

Tracing the ‘Messy’ History of Forensic DNA Analysis in Canada

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Abstract

This paper explores the history of scientific controversy surrounding forensic DNA analysis in the Canadian legal system. It focuses on DNA analysis and its introduction to legal cases of sexual assault. Drawing on Actor-Network Theory, this paper explores the scientific and legal controversies that preceded the ‘black boxing’ of DNA analysis in the medicolegal system. This paper begins by outlining some of the important contributors to the invention of DNA analysis and the Sexual Assault Evidence Kit (SAEK), a tool involved in collecting forensic DNA evidence. It then traces critiques from feminists, legal professionals, and scientists, who all raised objections to the introduction of forensic DNA analysis. The paper concludes by considering whether forensic DNA evidence has been successfully ‘black boxed’ in the Canadian medicolegal system.

Key words: DNA Analysis; Actor-Network Theory; Canadian legal system

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“DNA identification methods have been controversial from the very beginning, not just for social and legal reasons, but for scientific ones” (Gerlach, 2004, p.41).

The history of scientific controversy surrounding forensic DNA analysis in the Canadian legal system is

largely invisible. It is rarely discussed in the media and is often disregarded in scientific and legal practice. Since its introduction to the Canadian legal system in the late 1980s, DNA analysis has been used extensively to identify and trace perpetrators of crime (Gerlach, 2004). It is assumed to have the power to reveal truth about a criminal act (Quinlan, Fogel, & Quinlan, 2010). This presumed power of DNA analysis conceals and masks its own history of controversy. Tracing this history, however, is a necessary step towards understanding the contemporary usage of forensic DNA technology in the Canadian legal system.

This paper will explore the complex and ‘messy’ history of DNA analysis and its integration into the medicolegal system. Drawing on the methodological insights from Actor-Network Theory, I will outline some of the important contributors to the invention of DNA analysis and discuss its invention in the context of the Sexual Assault Evidence Kit (SAEK), a tool used to collect DNA evidence in sexual assault cases. I will trace the multitude of dissenting voices of feminists, legal professionals, and scientists who initially challenged the efficacy and reliability of forensic DNA evidence. Before doing so, however, I turn briefly to a discussion of Actor-Network Theory (ANT) and the methodological challenges in studying scientific controversy.

BLACK BOX NARRATIVES

Historical studies of scientific controversy in the field of Actor-Network Theory often fall within the confines of a similar plot line (Dugdale, 1999). As Dugdale contends, “many studies of controversy tell stories of convergence, of movement from difference to sameness, of a narrowing from many competing versions to a single stabilized ‘reality’” (Dugdale, 1999, p. 113) [emphasis in original]. To employ the language of another well known Actor-Network theorist, Bruno Latour (1987), ANT studies of

controversy are often accounts of “black boxing” (Latour, 1987, p. 3).

Latour describes a ‘black box’ as that which shields complexity and controversy from view. A black box, once it has been successfully closed, appears to be a “good machine”, operating to produce what are considered to be reliable and meaningful outputs (Latour, 1987, p. 3). As Latour (1999) suggests, “when a machine runs efficiently, when a matter of fact is settled, one needs to focus only on its inputs and outputs and not on its internal complexity” (p. 304). In science, black boxing is akin to the making of scientific fact (Epstein, 1996). Describing scientific facts, Epstein asserts, “masked beneath their hard exterior is an entire social history of actions and decisions, experiments and arguments, claims and counterclaims – often enough a disorderly history of contingency, controversy, and uncertainty” (Epstein, 1996, p. 28). It is this ‘messiness’ of competing voices that the black box renders invisible (Law, 2004). To quote Epstein again, “the process of closing a black box is successful when contingency is forgotten, controversy is smoothed over, and uncertainty is bracketed” (Epstein, 1996, p. 28). The black box is thus what creates order out of chaos, complexity, and uncertainty.

Many ANT stories have illustrated the construction of black boxes in science (e.g. Epstein, 1996; Latour, 1987; Latour, 1988). The ‘black box narrative’ in ANT begins with a messy collection of competing voices. These voices, of both human and non-human actors, are traced to their point of convergence and singularity.

This study presents a different narrative. While it begins in controversy, it does not end in singularity. Rather, this work tells stories of complex institutional action that, despite its possible appearance of being successfully black boxed, continues to exist in contention. Using Dugdale’s (1999) words, this work is not a story of translations of ‘difference’ into ‘sameness’ but, instead, it is a story of complexity.

Seeing Complexities

Law and Mol (2002) contend that methods of sociological inquiry need to shift away from the fabrication of simplicity, towards approaches that allow for the recognition, acceptance and “performance” of complexity (p. 6). Law (2003) argues that we must “find ways of living with and knowing confusion...of imagining methods that live...with disconcertment” (p. 4). Although these writers are responding to the trend in sociological research that encourages simplification through explanatory concepts and frameworks, their words shed light on stories of black boxes. While the black box narrative does trace complexities, as Dugdale (1999) suggested, such narratives often reduce complexities to an eventual end of singularity. Instead, Law and Mol (2002) call for a different kind of narrative, one that “pays tribute to the complexities” (p. 16) that exist before, and after, the

construction of scientific fact.

While these ideas may be liberating in theory as they free social scientists from a potentially restrictive narrative, how they translate into methodological practice is a remaining question. Dugdale (1999) examines the construction of health policies around Inter-Uterine Devices (IUDs) in Australia. Contrary to the black box narrative so often seen in ANT studies, Dugdale’s (1999) research does not illustrate the reduction of multiplicity to singularity but, instead, the simultaneous performance of multiplicity and singularity. She states that “closure” in this type of narrative “becomes a very different story, a story of oscillation between sameness and difference, of doing singularity and multiplicity together” (p. 113).

While the black box metaphor may appear to speak to the history of DNA analysis, as this paper will show, it is a metaphor that does not capture the complexity of this history. Instead, following Dugdale’s (1999) lead, the following will examine the complexities of DNA’s history of controversy.

DNA: A MESSY HISTORY

The use of DNA analysis in legal cases of sexual assault has a short but ‘messy’ history filled with the many competing perspectives from scientists, feminists, and legal professionals. While this paper attempts to outline the tensions between these groups and the translations they produced, it should be noted that this narrative does not claim to provide a comprehensive account of all that occurred during the introduction of DNA analysis to the legal system. Instead, like all other ANT stories, this narrative is a “translation” (Law, 2006, p. 47) of history that illustrates some of the actors that were involved in the confusion.

DNA Analysis

Alec Jeffreys, a prominent British geneticist working in the 1980s, is considered by most to be responsible for ‘discovering’ forensic DNA testing (Bieber, 2002; Gerlach, 2004). While forensic analysis dates back to the 1800s with the use of fingerprint evidence, Jeffreys’ work marked the birth of forensic analysis of DNA in criminal investigations (Cole, 2001). Jeffreys and his team of scientists at the University of Leicester had been working on familial genetic markers, a field wholly unrelated to forensic science (Cole, 2001). They were investigating how genetic codes, which they considered to reflect individual’s genetic composition, could be extracted from cellular material, a process they termed “genetic fingerprinting” (p. 289). This technique only entered the field of forensics when Jeffreys was approached by a local police force that was desperate for a scientific approach that could assist them in what seemed to be a hopeless murder case (Cole, 2001). Jeffreys’ exploratory work quite unintentionally formed the foundation for the adoption of

forensic DNA analysis in North American and Western European legal systems.

In Jeffreys' first publication on DNA, he argued that DNA patterns were highly individual and that the possibility of two people sharing the same DNA code was "unimaginably remote" (Gerlach, 2004, p.39). Shortly following this publication, in 1983, a young woman in a town near Leicester, United Kingdom was sexually assaulted and murdered (National DNA Databank, 2007). The case remained unsolved until several years later when, following a second slaying, local police sent a collection of blood samples from the crime scenes to Alec Jeffreys. He used his 'genetic fingerprinting' technique to extract and examine DNA found at the crime scene (Bieber, 2002). He compared the DNA collected at each crime scene and concluded that it originated from the same individual. In addition, the DNA of the suspect of the crimes was compared and concluded to be a different from the DNA found at the original crime scenes. Based on this conclusion, the suspect was exonerated (Bieber, 2002). Blood samples from 4,500 men were collected from nearby communities until a profile that matched those found was discovered (Bieber, 2002). The man whose DNA profile matched those found at the crime scenes was convicted of both murder and sexual assault. This case marked the first that employed Jeffreys' emerging techniques for forensic purposes.

The Sexual Assault Evidence Kit

Alongside these scientific developments in the United Kingdom in the 1980s, feminist groups in Canada were lobbying for improved medical and legal responses to sexual assault (Felberg, 1997). In 1978, the Ontario Provincial Secretariat for Justice held a consultation on rape where lawyers, police officers, rape crisis professionals, and physicians met to discuss the issues surrounding the medical care of victims of sexual assault and the gathering of forensic evidence (Felberg, 1997). Unlike contemporary practice, forensic evidence in the early 1980s was not collected for the purposes of DNA analysis. Physical evidence was instead used solely to determine if male sperm was present on a women's body and if a physical struggle between the victim and perpetrator occurred. Clothing, hair, and blood samples were collected for this type of analysis (National DNA Data Bank, 2003). Physical evidence was routinely analyzed in legal cases of sexual assault; however, its impact and usefulness was widely debated (Feldberg, 1997; Martin et al., 1985).

Feminist groups, along with several other professional communities, argued that the lack of standardization in forensic evidence collection produced wholly unreliable results (Parnis & Du Mont, 2006). Parnis and Du Mont describe this tension by saying,

Community-based feminists, crisis workers and some medical, scientific, law enforcement and legal professionals complained

that inadequate and haphazard medical and forensic evidence collection practices were meeting neither the needs of sexually assaulted women nor those of the legal system with respect to providing reliable and useful evidence (Parnis and Du Mont, 2006, p.77).

As a result of political pressure from these groups, the consultation on rape developed the Sexual Assault Evidence Kit (SAEK), or what has sometimes been termed the 'rape kit' (Parnis & Du Mont, 2006). The SAEK was designed to standardize forensic evidence collection. It contains "cotton swabs, test tubes, microscope slides, a comb and fingernail clippers" (Martin et al., 1985). The kit also includes detailed instructions regarding the steps for administering the kit (Feldberg, 1997). The swabs, test tubes, and microscope slides were designed to collect semen and blood, and fingernail clippers for collecting fingernails if the victim scratched the assailant (Martin et al., 1985). While the formation of the SAEK calmed some of the debate regarding forensic evidence collection in cases of sexual assault, new controversies regarding its production and use emerged.

Despite the intention to standardize forensic evidence collection with the SAEK, the contents of the kits were not uniform across jurisdictions. As Martin et al. stated in 1985, "currently, each judicial circuit is free to determine what form of rape kit (if any) will be used and what evidence will be collected" (p.230). In some regions, in an effort to standardize collection procedures, identical kits were used to produce what was thought to be more accurate evidence; however, this practice did not extend across North America (Felberg, 1997).

A debate ensued regarding the best location for the administering the SAEK. While some argued that a hospital emergency ward was the most favourable site, as it was equipped with medical services beyond what was required for forensic examinations, others claimed that a more accessible location for sexual assault victims was needed (Martin et al., 1985). In addition to this dispute, medical professionals argued about who among them should have the responsibility of administering the kit (Feldberg, 1997). In most cases physicians were placed in charge of the SAEK exam; however, most doctors were not given training in forensic science or forensic-evidence gathering. Some physicians argued that their new quasi-legal status as evidence collectors conflicted with their care-giving responsibilities as medical professionals (Feldberg, 1997).

As a response to this debate in the physician community, nursing education programs were developed that specialized in administering the SAEK (Du Mont & Parnis, 2003). Despite the existence of these programs, there was no regulation of the level of training in forensics needed to administer the SAEK (Du Mont & Parnis, 2003). Disputes surrounding the administration of the SAEK continued, but changed drastically with the

introduction of DNA analysis in Canada.

DNA Analysis in Canada

In 1989, the RCMP employed DNA analysis for the first time in a sexual assault case that occurred in Ottawa (RCMP, 2003). Hilary McCormack, the crown prosecutor of the case, was familiar with what had been the recent developments of forensic DNA analysis in the United States. It has been recorded that she had planned to send forensic samples from the case to the newly formed private DNA labs across the border. However, before the samples were sent, the RCMP made an offer to conduct the analysis locally (RCMP, 2003). As McCormack (2003) remembers, "it was going to be far less expensive and would also give the RCMP an opportunity to enhance their knowledge and expertise in this new field" (McCormack as cited in RCMP, 2003, p.13). It was with this decision, that forensic DNA analysis was introduced to the Canadian legal system.

The victim of the 1989 sexual assault had visually identified the perpetrator; however, the suspect had denied any involvement with the crime (National DNA Databank, 2007). Using Jeffreys' techniques, a DNA code of the perpetrator was extracted from the forensic samples and was then compared to the DNA of the suspect. When a match was found, it was concluded that the suspect was indeed the perpetrator (National DNA Databank, 2007). During the trial, the suspect changed his plea to guilty. The case set a historical precedent, marking the first time DNA analysis was conducted by the RCMP and used successfully in a Canadian legal case.

Despite the celebrated victory of this case, DNA analysis in cases of sexual assault continued to be contested by feminists, scientists and legal professionals. Reflecting back on this time, McCormack (2003) asserts,

There was so much controversy and there were so many different opinions through much of the early 90's...we really have come a long way in just 15 years. DNA evidence is so well accepted that we forget the huge hurdles we had to overcome (McCormack as cited in RCMP, 2003, p.13).

Following the trial of 1989, DNA analysis became a common, although not uncontested, practice in the legal system. As Gerlach (2004) contends, DNA testing formed the "new forensic paradigm with tremendous authority" (p.38). The SAEK became the tool for collecting forensic samples in sexual assault cases, and DNA analysis the instrument that uncovered the facts of sexual assault. Feldberg (1997) describes the kit of the 1990s by stating,

In a society where hard facts and scientific truths are revered, the purpose of the kit is to provide corroboration in the form of meticulous scientific evidence...it attempts to produce 'hard' physical evidence that will withstand scrutiny better than more subjective emotional/psychological measures (p.110).

With the influx of DNA analysis into the legal system, the voice of science came to dominate the courtrooms of sexual assault cases. However, this voice had many

opponents.

DNA Analysis in the 1990s

In 1996 the Solicitor General of Canada spoke to the new found confidence in DNA analysis by saying, "DNA can focus investigations, and will likely shorten trails and lead to guilty pleas. It could also deter some offenders from committing serious offences. The increased use of forensic DNA evidence will lead to long-term saving for the criminal justice system" (1996, p.2). While some regarded DNA analysis as the science that would revolutionize the Canadian legal system, others thought differently.

Kubaneck (1997), a grassroots feminist working at a Vancouver Rape Relief Centre, challenged the presumed power of DNA analysis by arguing that the authority it was gaining in the legal system could be detrimental to victims of sexual assault. She claimed that:

In the few sexual assault cases where DNA evidence could be useful, it seems likely that attackers who realize the strength of the scientific evidence against them will switch from "identity" to "consent" as their defense. This means that instead of claiming that he was not the man who attacked her, the accused will claim that she agreed to sexual contact. It has already been demonstrated in Canadian courts that consent cases are harder to win. This could mean that with increased use of DNA technology, the conviction rate will not increase, and may even decrease (Kubaneck, 1997, p.2)

This argument was in sharp contradiction to that of the Solicitor General's contention, who had suggested that DNA analysis would be the new time-saving device of the legal system.

Despite this dispute, and many others of its kind, DNA analysis grew to be a central practice in the Canadian legal system (Gerlach, 2004). The RCMP Forensics Division expanded to allow for the influx of forensic samples requiring testing and forensic experts were routinely brought into the courtroom to explain their findings. This increased presence of science in the courtroom only brought further contentions.

Some feminists during the 1990s argued that the authority of forensic science in the courtroom silenced women's voices and their narratives of sexual assault (Feldberg, 1997). For example, Kubaneck and Miller (1997) asserted that the introduction of DNA evidence brought with it an increased reliance on scientific expertise. They stated that "in the eyes of the judge and jurors, the verbal testimony of ... the victim, cannot carry the statistical reliability of scientific evidence, a bias which can only work against women in the majority of cases" (Kubaneck & Miller, 1997, p.3). In Kubaneck and Miller's analysis, women and their experiences were overshadowed by the imposition of DNA in the legal system. Similarly, Feldberg (1997) wrote that the new organization of legal practices, "reinforce[d] traditional relationships between gender, power, and the authority of science" (p.112). These feminists all claimed that despite the 1979 attempts to remedy the institutional handling of sexualized assault,

the influx of DNA analysis served to reinforce and recreate traditional power inequalities between victims of violence and the legal system. As Feldberg (1997) claimed, “the path to reform has led us onto troubled ground, and in some respects, the very tools we developed to achieve reform have in fact inhibited it” (p.110).

Challenging Science

While some writers disputed the implications of DNA analysis, others challenged the science itself. These challenges and objections were raised not only by feminists, but by legal practitioners and forensic scientists as well.

McCormack (2003), reflecting back on the first legal case to use DNA analysis, stated that despite the excitement of much of the legal community, “defense counsel had the opposite reaction...the science was hotly disputed for the next decade in courtrooms across the country” (as cited in RCMP, p. 13). During this time, skepticism regarding the strength, validity, and reliability of DNA evidence was raised by many defense lawyers. Forensic experts were routinely brought into the courtroom as witnesses for both the crown and the defense counsel (Holmes, 1994). The courtroom became the new setting for heated scientific debates. Holmes stated that “lawyers on each side are highly motivated to get DNA evidence disqualified or admitted” (p.230). What soon came to be termed the “DNA wars” in the courtroom, characterized much of the 1990s (Bieber, 2002, p.5).

Some legal professionals discussed the difficulties with scientific expert evidence and suggested that this type of evidence had the potential of appearing weightier than it actually was. As one judge presiding over a sexual assault case wrote “expert evidence is usually dressed up in scientific language which is, on the one hand, difficult to comprehend and, on the other, suggestive of a degree of certainty and infallibility that the evidence may not deserve” (R v. Murrin, 1999, p.52). What was phrased as the “aura of scientific infallibility” was problematized as something that mistakenly rendered scientific findings mystifying and as a result, authoritative (R v. Murrin, 1999, p.53).

Feldberg (1997), an academic feminist, argued that “forensic science is far from an accurate science. Its tools are crude and not easily regularized or quantified” (p. 110). Correspondingly, Holmes (1994) suggested that the techniques of DNA analysis were rife with laboratory errors, interpretation difficulties, and issues sounding quality control. She pointed to the impact of errors in DNA analysis, stating that “a false positive might serve to convict the innocent whereas false negatives might exonerate the guilty” (p.226). Holmes contended that “DNA typing is apparently so seductive a technology that worries about validity and reliability are minimized” (p. 229). Both scholars, Holmes and Feldberg, critiqued the supposed power of DNA analysis to uncover the scientific

facts of sexual assault. They asserted that despite its appearance of being beneficial for victims of sexual assault, the vast array of inconsistencies that accompanied DNA analysis rendered it detrimental to victims. Outlining this argument, Holmes (1994) wrote:

The prospect of an absolutely certain way to identify criminals based on genetic uniqueness has captivated scientists, lawyers, and the law enforcement system, not to mention the media and the general public. Yet DNA finger-printing probably was introduced into forensics too soon. Questions remain on the underlying theory; difficulties remain in getting reliable laboratory work and statistical estimates...a distasteful war game has arisen within the scientific and forensic communities, a struggle only to the disadvantage of the rape victim (p.238).

In the face of a mess of controversy, these feminists suggested that victims bore the brunt of disadvantage. Disputes regarding the practices of DNA analysis were by no means limited to legal and feminist communities; scientists also challenged their own practices.

CHANGING SCIENCE

The first, and perhaps most significant, controversy over DNA analysis in the scientific community involved statistical inferences (Gerlach, 2004). Part of the practice of DNA analysis involved and continues to involve the use of statistical methods to produce statistical probabilities that identical DNA profiles, to the ones generated, could be found in the general population (Holmes, 1994). This practice was designed to quantify Jeffreys’ original contention that the possibility of two individuals sharing the same DNA code was “unimaginably remote” (Gerlach, 2004, p.39).

Despite what appeared to be the illustration of robust results through these statistical methods, some population geneticists critiqued their validity, claiming that there was not enough population data available on which to base these statistical assertions (Holmes, 1994). In an effort to address these concerns, committees of scientists and law enforcement professionals were formed in 1996 (Gerlach, 2004). These committees reshaped the way in which statistical methods were used in conjunction with DNA analysis. Alongside this debate, the scientific practices of DNA analysis were also being contested.

The original DNA analysis method that Jeffreys developed used “restriction fragment length polymorphism (RFLP)” (Gerlach, 2004, p.39). It was this method that was used by the RCMP for much of the 1990s. To provide a brief overview this process, RFLP involved extracting DNA from a sample and then utilizing a technology called “restriction endonucleases” to cut the DNA segment into sections (p.39). The sections, or fragments of DNA, were then assorted by size using a technique termed “agarose gel electrophoresis” (Curran, 1997, p.12). The fragments were then “denatured”, a process which involves breaking the hydrogen bonds that hold the two strands of the DNA’s

double helix together (p.12). The single-stranded DNA fragment was then combined with DNA probes, which are single-stranded DNA fragments that are made radioactive. An X-ray film is used to record the radioactive probe pattern. As Curran (1997) explains, what resulted from this process was an image that appeared very similar to a “supermarket bar code” (p.14). It is this image that was compared with other DNA samples to determine if a match existed.

Despite its increased use in the legal system, RFLP analysis was critiqued in the scientific community for its restrictive requirement of large amounts of genetic material to generate DNA profiles (Gerlach, 2004). This constraint was considered problematic in many cases of sexual assault, where there often is limited amount of forensic material that can be gathered from the victim's body. In addition, the RFLP technique was criticized for its difficulties with decayed material (Gerlach, 2004). Given the large amount of material required, any type of bacterial or fungal decay attacking sections of the DNA had detrimental effects on the production of DNA profiles (Gerlach, 2004).

In 1998, however, the practices of DNA analysis in Canada drastically changed. The RCMP converted all of their RFLP technology to a method termed “PCR/STR (Polymerase Chain Reaction/Short Tandem Repeat) Analysis” (Curran, 1997, p.14). While the PCR/STR techniques shared some similarities to RFLP, they were uniquely different as they required a much smaller amount of DNA to conduct DNA profiling. Previous to this time, samples which contained limited amounts of DNA were not be analyzed. In addition, PCR/STR was thought to deal more effectively with degraded samples (Curran, 1997).

The reliability of the PCR/STR methodologies was also said to increase in comparison to the previous RFLP method, as they involved the identification and analysis of additional markers on the DNA strand. In RFLP profiling, five locations along the DNA strand were isolated to be compared with other DNA strands; whereas, in PCR/STR profiling, a minimum of nine locations were identified along the DNA strand for comparison. It was considered that the more locations that were identified and analyzed, the higher the statistical probability that this profile belonged to a single individual (Curran, 1997).

These new technological developments called into question previous conclusions drawn with RFLP DNA analysis. PCR/STR analysis became the dominant practice for forensic DNA analysis in Canada. All the trust that had once been placed in RFLP analysis was given to this new set of techniques.

The National DNA Data Bank

Despite the questions that surrounded forensic DNA analysis, in the 1990s moves were made by scientists and legal professionals to create what is now called the

National DNA Data Bank of Canada. As the RCMP (2004) wrote in a later report, “in order for this new tool to be used to its full potential, there was a need to coordinate DNA profiling data from investigations across the country” (p.8). A Canadian DNA Data Bank was created for this purpose.

The National DNA Data Bank was formed in 2000 and stores a growing number of DNA profiles that have been obtained from crime scenes. It includes two indexes: The Convicted Offender Index (COI), which stores profiles of convicted offenders, and the Crime Scene Index (CSI), which stores unidentified profiles obtained from crime scenes. In cases where there is no suspect, the DNA profile obtained from forensic samples gathered at the crime scene or from a victim's body are entered into the DNA Data Bank in hopes of finding a match. Since its inception, the RCMP has claimed that the DNA Data Bank has assisted in identifying perpetrators of various crimes (including sexual assault), determining if a perpetrator is a serial offender, and linking crimes where there are no suspects (RCMP, 2003). However, the DNA Data Bank, much like the other tools of forensic science discussed in this paper, began with, and continues to exist, in controversy.

In 1996, the Solicitor General of Canada wrote an in-depth consultation report on the envisioned DNA Data Bank. He raised questions regarding the proposed functioning of the Data Bank including: what information should be documented, how this information should be obtained, and how the bank should be funded. His consultation was written with the interest of sparking debate and discussion on these issues. However, limited public debate ensued, and women's groups were among the few who voiced strong objections to the proposed Data Bank (Kubaneck & Miller, 1997).

Kubaneck and Miller's (1997) strongly worded article stated that “Canadian women's groups are against the proposed National DNA Data Bank intended to aid in the solution of cases of sexual assault” (p.1). Through their writing, these authors sought to dispel what they considered to be the myth that the DNA Data Bank was created in the interests of victims of sexual assault. They contended that the development of the Data Bank would further entrench practices of DNA analysis within cases of sexual assault, practices which were inherently problematic.

Other feminist writers, such as Patricia Lee (2000), spoke to issues of increased surveillance and reduced privacy and confidentiality. Lee suggested that with the number of issues surrounding DNA analysis and storage, victims may be less likely to report their experiences of sexual assault. As she points out, this assertion, if true, would challenge many of the claims that DNA analysis had the potential to positively revolutionize the legal processing of sexual assault.

THE APPEARANCE OF A BLACK BOX

Since the time of its inception and introduction to the legal system, DNA analysis has been contested by legal professionals, scientists and feminists. Despite this messy history however, DNA analysis has become thoroughly integrated into the legal system (Gerlach, 2004). It has gained a legitimacy and authority that renders the appearance of its solidity. As DiFonzo (2005) suggests, "DNA forensic procedures have attained the courtroom air of flawlessness, often referred to as the 'mystical spell' of DNA" (p. 2). The National DNA Data Bank Annual Report (2003) states that DNA analysis marks the "dawn of a new era in the administration of justice in Canada" (p. 5). Similarly, the report (National DNA Data Bank Annual Report, 2003) claimed that "our work provides safer streets and safer communities for all Canadians and increasingly, for citizens around the world" (p. 5). Through these words, DNA analysis appears to have become a stable, uncontested practice within the legal system. However, it is possible this may be an illusion.

Returning to a quote of Actor-Network Theorist Steven Epstein (1996), a black box is said to be successfully closed "when contingency is forgotten, controversy is smoothed over, and uncertainty is bracketed" (p. 28). This assertion is reminiscent of the words of crown prosecutor Hilary McCormack (2003) who said, "DNA evidence is so well accepted that we forget the huge hurdles we had to overcome" (McCormack as cited in RCMP, 2003, p. 13). This claim seems to suggest that the complex history of DNA analysis in Canada has been successfully bracketed, and forensic DNA analysis, black boxed.

Despite what may be a multitude of claims of stability, vigorous controversies regarding the practices of DNA analysis have continued. Unlike what many may suggest, the new millennium did not bring with it a silencing of the many dissenters of DNA analysis. What it did bring was a complex identity of DNA analysis as an object that is considered by some to be completely black boxed, and others to be an open controversy.

Epstein (1996) suggests that for a practice to be fully black boxed, the voices of those who contest it must be quiet enough to not reopen the boxes' walls. While there are many who speak to the validity of the 'outputs' of the DNA analysis machine, there are some who continue to challenge its internal organization. Questions about the accuracy of robotics and automation for DNA analysis, the increased privatization of DNA labs, the standardization of DNA analysis across multiple sites, and the methodological and technological developments that produce profiles that are incompatible with those in the Data Bank, are being raised by those inside and outside of the scientific community (Quinlan, Fogel, Quinlan, 2010). The continued complexity surrounding DNA analysis renders the evaluation of the volume of dissenters' voices difficult. As was suggested at the beginning of this paper,

despite what may be its appearance of being so, this is not a black box narrative, or a story that ends with the convergence of competing realities. Rather, following in the path of Law and Mol (2002), it is a narrative of complexity - of a black box that is far from being closed.

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