of this book is the focus, delving into Van Gelder's acclaimed close microphone technique as elucidated by Huber and Runstein. Additionally, the authors explore the specifics of microphone positioning and techniques suitable for different musical instruments.

Finally, this work offers valuable insights by discussing the best practices for reducing noise levels during recordings, such as minimizing electrical equipment interference or using shock mounts to isolate mechanical vibrations. For my concluding research endeavor, I extensively examined relevant literature to contrast Van Gelder's recording methodologies with contemporary ones. This literature concisely portrays the process used to record instruments and illuminates the analogue signal flow resulting from Van Gelder's recordings.

3.2 *Sound Recording Practice by John Borwick:*

The literature in this work is valuable as it provides historical context for the key factors of this dissertation. For instance, according to the research in this dissertation, Van Gelder recorded in stereo from 1956. This statement is valuable because my research does not explain how Van Gelder did his panning for his stereo recordings, which is also one of the techniques that changed the sound of Jazz. However, Borwick explains how stereo panning worked and says “In the early days of stereo, a relationship was established between the proportion of signal level fed to two loudspeakers and the apparent position of the sound source” (Borwick, 1994).

Borwick's explanation is particularly relevant to the literature as it elucidates the relationship and concept of stereo panning. The literature indicates agreement that Van Gelder was known for producing a natural sound, as evidenced by research. This aligns with Borwick's emphasis on the same point, particularly in relation to the overdubbing technique used by Van Gelder.“ What most engineers are striving for is the natural live sound” (Borwick, 1994). Borwick's statement satisfies the outcome of the overdubbing technique that will be discussed in the dissertation.

Moreover, from my perspective, the statement above suggests that Borwick places significant emphasis on the need for sound engineers to produce recordings that faithfully capture realistic performances. The key themes in this work revolve around the concept of overdubbing technique, the attributes of a successful recording engineer, and the understanding of one's role in

being a proficient engineer. Borwick elaborates on his views regarding the definition of success as an engineer. “Live recording is another area you need to understand in order to be a successful producer” (Borwick, 1994).

Although the word success in this context is determined by the producer, my argument is that the definition of a producer, according to the Berklee website states that “Music producers oversee and direct recording projects for musical artists” (Music Producer [MP], n.d.). In my opinion, this definition is also what characterizes Van Gelder's role as he supervised and directed projects. The essence of the statement, before being explained, is that Borwick suggests that one must comprehend live recording to achieve success. According to the forthcoming research, Van Gelder was a proficient engineer who comprehended and appreciated live recordings.

In the literature, I however do disagree with what Borwick says as he says “During the sessions you may find that the band are coming up with ideas for arrangements, instrumentation, or interpretation, and of course their ideas should be discussed and tried. You will get situations where you completely disagree with each other, and then it is a question of knowing where to stop, which is where psychology comes into play” (Borwick, 1994). In my opinion, I disagree with this because according to the literature that I found and that will be presented. Van Gelder would set up for the musicians and they would just go into the studio and record, also another factor that is in line with the disagreement is that there is no evidence that Van Gelder disagreed with the musicians instead they all spoke well of him and as represented in the research the musicians mentioned that Van Gelder knew what they wanted.

The literature does not cover microphone techniques and tape saturation, nor does it delve into the process of the techniques. However, it does address part of the research gap by discussing the use of one of Van Gelder’s techniques. Furthermore, it thoroughly examines the positive qualities of sound that contribute to the overall recording. Additionally, Borwick's contribution to this study is significant as it emphasizes the importance of precise microphone positioning during live performances. It is mentioned in the study that Van Gelder prioritized recording perfection, while musicians valued good sound over live quality.

Borwick speaks about the importance of implementing good sound and identifies what should be avoided. “The worst situations can usually be avoided nowadays (like open brass blowing straight into the strings’ microphones) because producers understand the importance of good

sound, but without directional microphones we would still be in big trouble" (Borwick, 1994).

The statement above underscores the collaborative effort of musicians and the recording engineer in shaping the sound. Van Gelder's expertise in mic placement and volume adjustment during recording sessions was crucial. Additionally, the musicians understanding of how to position themselves in the studio to play effectively without overpowering the microphones was essential. Van Gelder's skill in mic placement allowed the musicians to play without blowing directly into the mics.

3.3 *The Microphone Book by John Eargle*

This literature is crucial to my dissertation because it discusses the significant microphone used by Van Gelder, the Neumann U-47 Microphone. It provides a comprehensive history of the Neumann U-47 Microphone. "This multiple pattern microphone was introduced to the US market in 1948 under the trade name of Telefunken, a German distribution company, and gained a high reputation for excellence in both popular and classical recording" (Eargle, 2005). Based on the picture that I will present in this study, shows Van Gelder's microphone with the trade name "Telefunken" on it. Eargle's statement is crucial because Van Gelder extensively used this microphone in his recordings. From my perspective, the history provided by Eargle provides valuable insight into why the microphone is referred to as a Neumann but carries the Telefunken trademark.

The consensus in this literature, based on the YouTube video "Rudy Van Gelder: The Man That Defined the Sound of Jazz," is that the video showcases the use of two to three microphones for the stereo technique, as also discussed by Eargle. "Modern stereophonic recording, or stereo as we normally call it, makes use of many diverse microphone arrays and techniques. At the basis of them all are a set of fundamental two-or three-microphone arrays for picking up a stereo sound stage for reproduction over a pair of loud speakers" (Eargle, 2005).

In the video that I have mentioned above and observed I can see how Van Gelder effectively utilized microphone placement to achieve a stereo sound, which is consistent with Eargle's explanation in his book. This literature is quite valuable as it provides a comprehensive description of the workings of stereo recording and offers a thorough analysis of the technique. Eargle's book is particularly helpful as there is a dearth of information available on Van Gelder's

application of this technique, despite Eargle's modern contextualization of the method.

Even though this literature is excellent at expressing stereo techniques, I disagree with Eargle when he says “The piano can be recorded best in recital halls of moderate reverberation time, as opposed to a typical concert hall” (Eargle, 2005). I disagree with this statement because some of Van Gelder’s recordings were made in his Hackensack home, including the piano recordings. These recordings, initially in mono and later in stereo, were of good quality. It was only around the 1970’s during the reconstruction of the Englewood studio that Van Gelder was inspired to create a studio resembling a recital hall.

This literature contributes to and highlights key theories to this study, particularly in Chapter 14 focusing on Studio Recording Techniques. This chapter delves into the essential instruments of any jazz album, such as the Trumpet, Saxophone, Drums, and Piano, and demonstrates the optimal recording techniques for each. Furthermore, it provides a comprehensive explanation and demonstration of microphone placement for both mono and stereo recording, outlining the ideal distances for studio recording.

The literature contributing to this dissertation highlights key theories, particularly in Chapter 14 focusing on Studio Recording Techniques. This chapter delves into the essential instruments of any jazz album, such as the Trumpet, Saxophone, Drums, and Piano, and demonstrates the optimal recording techniques for each. Furthermore, it provides a comprehensive explanation and demonstration of microphone placement for both mono and stereo recording, outlining the ideal distances for studio recording.

3.4 Mic It! Microphones, Microphone Techniques, and Their Impact on the Final Mix by Ian Corbett:

I find this literature to be exceptionally valuable for my dissertation because it includes numerous references to Corbett's views and images, which I use to compare to Van Gelder’s technique. The literature effectively outlines the close miking technique in a manner distinct from Huber and Runstein, elucidating the techniques from various genres and providing a more refined approach. The images used to demonstrate the techniques are clear and comprehensive, making it easy to understand Corbett's points. One of the most recent discoveries that aligns with my study and is mentioned by Corbett himself is that he says “In live concert, sound mics are

frequently placed closer than described in this book" (Corbett, 2015). This finding aligns with the comparisons that will be made because, based on the pictures, Van Gelder positions the microphones closer. It's a curious discovery because Corbett describes exactly what Van Gelder has demonstrated but does not illustrate it in his book.

In this literature, there seems to be a consensus that aligns with this dissertation. "Solos can be tracked live, as the band performs, or overdubbed later" (Corbett, 2015). This statement aligns with Van Gelder's use of the overdub technique. Van Gelder typically overdubbed after recording live. This point will be supported in the dissertation. Furthermore, this literature supports the dissertation's findings as the techniques contributed to low noise levels. Corbett states his idea on low noise and says "With the low noise floor and large dynamic ranges of 24 and 32-bit recording systems, it's tempting to set the vocal mic's gain based on the loudest moment of the singer's performance and leave it there" (Corbett, 2015). This statement elucidates the reason why low noise added immediacy to the Blue Note Sound, despite it being related to vocal microphones. Van Gelder utilized various microphones, including the Neumann U-47, for recording vocals. The statement implies that his use of the Neumann U-47 for a range of recordings contributed to the low noise aspect of immediacy.

However, in this literature, I disagree with Corbett when he says "Lower quality equipment used well, will always sound better than great quality equipment used poorly" (Corbett, 2015). I respectfully disagree with the notion that top-notch equipment is unnecessary for producing high-quality recordings. This dissertation highlights Van Gelder's use of the latest and most advanced equipment compared to other engineers, resulting in well-defined recordings. Therefore, I maintain that having superior equipment, akin to Van Gelder's, is crucial for creating high-quality recordings. However, the key factors in this literature are as asked and answered by Corbett. "So, what makes a technically good recording? Good-sounding sources and musicians are a prerequisite.

- Appropriate microphone choice.
- Good mic placement and mic techniques.
- No noise or distortion problems created by incorrect or inappropriate use of any of the equipment in the recording and mixing chain.
- Good balances and use of the stereo soundstage" (Corbett, 2015:50).

According to this dissertation, all the factors mentioned by Corbett are part of what Van Gelder utilized to create the Blue Note Sound. In the literature, Corbett explains the concept of good sound and its alignment with the Blue Note Sound, which reflects my opinion. “Good sound is subjective and can vary from person to person” (Corbett, 2015:40). In my opinion, according to Corbett's explanation of good sound, the Blue Note Sound is considered good because it suits a standard jazz style and is artistically fitting for its music.

This literature is valuable for this dissertation, but it lacks comprehensive coverage of tape saturation and peak limiting. It also overlooks Van Gelder's recordings of small ensembles, focusing instead on techniques for larger ensembles. Nonetheless, it does provide insight into achieving good sound and the close miking technique, which I will reference and compare. Lastly, it discusses replicating the techniques used by Van Gelder.

Chapter 4: Methodology

This dissertation aims to dissect, analyze comprehensively, and study Van Gelder's microphone techniques utilizing a self-reflexive methodology. To support this study's purpose. I aim to critically examine and conduct a comprehensive analysis of Van Gelder's microphone techniques by carefully comparing literature discussing his work, images from the Van Gelder studio, and contemporary literature and articles. This comparative analysis will offer valuable insight into the ideology behind the microphone techniques he employed to capture the sound of jazz records in the 1950s.

Upon investigation, it is evident that there are numerous unclear and somewhat perplexing aspects related to the techniques used in this research. To address this issue effectively, we should refer to modern literature and compare the techniques used by Van Gelder with contemporary sources. Modern literature provides a succinct explanation of the techniques and even demonstrates how they are meant to be used. This dissertation has revealed that Van Gelder was secretive, making it impossible to demonstrate how he recorded a song or a specific album using his techniques.

It is only based on research that we know he used specific techniques. However, there is no information in the investigation or study to show how he used them, when he used them, and how he would have recommended other jazz engineers in his time to use the same techniques However, comparing the images and literature will provide insight into the decisions he made while developing and using techniques. Additional information will be obtained from YouTube videos featuring interviews with Van Gelder. In these videos, he discusses his background, thoughts on jazz recording, what sets him apart from other sound engineers, and his feelings about recording jazz.

The information I gather will provide valuable insights into Van Gelder's thoughts on jazz recordings and how he intended them to be discussed and studied. This will involve analyzing articles and literature penned by scholars, researchers, and renowned sound engineers in the jazz community, aiming to understand their opinions about Van Gelder's sound and techniques. It will also shed light on his microphone methodology, recording techniques, and the effectiveness of his approach in capturing the essence of jazz albums.

Using my self-reflexive methodology, I intend to study and extract valuable insights from the record labels Van Gelder was associated with. This will involve a thorough listening analysis of his most notable recordings, accompanied by a comparison of listening reviews and analytical assessments, including my own. Additionally, I will conduct extensive literature reviews, and extract information from interviews to evaluate the ongoing relevance of the Blue Note Sound in today's music industry. This study aims to delve into the impact of the Blue Note Sound on contemporary musicians, despite its historical significance in the world of jazz.

When examining the musical performances in Van Gelder's recordings and the technical aspects of the recordings themselves, I aim to provide a brief explanation of the ideology behind them. This will help readers gain a deeper understanding of the intricate details that contribute to the distinct Blue Note Sound. While we would be keen to explore the use of Van Gelder's vintage equipment and analogue recording methods, the constraints of this study and the current era make this unfeasible.

Nevertheless, one can overcome this hurdle by conducting a listening analysis with the widely used equipment that Van Gelder employed. The investigations of this study will enable us to assess the audio quality and give other musicians insights into the equipment's sound profile. Moreover, I intend to contrast Van Gelder's recording techniques with contemporary literature and comprehend modern jazz engineering principles. Such an analysis will aid me in gauging the influence of Van Gelder's techniques on the jazz aesthetic.

Technological advancements have significantly impacted on how modern recordings differ from vintage ones in signal flow. Nevertheless, traditional recording techniques remain unchanged. Jazz recordings have a particular aesthetic regarding the process and the final product. Van Gelder's recording techniques created this aesthetic. As a result, I aim to highlight how his legacy can inspire contemporary engineers, encouraging them to explore and experiment with recording methods. Since multiple technologies are used in recording practice, it remains crucial to maintain a distinct jazz album recording aesthetic. The methodology of this dissertation aims to examine the techniques that were instrumental in shaping the sound of jazz. To address this, I will delve into the research to understand why Van Gelder used these techniques and how they have evolved since their initial implementation.

Chapter 5 – The Blue Note Sound

In this chapter, I aim to explore the origins of the Blue Note Sound and the contributing factors that define it. The structure of this chapter will involve researching the distinct characteristics of the Blue Note Sound and what sets it apart from other sounds. This inquiry will draw from research findings as well as my insights to address and present the questions at hand.

“Van Gelder was the architect of what become known as “the Blue Note sound,” which author Richard Havers described in Uncompromising Expression, his book on Blue Note, “as a sound so present that it makes you feel as if it were recorded just a few minutes before you hear it, almost as though the musicians were next door.” (Bambarger, 2018). I believe there's no room for subjectivity here. The author Richard Havers, who wrote about the Blue Note session, has clearly defined what the Blue Note Sound is. He describes it as a sound that makes you feel like the musicians are right next door and attributes its creation to Van Gelder.

My question now is why the sound is called Blue Note and not Van Gelder. Bambarger provides an answer for me. “Van Gelder didn’t only engineer magical sessions for Blue Note. Working in the heyday of recorded jazz, he set the standard by capturing artists for such other top labels as Prestige, Riverside, Verve and Impulse” (Bambarger, 2018). In my perspective, this explanation solidifies why it was called the Blue Note Sound. He created magical recording sessions for the pioneering jazz record label Blue Note in the 1950s.

Van Gelder used a unique audio formula to create his distinctive sound. “Rudy’s sonic recipe included four main ingredients: low noise, immediacy, a unique sound, and a large soundstage” (The Van Gelder Sound: Characteristics [TVGS], n.d.) The immediacy of the sound refers to the feeling that the music is being played right in front of you. Low noise means that the recording had minimal hiss or distortion. A large soundstage refers to the sense of space and depth in the recording and the distinctive piano sound[1] is a unique and recognizable characteristic of Van Gelder's recordings.

[1] The distinct sound comes from Van Gelder wrapping one of his piano mikes in a soft thin chamois cloth and tucking it in inside one of the middle holes in the piano soundboard. This leads to the piano to have a particular kind of middle register enhancement that sort of deepens the 'belly' register of the music; it makes that middle register extra dark and rich.

The techniques in the jazz industry were still evolving as engineers like Van Gelder were exploring new methods. These four factors combined to produce the unique Blue Note Sound. What sets it apart is that it was created by Van Gelder, and his methods were exclusively used in jazz, unlike other genres such as classical music, which utilized the Blumlein pair to add intensity to the music. “The Blumlein pair, like other coincident approaches to recording, relies on intensity differences between the signals captured by the two microphones. It results in strong stability and clear articulation of the stereo image, but it's not without compromise” (Paris, 2020).

Within the realm of jazz, The Blue Note Sound is widely regarded as a quintessential component that has greatly influenced the aesthetics of the genre. Jazz musicians endeavor to emulate their role models, and one remarkable aspect is that Van Gelder's recordings exude a live sound. Hence, jazz musicians need to strive to capture that live ambiance by transcribing the music and arrangements from the albums engineered by Van Gelder. In my perspective, this chapter provides a comprehensive explanation of The Blue Note Sound. The Blue Note Sound is a renowned phrase used to describe the unique sound that Rudy Van Gelder crafted in his Englewood studio. His fastidious recording methods were characterized by clarity[2], depth[3], warmth[4], and exceptional sonic detail.

[2] Clarity refers to a speaker's ability to convey the source content accurately and without distortion.
[3] Perceived space, distance, or layering of sounds.
[4] A warm sound is typically a low or mid-low-pitched sound, providing a rich spectrum in the mid-low frequencies.

This timeless sound was achieved using a variety of approaches, including close miking, peak limitation, and tape saturation. These strategies were methodically used to give the music a strong feeling of presence. Moreover, Van Gelder expertly utilized other techniques such as mono recording, balanced microphone technique, and overdubbing, which we will explore further in the upcoming chapter. These techniques have earned Van Gelder the distinction of being one of the primary architects of the classic jazz sound and cemented his position as one of his era's most influential recording engineers.

In Alfred Lion’s perspective, "good things happen after dark, musically," since jazz players often build up an enticing environment in front of a live audience (Waring, 2023). Nevertheless, reproducing this magic accurately took much work, mainly due to acoustic difficulties. Van Gelder was known for his innovative approach to overcoming acoustic challenges, his unique method of recording live music distinguished him from other jazz engineers of his time (Contreras, 2016).

This method involved his use of specific microphone techniques and his thorough exploration of the process of recording jazz music. “I used specific microphones located in places that allowed the musicians to sound as though they were playing from different locations in the room, which in reality they were. This created a sensation of dimension and depth”(Keepnews, 2016).Van Gelder was an audio recording expert renowned for his ability to capture the essence of live jazz performances.

His innovative techniques were regarded as playing a pivotal role in the development of The Blue Note Sound, which has since become a cornerstone of jazz recording. Van Gelder's unique approach has become the gold standard for live jazz recordings, offering a definitive guide for how they should sound (Skea, 2001). Despite the challenges of recording musicians in front of a live audience, Van Gelder produced phenomenal Blue Note albums such as Art Blakey's "A Night at Birdland" and Sonny Rollins' "A Night at the Village Vanguard" (Skea, 2001). These iconic recordings helped establish the live album’s reputation as an influential musical artefact in the jazz community.

Moreover, Van Gelder's influence extended beyond the studio, leaving an indelible mark on the entire jazz industry. Jazz is an art form that has stood the test of time and has produced exceptional musicians who have helped shape its unique sound. This text explores the recording techniques used in Englewood studio to capture the iconic Blue Note Sound. In the next chapter, I will compare Van Gelder's methods with modern approaches, highlighting those that contributed to the studio's distinctive character.

Chapter 6: The Van Gelder Techniques

6.1 The Close Miking Technique

In the early 1950s, a technique called close miking became popular in music recording. This technique involved assigning a dedicated microphone to each instrument, resulting in recordings with improved presence and realism. It wasn't until the early 1950s that close miking became a common practice. The technique involved each instrument being assigned its dedicated microphone, which greatly enhanced the overall presence and realism of recordings (The Van Gelder Sound: Characteristics [TVGS], n.d.).

Van Gelder popularized this technique by employing microphones to produce a strong feeling of energy in his recordings, making the listener feel more connected to the players. Today, this distinct method is a defining feature of his music (The Van Gelder Sound: Characteristics [TVGS], n.d.). "My goal is to make musicians sound the way they want to be heard. Someone wanted to put a man on the moon, but it was an engineer who got him there," Van Gelder told the New York Times in 2005 (Thomas, 2024).

Van Gelder was widely acclaimed for his innovative use of close microphone placement in all microphone locations. According to Van Gelder, the key to capturing the intimate sound of a performance was to position the microphones as close to the instruments as possible (Skea, 2001). By doing so, he was able to capture the nuances and intricacies of the music that often go unnoticed when using more distant microphone placements. Van Gelder's technique was revolutionary in its ability to capture the true essence of the musician's performance, making his recordings stand out for their exceptional clarity and depth of sound.

When close microphone placement is used, the mic is often positioned about 1 inch to 3 feet from a sound source. "This widely used approach achieves two results:

• it produces a tight, present sound quality

• it efficiently excludes the acoustic environment" (Huber & Runstein, 2005:138).

According to the experts Huber and Runstein, employing the close microphone technique can result in a vibrant and compact sound quality. To comprehend the distinctive sound of Van

Gelder, they provide two illustrations of the results that helped establish the renowned Blue Note Sound recognized for its lucidity and “cosiness”. In my perspective, their examples give an outstanding effect which is achieved primarily due to the close microphone technique emphasizing the present sound quality. This attribute accurately defines the unique Blue Note Sound, renowned for its tightness. Additionally, Huber and Runstein highlight that this technique excludes the acoustic environment.

6.1.1 Close Miking Analysis

To understand the close-miking technique, I will compare Van Gelder's close-miking technique, utilizing the images captured in his studio, and the close-miking techniques presented by Huber and Runstein in their publication (Huber & Runstein, 2005). By conducting this analysis, I can gauge the technique's efficacy and possible ability to enhance audio recording quality. In my comparison, I will strictly focus on the close-miking technique of a tenor saxophone. Van Gelder's masterful microphone techniques were celebrated by experts Huber and Runstein, who advised placing the microphone between 1 inch and 3 feet from the source of the sound.

Figure 1 showcases a photograph of a tenor saxophone taken by Francis Wolff, which exemplifies Van Gelder's skilful use of close miking. Based on my observation, the microphone seems appropriately positioned within the recommended range of 1 inch to 3 feet (see figure 1).

Figure 1. Van Gelder uses the close miking technique with Zoot Sims. Source: The Van Gelder Sound Characteristics – RVG Legacy, n.d. Photo credit: ©Francis Wolff, 1956.

Van Gelder employed a close-miking technique, using the highly regarded U-47 Condenser Microphone. This versatile studio microphone features a giant diaphragm and fet (field-effect transistors 80 circuit technology and is widely regarded as Neumann's first and most revered microphone after World War II (U 47, n.d.). It has since become the most sought-after vocal microphone in history and was a defining symbol of the 1950s era, powerfully shaping its sound. The U-47 microphone was the first of its kind to have a switchable pattern, which had a significant impact in America. It quickly became the studio standard, surpassing the RCA ribbon microphone. The U-47 was able to process extremely high sound pressure levels, which was a new capability during that era. This made it a suitable choice for use in front of loud amplifiers (see figure 2).

Figure 2. Van Gelder's Neumann U-47 microphone. Source: Microphones – RVG Legacy, n.d. Photo credit: Atane Ofiaja.

In the Modern Recording Techniques literature by Huber and Runstein, the authors recommend a suitable way of placing a microphone. “As with other woodwinds, the mic should be placed roughly in the middle of the instrument at the desired distance and pointed slightly toward the bell” (Huber & Runstein, 2005:173). The book showcases two photos demonstrating their close microphone techniques for a tenor saxophone. The first photo utilized the same technique as the second one, the only difference being the presentation. In the second photo, the authors showcase an alternative approach to the close-miking technique by utilizing clip-on (Lavalier) microphones.

The lavalier microphone, or a lapel or collar microphone, is a portable and compact microphone typically attached to clothing such as a collar or lapel and worn on the body. It was invented by Georges Lavalier, a French actor and inventor, in the late 1920s (Boyd, 2019). While Lavalier microphones have existed for almost a century, Van Gelder did not initially use them. Nowadays, the close-miking technique and other techniques that incorporate Lavalier microphones are commonly used (see figure 3).

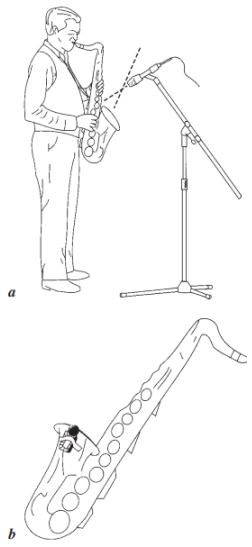

Figure 3. Huber and Runstein close microphone techniques: (a) standard close miking placement; (b) clip-on microphone placement. Source: Huber and Runstein, 2005, p.174.

In Ian Corbett's writing Mic, It! (Corbett, 2015). Corbett advocates for the close miking technique but he suggests using different measures. Corbett says, “a mic can be placed from 15 to 30 cm (6 to 12 in) in front of, and slightly to 30 cm (up to 8 in) above the bell, pointing back past the top of the bell towards the keys on the instrument” (Corbett, 2015:243). Corbett goes on to say that “two mics can be used with the closed microphone method, for close miking, straight instruments need two mics” (Corbett, 2015:243). “A person should stand 30 cm (1 ft) in front of the device and tilt their head 1/4 to 1/3 up” (Corbett, 2015:244). Figure 4 illustrates Corbett's close-miking technique and how he positions the microphone to the musician with precise measurements (see figure 4).

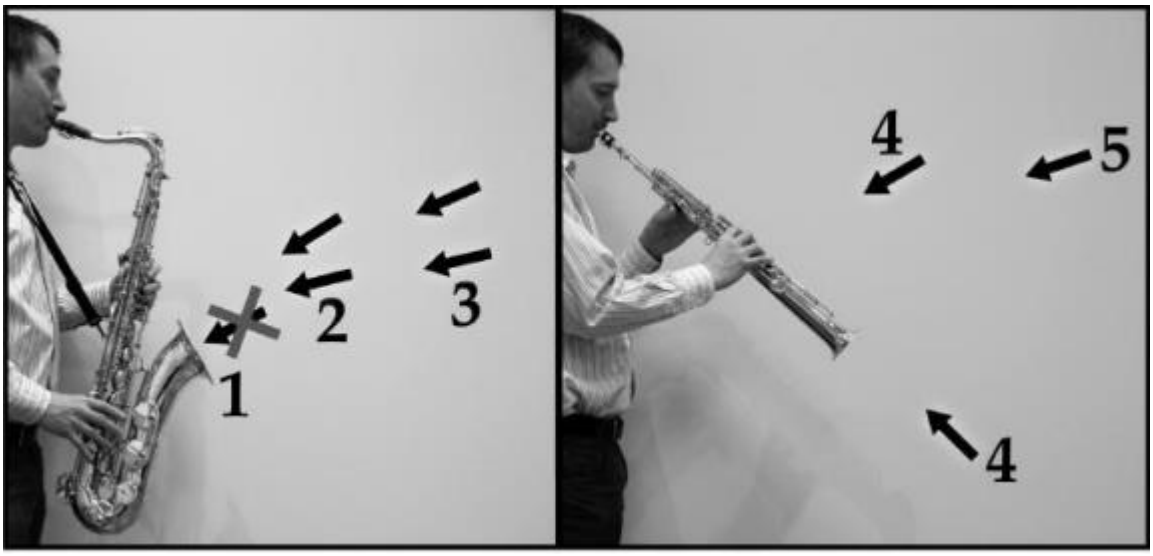

Figure 4. Corbett’s Close Miking Technique. Source: Corbett, 2015, p. 243.

After conducting a comparative analysis and sample reference of Van Gelder's close-miking technique, and reviewing relevant literature, I can confidently state that his technique closely resembles the contemporary technique used today. The only noticeable difference is that modern sound engineers use two microphones, as explained in Corbett's literature, and position them slightly further away than the traditional centimetre placement. It is my opinion that Van Gelder popularized the close-miking technique.

Van Gelder's close-miking technique revolutionized the sound of jazz and distinguished him from other engineers across various genres. According to producer Michael Cuscuna, Van Gelder not only popularized this new approach, but he also went above and beyond by skillfully utilizing his microphones to effectively bring the audience even closer to the musicians. This resulted in his records having a powerful, energetic feeling that still characterizes his sound to this day (Cuscuna, M. 2004). According to my research, both Huber and Runstein's literature (Huber & Runstein, 2005) and Corbett's literature (Corbett, 2015) indicate that the close-miking technique has remained largely unchanged since Van Gelder first used it. However, my findings suggest that close-miking can be applied in multiple directions and with the use of a Lavalier microphone.

6.2 Peak Limiting Analysis

True peak limiting is an audio production method that controls an audio track's maximum levels in the digital realm (Spencer, 2023). This technique guarantees that the audio output is free of digital clipping or distortion, which may degrade the quality of the listening experience. True peak limiting is often the last and most important step in the audio mastering process (Spencer, 2023).

6.2.2 How True Peak Limiting Works

In the 1950s, digital conversion techniques were not explained, and the process was not well understood. In the following section, I will explain how this technique works. I assume that the process was the same in the 1950s as it is now. In modern times when a digital waveform is transformed back to analogue, it is important to anticipate what occurs to avoid any issues. The main objective of genuine peak limitation is to detect possible peak overloads while selectively regulating the volume of an audio track's louder sections. This ensures that the audio does not peak or clip, which can compromise its quality. Essentially, it allows you to control the volume of the loudest parts of your music while maintaining its quality (Spencer, 2023).

Van Gelder's peak limiting method is one of the most famous techniques in the field of sound engineering. Even today, this method is considered to be highly useful. Rudy Van Gelder’s gift was for adjusting the sound balance while the musicians ran through a song prior to doing a take, so that by the time the red light came on, all of the musical parts fitted together perfectly and no

one was louder than anyone else (Skea, 2001). Through this creative process, it allowed all of the musical elements to blend seamlessly so that when the red light came on, the recording would be perfect.

Charles Waring's article in uDiscover Music explains the peak limiting technique and how it can ensure that no musician is louder than the others (Waring, 2023). Van Gelder's technique for achieving peak limiting remains a mystery, as it was never explicitly disclosed (Waring, 2023). However, to shed light on this topic, I will delve into the history of peak limiting, its prevalence in the 1950s, and compare it to modern recording practices. Although there is no definitive approach to utilizing peak limiting, many musicians have noted that Van Gelder's method produced a profound sense of immediacy in his recordings.

6.2.3 History of Peak Limiting

In 1937, the audio industry saw a major revolution with the introduction of the first commercial peak limiters by Western Electric and RCA. The initial release was Western Electric's 110A, followed by RCA's 96-AB six months later. Although they weren't audio processors, these limiters played a crucial role in eliminating over-modulation by addressing this specific issue. This made them relatively simple, but transmission operators across the United States were grateful for their introduction. Many audio engineers rapidly recognized the advantages of combining a harsh peak limiter with a gentler averaging processor. One of them was Al Towne of KSFO in San Francisco, who set out to design an innovative audio processor. He developed an adaptive compressor that automatically changes gain and has a peak limiter (see figure 5).

Figure 5. RCA 96 A limiter. Source: Retro Gear Shop, 2021.

In the early 1940s, there was a significant breakthrough in processing technology with advanced peak limitation capabilities. The General Electric BA-5 delay-line peak limiter, which was first launched in 1947, was a notable advancement for the broadcast business. This device employs a feed-forward limiting scheme that is further improved by incorporating a delay line to ensure perfect synchronization between the audio and the bias generator. As a result, this instrument is highly sought after (see figure 6).

Figure 6. BA-5 delay line peak limiter. Source: Buy & Sell Music Gear Online, 2019.

The BA-5 peak limiter made its debut in the early 1950s, followed by the BA-7 in 1957. Van Gelder is credited with pioneering the distinctive Blue Note Sound currently, adopting his particular peak limitation approach. Initially, peak restriction is employed during the mastering process.

Van Gelder was a master of many skills, but his vinyl mastering abilities were truly exceptional. From the early 1950s, throughout his career as a professional mastering engineer, Van Gelder's expertise in cutting grooves was lauded by many.

Producer Bob Porter recalls that Rudy was able to "put more level on an LP than anyone else in the business" (Skea, 2001). Earlier, I presented an overview of Peak Limiting and its functioning. Now, I will delve into the tools employed by Van Gelder to execute this technique, in addition to its background and traits. This discussion's objective is to enlighten readers about the gear that went into creating the distinctive Blue Note Sound. It is important to keep in mind that comparing this gear with modern tools is not possible since peak limiting is now done using DAWSs (Digital Audio Workstations) with different individual preferences. Figure 7 showcases the equipment employed by Van Gelder that he used for the peak limiting technique.

6.2.4 Van Gelder's Fairchild 660 Limiter

In the 1950s, Rein Narma, an American engineer of Estonian descent, invented the initial version of the Fairchild. Before this, Narma had designed mixing consoles for renowned musicians such as Rudy Van Gelder and Les Paul (Bieger, 2016). Some believe Paul was the primary factor in the development of the compressor. Nevertheless, the development of this project was performed by Fairchild Equipment Corporation, with Narma being the chief engineer supervising it (Bieger, 2016).

The first unit limiter was sold to Van Gelder, who used the compressor incredibly well when cutting the lacquer master's for Blue Note jazz and Vox classical records. The Fairchild 660/670 Tube Compressor/Limiter is considered to be the most famous dynamic processor of all time (Bieger, 2016). It served as the basis for all tube-based compressors and has gained a legendary reputation in the audio industry due to its rarity, cost, complexity, and, most notably, its distinctive sound (Bieger, 2016).

Figure 7. Van Gelder's Fairchild 660 Limiting Amplifier. Source: Outboard Gear – RVG Legacy, n.d.

6.2.5 History of Fairchild

During the jazz era of the 1950s, Van Gelder and Narma worked together to develop a more powerful cutting amp for the Grampian cutter head (Joel, 2002). They established a strong working relationship, and Van Gelder provided valuable feedback and studio access to help create the Fairchild 642, which was one of the earliest stereo cutter heads. Narma co-designed the system with a unique architecture that differed from that of its competitor, Western Electric. Although the Westrex cutter eventually became the industry standard, Van Gelder continued to use the Fairchild cutter for several more years.

The Westrex Stereodisk is a highly regarded master lathe model specializing in creating stereo recordings on vinyl records. The Westrex Corporation was a prominent figure in the audio and film industries due to its innovative contributions to sound recording, reproduction, and motion picture projection technology.

Using the Westrex Stereodisk lathe, stereo audio is etched onto lacquer discs, which serve as masters for vinyl records. This lathe plays a critical role in the audio mastering process by translating the stereo information from the audio source into physical grooves on the lacquer disk. As a result, these grooves can be transferred to vinyl records, enabling playback of high-quality stereo sound.

The Fairchild 660 compressor was highly respected during its time due to its many desirable features (Bieger, 2016). Its design prioritized maximum level control while maintaining minimal artefacts (Bieger, 2016). Back then, engineers aimed to capture sources in the most natural and pristine way. Unlike the "colour" processors or "groove tools" of today, compressors and equalizers were seen as tools to help engineers produce clean, natural-sounding outputs. Dynamic instruments like the Fairchild were frequently used for mundane tasks, such as preventing high levels of damage to radio transmitter valves and cutting styli. These instruments were critical in controlling dangerous peaks and ensuring a healthy program level.

The Fairchild was created during a time when stereo vinyl records and recording techniques were becoming increasingly popular. Stereo records require twice as much information as mono LPs to be stored on the same surface. Therefore, dynamic shaping of the audio material was necessary to maintain program length and loudness. The Mid-Side (M-S) method was developed to ensure that the audio would work with mono systems, which was crucial back then, while also saving lacquer space during the cutting process. As a result, the dual-channel Fairchild 670 compressor can either be used as a dual-mono device with separate stereo channels or in M-S mode.

6.2.6 Van Gelder’s Rein Narma Custom Console (1957-1970)

Van Gelder had a passion for using his equipment, and in 1956 he requested a custom console from Fairchild engineer Rein Narma specifically designed to work with his favourite high-output German microphones. The console was built by Narma single-handedly. It was initially completed in January 1957, installed in the Hackensack control room, and then moved to Englewood Cliffs (Robertson, 1957). This custom console was also utilized for peak limiting in Van Gelder's recording process.

In 1955-1956, Rein Narma founded the Rein Narma Audio Development Company to design and build sophisticated recording/mixing consoles, automatic volume limiters, and audio amplifiers for recording studios. He modified Ampex multitrack recorders to comply with more stringent distortion requirements. In 1956, Fairchild engineer Narma was commissioned by Van Gelder to design a special console to connect his preferred high-output German microphones. Narma designed the console entirely by herself. Charles Robertson, a reviewer of stereo LPs, offers an

inside perspective. “It was built in January 1957 and initially put in the Hackensack control center before being relocated to Englewood Cliffs” (Robertson, 1957).

Narma was the driving force behind the creation and construction of numerous recording studios throughout New York and New Jersey. He brought his expertise to iconic studios such as Van Gelder's, Olmsted Sound Studios, and Les Paul and Mary Ford's setup. Narma's ingenuity also led to the development of the first-ever intelligent automated volume control limiter, which he licensed to Fairchild Recording Equipment Corp. This pioneering technology became known as the renowned Fairchild 67. From 1957 to 1970, Narma crafted a line of top-of-the-line recording consoles, the Rein Narma Custom Console, which quickly gained a reputation for excellence in the industry and was widely used by industry professionals in Los Angeles.

The Custom Console was renowned for its remarkable audio fidelity and cutting-edge design features. It enjoyed widespread use in the professional recording industry throughout the 1960s and 1970s and was especially favoured by rock and pop music producers. The console's modular architecture was a key feature that set it apart. With interchangeable modules that could be tailored to the unique demands of any given recording session, engineers were able to adapt the console to each project's requirements and keep up with the most recent developments in technology.

The Custom Console utilized vacuum tube technology, which was highly regarded for its warm and natural sound. The console's exceptional sound quality and long-term dependability were also attributed to its high-grade components and thorough construction. Furthermore, the Narma radio console was a significant improvement over Van Gelder's earlier Altec radio console in every aspect. Irving Joel, a member of the Audio Engineering Society, gives intimate knowledge regarding this console and says, “it contained ten channels of inputs, each with a three-band equalization, an echo sends, and a unique 20-decibel gain block for high-output mics” (Joel, 2002).

During my investigation, I learned that Van Gelder preferred mono recording. However, it was not until he was introduced to stereo recording by Tom Dowd that he contemplated its potential as the way forward. Consequently, Van Gelder came to appreciate the importance of making more resolute choices about the equipment he would employ. Sasha Zand states, “Although he hadn't yet begun recording in stereo, the console was future-compatible with the new and

growing format" (Zand, 2004:42). In an interview, Don Sickler also gave his preferences for how the custom console looked. "It was designed to look like the console at Columbia Records 30th Street Studio" (Sickler et al., 2011). The Narma Custom Console is now highly sought after by collectors and recording fans as a classic example of mid-century recording technology (see figure 8).

Figure 8. Van Gelder's Narma Custom Console 1957-1970. Source: The Van Gelder Estate. Mixing – RVG Legacy, n.d.

6.3 Tape Saturation Analysis

Tape saturation is a phenomenon that occurs in analogue tape recording. It happens when the voltage level exceeds the tape's recording capability. When a signal is sent to a tape recorder, the electromagnet in the recording head detects the voltage (Blackmore, 2024).

The tape has a surface composed of iron oxide powder, and the recording head magnetizes individual iron oxide particles on the tape to capture the signal. The magnetization undergoes temporal variations to generate a recording on the tape.

6.3.1 How does tape saturation work

Tape Saturation replicates the auditory characteristics of audio captured by tape machines. It introduces harmonics of an odd order, mild non-linear compression, and changes in the frequency response. This technique attenuates high-frequency signals and imparts little amplification to low-frequency signals.

Van Gelder utilized this technique, which created immediacy in his recordings. However, his specific methods to employ this technique remain a mystery. Before recording, Van Gelder meticulously adjusted the sound balance while the musicians played the song, ensuring that each element fit seamlessly without overpowering the others (Waring, 2023). In my opinion, Tape Saturation was instrumental in defining the unique Blue Note Sound. To understand this technique better I will compare vintage Tape Saturation to more modern tape saturation techniques to gain a more comprehensive understanding of this technique.

During the 1950s, Tape Saturation grew popular to achieve rich, expansive recordings. However, I'm uncertain how Van Gelder employed this technique in his mix. In this section, I will shed light on its efficacy and practicality. Analogue recording tape has intrinsic nonlinearity and is influenced by several factors, including tape formulation, recording and replay head construction, tape speed, tape width, equalization, phase shifts, high-frequency bias level, and waveform. These characteristics provide many opportunities for experimentation, but they may also result in distortions in harmonic content, inconsistencies in frequency and phase response, and a decrease in dynamic range. Magnetic saturation and "self-erasure" phenomena pose a significant risk to high-frequency transients.

Professional tape machines are often calibrated to a slightly higher bias level than the ideal setting to minimize harmonic distortions in the low and mid-frequency range. This leads to a more "sonically pleasing" sound in contrast to digital systems, which often exhibit a uniform and straight-line response. Despite the little disparity in frequency response, the gentle curvature of the response curve and its corresponding phase response contribute to a more enjoyable and warmer auditory experience in contrast to almost flawless digital systems.

Nevertheless, analogue tape recorders may contribute high-frequency oscillation in pre-emphasis equalization, a boost in the mid-range of the frequency response (particularly evident at slower tape speeds), and considerable third-harmonic distortion in loud low-frequency elements as a result of signal processing. Slight modifications of a decibel or less can have a notable impact on the impression of sound quality (Robjohns, 2010). It should be emphasized that while frequency response plays a vital role in creating a sense of warmth, the overall tone alone is insufficient to impart warmth to a recording.

The technique of tape saturation is frequently utilized in contemporary music production. Although sound engineers nowadays can access various plug-ins to attain this effect, this wasn't always the case. Back in the 1950s, Van Gelder's time, there were no plug-ins accessible and no recognized methods to obtain the desired sound. Nevertheless, with the help of contemporary technology and expertise, sound engineers can now offer valuable recommendations on seamlessly integrating tape saturation into our mixes, which makes the music richer[5]and fuller[6].

6.3.2 How Audio Saturation Can Improve Your Mix

This technique is a crucial factor in recording. Utilizing this technique on individual bus groups, tracks, and the master channel will significantly enhance the quality of your mix. Furthermore, it enhances the ideal analogue ambience (Blackmore, 2024).

Saturation is an influential audio technique that may enrich the sound with complex harmonics and a gentle type of compression, leading to improved auditory perception (Blackmore, 2024). This procedure enhances the sound by adding increased warmth, depth, presence, color, and character, resulting in a more powerful and louder overall tone. In addition, saturation is optimal

[5] A sound laden with multiple overtones.
[6] A separation of a great-sounding song from a home-produced song.

for effectively merging clusters of sounds and creating a unified mix when applied to bus groups and the master.

6.3.3 Where To Apply Tape Saturation

As stated in this research, Van Gelder applied tape saturation in his recording process. The only limitation to the research, as stated, is that we don't know exactly where and how he applied it. According to this research tape saturation can be applied in the mixing process. However, overdoing can make the mix sound bad (Blackmore, 2024). Saturation is also a versatile effect used for both sound design and mixing. It's critical to acknowledge that sound engineers are recommending specific areas where tape saturation can be utilized, as I previously mentioned. To illustrate, I will provide a few examples from the pioneer of audio saturation, outlining the effective applications of tape saturation. These examples are based on modern times, which does affect the research problem, considering there were no DAWs in Van Gelder's time. In my opinion, these three examples are the most valuable areas where he could have applied tape saturation.

6.3.4 Drum Bus

It is unclear how Van Gelder applied tape saturation to the drum buses in modern times. Tape saturation on your drum bus is effective because it consolidates your drum tracks by binding them together. Additionally, it allows you to control unpredictable sudden changes and reduce any undesirable excessive high-frequency harshness (Blackmore, 2024). This method is an outstanding technique to include personality and energy into your drum sound while providing a subtle but impactful "punch" that will enhance the presence of your drums in the mix (Blackmore, 2024).

6.3.5 Basslines

Van Gelder incorporated tape saturation in the bass mix, but there is no documented information on the specific method he used. According to this research, it is known that he panned the bass along with the drums to the right. In this section, I aim to elucidate the workings of tape saturation in the bassline, considering the absence of evidence regarding his approach. Adding tube saturation to bass components boosts power and fat. Driving the bass via harmonic

distortion increases the mid-range, enabling it to stand out in the mix giving them prominence within the overall mix (Blackmore, 2024).

6.3.6 Master

Van Gelder employed tape saturation on his master tapes to prevent sound distortion. To minimize noise, Rudy consistently pushed the meter to the brink of distortion during both recording and mastering, enabling the music to mask tape hiss and vinyl LP surface noise. This technique is widely believed to impart a favorable character to the sound (The Van Gelder Sound: Characteristics [TVGS], n.d.). In my view, comprehending his rationale for using tape saturation during mastering is challenging, but research indicates that it was to achieve the lowest possible noise. In modern-day times applying tape saturation to your master can enhance the overall sound of your mix by adding a cohesive analogue effect (Blackmore, 2024).

However, it is important to be careful with the amount you use, as a little can go a long way. Another valuable option is to add a console-emulated plugin to the master. This method would imply replicating your mix via an analogue console, which would work best with single tracks. This method creates a cohesive, analogue vibe across your entire mix (Blackmore, 2024).

To conclude this subsection, it's worth noting that tape saturation techniques have undergone significant evolution over time. Comparing the past and present, we see that Van Gelder employed several types of equipment for tape saturation. Modern sound engineers predominantly depend on digital audio workstations (DAWs) containing built-in tape saturation and plug-ins. Below, I have included some photographs highlighting Van Gelder's tape recorders that he utilized for tape saturation (see figure 9).

Figure 9. Van Gelder's Ampex 300-C in 1953 in the Hackensack control room. Source: The Van Gelder Estate. Mixing – RVG Legacy, n.d.

In 1956, Van Gelder and engineer Tom Dowd joined forces to experiment with two-track recordings. Dowd brought his trusty two-track tape recorder to assist Van Gelder, who had recorded in mono during numerous Atlantic sessions at the Hackensack studio (Tape Recorders – RVG Legacy [TP], n.d). In the image below I will showcase the equipment Van Gelder used for mono and stereo (see figure 10).

Figure 10. Van Gelder's Ampex 350-2P used at Art Blakey's session. Source: Mono & Stereo – RVG Legacy, n.d. Photo credit: ©Francis Wolff Mosaic Images LLC, 1957.

During studio sessions between 1951 and 1959, Van Gelder employed two full-track Ampex 300s for recording, and it's possible that he also utilized a pair of 350-2P portable machines for two-track studio recordings. When Van Gelder moved to his Englewood Cliffs home in the summer of 1959, he improved his equipment by combining two Ampex 300-2C two-track and one 300-3C three-track console tape recorders.

Although it's unclear whether he used the three-track recorder for recording, it was likely employed for mastering purposes for companies like Vox (see figure 11).

Figure 11. Rudy in the Englewood Cliffs control room ca. 1960s. Source: The Van Gelder Estate. Monitors – RVG Legacy, n.d.

Following an examination of Van Gelder's techniques. I plan to analyze the techniques used by Van Gelder and conduct a listening analysis on selected songs where I believe Van Gelder employed his techniques. I will compare Alex Declet's article on Engineers Throughout Jazz History with my analysis. This will help me critically listen and examine the intricacies of these techniques. Although there's no video footage of Van Gelder's techniques being demonstrated, Declet's article will provide insight into how they were used. Additionally, Van Gelder's replica, James Farber, will offer insights into how Van Gelder influenced him, especially in terms of how his techniques are used in modern times and how he tries to replicate what Van Gelder employed.

6.4 Listening Analysis

Art Farmer's "A Night at Tony's," released in 1954 by Prestige Records, offers a compelling illustration of three techniques contributing to the recording's immediacy. Based on my analysis, I assume that Van Gelder used the close-miking technique. This assumption is supported by the fact that he frequently used this technique, and upon listening to the recording, it is apparent that the piano and alto are positioned close to each other and panned to the left, indicating the use of close-microphone technique, this assumption is based on several testing videos viewed on Youtube demonstrating how the close-microphone technique sounds.

In my analysis, I noticed the presence of the peak limiting technique. I gathered this from the distinct clarity between the trumpet and alto saxophone, as they do not overlap in terms of volume. Additionally, I identified the use of tape saturation because the track has a warm sound and attenuates high-frequency signals while imparting little amplification to low-frequency signals, which aligns with the definition of tape saturation. The song's arrangement mirrors Van Gelder's techniques, and this can be seen in comparison to how the song "Freddie Freeloader" employs similar techniques, despite not being engineered by Van Gelder.

After comparing the two songs, it's clear that Van Gelder's techniques are employed in both. However, "A Night at Tony's" is a bit louder and brighter, while "Freddie Freeloader" is softer and calmer. Declet also corroborates my analysis and gives his input on “Freddie Freeloader” and says “The piano and alto saxophone are panned to the left, while the bass takes center stage. On the right, the trumpet, alto saxophone, and drums are in perfect sync. The drummer keeps the swing going throughout the song, with most of the snare accents staying low” (Declet, 2017).

The recording techniques employed by Van Gelder are renowned for their ability to evoke a live sound quality, as exemplified in this song. Listening to this piece transports me to a jazz lounge where I can imagine Art Farmer performing live. It's worth noting that the authenticity of Van Gelder's recording style has been praised by many, including the esteemed producer, Michael Cuscuna.

In his article titled "Secrets of the Blue Note Vault: Rediscovering Monk, Blakey, and Hancock," Dean Schaffer shares his perspective on Van Gelder's live recordings. He states Van Gelder loved

the raw sound of live music. Whenever he attended a concert, he would feel that the recordings don’t sound like the live concert. “Rudy wanted to make records that sound better and closer to the live experience. Because of his passion, he changed how jazz was heard on record” (Schaffer, 2010).

Van Gelder was also gaining valuable experience with every new session. Blue Note owner Alfred Lion, especially particular about sound, offered guidance and encouragement to help Rudy sharpen his own already keen aural sensitivity (Skea, 2001).

In the book Jazz on Records, Alfred Lion discusses his good relationship with Van Gelder and how he understood what he wanted in his music. "I had the chance to tell Rudy what I wanted to hear in the recording, but in a different way" (Fox, 1987:68). Lion noticed that in commercial songs produced by large corporations, the drummer was often placed in the background, making it difficult to hear the hi-hat (Fox, 1987:68). Lion asked Van Gelder to place a microphone there, and he happily obliged. I could never hear the [hi-hat]. So, Rudy suggested we put a microphone there (Fox, 1987:68).

Lion describes Van Gelder as a compassionate collaborator who always worked hard to achieve what Lion wanted. Van Gelder delivered exactly what the audience desired, perfecting their performance to the highest level. He consistently pushed boundaries and explored uncharted territories. He was always working, hoping to meet what I wanted. He was very sympathetic, and we worked together constantly (Fox, 1987:68).

The techniques discussed underline the essence of jazz and have given it a unique and recognizable sound that endures to this day Van Gelder was the only engineer working for Blue Note during the 1950s and 1960s. His prestigious sound, known as the "Van Gelder Sound", became synonymous with the label's distinctive Blue Note Sound. Despite recording for other labels, Van Gelder always employed his signature methods, giving each recording his distinctive stamp.

James Farber, a renowned engineer, upholds the legacy of the legendary jazz engineer Van Gelder, whom he regards as the best jazz engineer of his time. Van Gelder's techniques are responsible for shaping the sound of jazz recordings as we know them. Farber has done an exceptional job in preserving Van Gelder's techniques and continuing his legacy. Considering

this, I will present a listening analysis of Joshua Redman's album, Moodswing, to highlight Farber's skills. I will analyze the album by critically listening, taking notes on what I hear, and comparing my analysis to Declet's article.

James Farber produced and mixed Joshua Redman's album "Moodswing", which is regarded as a blend of modern jazz and Van Gelder influences. "Alone in the Morning", the opening track, features a bossa nova beat played by piano, bass, and drums. The gentle and soothing sound of the ride cymbal catches the listener's attention. The drum set is mixed in stereo, with the snare placed in the centre and the hi-hat slightly panned to the right. The kick is also placed in the centre, while the cymbals are hard-panned to the right. This creates an intimate feel similar to Van Gelder recordings (Branciforte, 2016). Based on my analysis, what I heard from the track, and the information from Declet's article, I can confirm that this statement is accurate.

According to Farber, contemporary artists prefer high-quality pianos and drums on their albums (Declet, 2017). In continuation of the analysis of the Redman album, the release features a well-nourished, full-sounding kit panned to the mid-right, a stereo-recorded piano, and a tenor saxophone and bass in the centre (Declet, 2017). On the album, Meldhau plays a supportive role without overpowering the listener. Redman's saxophone produces a subtle reverb effect that enhances his solo, giving length and depth to his phrases. Farber notes reverb complements Redman's slow, upbeat bossa. Christian McBride's bass playing is prominent and adds depth to the music (Declet, 2017).

However, there is an issue with the bass track that causes some reverberation throughout the album (Declet, 2017). This rumble often clashes with the lower notes of Redman's tenor. Despite this problem, the bass track was kept as it fills the rest of the space within the spatial spectrum. The recording features a blend of sounds that demonstrate the microphone's frequency range (Declet, 2017).

In my opinion, and based on Declet's observations, it seems that Farber intended for each musician to have their unique voice, as evidenced by McBride's bass clarity and presence in the foreground. Redman's album showcases a polished quality that distinguishes it from the raw intensity of a classic "Blue Note" Van Gelder recording. Upon comparing the songs "Moonswing" and "Moonray," I believe that Van Gelder's techniques were used on both tracks, with the only variance being the different engineers involved in their production.

This is supported by the fact that both songs sound similar in terms of panning and how they sound similar to one another in terms of the recording techniques used. When you listen to "Moonray," a piece by Artie Shaw, from the Album Out of the Afternoon by the renowned jazz drummer Roy Haynes. At the beginning of the song, the drums and cymbals hit the right ear with a loud and sudden impact, and the snap of the snare can be heard in the saxophone microphone and possibly the room microphones.

Rahsaan Roland Kirk played both tenor and soprano saxophones. He was recorded in mono using a single microphone that was panned hard left. This approach caused his sound to bleed into the drum mics, generating an eerie effect due to the distance between the saxophones and the microphone (Declet, 2017). Similarly, Tommy Flanagan, the pianist, was recorded in mono but panned to the centre. There is some debate over whether the unique tone of Roland Kirk's saxophone is due to Van Gelder's microphone choices or the mics capturing more of the room's acoustics.

This recording approach enables the pianist to deliver a raw and true sound since the environment cannot enhance the tone. Henry Grimes, the bassist, is positioned in the middle, with a hollow and powerful sound that sometimes gets lost in the upper register. The panning and sound of all artists alter significantly between the two albums, which might be attributed to Van Gelder's microphone choices or to the mics capturing more of the room's acoustics. Roland Kirk's saxophone has a unique tone, and when he performs double melodic lines, they sound slightly off-key, providing character to the song. Farber's panning choices complement the stereo range and combine the musical elements seamlessly (Declet, 2017).

In an interview with Tape Op Magazine by Joseph Branciforte, Farber discusses his modern recording techniques and highlights Van Gelder's pioneering methods. "I tend to use compression on vocals and electric instruments such as electric bass or electric guitar. However, I rarely use it on acoustic instruments, unless there is a peaky sound from a trombone or a trumpet that could lead to too many overs if I have the average level where I want it. For drums, I might use some parallel compression as the dynamics of drums can be a little wider than the band's dynamics. So, I blend some compressed signal underneath to achieve a good mix" (Branciforte, 2016).

In the same interview, Farber was asked about his approach to setting up and monitoring sound in a small club like the Village Vanguard. He stated that his usual method involves running the audio signal through a preamp, then a converter, and then recording on ProTools with no processing. As for monitoring, he relies on earphones. However, this approach requires critical thinking and planning. Farber testifies and says “It requires a lot of pre-planning because you've got to plan the load-in, the running of the cables, and the backend setup (Branciforte, 2016).

I became proficient in using Pro Tools during my music technology undergraduate studies. I learned that James Farber, a renowned sound engineer, also uses Pro Tools for peak limiting, although his specific approach may differ from that of other sound engineers. It is crucial to keep in mind that when comparing the peak limiting methods of Farber and Van Gelder, we need to consider that Van Gelder had access to custom-made equipment (Fairchild 660) for his work. On the other hand, contemporary engineers use digital audio workstations (DAWs) with plug-ins to limit the peaks during mastering.

There are discernable differences when comparing Van Gelder's compression equipment with contemporary equipment. Nevertheless, I believe that Van Gelder's peak limiting technique is comparable to James Farber's, given that Farber drew inspiration from Van Gelder's recording methodology. To support my stance, I base this on Farber's records and interviews where he speaks about Van Gelder.

During the Tape Op Magazine interview, Farber discussed his engineering approaches, including the influence of Van Gelder. When asked if he still uses those approaches, Farber replies and says “Well, I'm always working for someone, so I want the record to reflect what they're into. A lot of piano players hate that mono Rudy piano sound; they want a big, expensive stereo piano sound” (Branciforte, 2016).

During the same interview, Farber spoke with Bill Evans and referred to Van Gelder's stereo recordings, which will be discussed later in the study. Farber, who was a big jazz fan even when he was just out of college, shared that jazz was what he listened to at home, played, and loved. In terms of engineering, he expressed admiration for the early stereo records of the late '50s and early '60s, particularly the sound of Van Gelder's recordings. Farber loved how the drums were in mono on the right speaker, and there were no pan pots- just left, centre, right.

Farber has successfully continued Van Gelder's legacy by meticulously reproducing his techniques, which include close-miking and peak limiting. Thanks to his deep appreciation for Van Gelder's sound, we are now able to relish exceptional jazz recordings from artists such as Joshua Redman and Randy Brecker with remarkable clarity and artistry.

When considering the recording engineers who have had a significant impact on the recorded history of jazz music, notable figures such as Rudy Van Gelder or Fred Plaut may come to mind. However, if you were to ask prominent jazz artists from the last 25 years, such as John Scofield, Joshua Redman, Brad Mehldau, Dave Holland, Joe Lovano, and the late Michael Brecker, they would likely acknowledge the contributions of engineer and mixer James Farber. "He's, without question, one of the greatest if not the greatest — jazz engineers of his generation," says saxophonist Redman, who came to prominence in the early ‘90s (Branciforte, 2016).

6.5 Mono Recording

Van Gelder was a highly esteemed authority in the realm of mono recording, and he held a particular affinity for this approach, particularly when it came to the piano. “RVG made either mono or stereo sound great” (LondonJazzCollector et al., 2014). Despite mono recording still seeing some use today, it has largely been supplanted by stereo recording in the industry. Nonetheless, only a scant amount of information exists regarding Van Gelder's mono-recording technique. To address this challenge, I intend to compare Van Gelder's mono-recording techniques, as spoken about by his influencers, with contemporary mono-recording techniques.

The initial notion of sound recording differed from what we know now. Mono is a term derived from the word "monaural". It refers to a format that uses only one channel. This format became popular with the advancement of recorded sound (LondonJazzCollector et al., 2014). Before the late 1950s, engineers such as Rudy Van Gelder commonly used the Mono format. However, after the introduction of the first stereo LPs, there was a significant increase in the demand for stereo records and equipment. This ultimately led to the decline of the Mono format by the late 1960s (LondonJazzCollector et al., 2014).

I came across an article by Dan Skea, where he explains that Van Gelder used a mono-recording technique. This method consolidated the signals from all the microphones onto a solitary track, which was subsequently played through a single loudspeaker. Once an initial equilibrium was

achieved and the levels of the different instruments were adjusted, the engineer only needed to make real-time modifications by increasing the volume of a specific microphone to enhance the recording of a solo section (Skea, 2001). Farber admired Van Gelder's mono-recording technique and attempted to implement it in modern times. However, modern piano players do not prefer mono recordings.

In an interview with TapeOp magazine, Farber discussed Van Gelder's mono-recording technique. According to Farber, many piano players dislike the mono Rudy piano sound and prefer a bigger, more expensive stereo piano sound. Additionally, the hard-panned mono approach is not suitable for complex music that requires isolation for editing purposes because it lacks leakage. Leakage defines the room and allows hard-panned instruments to sound more connected to each other (Branciforte, 2016).

As mentioned earlier, mono recordings are still in use today, but their production is limited to a few select cases. In the United States, record companies stopped publicly distributing mono records in 1968. However, they occasionally pressed them for radio station use until around 1973. At that time, AM radio was still a popular music format, and it was only capable of playing mono recordings. In today's music market, stereo records have replaced mono records. However, mono recording is a valuable tool in contemporary music production, often used to record a specific instrument rather than the entire process.

Furthermore, monophonic recording plays a key part in the process of mixing. Ensuring the right wiring of the hot and neutral pins of balanced microphone cables is crucial in music and production facilities. Failing to do so could result in multiple microphones (and other equipment) being wired with opposite polarities, leading to audio distortion and other issues. Therefore, ensuring proper cable wiring is crucial to avoid any potential problems. Huber and Runstein give an example and state that ‘if a single instrument is picked up by two mics that uses improperly phased cables, the instrument might end up being either totally or partially canceled when mixed to mono (Huber & Runstein, 2005:132).

My literature analysis delves into Corbett's book, focusing on drum miking in mono recording and its impact on sound clarity. Through my work, I aim to offer a comprehensive overview of the evolution of mono-recording techniques in contemporary times. Corbett prefers mono recording in drum miking, as it produces a more authentic and natural sound.

A drum set can be miked with anything from a single mono microphone to 20 or more mics! Natural sounds tend to be preferred for jazz and folk styles, whereas huge, studio-crafted, power-house sounds provide the basis of rock music (Corbett, 2015:194).

Corbett highlights Van Gelder's close microphone technique using the mono recording technique for guitar by saying there will be frequency cancellation when using a mono recording. When using both a close mic and a distant mic, panning them to the left and right, respectively, can create a huge and expansive stereo sound. However, there may be a problem with frequency cancellation when the two mics are panned together in the centre or summed to mono by a consumer playback system. To ensure that the sound remains big and full, always check the multi-miked guitar sound in mono. In mono, the sound will become narrower (Corbett, 2015:216).

To summarize this section, it is evident that Van Gelder preferred mono recording over stereo. In the 1950s, he would release a complete record when he recorded in mono. Nowadays, mono recording techniques are utilized in DAWs for specific instruments, such as the trumpet and guitar, to achieve a clear mix. An example of Van Gelder's mono recording can be heard in "Timepiece" (Gil Melle Quintet Vol. 2; Blue Note 5033) Original RVG Mastering – 1953. The piano and drums are recorded in mono in this piece, but the latter is panned to the right.

6.5.1 Stereo Recording

In March of 1957, Van Gelder conducted his initial professional stereo recording at the Manhattan Towers, a hotel situated on Broadway between 76th and 77th Streets. The recording was helmed by Art Blakey and was ultimately released by the Blue Note label. For this session, Van Gelder utilized his newly acquired portable two-track tape recorder, the Ampex 350-2P.

Frederick Cohen talks about Blue Note's transition to stereo recording. In May, the label started recording all of their sessions in both full-track (mono) and two-track (stereo) tape, but they were hesitant to release their first stereo albums to the public for two more years due to doubts about its popularity in the market (Cohen, 2010).

During the late 1950s, Van Gelder conducted experiments with stereo recording techniques in Englewood. He grew fond of the technique and started using it frequently. In 1959, with the

increasing popularity of stereo recordings, Van Gelder constructed a new studio and residence in Englewood Cliffs, New Jersey (Skea, 2001).

However, only a partial documentation of Van Gelder's stereo recording technique is available today. To address this issue, we can compare images of his stereo recording techniques with modern-day stereo recording techniques. Despite the technological breakthrough in stereo recording, some record companies were hesitant to adopt the new technology due to uncertainty about the general public's interest.

Moving to stereo required purchasing a second loudspeaker, two-channel amplifier, stereo cartridge, and other components. Initially, some labels released stereo recordings on quarter-inch reel-to-reel tape, targeting audiophiles. However, most customers found the transition to stereo time-consuming and challenging. Additionally, engineers required more advanced skills to produce stereo recordings compared to the simpler monaural process.

During the early days of stereo, engineers had limited options for routing signals as consoles that enabled panning signals from right to left were not yet available. They could only send sounds to either the left or right channel, or to both channels simultaneously, giving the impression of a sound placed at the centre of the sound stage. However, due to the "direct to two-track" method, any decisions taken while recording could not be undone during post-production.

The shift from mono to stereo recording was a challenging process for the music industry. Record companies started releasing music in both formats, which meant that engineers had to record using separate machines simultaneously. This created a tricky situation as it was impossible to monitor both versions at the same time. Over time, advances in stereo recording techniques have been made, and stereo miking has become a common practice in the recording process.

Unlike when pianos were only recorded in mono, modern recording now often employs Digital Audio Workstations (DAWs) for stereo recording. As a result of these advances, records are now produced in stereo. Huber and Runstein define the term stereo miking. The term stereo miking techniques refers to using two microphones to obtain a coherent stereo image (Huber & Runstein, 2005:143). From my viewpoint, these methods may be used for close or far placement of individual instruments, vocalists, and large or small groups in either live or studio

environments. Your ingenuity is the only constraint. Modern engineers use various stereo miking techniques to achieve a well-rounded stereo sound. The four fundamental techniques are Spaced Pair, X/Y, M/S, and Decca Tree.

6.5.2 Spaced Microphones

Spaced microphones is a technique used to create a stereo image of an instrument or group. This technique involves placing two identical microphones in front of the instrument or ensemble at varying distances (Huber & Runstein, 2005:144). The spacing between the microphones is determined by the dimensions of the instrument or ensemble, and they use disparities in time and amplitude to provide a stereo representation. However, due to differences in the time of sound arrival at each microphone, phase mismatches may occur between the two channels. Playing back audio in mono may result in frequency response variations and perhaps lead to partial cancelation of sound components (see figure 12).

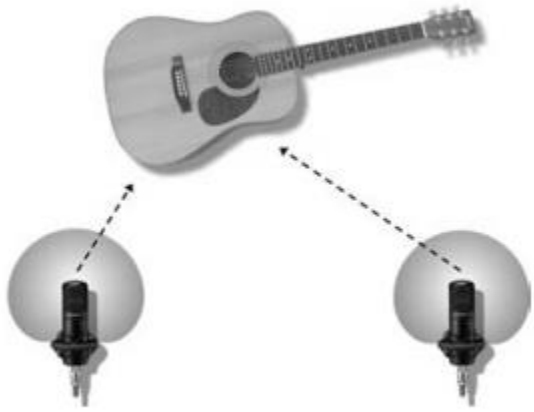

Figure 12. Spaced Pair Miking Techniques. Source: Huber & Runstein, 2005, p.144.

6.5.3 X/Y

“X / Y stereo miking is an intensity-dependent system that uses only the cue of amplitude to discriminate direction” (Huber & Runstein, 2005:144). To use this technique, two directional microphones must be placed close to each other but not touching. They are angled towards each

other at an angle of 90 to 135 degrees and focused on the sound source. The outputs of the microphones are equally panned left and right to produce a stereo image. This method produces a better stereo image than a separated pair, and the close positioning of the microphones prevents serious phase issues. Most X/Y configurations use cardioid-polarized microphones, but the Blumlein approach is also becoming popular. “The Blumlein approach involves two crossed bidirectional microphones offset by 90 degrees” (Huber & Runstein, 2005:144). Stereo microphones with two diaphragms in the same housing are also available, either fixed in a 90-degree or switchable X/Y pattern or designed so that the top diaphragm may be rotated 180 degrees to allow for numerous coincident X/Y angles.

Figure 13. Huber and Runstein X/Y stereo miking technique: (a) X/Y crossed cardioid pair; (b) sideways shot of the Royer/ Speiden SF-24 phantom-powered stereo coincident ribbon microphone in the Blumlein cross-figure-8 setting. Source: Huber & Runstein, 2005, p.145.

6.5.4 M/S

The M/S technique, also known as the mid-side technique, is a type of coincident-pair system that employs two closely positioned pickups. “This technique is akin to the X/Y technique but requires the use of an external transformer, active matrix, or software plug-in” (Huber &

Runstein, 2005:145). To use the M/S technique, the first microphone capsule is designated as the M (mid) position pickup, while the second capsule is labeled as the S (side) capsule. The M capsule has a cardioid pickup pattern, directed towards the sound source, while the S capsule has a figure-8 pattern positioned perpendicular to the M capsule at 90 and 270 degrees. The M capsule captures the primary sound, while the S capsule captures the surrounding ambient and reverberant sound. “The outputs are merged using a sum-and-difference decoder matrix, which might be electrical or mathematical. This technique converts them into a normal X/Y stereo signal” (M-S = X, M+S = Y) (Huber & Runstein, 2005:146).

One benefit of this approach is that it is effective with monoaural signals. “When the left and right signals are merged, the side signal is removed and the center signal enhanced” (Huber & Runstein, 2005:146).

This is useful because adding reverb to a mono signal can reduce its clarity. Additionally, it enables us to adjust the mix of mid-to-side sound continuously during recording or mixdown. To achieve this, we combine the mid-to-side ratios provided to the decoder matrix. It's advisable to route the M/S tracks to the decoder matrix during mixdown. This allows us to have more control over the stereo width and depth when making crucial decisions later. It's recommended to use a digital recorder for this process, as analogue recording can cause phase delays that may interfere with the decoding process.

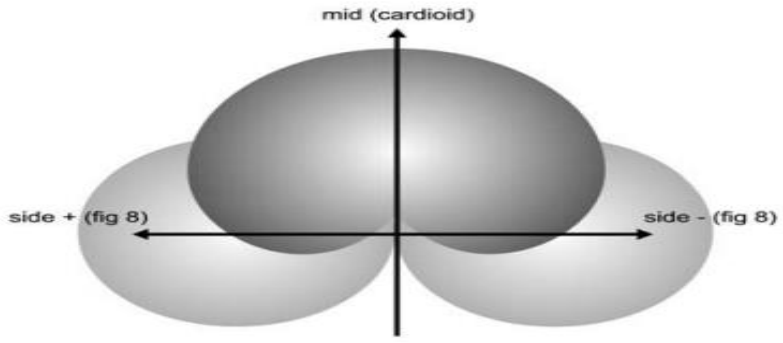

Figure 14. Example of M/S. Source: Huber & Runstein, 2005, p.146.

6.5.5 Decca Tree

“The Decca tree is a time-tested, classical miking technique that uses both time and amplitude cues in order to create a coherent stereo image” (Huber & Runstein, 2005:146). This technique utilises three omnidirectional microphones - two mics positioned 3 feet apart on the left and right, and a third mic situated 1.5 feet in front and in the centre of the stereo field. “This method is often used to capture orchestral performances, and it is commonly positioned on an elevated boom situated above and behind the conductor” (Huber & Runstein, 2005:146). In 1954, the engineers Roy Wallace and Arthur Haddy used Neumann M50 microphones to develop this method. Haddy coined the term "Decca tree" upon seeing the striking resemblance of the arrangement to a Christmas tree.

In contrast, Van Gelder's stereo technique relied heavily on close miking techniques and particular equipment. This approach became prominent in the late 1950s when he partnered with Tom Dowd to utilize the two-track tape recorder (Mono & Stereo [MS], n.d).

This breakthrough allowed for the creation of stereo sound, which became hugely popular among jazz enthusiasts. One of Van Gelder's most notable stereo records was Coleman Hawkins's "There's Nothing Like a Dame," recorded at Worldwide Records in 1958. In my research, I discovered that Van Gelder used three notable techniques for creating stereo recordings: close miking, peak limiting, and tape saturation. Nowadays, there are several techniques available for capturing stereo recordings, including AB, XY, MS, Near Coincident, ORTF, DIN, and NOS. These modern techniques were not available when Van Gelder pioneered stereo recordings in the 1950s. This is why his techniques are so highly regarded. He was able to achieve great results using only three techniques, whereas nowadays, there is a wide variety of techniques and approaches used for stereo recordings.

6.5.6 Overdubbing

Van Gelder was a famous sound engineer who is credited with developing the overdubbing technique, which is now commonly used in pop music production. This technique allows the engineer to experiment with various microphones, placements, and ambience to achieve the desired sound. With only one or two musicians to record, there is plenty of time to perfect the

recording. Achieving the right ambience and depth are crucial aspects of recording that give the listener the impression of being present at the performance.

In music production, overdubbing is a commonly used technique to expand the instrumental or vocal arrangement of a recording. This involves listening to the pre-existing tape tracks, usually through headphones, while recording additional instruments or vocals onto one or more available tracks. These new tracks can be doubled or layered to enrich the final mix's overall sonic texture and quality. Les Paul, a prominent jazz musician, is credited with inventing overdubbing during multitrack recording, a process utilized by Van Gelder.

One of his most famous recordings, "Lover," from 1947, featured eight guitars recorded at different speeds. Van Gelder, known for his love of natural sounds, was intrigued by the possibilities of overdubbing. Borwick generalizes and points out engineers aim for certain goals when utilizing this technique. ‘What most engineers are striving for is the natural live sound. (Borwick, 1994:374).

It should be noted that there is limited information available on how Van Gelder utilized the overdubbing technique. However, Dan Skea sheds some light on what it is and when it was used. According to Skea, Van Gelder began to devote more time to researching the new methods that had become available with the advent of tape recording. One of these methods was overdubbing, which allowed multiple tracks to be recorded or "stacked" on the same tape, one after the other. (Skea, 2001).

In 1951, Van Gelder came up with the idea of sound-on-sound recordings by bouncing signals between tape recorders. That same year, pianist Lennie Tristano used Van Gelder's Ampexes in Hackensack to overdub multiple piano tracks. Concurrently, guitarist Billy Bauer, who often collaborated with Tristano, recorded a collection of Bach's two-part inventions through his overdubbing at Hackensack, performing both parts. "Rudy was just starting to do double tracks at that time. I mean, it was comparatively new," (Bauer, 1998). Saxophonist Teo Macero recalled a session in 1953 where he overdubbed multiple parts on his composition “Explorations”.

The limitations of this dissertation include the varied and secretive nature of Van Gelder's overdubbing technique. However, based on my listening to the recordings from the time he worked, I can say that Van Gelder modified his overdubbing technique for brass instruments.

Borwick compliments the nature of overdubbing in brass and says “Brass too can benefit from overdubbing, as microphones are taken further away to reduce valve or air noises”. (Borwick, 1994:374). When experimenting with distancing microphones, working in a live acoustic environment is important. A dead room can often muffle the sound, but reflective panels help.

To conclude my discussion of the Overdubbing technique, it's worth noting that when Van Gelder used to record musicians, they couldn't stop between recordings while using this technique. However, today, there is a growing trend towards constructing a live area in studios, and some major studios are now entirely live. With overdubbing, the musical passages can be recorded in sections. For instance, the first eight bars might be recorded first. Then, the recording is played back to the musicians, and the record button is pressed at the start of the ninth bar. The musicians then start playing from this point until a musical error or other problem arises.

Chapter 7: Van Gelder’s Approach to Microphone Placement

Rudy Van Gelder was known for his secrecy and precision. He mastered the art of microphone placement techniques using his famous condenser mics. In the 1950s, jazz musicians loved using condenser microphones because they made them sound better. Condenser microphones are best used to capture vocals and high frequencies. They are also the preferred type of microphone for most studio applications.

Van Gelder used these microphones because they offered clear and precise sound quality. In my opinion, using condenser microphones was a major factor in Van Gelder's recordings being so clear and well-defined. Huber and Runstein state their view on condenser microphones: ‘Condenser mics often have a clear, present, and full-range sound that varies with mic design, grill options, and capsule size (Huber & Runstein, 2005:151).

As previously discussed, Van Gelder utilized the close miking technique in his recordings. However, this chapter is lacking in information regarding his approach to microphone placement, given his constant exploration of new techniques. To address this, I will compare Van Gelder's microphone placement in his photographs with modern methods.

7.1 Close Microphone Placement

Van Gelder was a highly esteemed audio engineer renowned for his groundbreaking microphone placement techniques. His approach involved positioning the microphones near the instruments, which allowed him to capture even the most delicate nuances and intricacies of a performance that might go unnoticed when using more distant microphone locations. Through his unique and distinctive approach, Van Gelder could record music in a way that truly conveyed the intimacy and essence of the performance, setting a new standard in audio engineering. Huber and Runstein state, “When close microphone placement is used, the mic is often positioned about 1 inch to 3 feet from a sound source” (Huber & Runstein, 2005:138).

This widely used approach achieves two results:

• it produces a tight, present sound quality

• it efficiently excludes the acoustic environment.

The sound level decreases when recording audio as it moves further away from the source. This means that sounds picked up very close to the microphone will be much louder than those further away. A technique called "near miking" is used to avoid picking up unnecessary background noise. With near miking, only the sound directly in front of the microphone is captured, while any other sounds further away are still picked up to some extent. However, these distant sounds will be much quieter than the main sound source.

In the recording process, Leakage is a common issue when an instrument's microphone also captures the sound of a nearby instrument. This happens because the microphone of one instrument picks up the sound of another neighbouring instrument, resulting in a "leaked" signal picked up by its intended microphone and a nearby microphone. As a result, during the mixdown process, it's easy for the signals to be mixed, causing level and phase cancellations that can make it difficult to control individual tracks without affecting other track levels and sound character. Figure 15 (a trumpet example of Huber and Runstein microphone placement.

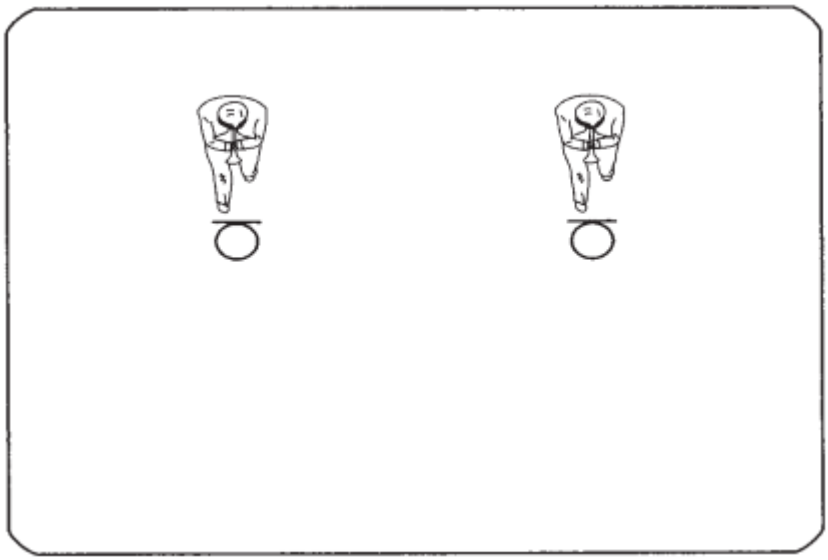

Figure 15. Microphone Placement. Source: Huber & Runstein, 2005, p.174.

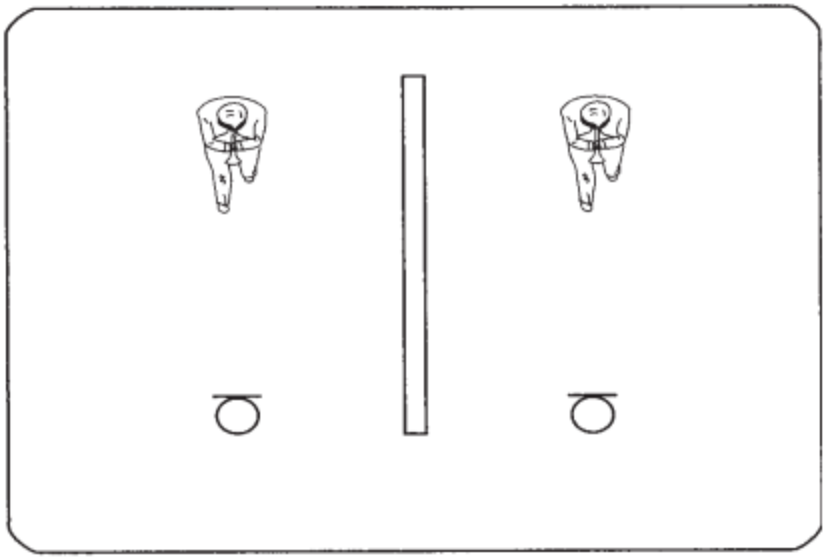

Figure 16. Microphone placement with an acoustic barrier. Huber & Runstein, 2005, p.174.

Below, there are photographs of Lee Morgan. In my opinion, these photographs showcase Van Gelder's close microphone placement, except for Figure 16.

Figure 17. Lee Morgan in Hackensack and Van Gelder’s perception of the close microphone placement. Source:(LondonJazzCollector, 2016).

Figure 18. Position of Lee Morgan using Van Gelder’s close microphone placement. Source: Bluenote, 2023.

When comparing Figure 15 and Figure 17, Van Gelder's close microphone placement technique aligns with Huber and Runstein's contemporary approach to microphone placement. The sole disparity is that Figure 16 displays Huber and Runstein utilizing an acoustic barrier to investigate their placement technique. Contrarily, Figure 16 depicts Van Gelder using the same close microphone placement technique, but Lee Morgan adopts a distinct posture while expressing a deeply emotional moment through his playing or improvisation.

In conclusion of this subsection, it is noted that Van Gelder was known for his focus on the art of experience. Huber and Runstein emphasized the importance of practicality with their statement, "As always, the experience will be your best teacher" (Huber & Runstein, 2005:141). When using a microphone placed between 1 and 6 inches away from the sound source to record audio, it is important to note that the complete tonal balance of the source may not be captured. This is due to the microphone's proximity to the source, which records only a small portion of its surface.

As a result, the tonal balance is specific to that area, much like hearing parts of an instrument through an acoustic microscope. Moving the microphone a few inches away at such close distances can greatly impact the captured sound.

7.1.1 Accent Microphone Placement

When capturing musical performances, placing an accent microphone strategically near a specific instrument or group section is essential. There is no defined explanation for accent microphone placement. Still, in my opinion, accent microphone placement refers to positioning the microphone adjacent to you, typically in the corner of a studio setup. Striking the perfect balance between proximity and natural acoustics is crucial for optimal recording. The accent signal should blend seamlessly with the overall recording without overpowering or drawing undue attention to itself. “A high-quality accent mic should enhance the listening experience without detracting from the performance” (Huber & Runstein, 2005:142) (see figure 19). Example of an Accent Microphone Placement setup.

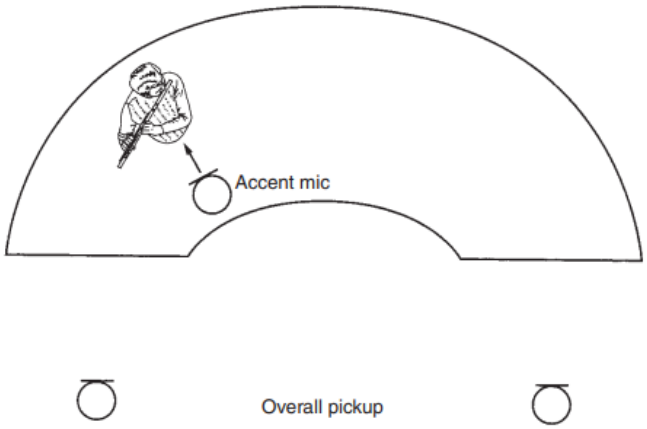

Figure 19. Example of an Accent Microphone Placement Setup. Source: Huber & Runstein, 2005, p.143.

Curtis Fuller warming up; this could be an example of Van Gelder's accent microphone placement (see figure 20).

Figure 20. Curtis Fuller warming up. Source: The Van Gelder Estate. Smithsonian Institution, 2024. Photo credit: ©Francis Wolff, 1957.

Regarding the placement of the accent microphone, it remains uncertain whether Van Gelder employed this particular method. Nevertheless, upon examining Huber and Runstein's placement in comparison to Van Gelder's photographs, it is conceivable that Van Gelder utilized the accent microphone placement during Curtis Fuller's warm-up.

Although Van Gelder preferred to work alone and did not adhere to any particular methodology when selecting his microphones, Huber and Runstein's book Modern Recording Techniques offers a comprehensive guide that outlines the ideal microphone for each sound or quality. Additionally, they emphasize the importance of having skilled musicianship as a critical factor in achieving exceptional recordings.

Van Gelder was always prepared to record, and that's why no one knows his secrets. When he set up the microphones, nobody was there to witness him. However, Huber and Runstein emphasized the importance of a musician being ready to record. “As a rule, starting with an experienced, rehearsed, and ready musician who has a well-tuned quality instrument is the best insurance for getting the best possible sound” (Huber & Runstein, 2005:152).

7.1.2 Discussing the Techniques

Van Gelder's microphone skills were exceptional. Each microphone has a unique sound signature, determined by its design and type. With many microphone types and models available for various applications, it's up to the engineer to select the best one for the recording project.

Van Gelder's exploration always seems to reach its deepest depths. His techniques add a certain jazz aesthetic to the music in terms of sound and the techniques used. For example, close miking refers to a method of placing microphones nearby. I tend to prefer the close miking technique as it makes me feel more comfortable and allows me to be heard in the studio. Nonetheless, it's the sound engineer's responsibility to control the volume and microphone settings. Jazz musicians particularly appreciate close miking because the microphone is placed directly in front of them. The close miking technique offers a distinct presence. It requires a certain level of control as the microphone is situated close, but this is not a limitation. Rather, it allows the sound engineer to mix and master the recording expertly. The result is exceptional clarity, as unwanted sounds can be easily detected and eliminated.

During my fourth year of audio mastery, I discovered the crucial role of peak limiting. In 2020, I had the privilege of job shadowing at Kaya FM and learning from Thapelo Mokoena. As he imparted his knowledge, he emphasized the importance of avoiding audio clipping in the mix to achieve a well-rounded and polished final product. With modern digital audio workstations (DAWs), such as Pro Tools, and plug-ins like i-Zotope, peak limiting can be conveniently handled automatically. However, in the past, sound engineers like Van Gelder had to experiment with their equipment to achieve the desired outcome for song releases.

Peak Limiting is a critical aspect of the audio engineering process as it ensures that your music does not clip or get distorted when played on various platforms, including radio stations. With the latest technological advancements, peak limiting has become more widely available to all.

Nevertheless, to distinguish yourself as an engineer, you must possess unique skills and techniques, such as Van Gelder. His techniques cannot be easily replicated without a thorough understanding of how he implemented them, making them invaluable tools for achieving success in the industry.

In this dissertation, tape saturation refers to the analogue recording process. From my personal standpoint, analogue recording presents a distinct array of intricacies and richness. Harmonic enhancement is made possible through the significant role of tape saturation. Unfortunately, in modern recording, we often disregard distortion, which is, in fact, a vital element. Hence, the importance of tape saturation is implemented. When discussing Van Gelder's records, the term "warmth" is commonly used to describe their sound quality.

In modern times, the Neutron Exciter has four different types of saturation: Tube, Warm, Tape, and Retro. In my opinion, tape saturation was an essential factor that gave Van Gelder's records warmth. As per Huber and Runstein, there exist two methods for selecting microphones for a production or studio toolkit. The first approach entails choosing a restricted range of microphones that are suitable for diverse applications.

This method is particularly useful for those who are starting in a project studio or are working within a limited budget. Even seasoned professionals utilize this technique by using a small selection of their preferred dynamic or condenser microphones, which they utilize in stereo pairs. These microphones can be utilized in both project studios and professional settings. The second approach, the "Alan Sides Approach," is more suited for professional studios or personal collectors who want to build their own "dream collection" of microphones to offer their clients. Ultimately, both approaches have their advantages.

In conclusion, this chapter discusses various techniques and makes comparisons to microphone placements. However, Huber and Runstein state that choosing the appropriate mic is only half the story. “The placement of a microphone can play just as important a role and is one of an engineer’s most valued tools” (Huber & Runstein,2005:36). “There is no right or wrong because mic placement is an art form. Placement techniques considered ‘‘bad’’ might be the accepted standard five years from now” (Huber & Runstein,2005:136). New recording methods arise with the emergence of new musical genres. This contributes to the rejuvenation of music and production. The art of recording should consistently embrace adaptability and originality, which

are two of the most influential factors in sustaining the vitality and prosperity of music and the music industry.

Chapter 8: Overview of Van Gelder’s studio

In this chapter, I will delve into the life of Van Gelder, the mastermind behind the studio where the iconic Blue Note sound was born. I will explore how he acquired the studio, his motivations, and the influence and evolution of the renowned Van Gelder studio, where he applied his techniques to create the classic Blue Note sound. I will also include photographs of the studio's interior and discuss the inspiration behind the Van Gelder studio.

The blue note sound was created in Van Gelder's Englewood studio. He was passionate about recording and improving his studio while also practicing optometry. During an interview, Marc Myers questioned Van Gelder's activities and made certain statements and stated that “In the mid-1950s, Rudy Van Gelder was still practicing optometry but making a lot more money from his recording activities” (Myers, 2012). Myers continued to talk about how Van Gelder was becoming well-known and had to schedule work for recordings. “He had so much work that he had to start allocating specific days of the week for specific labels” (Sickler et al., 2011; Myers, 2012).

8.1 Moving to Englewood

At the beginning of 1954 Van Gelder was engaged to Elva, and they lived together in Manhattan. Rudy's recording business in Hackensack was flourishing, so the couple decided to move out of the city and rent a place on the same street as Rudy's parents (Myers, 2012). After getting married the following year, Rudy and Elva began searching for a home of their own (Murphy, 2008).

Van Gelder had been recording at his parent's house for quite some time, but he started to feel like he was overstaying his welcome. Despite moving out some time ago, he couldn't shake the feeling that he was inconveniencing them. His parents even went so far as to add an entrance to the bedroom wing of the house to avoid disturbing his recording sessions. Unfortunately, Alfred Lion, the producer, preferred recording at night, but this was no longer an option due to noise complaints from the neighbours. After a series of sessions for the Prestige album Gil Evans & Ten, Van Gelder realized that he needed a larger space to accommodate bigger ensembles.

In an interview conducted by NEA (National Endowment for the Arts) Jazz Masters. Van Gelder discusses the reason for his departure from his parent's house. When asked about why he moved out, He said that he got married and needed to have his place to build a studio. He planned to have his living space on the second floor, while the first floor would be dedicated to his studio (Murphy, 2008).

The second reason for moving out was the inability to provide the musicians with the sound quality they deserved. He wanted to give them the best possible sound quality that would help them achieve their musical goals. His focus was to help and guide the musicians in creating the best music they could (Murphy, 2008). In an interview conducted by Molly Murphy for the NEA in June 2008, Murphy asks Van Gelder questions about his new studio.

Murphy: What did you need?

Rudy Van Gelder: “I needed a bigger space. Let me give you an example. Gil Evans had amazing music in his head, and over time, people discovered it. I remember one day when he brought a nine-piece band into my living room in Hackensack. At that moment, I realized I couldn't do justice to his music in that small space. It made me feel inadequate, but I knew I had a responsibility to the producer and the musician. I couldn't fulfil that responsibility in Hackensack, and that's why I needed a bigger space” (Murphy, 2008).

Murphy: "I think building the perfect recording studio would be intimidating," (Murphy, 2008).

Rudy Van Gelder replied: "I never felt that. My drive was so strong that I was ready to take any chance. I put every penny I had into this building. In those days, there were only three big record companies with millions of dollars, but here I am, the one little guy from New Jersey trying to make sounds. During my earlier days, I used to visit different venues, ranging from concert halls to other locations, to find the perfect acoustics for my recordings. I had a clear idea of what I wanted (Murphy, 2008).

After the interview, Murphy shares his thoughts and says: “Van Gelder was describing the building materials used in his recording studio when someone inquired about the many aspects involved. The individual saw that the whole studio looked to be constructed of cinder blocks” (Murphy, 2008). Murphy further goes on about the structure of the studio and states “Rudy explained that although it was not fully blocked, the concrete block was utilized in part. He

added that the studio's design was influenced by Frank Lloyd Wright's conceptions since he was adept at economically working with materials like concrete. However, Rudy did not contact Frank Lloyd Wright personally since he believed it would be too costly" (Murphy, 2008). "Instead, he met with one of Wright's apprentices and talked over the materials in great depth, including what materials to use and how they should be completed. This helped him construct a location that had the appropriate acoustic properties and looked visually beautiful (Murphy, 2008).

8.1.1 Inspiration

The vision for the studio itself came from two specific locations Van Gelder had visited in the 1950s. During this time, he took a job recording on location at Symphony Hall in Boston for Vox Records, a classical label for which he had been doing a lot of mastering work. The studio's design was inspired by two distinct locations Van Gelder had visited in the 1950s. While working for Vox Records, a prominent classical label where he had been mastering extensively, he secured a job to record on-site at Symphony Hall in Boston. "There he spent an entire week learning the acoustics of the venue's large performance space, and the experience made a lasting impression" (Sickler et al., 2011) (see figure 21).

Figure 21. Symphony Hall in Boston. Source: Englewood Cliffs – RVG Legacy, n.d.

Van Gelder had inspiration for arches. Arches were transported from Portland, Oregon, to New Jersey via rail, passing through Canada. Upon arrival, the arches were lifted into place by a

crane, bolted together at the top, and connected at the bottom with steel cables placed underneath the floor. (see figure 22). Arches supporting the studio ceiling.

Figure 22. Douglas fir arches supporting the studio ceiling. Source: Construction of Englewood Cliffs – RVG Legacy, n.d. Photo credit: Atane Ofiaja.

Figure 23. The Englewood Cliffs studio ceiling. Source: Construction of Englewood Cliffs – RVG Legacy, n.d. Photo credit: Atane Ofiaja.

The floor was completed with Cherokee, red-tinted concrete and four-foot square delineations to echo the modular design of the building (Sickler et al., 2011; Myers, 2012) (see figure 24).

Figure 24. Closeup of Englewood's studio's cement floor. Source: Construction of Englewood Cliffs – RVG Legacy, n.d. Photo credit: Atane Ofiaja.

Figure 25. Englewood's studio exterior in 2019. Construction of Englewood Cliffs – RVG Legacy, n.d.

In July of 1959, Van Gelder's brand-new studio was ready for business as soon as it received the certificate of occupancy. Although Van Geld was pleased with the results, others had mixed feelings. Those musicians who had grown attached to the cosy atmosphere of the Hackensack home found the new space to be a significant adjustment. During its first ten years of operation, the living room was a single, expansive area reminiscent of Columbia's 30th Street Studio, with isolation booths not installed until the 1970s (see figure 26).

Figure 26. Stanley Turrentine and The Three Sounds recording at Englewood Cliffs in December Opening of Englewood Cliffs – RVG Legacy, n.d. Photo credit: ©Francis Wolff,1960.

The visionary Alfred Lion, responsible for the inception of Blue Note's groundbreaking project, urged all involved, including his partner Francis Wolff, to embrace the venture. With time, the musicians grew at ease within the fresh surroundings and resumed their craft, yielding timeless jazz recordings with the expert engineering of Van Gelder.

After moving into the studio's living quarters, Rudy continued seeing a handful of his optometry patients (Clark & Cogan, 2003). Still, his recording business continued to grow, so he gave up optometry for good in 1960 (Sickler et al., 2011). Van Gelder made Englewood Cliffs his home and place of work for the rest of his life. His discography kept expanding decade after decade,

thanks to his collaborations with new labels such as Impulse, Verve, and CTI. Despite many changes in the music industry, he remained loyal to jazz music.

Chapter 9: The Rudy Van Gelder “RVG” Future Sound

In the 1960s, Van Gelder's digital sound underwent significant changes as he transitioned from the Hackensack studio to the Englewood studio. After settling in at Englewood Cliffs, Van Gelder refined his sound by perfecting a new room sound. He focused on combining the natural reflections of the live room with the reverb from a specific plate, known as Plate Number 1. This resulted in a beautiful, spacious soundstage quickly becoming a focal point in Van Gelder's earliest mixes at the new studio.

In 1964, there was a noticeable change in the Van Gelder sound. Lee Morgan's "The Sidewinder" became a massive hit for Blue Note that summer, featuring an energetic and radio-friendly sound that was not typical of all Van Gelder's mixes. Similarly, Horace Silver's "Song for My Father" was another radio hit that year, and Van Gelder utilized a similar aggressive mixing style for its production (Hovan, 1999).

Van Gelder's recording studios in Hackensack and Englewood Cliffs had unique sound qualities. However, the Van Gelder Sound's key features are present in both studios' recordings. Although Van Gelder stated that he tailored his approach to each session's musicians and producers, the sound's consistency dominates any potential differences. This is why the Van Gelder sound remains essential to jazz vocabulary today (Updates to the Van Gelder Sound, n.d.)

During the 1970s, Van Gelder remained loyal to analogue media and utilized tape for recording sessions, as well as lacquer disks for vinyl mastering. However, as digital recording technology became increasingly accessible in the early 1980s, “Rudy was excited to acquire his first digital recording equipment, a Sony PCM-1630 digital tape machine accompanied by a U-MATIC transport” (Zand, 2004:42). “This innovative technology allowed for videocassette tapes to capture pulsating signals containing digital information, which Van Gelder utilized for mastering. The PCM-1630 quickly became a favored choice for professional mastering studios throughout the 1980s and 1990s” (Zand, 2004:42).

Figure 27. Van Gelder's Sony PCM-1630 analog-to-digital. Source: (The Digital Era – RVG Legacy, n.d).

"During recording sessions, Rudy used a two-track Mitsubishi X-80 as his first digital reel-to-reel tape machine, which served him well throughout the 1980s for capturing live music. As the '90s began, Rudy acquired another digital two-track, the Sony DASH PCM-3402" (Hovan, 1989). Since the 1960s, multitrack recording has been popular among music producers and musicians because it provides more control. 8, 16, and even 24-track machines were preferred for this reason. "Although Rudy felt that multitrack recording generally did the music a disservice" (Sickler et al., 2011), "throughout the 1970s, he used analog multitrack tape machines. To keep up with the digital era, he acquired a digital 24-track recorder, the Sony DASH PCM-3324, to continue meeting his clients' needs" (Sickler et al., 2011).

Figure 28. Van Gelder is surrounded by his beloved digital tape recorders. Source: The Digital Era – RVG Legacy, n.d. Photo credit: Steve Auchard, The Bergen Record, 1989.

During the 1980s, digital audio emerged as a new technology, but its reception was mixed. Some people who preferred the "warmth" of tape and vinyl found it to be "cold" and "brittle." (The Digital Era [TDE], n.d.). However, Van Gelder, a distinguished professional who worked independently and had a steady stream of clients, welcomed technological advancements that streamlined his work process. As a result, he found the convenience and efficiency of modern equipment appealing, often working up to six days a week (The Digital Era [TDE], n.d.). In the Clark and Cogan book (Clark & Cogan, 2003) Van Gelder says, “I don’t want to go back to [analogue] tape,” he said in 2004. “I don’t want to go back to tubes. I don’t want to edit with a razor blade” (Clark & Cogan, 2003:48). When asked what modern recording technology he wished he had in the ‘50s and ‘60s, Van Gelder replied, “All of it” (Karp, 2009). Rudy also dismissed the naysayer’s claims that digital audio formats inherently sounded inferior:

In an interview done by James Rozzi, Van Gelder expresses his opinions on digital sound and says “If people don’t like what they hear in digital, they should blame the engineer who did it. Blame the mastering house. Blame the mixing engineer. That’s why some digital recordings sound terrible, and I’m not denying that they do, but I don’t blame the medium. They say digital is cold, so they’ve given it an attribute, but linear digital has no attributes. It’s just a medium for storage. It’s what you do with it” (Rozzi, 1995:46).

After the Chris Hovan interview (Hovan, 1989), Hovan shares his thoughts and reflects on the experience. “For Rudy, digital was “a total revolution in the way sound is recorded. “People don’t understand how far-reaching that is yet they’re comparing analogue to digital, but there’s no comparison. People ask me if I’m sentimental about the demise of the LP, no. I’m glad to see it go” (Hovan, 1989).

In my opinion, and Hovan’s opinion, I would say that Van Gelder was also aware of the advantages that come with mastering and manufacturing in the digital era. When asked about the digital era, he stated that “digital data can be copied and transferred from one machine to another. You can decode the data and have a duplicate of your original recording. Van Gelder goes on to say that it’s impossible in the analogue world to make copies of a master tape without losing something. Now, you can say, I love the sound without that something, but you cannot duplicate the master tape in the analogue domain. It’s exactly what it is: an analogue. It’s an approximation It’s a different way of recording, it is just the original recording, but preparing it

for release, making it presentable, and in a form that can go to the plant, so this will ultimately be on a CD without destroying or compromising the sound" (Hovan, 1989).

Van Gelder's knowledge of both digital and analogue recording is truly insightful, given his extensive experience in both realms. It seems clear that he has thoroughly studied every aspect, including the transition from analogue to digital. Following the James Rozzi interview, Rozzi elaborates on Van Gelder's insights and provides his perspective on the digital landscape, offering guidance for modern engineers.

"Ironically, some younger engineers today are not bothered by the inconvenience of maintaining the same older equipment that Van Gelder helped popularize in the 1950s and 1960s. Another ironic twist is that record collectors have praised Van Gelder for mastering vinyl LPs. Still, he has openly stated that he believes the LPs to be the biggest distorter" (Rozzi, 1995:46). In the James Rozzi Interview Van Gelder shares his words on vinyl LPs and states "I've made thousands of LP masters," he lamented. "I used to make 17 a day, with two lathes going simultaneously, and I'm glad to see the LP go. As far as I'm concerned, good riddance. It was a constant battle trying to make the music sound as it should" (Rozzi, 1995:46).

In conclusion, it can be inferred that Van Gelder, drawing from his engineering background, had a keen appreciation for both digital and analogue recording equipment. However, his discerning eye and technical expertise led him to favor analogue methods. His deep understanding of the equipment and its efficacy indicates a strong preference for analogue recording. His exploration of analogue recording techniques reflects his admiration for its visual aesthetics, operational intricacies, and the captivating process involved.

Chapter 10: Discussion and Evaluations

Recording studio owners often emphasize the importance of interpersonal relations in conducting a successful recording session. Unlike larger studios with extensive staff, including a studio manager, independent studios are often run by a single individual, usually the engineer. This makes it even more critical for them to have excellent people skills (Huber & Runstein, 2005:138).

In this dissertation, research has revealed that Van Gelder was a self-taught audio engineer who became famous for constructing and running his recording studio at home. Initially, his clients were accustomed to booking time at professional studios and radio stations. Nevertheless, many jazz labels ultimately started to favor working with Rudy. The question is, what made them choose him over other alternatives?

He kept his rates low, which he could do because he didn't have any staff wages or rent to pay, unlike the studios in the city that had higher overhead and charged more. For instance, Fine Recording, located on West 57th Street in Manhattan, charged $50 an hour, while Rudy only charged $35 at his state-of-the-art studio. This was an effective discount of 30% (Fine Recording Inc. n.d.).

In DownBeat magazine, Leonard Feather gives his opinion on how Van Gelder adored the music he recorded and how enthusiastic he was. “Van Gelder loved the music he recorded. As a record collector from an early age, he would record jazz programs whenever they aired on the radio. He also frequented jazz clubs in Manhattan. In 1956, he got the opportunity to prove his knowledge of jazz in DownBeat magazine's "blindfold test." Rudy performed incredibly well, correctly identifying the title, soloist, or location for an astonishing seven out of eight records by ear” (Feather, 1956).

In addition, Andrew Hovan shared his perspective on the importance of creating a welcoming environment for musicians, aligning with the research question and the fundamental principles of the Blue Note Sound. “Rudy’s work also created the circumstances for his love of jazz to grow into a personal adoration for the musicians and producers he served. When asked about the sound of his records in 1999, Van Gelder explained: You say it’s ‘my sound’; really, what it is my

feeling and my approach to the musicians I'm recording at a particular session. I really don't like to think of it as being 'my sound.' What I'm doing really is trying to let the musicians be heard the way they want to be heard. What it really is, is the musicians' sound" (Hovan, 1999).

10.1 Secrecy behind the Blue Note Sound

There is a prevalent misconception that Van Gelder used "dummies" instead of real microphones in his studio. This belief is rooted in the fact that the Telefunken trademark appears on the microphone before a picture is taken but then seems to disappear afterward. However, this assumption is based on audio recordings made by Charles Robertson about Van Gelder. "The rumor might stem from an interview he gave to Audio magazine in 1957, in which the engineer said, "Of course, Telefunkens are likely to appear in a photograph of a date, but that reminds me of the story of the company which recorded with one make of microphone and then brought out another make for pictures" (Robertson, 1957).

Producer Michael Cuscuna, who knew Van Gelder personally, subsequently clarified that this was a mistaken notion. "there's a misconception that Rudy would switch microphones to avoid being recorded by photographers. But that's not true. Rudy was actually more discreet about his control room equipment and recording practices than his choice of microphones (Cuscuna, 2018).

In this dissertation, it is mentioned that Van Gelder always strived to stay ahead of the competition. He had a habit of covering up brand names on his equipment with electrical tape and avoided answering interviewers' questions about his techniques. While most musicians and producers were able to cope with Van Gelder's peculiar behavior, one collaborator found it unbearable. Charles Mingus, a bassist who recorded for Savoy and his own Debut Records at Hackensack for eight months in the mid-1950s, famously criticized Van Gelder publicly during Mingus' own DownBeat blindfold test in 1960 (Personal approach [PA], n.d.).

Additionally, While Van Gelder had a strong personality capable of conflicting with other headstrong individuals like Charles Mingus, countless world-class musicians returned to Rudy over and over again, decade after decade, happy with their recordings. (Personal approach [PA], n.d.). In 1993, Van Gelder put forth his own theory as to why this was the case:

"The musicians get albums that sound the way they want them to sound, and everything else can be tough, including me personally and in any other way. However, I always strive to ensure that nothing leaves the recording studio that's not flattering to the musician, and that's not what the musician wants" (Stamberg, 1993). When asked to describe his sound, Rudy Van Gelder replied, "I do feel that it's unique, and I can recognize the difference. I feel comfortable with the difference, and I don't think it has been duplicated anywhere else" (Clark & Cogan, 2003:206).

In conclusion, Van Gelder is a renowned audio engineer whose sound is held in high esteem within the industry. He is renowned for his distinctive approach, which is partially attributed to his utmost confidentiality. Nevertheless, there exists compelling evidence that Van Gelder was a trailblazer whose contributions had a profound impact on other audio engineers over the years. He was the first audio engineer to gain recognition among recorders, owing to his unique tone. Furthermore, he was the first engineer to constantly be acknowledged for his contributions.

Chapter 11: Conclusion

The question remains: what was Rudy Van Gelder thinking when he used these techniques? In my opinion, there is no right or wrong answer to the research question, as he explored many techniques. Based on the conclusion of this dissertation, I can say that Van Gelder created the Blue Note Sound in his Hackensack home using three pivotal techniques: close miking, tape saturation, and peak limiting. He used these techniques to make the audience feel the live sound while listening to the album, aiming to recreate the experience of a jazz concert. These techniques are still used today, and James Farber is one of the engineers who is closest to replicating Van Gelder's sound in modern times. In my perspective, Farber is using Van Gelder's techniques to produce a "modern day" Van Gelder sound.

Van Gelder gained recognition and acclaim for creating the Blue Note Sound through his hard work. He is highly regarded in the world of jazz music for his exceptional contributions to iconic recordings made by famous jazz musicians such as Miles Davis, John Coltrane, Wayne Shorter, and Sonny Rollins. Van Gelder's most notable achievement was his ability to accurately capture the essence of live jazz performances inside the confines of a recording studio. He used innovative techniques to create a warm, natural sound that genuinely reflected the energy and spontaneity of the performers. Furthermore, his meticulous attention to detail allowed him to achieve unparalleled clarity and precision in his recordings.

Van Gelder's esteemed reputation was established through his adeptness at forming close partnerships with the musicians he collaborated with. This approach fostered a relaxed and inspiring atmosphere in the studio, leading to the creation of some of the most iconic and indispensable jazz recordings in history. Commencing his career as a recording engineer in the 1950s, Van Gelder swiftly ascended to become one of the industry's most respected professionals. Throughout the 1950s and 1960s, he produced numerous records for renowned companies such as Blue Note, Prestige, and Empire (Skea, 2001). “Some of these albums have become legendary, such as John Coltrane's "A Love Supreme," Herbie Hancock's first appearance as a replacement for Miles Davis's "Colossus," Sonny Rollins' saxophone recordings, and Horace Silver's "Song for My Father,"(Skea, 2001).

From my perspective, I would say that Van Gelder was a trailblazer in the field of recording, renowned for his innovative approach to capturing the essence of jazz music. He developed a specific recording technique to preserve the spontaneous nature and vibrant energy of live jazz performances. To ensure high quality, he marked his recordings with his signature "Hallmark," an RVG etching in the runout area (Skea, 2001). His expertise in sound quality earned him a well-deserved reputation as a highly respected audio engineer in the industry. He was meticulous about the equipment he used, often crafting his own amplifiers and fine-tuning recording tools to achieve the desired sound. His focus on creating a sense of space in his music is frequently cited when discussing his albums (Skea, 2001).

In conclusion, I would say that Rudy Van Gelder's legacy lives on today. His recordings continue to inspire new generations of musicians, and his sound has become the standard by which all other jazz recordings are judged. Van Gelder's contributions to the jazz community were invaluable, especially considering the long-standing negative stereotypes surrounding jazz musicians in America (Skea, 2001). For decades, these artists were unfairly portrayed as immoral, drug-addicted rebels who posed a threat to American culture. However, Rudy personally knew the people behind the music and recognized that they shared the same values as the broader American population (Skea, 2001). He believed that his work as a recording engineer was more important than politics, as these harmful stereotypes were particularly damaging during the 1950s and 1960s (Sickler et al., 2011).

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