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DNA Technology and the Struggle for the Power to Declare Missing Soldiers Dead in the Post-Vietnam War United States

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Abstract

The recovery of soldiers' remains has been a major concern of the US military since the mid-nineteenth century. However, military defeats during the Cold War left the remains of US soldiers unattended for decades, which diminished the odds of their identification and created ambiguities about their fates. After the Vietnam War, some statespersons and soldiers' families alleged that many missing soldiers had not been killed, but rather detained by the enemy and abandoned by US authorities. The US military strove to recover and identify as many missing soldiers as possible to debunk these allegations. Existing forensic methods failed to provide definitive conclusions, straining the relationship between the military and the American public. Consequently, the military turned to DNA profiling to identify missing personnel. Technical limitations and US society's lingering distrust of authorities turned DNA profiling into a new battleground between the US military and prisoners of war/missing in action (POW/MIA) families. Despite the promise DNA technology seemed to offer for remains' identification, this article argues that its success was reliant on POW/MIA families' attitudes towards the military and politics, who demanded much more than identified remains as a means of achieving closure.

I

In 1984, British geneticist Alec Jeffreys reported that the probability of two individuals sharing the same DNA profile was approximately one in 30 billion.¹ DNA profiling became widely used for identifying individuals, and its application in unsolved murders has been transformative in the field of criminal investigation. Its most enduring application is, arguably, in the identification

¹ A. J. Jeffreys, V. Wilson, and S. L. Thein, 'Individual-specific "fingerprints" of human DNA', *Nature*, 316 (1985), pp. 76–9.

of missing US military personnel. Most of their recovered remains are heavily damaged and commingled, making DNA profiling the only recourse for identification. The US military lists over 80,000 soldiers as missing, approximately half of whom have a chance of being recovered.² When missing soldiers are successfully identified, DNA technology has often been hailed by relatives and journalists as something of a silver bullet.

The application of DNA profiling is often highly political. Social studies of DNA profiling provide extensive analysis of its threats to civil liberties, controversies in courtrooms, and exaggerated accuracy on television.³ Anthropologists have highlighted the political capital gained by various stakeholders through identifying the remains of genocide victims.⁴ Likewise, the identification of missing US soldiers should be interpreted within a political context in which the US military was reluctant to declare them without recovering their remains. Studies of DNA investigations have mostly focused on civilians murdered through political violence or genocide, whose identification is essential for prosecuting the perpetrators. Instead, this article discusses combatants: people who were victimized in morally ambiguous wars and identified by the authorities that provoked the war. In the contemporary United States – the focus of this article – fallen soldiers whose remains have not been recovered are regarded as prisoners of war/missing in action (POW/MIA), an ambiguous term that leaves open the possibility of their survival. POW/MIA campaigns thus include any efforts calling for their repatriation, dead or alive.

This article argues that POW/MIA families, forensic scientists, and military commanders, jointly prompted the introduction of DNA profiling to POW/MIA affairs. It suggests that the destruction of remains and Cold War political rhetoric weakened the US military's authority to declare missing soldiers dead, and that the adoption of DNA profiling was therefore a desperate attempt by the US military, or the federal government more broadly, to regain control over necro-governmentality.⁵ I also contend that while DNA technology offered opportunities to re-examine thousands of POW/MIA cases, it was only partially successful in practice, owing to lingering popular distrust of authorities and the fact that POW/MIA families demanded more information to achieve closure than this technology can provide.

² The military's roster of POW/MIAs includes approximately 80,000 Second World War, 8,000 Korean War, 2,000 Vietnam War, and 100 Cold War casualties.

³ Jay D. Aronson, *Genetic witness: science, law, and controversy in the making of DNA profiling* (New Brunswick, NJ, 2007); Michael Lynch et al., *Truth machine: the contentious history of DNA fingerprinting* (Chicago, IL, 2008); Erin E. Murphy, *Inside the cell: the dark side of forensic DNA* (New York, NY, 2015).

⁴ Sarah E. Wagner, *To know where he lies: DNA technology and the search for Srebrenica's missing* (Berkeley, CA, 2008); Francisco Ferrandiz and Antonius C. G. M. Robben, eds., *Necropolitics: mass graves and exhumations in the age of human rights* (Philadelphia, PA, 2015); Élisabeth Anstett and Jean-Marc Dreyfus, eds., *Human remains and identification: mass violence, genocide, and the 'forensic turn'* (Manchester, 2015).

⁵ For the definition of necro-governmentality, see Isaías Rojas-Perez, *Mourning remains: state atrocity, exhumations, and governing the disappeared in Peru's postwar Andes* (Stanford, CA, 2017), pp. 17–18.

This article draws on, and extends, the existing literature on POW/MIA affairs, which primarily discusses POW/MIA campaigns following the Vietnam War without delving into their precursors.⁶ Researchers have shown that ongoing US efforts to locate missing personnel are the products of the Vietnam War POW/MIA campaigns. These campaigns initially aimed to facilitate the release of war prisoners but were later hijacked by right-wing politicians who harboured resentment towards anti-war demonstrators and left-wing social reformists. Those politicians charged their political opponents with depriving America of victory and abandoning prisoners to their captors, a strategy that tended to alienate their opponents from the American public who, out of sympathy for the prisoners, wished for their prompt repatriation. POW/MIA campaigners' propagation of the abandoned prisoner narrative shaped the country's memory of the Vietnam War. As my other studies show, however, POW/MIA campaigns already existed in the Korean War. US generals and politicians who resented the stalemate in Korea created the myth of abandoned prisoners to demonize foreign communists and so-called domestic communist sympathizers.⁷ Some POW/MIA campaigners even assert that the USSR detained US prisoners liberated from German POW camps after the Second World War, because the USSR refused to open its territory for US military personnel to locate prisoners. Given this history, I contend that POW/MIA affairs should be studied as a Cold War phenomenon, or more precisely, as the consequence of a range of US military failures since 1945.⁸ It should also be noted that Vietnam War POW/MIAs account for a small percentage of the total number of missing service members acknowledged by current US governmental agencies. Accordingly, this article questions the hitherto central place held by the Vietnam War in POW/MIA affairs.

Allegations regarding secret prisoners have also politicized scientific controversies. Michael Allen and Thomas Hawley respectively discussed an influential incident, which occurred in 1985 and involved the Central Identification Laboratory, Hawaii (CILHI), the agency that identifies deceased US soldiers. Both scholars linked this incident to POW/MIA campaigners' confrontation with the military over who could finalize a POW/MIA's fate in cases where soldiers' identifiable remains fell below the epistemological threshold for renunciation of hope of their survival.⁹ These authors employed political and

⁶ H. Bruce Franklin, *M.I.A. or mythmaking in America: how and why belief in live POWs has possessed a nation* (expanded and updated edn, New Brunswick, NJ, 1993); Michael J. Allen, *Until the last man comes home: POWs, MIAs, and the unending Vietnam War* (Chapel Hill, NC, 2008); Patrick Gallagher, *Traumatic defeat: POWs, MIAs, and national mythmaking* (Lawrence, KS, 2018).

⁷ Allen, *Until the last man comes home*, pp. 133–4. My forthcoming article explains why POW/MIA campaigns was born with the Cold War.

⁸ American people's calls for locating missing combatants already existed in the colonial era, but the birth of the POW/MIA issue had two preconditions: (1) assumption of the responsibility for locating MIAs by the state and (2) post-conflict inaccessibility of the territory where soldiers went missing.

⁹ Allen, *Until the last man comes home*, pp. 241–4; Thomas M. Hawley, *The remains of war: bodies, politics, and the search for American soldiers unaccounted for in Southeast Asia* (Durham, NC, 2005), pp. 105–13.

cultural approaches to analyse the causal relations between soldiers' deaths and identifiable remains. The present article, however, follows a technical approach, as adopting new technology tends to be the US military's expedient strategy for defending its necro-governmentality when POW/MIA campaigners doubt its determination to account for missing soldiers. I trace the struggle surrounding identification in the DNA era, when this technology offered apparently irrefutable evidence to confirm soldiers' deaths. Drawing on her experience with military agencies and a rural Wisconsin community, Sarah Wagner has demonstrated how DNA profiling transformed the country's commitment to missing soldiers and the landscape of US war commemoration.¹⁰ However, the tortuous path of DNA technology's entry into POW/MIA affairs warrants further investigation.

This article complements the POW/MIA literature by examining POW/MIA families' diverse perspectives on the application of DNA technology. While more than 100,000 US families can be regarded as POW/MIA families, only a small percentage have joined POW/MIA campaigns, which are dominated by a few key personalities, usually relatives of Vietnam War POW/MIAs. Their pursuit for attention and political power affects their attitudes towards new technology and authorities. My observations rely on local news reports and interviews with a wider range of individuals, including both campaign leaders and less prominent family members who have received soldiers' remains or who are expecting their future repatriation. Many families have chosen not to speak and shown little concern regarding POW/MIA affairs. Not all interviewees believe that DNA profiling can solve all the uncertainties that have lingered for decades as routinely dramatized on television, but they are also not consistently suspicious of the validity of this technology. Most of my interviewees are relatives of Korean War POW/MIAs. They are presently the primary beneficiaries of DNA technology, though their voices have long been overlooked. My conversations with ordinary POW/MIA families (excluding leading campaigners) related to all conflicts indicates that they share similar attitudes towards DNA profiling; the demography of my interviewees is unlikely to bias my conclusion.

II

The US military's handling of soldiers' bodies and accounting for the missing have undergone a series of developments over the past 160 years. The Civil War marked the birth of policies for locating and collecting soldiers' remains. During the Spanish–American War, the US military started giving soldiers' families the option of repatriating their loved ones or burying them overseas. However, during the Korean War, the US military ordered all deceased personnel to be promptly repatriated for burial due to the challenges of glorifying the war and the possibility that North Korea would over-run the whole peninsula

¹⁰ Sarah E. Wagner, 'The making and unmaking of an unknown soldier', *Social Studies of Science*, 43 (2013), pp. 631–56; Sarah E. Wagner, *What remains: bringing America's missing home from the Vietnam War* (Cambridge, MA, 2019), ch. 3, Kindle.

in the future.¹¹ To the American public, these policies conveyed a new idea that the military must return soldiers' remains to their families for a decent funeral before declaring its duty to them fully discharged.

Failures to identify remains broke this implied covenant. Following the Second World War, although ID tags remained a primary identification method, the US military established forensic laboratories to identify remains. During the Korean War, it created a Central Identification Unit (CIU, active between 1951 and 1956) to confirm the identities of all decedents, including those found with ID tags, via dental and anthropological evidence. The CIU's operating procedure for identification, drafted in 1952, was only comprehensively rewritten in 2005, after DNA profiling had become indispensable to the US military. When identifying heavily damaged bodies, teeth provided crucial evidence. Arm and leg bones were measured to estimate decedents' heights, and skull shape was used to determine races, while the morphology of spines and pelvic bones indicated age. Healed fractures provided supplementary evidence.¹² Positive identification necessitated the presence of multiple teeth and that specific body sections remained mostly intact.

The CIU's rigorous approach was a response to the earliest POW/MIA campaigns in the US. In December 1951, as a propaganda tactic, the US military asserted that the communist bloc would hold American prisoners as bargaining chips in armistice talks. This assertion was subsequently repurposed by political figures, notably Joseph McCarthy, to attack anyone perceived as having deprived the US of victory in Korea. Declaring missing soldiers dead without forcing North Korea to release them convinced these soldiers' families of the military's timidity during the Cold War. A defence against this accusation included identifying all recoverable remains. However, given the war's limited impact on US society, its POW/MIA campaigns quickly sank into obscurity, and challenges to the CIU were rare.¹³

The Vietnam War posed new challenges for US military's forensic experts. With the technology available in the 1970s, 10 per cent of a skeleton was sufficient for identification if the dentition was recovered or if a uniquely characteristic bone existed; otherwise, at least 65 per cent of the body was required.¹⁴ However, soldiers' remains recovered from Southeast Asia in the 1980s did not always satisfy these thresholds. When a jet crashed, the impact, along with fuel and ammunition explosions, largely obliterated the crew's bodies. Scavenging animals and acidic rainfall eliminated the remaining flesh, leaving only tiny

¹¹ Bradley L. Coleman, 'Recovering the Korean War dead, 1950–1958: graves registration, forensic anthropology, and wartime memorialization', *Journal of Military History*, 27 (2008), pp. 195–6.

¹² Central Identification Unit, 'Memorandum no. 7, standard operating procedure', 23 July 1952, College Park, MD, US National Archives and Records Administration II (NARAII), Record Group (RG) 338, entry UD-37042, box 5550.

¹³ Liu Zhaokun, 'Forgotten war, unforgotten bodies: locating, repatriating, and identifying the remains of American servicemen missing in Korea, 1950–2018' (D.Phil. thesis, Carnegie Mellon University, 2020), pp. 200–37.

¹⁴ *American missing in Southeast Asia, final report together with additional and separate views of the select committee on missing persons in Southeast Asia*, US House of Representatives, ninety-fourth congress, second session, report 94–1764 (Washington, DC, 1976), p. 210.

bone fragments. In previous conflicts, the military would have declared such bones unidentifiable.

Yet, in the post-Vietnam War era, renouncing the chance of identifying a deceased individual became politically impossible. Like their predecessors, POW/MIA campaigns became channels through which soldiers' families attacked anti-war activists and left-wing statespersons, but more importantly, what they saw as a treacherous government that had determined citizens' fates irresponsibly. President Reagan openly endorsed POW/MIA campaigns and transformed the belief that US prisoners remained captive in Vietnam into a 'national myth'.¹⁵ Amid the military's recovery from its Vietnam War public-relations disasters, it saw leaving this belief unaddressed as the worst option.

A by-product of this myth was the idea that soldiers would remain missing until their bodies were recovered. As a tactic to justify the prolongation of the Vietnam War, President Nixon exaggerated the numbers of US prisoners.¹⁶ When the claimed number of POWs could not be recovered after the war, relatives of missing soldiers were tempted to believe that their loved ones remained imprisoned. As the military could not gather further evidence about MIAs, they were presumed dead and reclassified as Killed in Action, Body not Recovered (KIA/BNR), implying that investigation into their fates had terminated.¹⁷ A number of POW/MIA relatives strove to block this unilateral presumption, resulting in the lawsuit *McDonald v. McLucas* filed on 20 July 1973 by five hardliners from the National League of POW/MIA Families (NLPF), the most influential POW/MIA campaigners' organization in US history. NLPF leaders argued that the Pentagon was ignoring evidence that some KIA/BNRs could be alive despite their relatives' objection. The court argued that POW/MIA relatives should be given chance to attend MIA status reviews, but did not guarantee them veto power over those reviews' conclusions.¹⁸

The impact of this lawsuit was nevertheless profound. According to Ann Mills-Griffiths, who has dominated the NLPF since 1978, the League accomplished one essential goal. The military could designate the missing as KIA/BNRs at its discretion, but it remained obligated to provide the latest evidence of their fate.¹⁹ Mills-Griffiths's claim is debatable; however, the demarcation between POW/MIA and KIA/BNR had gradually dissolved by the early 1980s, and the military had to gather intelligence regarding MIAs irrespective of their casualty status. Combatants who escaped aircraft without parachutes or sank with warships therefore became POW/MIAs presumptively detained for decades. The tally of Vietnam War POW/MIAs rose from roughly 1,300 to more than 2,500, and the number of Korean War POW/MIAs exploded from 389 to 8,177. This development shifted the US military's priority to retrieving soldiers' remains as proof of death. Some POW/MIA campaigners criticized this

¹⁵ Franklin, *M.I.A. or mythmaking in America*, pp. 3, 136, 162.

¹⁶ *Ibid.*, p. 13.

¹⁷ Allen, *Until the last man comes home*, pp. 91, 97.

¹⁸ *McDonald v. McLucas*, 371 F. Supp. 831 (S.D.N.Y. 1974).

¹⁹ Ann Mills-Griffiths, interview by the author, 17 Apr. 2018.

tactic as neglecting living POWs but could not discredit the military's efforts. Logically, search for surviving POWs guarantees a dead end. Identifying all acquired human remains became a feasible option for the military to regain the public's trust and approach the goal of 'fullest possible accounting' for POW/MIAs, a flexible line set by the campaigners to signal the enduring nature of their crusade.

Accordingly, POW/MIA campaigners turned their attention to forensic technology. The identification of their loved ones' remains would change them from POW/MIA next-of-kin to a surviving family member. Their political agency, sustained by society's sympathy for having relatives held hostage, dissipated. Consequently, they became excessively sceptical of evidence proving their relatives' deaths. Leading Vietnam War POW/MIA campaigners exploited the country's overall scepticism towards the authorities and mobilized forensic experts to join battles over POW/MIAs' fate on their behalf. By labelling controversial identification as 'junk science' and portraying it as a scheme to write off their loved ones, they protested the military's reliance on identifying bodies, rather than rescuing prisoners, when deciding POW/MIAs' fate.²⁰

Ironically, the most controversial case initially marked a milestone in accounting for POW/MIAs. It centred on a US aircraft that crashed near Pakse, Laos, in 1972; the ensuing explosion was so intense that pro-US partisans found only a severed arm in the wreckage, leaving thirteen crew members missing. In February 1985, Pakse became the first site in Southeast Asia that US investigators surveyed after the fall of Saigon. The search retrieved more than 50,000 bone fragments, most approximately the size of a dime.²¹ When CILHI announced the identification of all missing crew members, Ann Hart, wife of Lieutenant Colonel Thomas Hart III, the crew members' commander, detected obvious discrepancies between CILHI's report and her knowledge of the excavation work at Pakse. She hired Michael Charney, an anthropologist recognized for his success in identifying decomposed flood victims, to re-examine the bones that CILHI claimed belonged to her husband.²² Charney remarked that 'there was no way' a few one- to six-inch bone fragments 'could be identified as Lt. Col. Hart', and questioned CILHI's competency.²³ Similar concerns spread among other POW/MIA relatives, including Kathryn Fanning, wife of Major Hugh Fanning. In 1984, bones marked as Major Fanning's were delivered from Vietnam, with the Marine Corps stating that her husband was identified through his dental chart. However, she later claimed to have found clues suggesting her husband's survival, along with an inventory of recovered bones

²⁰ Allen, *Until the last man comes home*, pp. 243–4.

²¹ Hawley, *The remains of war*, p. 108; *Activities of the Central Identification Laboratory, hearing before the investigation subcommittee of the committee on armed services*, House of Representatives, ninety-ninth congress, second session, 10 Sept. 1986 (Washington, DC, 1987), p. 26. Cited hereafter as '1986 CILHI hearing'.

²² Hawley, *The remains of war*, p. 109.

²³ Josh Getlin, 'Hearts & bones: thirteen years after Lt. Col. Thomas Hart disappeared in Laos, the army said it had found his remains. His wife, Anne, couldn't be sure. Finally, the army admitted it wasn't either', *Los Angeles Times*, 12 Oct. 1986, http://articles.latimes.com/1986-10-12/magazine/tm-2683_1_bone-fragments/.

that contained no teeth.²⁴ She asked Charney and Clyde Snow, a professor who had identified the victims of the Flight AA191 crash, to re-examine the bones. Both declared that identification was impossible.²⁵

Central to this controversy was Tadao Furue, the leading CILHI anthropologist, and the 'morphological approximation' method he had developed. Specifically, by comparing bone fragments (approximately one-third of a long bone) against a collection of intact bones from individuals with various physical characteristics, the complete bones' parameters and the bodily features of the deceased could be predicted. In a 1986 congressional hearing on CILHI, Furue testified that this technique had been widely adopted by anthropologists and stressed that he primarily employed this technique to segregate commingled bones.²⁶ In Hart's case, however, it was likely the sole basis of Furue's identification. Multiple anthropologists in this hearing acknowledged the validity of methods resembling morphological approximation in principle but lambasted Furue for misusing it. For instance, Charney accused Furue of reporting unrepeatable observations, fabricating age data, using formulae unsupported by scientific literature to predict the length of intact bones, and failing to include margins of error in his height estimates.²⁷ Two other anthropologists concurred with Charney and insisted that Furue's work was guided by wishful thinking, as CILHI strove to achieve the military's goal of identifying as many POW/MIAs as possible.²⁸ In the eyes of POW/MIA campaigners, the military's dependence on this questionable method was tantamount to shunning their responsibility for disclosing soldiers' true fate. During the Korean War, CIU anthropologists including Furue had also predicted biometric data from incomplete bones. However, I found only one case in which a soldier's parents detected a flaw in identification and insisted that their son remained a captive. This might be because in the 1950s, challenging the authorities was an aberrant behaviour in US society, and the military also discouraged the disclosure of identification data.²⁹

Although the controversy surrounding Furue was politically charged, its solution had to be technical. Two questions arose. First, can a few bone fragments be affirmatively associated with a specific individual? Second, can such fragments indicate no chance of survival? Technology in the 1980s was inadequate to answer the first question. For instance, the length of limb bones implied the possible range of a decedent's stature; when only a small bone section was present, the range became broader, if still possible to calculate. Reading the wide error margin, POW/MIA families were prone to question the individual's identity deducted from these bones. The military needed techniques that could convincingly identify decedents based on tiny bones with

²⁴ David Finkel, 'Marine's widow returns bones: she doubts they are those of pilot-husband', *St Petersburg Times* (St Petersburg, FL), 17 July 1987, p. 1A.

²⁵ Allen, *Until the last man comes home*, p. 241.

²⁶ 1986 CILHI hearing, pp. 4, 81–5.

²⁷ *Ibid.*, pp. 51–8, 102–3.

²⁸ *Ibid.*, pp. 32–51.

²⁹ Chief Memorial Division to Acting Assistant for Administration, 27 Dec. 1951, NARAII, RG 92, entry NM81–1894A, box 581.

decent accuracy. Due to the paucity of recoverable remains, the second question could not always be resolved. If the military could regain POW/MIA families' trust by addressing the first, they might accept the inevitable fact of their loved ones' demise.

In response to the attack on CILHI, the military invited scholars to scrutinize its operations in December 1985. These investigators, including Ellis Kerley who had worked with Furue in the CIU, detected problems with equipment and work protocols but no obvious data manipulation. However, they could not make the same identifications as Furue using approaches generally accepted in academia.³⁰ Years later, Kerley noted that by the 1980s, Furue was no longer as cautious as he had been in the 1950s.³¹ Another investigator, William Maples, founder of the eminent Pound Human Identification Laboratory, remarked in his autobiography that Furue became so obsessed with identifying all remains that he reached impossible conclusions with unreliable methods.³² A later inspection by the US Congress recommended a moratorium on morphological approximation.³³ Both investigations exposed limitations in CILHI's working procedures but downplayed possible ethical lapses. By 1987, Hart's identification had been rescinded. Although Fanning's was not, his bones were returned to CILHI,³⁴ a tacit recognition of technology-related problems with previous findings.

Although CILHI was not entirely discredited, its situation continued to deteriorate. Furue's approach was suspended without replacement, and the backlog of unidentified bones from Vietnam kept growing. In the early 1990s, remains repatriated from North Korea aggravated this situation. Among these remains, bones of multiple persons were sometimes placed in one coffin, and those of one soldier may have been found at multiple sites. At that time, there was no systematic research on large-scale segregation of commingled remains.³⁵ This was further complicated by the 1973 fire at the National Personnel Records Centre, which severely damaged service members' records of the Korean War era. Hence, CILHI desperately needed a technique not solely dependent on ante-mortem data for segregating and identifying multiple individuals' bones without clear morphological distinctions. In

³⁰ 'CILHI identification inspection report of an on-site inspection of the facilities and procedures of the US Army Central Identification Laboratory in the Hawaiian Islands, December 9–12, 1985', Washington, DC, US National Archives and Records Administration I (NARAI), RG 46, senate select committee on POW/MIA affairs files (SSCPMAF), section Q (Erickson), box 5, unlabelled folder.

³¹ Ellis R. Kerley, memorandum from Tom Long, 23 Oct. 1991, NARAI, RG 46, SSCPMAF, section Q (Erickson), box 5, folder identification of MIA remains.

³² William R. Maples and Michael Browning, *Dead men do tell tales: the strange and fascinating cases of a forensic anthropologist* (New York, NY, 1994), p. 201.

³³ 1986 CILHI hearing, pp. 10–11.

³⁴ US Army Central Identification Laboratory, Hawaii (CILHI), hearing before the investigation subcommittee of the committee on armed services, US House of Representatives, one-hundredth congress, first session, 15 Sept. 1987 (Washington, DC, 1988), p. 25.

³⁵ Jennie Jin et al., 'The Korea 208: a large-scale commingling case of American remains from the Korean War', in Bradley J. Adams and John E. Byrd, eds., *Commingled human remains: methods in recovery, analysis, and identification* (Oxford, 2014), p. 409.

October 1991, Kerley advised CILHI to adopt DNA-based techniques to reduce the backlog.³⁶

III

Theoretically, a decedent's DNA profile can be obtained from just one tiny bone fragment, because all cells in the person's body carry the same DNA sequence. However, unlike court cases, in which suspects' DNA is compared against genetic evidence from crime scenes, the US military could not compare the DNA sequences of remains recovered from Korea or Vietnam against genetic profiles of POW/MIAs, as it did not collect its combatants' DNA until the 1990s. The genetic variations used for identification are included in what is passed down through generations and shared among family members, thus identification must rely on relatives' DNA profiles, coupled with relevant statistical methods.

The US military selected mitochondrial DNA (mtDNA) sequencing as its primary method of identification for two reasons. First, the chance of obtaining usable mtDNA from remains left unattended for decades is much higher than that of other types of DNA, which degrade more quickly. Second, the number of POW/MIAs' parents, whose DNA profiles are most useful for comparison, had been shrinking rapidly since the 1990s. Being maternally inherited, a soldier's mtDNA shares the same sequence with that of all siblings, and sisters' and maternal aunts' children. This larger pool of donors made mtDNA easier to obtain for comparison, but it also required additional evidence for definitive identification. Geneticist Mary-Claire King first used mtDNA profiling to determine whether a boy abducted during the Dirty War in Argentina belonged to a specific family; and, in 1991, it was used to identify Nazi fugitive Josef Mengele's body.³⁷ These high-profile events, alongside pressure from POW/MIA campaigns, prompted the US military to adopt this technology.

The military launched the Armed Forces DNA Identification Laboratory (AFDIL) in 1991 to harness the power of this technology to regain authority in declaring soldiers dead; even before AFDIL's establishment, CILHI had consulted DNA profiling companies to evince its commitment to POW/MIA families. Navy corpsman Mark Dennis perished when his helicopter exploded in Vietnam in 1966, and the military promptly repatriated his charred remains. However, in 1971, Dennis's relatives claimed to have seen him in a photo purportedly taken in a Vietnamese prison, and the 1985 CILHI controversy encouraged them to join Hart's battle against the Pentagon. In 1988, to defend its credibility, CILHI submitted eight samples from Dennis's body to the LifeCodes Corporation. The company concluded that the DNA samples were 'genetically consistent with that of the mother' of the individual examined;

³⁶ Ellis R. Kerley, memorandum from Tom Long, 23 Oct. 1991, NARAI, RG 46, SSCPMAF, section Q (Erickson), box 5, folder identification of MIA remains.

³⁷ Terry Melton and Victor W. Weedn, 'Forensic DNA sequencing', in Brian K. Nunnally, ed., *Analytical techniques in DNA sequencing* (Boca Raton, FL, 2005), pp. 218–19.

however, this did 'not constitute an absolute biological identification'.³⁸ Dennis's relatives were not persuaded by this ambiguous conclusion. Multiple DNA tests in later years reconfirmed the remains' identity in response to their repeated challenges; in 2017, they finally acknowledged that DNA profiling was more reliable than Furue's methods in the 1980s and cremated the remains.³⁹ Although they rejected the military's explanation of Dennis's death, repeatable DNA results must have contributed to their decision to accept the remains.

While the Dennis case did not yield a conclusive result in 1988, the outcome of the Fanning case convinced the military that mtDNA testing was a practical means of clearing its backlog of unidentified remains. In July 1991, CILHI reaffirmed the original identification, but Fanning's widow was adamant about preventing what she saw as a premature declaration of her husband's death. US Senator Bob Smith, who was leading the most comprehensive congressional investigation of POW/MIA matters up to that date, supported her.⁴⁰ To resolve this impasse, the military resorted to DNA technology. Its decision was also influenced by a POW/MIA-related rumour: while the Gulf War was a sweeping victory over Iraq, suspicion that Iraq was secretly detaining Captain Michael Speicher, the sole MIA from this war, thrived in US society.⁴¹ The Pentagon was desperate to use any available methods to confirm the deaths of Fanning and Speicher and appease POW/MIA campaigners.

The military obtained mtDNA samples from four bones believed to be Fanning's, together with samples from his parents and sisters. AFDIL sequenced a DNA region of approximately 100 base pairs (bp) and found that the sequences from all four bones were identical. It established that an 80 bp region matched the sample from Fanning's mother, but not ones from unrelated persons.⁴² A later test revealed that a DNA segment of more than 200 bp from the same four bones matched Fanning's sisters and mother, but not his father. When this sequence was compared against a database of 650 individuals, no match was found, indicating the rarity of this specific sequence in the general population. AFDIL chief Major Victor Weedn concluded that this constituted 'clear and convincing confirmation of previous identification

³⁸ 'Objection to identification of Mark V. Dennis, complete study made by brother Jerry Dennis', deposited as an appendix in *POW/MIA policy and process, hearings before the select committee on POW/MIA Affairs, on the US government's efforts to learn the fate of America's missing men*, Part II of II, US Senate, 102nd congress, first session, 5, 6, 7, and 15 Nov. 1991 (Washington, DC, 1992), pp. 1107–417.

³⁹ Howard Altman, 'Family finally accepts death of navy corpsman shot down in Vietnam', *Tampa Bay Times* (St Petersburg, FL), 31 Mar. 2017, www.tampabay.com/news/military/war/family-finally-accepts-death-of-navy-corpsman-shot-down-in-vietnam/2318696.

⁴⁰ Michael Kennedy, 'Wife, marines clash over whose bones are in coffin', *Los Angeles Times*, 16 July 1991, pp. A1, A13.

⁴¹ Hawley, *The remains of war*, pp. 244–52.

⁴² 'Preliminary report identification of remains, Major Hugh M. Fanning, US Marine Corps, CILHI Case #0013–84', 16 Aug. 1991, archived by the MIA Facts Site, accessed 8 Oct. 2015, www.miafacts.org/fnprlp2.htm2/.

efforts'.⁴³ Although the database and the length of the sequenced mtDNA were unacceptably small by current standards, this was the best result the military could obtain at the time.

Fanning's widow, however, did not budge. She declared that 'if I can determine these bones are my husband's...I will consider that knowledge a victory after six years' struggle to determine the truth'.⁴⁴ The phrase, 'I can determine', signalled that it was her opinion, not scientific evidence offered by the military, that would close the case. POW/MIA campaign hardliners naturally suspected a brand-new technology introduced by the military as another trick to declare their loved ones dead. She followed the same process as in 1985, seeking experts' input to disprove the findings, but received considerably less publicity than previously. When AFDIL released its final report in September 1991, her view was scarcely reported. Since a key argument during the 1985 controversy was that academia had not accepted Furue's approach, the subsequent publication of the details of this identification in a renowned academic journal made it harder to question the results. Fanning's widow did not relinquish her battle, but her later posts on POW/MIA websites seldom mentioned DNA technology.

Her opinion aside, this identification established mtDNA as a promising solution for clearing the backlog of unidentified bodies. Leading CILHI anthropologists 'believed that DNA techniques would revolutionize the identification of remains, though more tests were needed before their large-scale application'.⁴⁵ By June 1992, CILHI was holding approximately 1,100 sets of remains, of which roughly 800 were unlikely to be identified by 'existing scientifically accepted techniques'. Admitting the risk of relying solely on DNA for identification, due to scientific limitations, CILHI still vowed to increase its use of DNA-based techniques,⁴⁶ possibly viewing any action as better than further delaying the solution of open POW/MIA cases.

IV

Because mtDNA testing in the early 1990s consumed a considerable amount of bone material, to the point that testing could effectively destroy all recoverable remains of a missing soldier, CILHI's initial stance was that DNA testing should

⁴³ 'Final report, identification of remains, Major Hugh M. Fanning, US Marine Corps, CILHI Case #0013-84', 6 Sept. 1991, archived by the MIA Facts Site, accessed 8 Oct. 2015, www.miafacts.org/afmepg1.htm1/.

⁴⁴ Associated Press, 'Genetic testing identifies MIA flier', *Press Democrat* (Santa Rosa, CA), 24 Aug. 1991, p. B3.

⁴⁵ 'Evaluation of the human remains identification process at the US Army's Central Identification Laboratory, status briefing', 20 Feb. 1992, NARAI, RG 46, SSCPMAF, section J, box 1, folder evaluation of CILHI.

⁴⁶ GAO draft report to the chairman, select committee on POW/MIA, US Senate, issues related to the identification of human remains from the Vietnam conflict, June 1992, NARAI, RG 46, SSCPMAF, section J, box 13, folder GAO CILHI.

be the last resort 'when other identification techniques are impracticable'.⁴⁷ Moreover, mtDNA testing procedures were not standardized, and a CILHI anthropologist reported that 'a number of "bugs" appear to remain for the timely and accurate enhancement and analysis of DNA'.⁴⁸

However, the military could not wait for scientists to remove all 'bugs', as the relation between government officials and POW/MIA campaigners was deteriorating rapidly. These campaigners realized that Reagan had exploited their suffering only to mobilize support for his aggressive anti-USSR propaganda; the end of the Cold War prompted the Bush and Clinton administrations to consider reconciliation with Vietnam for business reasons, further stoking their sense of betrayal.⁴⁹ Conducting DNA tests on all remains that could not be identified by other methods was expected to appease the campaigners after they received their loved ones' remains. In February 1993, the Pentagon announced its first identification using DNA testing 'as the sole means of identification, except for circumstantial evidence'.⁵⁰

The military was further pressured to apply large-scale mtDNA tests after receiving several hundred boxes of remains from North Korea. In June 1994, the US Defense Science Board (DSB) launched a task force to determine the feasibility of employing DNA techniques to clear CILHI's backlog of remains 'that cannot be identified through traditional means'; mtDNA profiling was found to be the best option. Although it recommended that the military prioritize using mtDNA tests on Vietnam War casualties, the task force concluded that 'current DNA identification efforts are supported by sufficient scientific evidence to proceed, in particular with application of mtDNA sequencing, to identify ancient remains from the Korean conflict'.⁵¹

The standardization of mtDNA methods required input from the POW/MIA families. In 1958, the USSR destroyed a US surveillance aircraft, killing all crew members, including Airman Archie Bourg Jr. The USSR returned six bodies, including one later designated X-6. After the USSR's collapse, the US military reinvestigated the loss of Bourg's plane; his family requested mtDNA testing on X-6 to determine if Bourg was still alive. In July 1993, AFDIL identified X-6 as Bourg. In October, unconvinced, Bourg's sister contacted a laboratory at the University of California, Berkeley, to verify the identity of X-6, and subsequent tests revealed that two positions of X-6's mtDNA sequence did not match hers. Shortly after the laboratory reported its findings, the military placed a moratorium on mtDNA use as a 'primary means of identification' to avoid another public-relations disaster. AFDIL re-examined X-6's DNA sample and sent it to a

⁴⁷ 'Policy statement, identification of remains using deoxyribonucleic acid (DNA) comparison', 21 Dec. 1993, Silver Spring, MD, National Anthropological Archives (NAA), Ted A. Rathbun papers (TAR papers), box 14, folder May 1994.

⁴⁸ Ted A. Rathbun to M. T. Spinello, 20 May 1993, NAA, TAR papers, box 14, folder CILHI laboratory visit May 1993.

⁴⁹ Allen, *Until the last man comes home*, p. 252.

⁵⁰ John Fritz, 'DNA technique identifies pilots killed in Vietnam', *Lansing State Journal*, 7 Feb. 1993, p. 6A.

⁵¹ *Report of the Defense Science Board Task Force on the use of DNA technology for identification of ancient remains*, 20 July 1995 (DSB report) (Washington, DC, 1995), summary pages, pp. 55–7.

British laboratory, which affirmed AFDIL's initial finding. Nonetheless, AFDIL modified its operating procedure before resuming mtDNA testing in October 1994. The task force cited this incident to stress the importance of quality assurance and avoiding sample contamination during tests.⁵²

Since the mid-1990s, mtDNA identification has become increasingly common in identifying Vietnam War casualties. Sometimes, it is the only biological evidence substantiating the military's finding. However, consistent success in identifying Korean War casualties, most of which involved DNA profiling as the DSB had envisioned, was not achieved until 2005. This situation could be partially traced to the fact that the Korean War was remembered for its 'forgotten' status, whereas the Vietnam War, including the image of a treacherous government, dominated Americans' memories.

The foremost reason for this delay was the need to establish mtDNA databases of the general population and Korean War POW/MIA families. DNA profiling requires the inclusion of a probability estimate of a coincidental match with unrelated individuals from a specific population. In 1995, the DSB deemed that the AFDIL database contained inadequate entries from each ethnic group to ensure the discriminatory power of mtDNA tests for individual identification.⁵³ Besides random samples from the general population, the military had to collect family reference samples (FRS) for comparison with DNA extracted from soldiers' remains. The DSB predicted that the project to collect Korean War FRS would face significant impediments due to 'client unawareness, poor records availability, aging population, etc.', as the country had almost forgotten this war. It estimated that a DNA outreach programme might cover 70 per cent of POW/MIA families but that 40 per cent was more realistic.⁵⁴ In the long term, this view turned out to be pessimistic: coverage now is greater than 90 per cent.

Nevertheless, the initial collection of FRS was painfully slow, achieving only 15 per cent by 1999.⁵⁵ It was only in 2005 that AFDIL began collecting FRS after each public briefing on its progress in accounting for POW/MIAs.⁵⁶ The DSB recommended that the military outsource FRS collection to civilian organizations because of personnel shortages.⁵⁷ For example, in 1995, the military asked the Korean War Project (KWP), a private group promoting the war's commemoration, to locate the families of casualties. However, according to KWP director Ted Barker, his group's request for DNA only attracted media coverage beginning in early 1999.⁵⁸ It was not coincidental that this occurred shortly after DNA profiling proved that Michael Blassie was the unknown Vietnam War soldier buried in Arlington, a key event in a technical sense signalling the potential for identifying remains previously declared unidentifiable.

⁵² Ibid., p. 29, Appendix D, and Annexes D and E.

⁵³ Ibid., pp. 26, 36–7, 56.

⁵⁴ Ibid., Annex G.

⁵⁵ Jin et al., 'The Korea 208', p. 409.

⁵⁶ Robert Maves to Ted Barker, 3 May 2005, courtesy of Ted Barker.

⁵⁷ DSB report, Annex G.

⁵⁸ Ted Barker, interview by the author, 24 Aug. 2018.

Another obstacle to establishing comprehensive DNA databases was families' reluctance to donate FRS. In February 1992, when evaluating DNA techniques, CILHI admitted that 'civil liberty and privacy advocates [had] expressed concerns that the DNA database could be used inappropriately for genetic discrimination'.⁵⁹ Post-Vietnam War distrust of the government had seeped into all strata of US society. While the rate of obtaining Vietnam War POW/MIAs' FRS was lower than that for Korean War casualties,⁶⁰ Korean War POW/MIA families also remained alert to the authorities' possible misuse of their DNA data. A niece of missing Corporal Freeman Lindsey acknowledged that her surviving uncles were initially reluctant to provide FRS to the military because they considered it a scam. Barker likewise noted that 'people were leery' of offering biological samples, especially to the government.⁶¹ Reluctance to donate also reflected families' hesitation to reopen old wounds, particularly those that they had not touched since the 1950s. Barker's comments reveal that distant descendants of POW/MIAs were more comfortable donating samples than the missing individuals' parents and siblings were.⁶² Some POW/MIA relatives only agreed to donate when FRS submission was dissociated from receiving updates about their missing loved ones.⁶³

What also delayed mtDNA identification of remains from North Korea was the military's priority to placate Vietnam War POW/MIA campaigners. For decades, public discussions of POW/MIAs in the US only covered those lost in Vietnam. A POW/MIA campaigner once reminded President Reagan that, per the new definition of POW/MIA (including KIA/BNR), the number of individuals who went missing in the Second World War and Korean War far exceeded Vietnam War POW/MIAs, but that the latter dominated the country's attention,⁶⁴ a situation that remained largely unchanged. In 2009, POW/MIA campaign activist Ron Broward testified to Congress that only 20–5 per cent of the Department of Defense funding for POW/MIA identification was allocated to the missing from those two earlier wars. An admiral who oversaw POW/MIA affairs admitted that only 12.8 per cent of research and recovery efforts up to that point had pertained to the Korean War.⁶⁵ Worse still, each Korean War casualty's remains were typically scattered across multiple containers, and thus required more mtDNA tests for reassociation and identification than

⁵⁹ 'Evaluation of the human remains identification process at the US Army's Central Identification Laboratory, status briefing'.

⁶⁰ Wagner, *What remains*, ch. 3.

⁶¹ Amy Matzke-Fawcett, '60 years later, Korean War POW's fate told to Pulaski family', *Roanoke Times* (Roanoke, VA), 2 Sept. 2011, www.roanoke.com/news/years-later-korean-war-pow-s-fate-told-to-pulaski/article_6846dd40-1feb-52f9-a156-eccc72455b48.html.

⁶² Ted Barker, interview by the author, 24 Aug. 2018.

⁶³ R. H. Armbruster to Ted Barker, 9 June 2006, courtesy of Ted Barker.

⁶⁴ Lynn D. Dougherty to Ronald Reagan, 9 Dec. 1987, Simi Valley, CA, Ronald Reagan Presidential Library and Museum, Richard T. Childress files, box 14, folder POW/MIA correspondence January to May 1988 (3).

⁶⁵ *Improving recovery and full accounting of POW/MIA personnel from all past conflicts, hearing before the military personnel committee of the committee on armed forces*, House of Representatives, 111th congress, first session, 2 Apr. 2009 (Washington, DC, 2009), pp. 11, 30, 38.

Vietnam War remains. DNA testing only became financially and scientifically practical for identifying casualties en masse in the early 2000s.⁶⁶

Once DNA tests became routine in POW/MIA accounting, the military became reluctant to announce identification without any DNA evidence. The identification of unknown Korean War soldiers buried in the National Memorial Cemetery of the Pacific, known as the Punchbowl, exemplified this development. Citing Blassie's identification, a senior military officer noted in May 1999 that the military 'could apply the same science to other unknowns', including 'those buried in the Punchbowl'.⁶⁷ However, the military had embalmed these soldiers' bodies with formaldehyde, rendering DNA extracted from them impossible to sequence using methods available in the 2000s. Therefore, they resorted to chest X-rays to identify the Punchbowl remains. Annual progress in their identification was limited in contrast to the remains delivered by North Korea since 1990 (never embalmed). In the late 2010s, owing to improvement in DNA extraction and sequencing techniques, the military accelerated the exhumation of Punchbowl remains and added DNA testing to most of their identification attempts.

V

TV shows like *CSI: crime scene investigation* portray scenarios in which DNA traces from a crime scene perfectly match a suspect's DNA profile, and the case is unequivocally resolved.⁶⁸ Thus, in POW/MIA terms, if a DNA sample extracted from a bone matches an FRS, the missing person has been identified; therefore, no POW/MIA should go unidentified. Aware of this distortion of reality, a military spokesperson once stressed that real-world identification bore 'scant resemblance to the fictitious versions of the forensic programs we see on television'.⁶⁹ Nevertheless, during a Department of Defense briefing I attended in 2018, military speakers were besieged by families who demanded immediate investigation of all Punchbowl remains. These families felt that the military should easily be able to identify these remains as exaggerated by TV dramas of criminal investigation, unaware of how difficult extracting DNA from them still was. TV programmes also routinely ignore the fact that DNA data are valid only if accompanied by an estimate of the probability that they match an unrelated person; few of my interviewees mentioned probability either.

Given the technology's popularity, POW/MIA families came to prefer DNA test results to other evidence. When I asked them about their reasons for accepting identification of their relatives, many people immediately mentioned how DNA 'accurately' identified the bodies and shared their experiences of donating FRS. Conversely, several families hinted that without DNA-based methods, identification was unlikely. Corporal Robert Higgins's niece, for

⁶⁶ Jin et al., 'The Korea 208', p. 409.

⁶⁷ Department of Defense, 'Unidentified remains disinterment policy established, release No. 250-99', Defense.gov, 21 May 1999, www.defense.gov/releases/release.aspx?releaseid=2099.

⁶⁸ Corinna Kruse, 'Producing absolute truth: *CSI* science as wishful thinking', *American Anthropologist*, new ser. 112 (2010), p. 85.

⁶⁹ Steve Vogel, 'VA. nieces help ID soldier's remains', *Washington Post*, 23 July 2007, p. B1.

instance, told reporters that 'we're fortunate his remains were not put into "the punch bowl" in Hawaii', since the military 'can't get a true DNA match' and would have never identified him.⁷⁰

However, DNA evidence alone is insufficient to convince everyone. In some cases, it must be supplemented by trust in the military, which borders on unconditional. Describing Sergeant Gerald Muller's forensic data, his half-brother wrote, 'I put full confidence in what we read, along with the briefing we also received...I do not think the Dept of Defense would tell us anything but the truth.'⁷¹ Ann Ford, a relative of Sergeant Joseph Bowen, stated that DNA assisted in Bowen's identification, but emphasized that trust had convinced her of the accuracy of identification.⁷² This was a common stance among most Korean War and Vietnam War POW/MIA families;⁷³ hardline campaigners accounted for a tiny subpopulation of POW/MIA relatives from all wars. When coupled with trust, a single tooth identified by its shape or DNA sequence could be adequate to convince a soldier's family that their loved one had perished, whereas for militant campaigners, such finding was fresh proof of the government's treachery.

Trust cannot be guaranteed; it must be earned through transparency on the part of the military agencies responsible for reporting the identification results. According to Sheila Jasanoff, 'judgements concerning the credibility of science appear to be governed by standards of virtue, of ethical and reasonable behaviour', and the use of 'mundane normative language' facilitates the accessibility of experts' judgements.⁷⁴ A key component of POW/MIA identification reports since 2000 is long DNA sequences of the deceased and their family members, which are aligned to show matches in an easily comprehensible manner (two strings of letters rather than intricate DNA sequencing graphs), and this is accompanied by a numerical likelihood of a match with unrelated individuals. Straightforward presentation of data allows POW/MIA families themselves to determine if they have received the correct body. Mary Lynch, Corporal Clarence Skates's sister, underscored that the military dispatched forensic experts to her house and reviewed each graph in Skates's identification report with her. Ralph Delaney, representing Private Walter Piper, recounted that the military handed him a 150-page book, detailing the segregation of Piper's remains from the commingled bones returned by North Korea and their conclusion that his DNA perfectly matched his family's.⁷⁵

⁷⁰ Petra Chesner Schaltter, 'Coming home: remains of missing in action Korean War veteran to be buried Saturday at Washington Crossing National Cemetery', *Bucks Local News* (Lansdale, PA), 10 Apr. 2015, www.buckslocalnews.com/news/coming-home-remains-of-missing-in-action-korean-war-veteran/article_cde53643-2d7d-51e7-a84f-41c837fc3ad.html.

⁷¹ Questionnaire filed by Greg Beckwith regarding Sergeant Gerald Muller, 3 Aug. 2018.

⁷² Ann Ford, interview by the author, 16 Aug. 2018.

⁷³ Wagner, *What remains*, ch. 3.

⁷⁴ Sheila Jasanoff, 'The eye of everyman: witnessing DNA in the Simpson trial', *Social Studies of Sciences*, 28 (1998), p. 729.

⁷⁵ Ralph Delaney, interview by the author, 2 Aug. 2018.

Families may demand an extra layer of affirmation before accepting soldiers' deaths, depending on their epistemology of death and survival. Presenting mere DNA matches sometimes reinforces their belief that the military was desperate to resolve their relatives' cases by any means. As DNA testing is never error-free and DNA samples are obtainable from almost any body part, some interviewees required additional lines of evidence. Paul DeFrain, a nephew of Corporal Roy Fink, described DNA as convincing, but noted that if the returned bone was a femur, it proved only that his uncle had lost a leg, whereas a piece of skull would provide definitive proof of death.⁷⁶ Patricia Goff, sister of Sergeant Charles Scott, initially told me that mtDNA test was crucial for his identification. As our communication progressed, however, she clarified that his dental records, skeletal features, chest X-ray photos together with mtDNA sequence left her with 'no doubt' over the remains' identity.⁷⁷

This preference for multiple forms of evidence was prevalent among leaders of POW/MIA campaigns. They demonstrated knowledge of DNA technology and resolution to judge their loved ones' fates by themselves. Two leaders of the Coalition of Families of Korean and Cold War POWs/MIAs, Donna Knox and Rick Downes, regarded the combination of chest X-ray comparisons and mtDNA analysis, reinforced by circumstantial evidence, as essential for identification.⁷⁸ An ex-director of the Coalition, Robin Piacine, likewise stressed the importance of avoiding reliance on one method, insisting that mtDNA testing could not conclusively identify a specific body, only eliminate alternative candidates.⁷⁹ Perhaps in reaction to the military's reliance on physical remains to close POW/MIA cases, campaign leaders had a high regard for circumstantial evidence. Mills-Griffiths, for example, appreciated the merits of DNA profiling and the military's laboratories, but did not want them to overshadow the POW/MIA accounting process. Referring to her own case, she mentioned that since her brother's aircraft canopy had been found amid other wreckage, and his co-pilot's remains were identified, the military could cease searching for her brother's remains after one more attempt.⁸⁰

Arguably the most-organized critics of the military's dependence on mtDNA profiling were from the National Alliance of Families POW/MIA (NAF), a group known for its militant stance against the federal government. Technical problems offered fresh ammunition to NAF members. In 1997, for example, after an AFDIL official presented the military's mtDNA testing to NAF campaigners, the latter alleged proof that AFDIL was using mtDNA matches solely to make identifications instead of evincing 'no match' and without disclosing the probability of a random match. NAF also learned that AFDIL's mtDNA database lacked entries for Native Americans and Asians, and concluded that the

⁷⁶ Paul DeFrain, interview by the author, 13 Aug. 2018.

⁷⁷ Personal correspondence with Patricia Goff, 14 Aug. 2018 and 6 Sept. 2018.

⁷⁸ Rick Downes, interview by the author, 7 Nov. 2017, and Donna Knox, interview by the author, 24 Apr. 2018.

⁷⁹ Robin Piacine, interview by the author, 20 Apr. 2018.

⁸⁰ Ann Mills-Griffiths, interview by the author, 17 Apr. 2018.

government had been 'using a faulty technology to bury men that may still be alive'.⁸¹ This organization regularly attacked the military's identification efforts with controversial cases. In one case, NAF claimed that the military never fully clarified why the remains of Captain Victor Apodaca, originally determined to be animal bones, were later deemed to be of human origin and identified using mtDNA evidence. While such finding is technically possible, NAF claimed that mtDNA tests gave the military 'a new method to creatively account for our missing servicemen'.⁸² It continues to seize upon new findings in human genetics, even rare ones like paternal inheritance of mtDNA, to doubt the validity of mtDNA testing, in efforts to prove the military's tendency to close POW/MIA cases prematurely. The rhetoric born from the 1985 CILHI controversy remains unchanged.

NAF's position on DNA technology is uncommon among POW/MIA campaigners, but their disagreements with the military's findings persist in the DNA era. Before the COVID-19 pandemic, at least twelve Korean War POW/MIA families delayed the burial of their loved ones by more than a year. They may have wished to elicit more information regarding their loved one's fate from the remains, and their burial would forestall a serious investigation. For instance, in December 2010, the Department of Defense announced the identification of Corporal Nehemiah Butler with mtDNA and chest X-ray evidence. After reviewing his remains, Butler's daughter suspected that he had been executed as a helpless POW. The army maintained that Butler was never captured, but his relatives demanded a moratorium on his burial and an enquiry into war crimes. His great-niece noted that 'with questions remaining, we didn't want to close the case'. After securing additional evidence, Butler's family buried him in 2015.⁸³

VI

A more common scenario was POW/MIA families refusing to close their cases in their minds even upon accepting their loved ones' conclusively identified remains. The return of remains marks the administrative termination of the military's investigation, and the authorities usually use the word 'closure' to define this moment. However, as Brandon Hamber and Richard Wilson have argued, post-conflict closure at the national level differs from that at the individual level.⁸⁴ For radical POW/MIA campaigners immediately after the Vietnam War, closure might have meant the downfall of political and military figures who were seen as having allowed the country to lose the war. Ordinary POW/MIA families today, as their hostility towards the authorities has waned over decades, have less ambitious goals.

⁸¹ *Bits 'n' pieces*, 27 June 1997. No other source could corroborate NAF's stories.

⁸² *Bits 'n' pieces*, 24 Jan. 1998.

⁸³ Mitchell Northam, 'Six decades later, Pocomoke soldier buried at Arlington', *DelmarvaNow*, 27 Nov. 2015, www.delmarvanow.com/story/news/local/maryland/2015/11/27/pocomoke-soldier-arlington/76320442/.

⁸⁴ Brandon Hamber and Richard Wilson, 'Symbolic closure through memory, reparation, and revenge in post-conflict societies', *Journal of Human Rights*, 1 (2002), p. 35.

The preconditions for ordinary POW/MIA families' closure vary, the easiest perhaps being that their loved ones are buried in home soil. Such closure occurs immediately after the military delivers the remains. Upon receiving Sergeant Wilson Meckley Jr's body, his brother said that he had achieved closure, replacing 'a sense of emptiness' he had felt when thinking 'of his brother lying dead somewhere in North Korea'.⁸⁵ This type of closure was particularly important for POW/MIA offspring who deemed local burial a multi-generational familial obligation, as most POW/MIA parents and siblings passed away before they could recover their lost relatives. Lori Evans, a niece of Corporal Harold Evans, defined the return of her uncle's body as 'closure' for her family, who had waited more than fifty years to learn his fate, and regarded herself as having carried the family's burden.⁸⁶ William Sowles, a determined POW/MIA campaigner, stated that his final task for his father will be to bury his body side by side with those of his ancestors. Sowles said that he had inherited this duty from his mother and uncles, and pledged, 'If I am gone, my son will do the same.'⁸⁷

Some families that regard the burial of deceased soldiers as closure do so only on the condition that their graves are never reopened. The remains of a single person can be repatriated from Korea and Vietnam in multiple batches over decades. Even if one batch has been identified, the absence of other parts sometimes haunts the decedent's relatives. Not taking additional remains could avoid a second trauma, but it is a morally challenging option. Lori Evans noted that although her uncle's legs, clavicle, and some parts of his arms and skull were returned, much of him was still buried in Korea. She wished to recover these missing parts. For her, closure means the repatriation of the last piece of her uncle's identifiable remains.⁸⁸ In contrast, Gerald Muller's half-brother did not want to disturb the dead. He had obtained closure and asked the military to cremate any of Muller's remains that might be found after his funeral.⁸⁹

On several occasions, public attention to funerals, rather than mere burial of repatriated soldiers, brings closure. This means their families and communities honouring their sacrifice. Although the Korean War was the 'forgotten war', personal losses were not easily forgotten. If the burial of decedents attracted sufficient attention, families tended to feel relief that their loved ones' sacrifice was not ignored by their offspring and friends. For instance, when I asked him what was most important about his uncle's body returning home, a nephew of Private Charles Follese replied 'Closure! For so many relatives and visibility for future generations.'⁹⁰ Elva Evans, despite knowing little about her brother-in-law Corporal Dudley Evans, underscored that the soldier's

⁸⁵ Ron Devlin, 'Robeson Township man whose brother was killed in Korean War getting closure', *Reading Eagle* (Reading, PA), 27 Mar. 2016, www.readingeagle.com/news/article/robeson-township-man-whose-brother-was-killed-in-korean-war-getting-closure.

⁸⁶ Lori Evans, interview by the author, 6 Aug. 2018.

⁸⁷ Personal email from William Sowles, 12 Feb. 2018.

⁸⁸ Lori Evans, interview by the author, 6 Aug. 2018.

⁸⁹ Greg Beckwith, interview by the author, 4 Aug. 2018.

⁹⁰ Questionnaire filled out by Michael Follese, regarding Private First Class Charles Follese.

funeral had 'given the family great comfort'. She was impressed by the motorcade accompanying the coffin and the number of locals gathered at the funeral.⁹¹

The information conveyed by the presence of remains is more critical for closure. In the post-Vietnam War era, a cliché in US media is that identified soldiers' remains bring closure because their relatives can confirm that they are not languishing in a secret camp. My data indicate that this notion remains prevalent among POW/MIA families. Sergeant Bowen's sister emphasized 'closure' in response to my question about the importance of receiving his body, adding that her father had always harboured doubts about Bowen's death.⁹² However, some POW/MIA families, who firmly believed that their loved ones were detained by the Soviet bloc, now admitted that they must have perished and that their remains are irrecoverable. They sought closure without remains. Robert Moore, whose brother went missing in Korea, defined closure as the moment 'you have found what happened to your loved one and are now willing to just have memories, even if there are no remains to bury'.⁹³ Moore did not disclose what would bring him closure, but it was likely confirming whether and when his brother had been transferred to the USSR because of his avionics expertise.

The information families need to achieve closure is usually more than confirmation of death. Many Korean War families learned in the 1950s that their loved ones had been left in temporary cemeteries in North Korea, but they remained interested in POW/MIA affairs. They wanted to fill gaps in their family histories, particularly their loved ones' last moments, which military records could not reveal. When Private Walter Hackenberg's sister talked about closure, she mentioned that she figured out from the bones that her brother had perished in a POW camp rather than during a battle.⁹⁴ She told a journalist that 'we assumed all this time he was no longer living, but just to think of where he could be – it was a missing part of our family'.⁹⁵ Closure for Corporal Frank Smith's relatives was not based on knowledge of his demise, as they posted his obituary in newspapers in 1951. They felt relieved upon learning that he was mortally wounded by a grenade, as indicated by the damage on his bones.⁹⁶

When the fate of missing soldiers remains obscure due to the paucity of recoverable remains or a lack of historical records, even an immaculate identification report fails to bring a sense of closure. When Emma Lunsford received the body of her brother, Captain Turnace Brown, she was impressed

⁹¹ Personal correspondence from Elva R. Evans, 10 July 2018.

⁹² Ann Ford, interview by the author, 16 Aug. 2018.

⁹³ Personal email from Robert Moore, 10 Oct. 2017.

⁹⁴ Stella Knepp, interview by the author, 5 Dec. 2017.

⁹⁵ Barbara Miller, 'Central Pa. prisoner of war in Korea will be laid to rest at home', *Pennlive.com*, 24 Oct. 2017, www.pennlive.com/news/2017/10/central_pa_prisoner_of_war_in.html.

⁹⁶ Rick Moriarty, 'Remains of Salina soldier killed in Korean War finally come home', *Syracuse.com*, 30 Aug. 2010, www.syracuse.com/news/index.ssf/2010/08/remains_of_salina_soldier_kill.html.

by the generous support she received from the military. However, what she found in the casket was just a 'few bones'. She felt that his fate would not be ascertained unless more of his body was returned and, therefore, that she would 'never have full closure'.⁹⁷ The most disheartening cases involve soldiers whom the authorities had suspected of being secretly detained by the enemy, something DNA testing can hardly reveal. Private Frank Worley was officially listed as one of the 389 prisoners possibly withheld by North Korea after the Korean War. After receiving his remains, his brother commented that the military could not confirm whether Worley had expired in a labour camp years after the armistice in Korea. Consequently, he 'still didn't think the family would find any sort of closure'.⁹⁸ Finally, closure is 'a situation where the trauma is no longer seen as unfinished business'.⁹⁹ Even if a missing soldier's fate could be determined somehow, the sense of unfinished business brought by a loved one's tragic death can be permanent. For example, the widow of Sergeant Dean Chaney could not recover from the loss of her husband and found it impossible to forget his death as a prisoner. Admitting that she felt better after receiving his remains, she said, 'they [the military] say it will bring you closure. But it never will.'¹⁰⁰

VII

POW/MIA campaigns in the wake of the Vietnam War ended the US military's practice of declaring personnel dead without retrieving their remains. The Vietnam War shattered Americans' trust in the federal government, which forced the military to keep seeking scientifically reliable methods to identify all recoverable soldiers' remains to prove their demise. Amid rumours that the USSR relocated American prisoners from Germany to Siberia after the Second World War, and during the Korean War, the US military started requiring all fallen soldiers to be promptly repatriated, it is tempting to state that the Cold War redefined the significance of missing soldiers and their remains in US public discourse.

Progress in forensic technology has dramatically reduced the quantity of bones required to identify individuals. In the nineteenth century, even a full skeleton could not guarantee identification, and during the Korean War, multiple teeth and a large portion of the skeleton were still indispensable. When handling bodies from Vietnam, CILHI's efforts to minimize the necessary bone quantity with latest forensic techniques sparked the controversy in 1985. The loose connection between tiny osseous materials and complete human beings

⁹⁷ Christopher Curry, 'Gainesville soldier killed in Korea is laid to rest', *Gainesville Sun* (Gainesville, FL), 5 Oct. 2012, www.gainesville.com/article/LK/20121005/News/604155874/GS/.

⁹⁸ Lydia Coutre, 'Remains of Korean War soldier from Wilmington identified', *Wilmington Star-News* (Wilmington, NC), 30 Oct. 2015, www.starnewsonline.com/news/20151030/remains-of-korean-war-soldier-from-wilmington-identified/.

⁹⁹ Hamber and Wilson, 'Symbolic closure', p. 38.

¹⁰⁰ John Boyle, 'Korean War soldier comes home, after 65 years', *Citizen-Times* (Asheville, NC), 28 Nov. 2015, www.citizen-times.com/story/news/local/2015/11/28/boyle-column-korean-war-soldier-comes-home-after-65-years/76369940/.

was severed first by distrust towards the military in post-Vietnam War US society, and then by forensic experts taking the POW/MIA families' side, ultimately undermining the military's authority to declare soldiers dead. Regaining this authority required the military to overcome technical bottlenecks first; rebuilding trust would be time-consuming, assuming it would be possible at all.

DNA techniques altered identification possibilities: even small bone fragments now have the potential to account for POW/MIAs. By 2017, DNA extracted from a single two-inch bone could lead to positive identification. Pop-culture exaggerations of this approach's effectiveness have rendered it difficult for even the most militant POW/MIA campaigners to disregard DNA evidence, though a convincing identification report hinges on various epistemological and psychological factors. While progresses in genetics continue, the rhetoric of POW/MIA campaigns remains embedded in US culture, and challenges to the military's DNA-based identification process will persist. Scientific accuracy in individual identification, achieved by lifeless dental charts, bone lengths, genetic codes, and military maps, does not always align with the needs of missing soldiers' families to commemorate personal loss. Avant-garde forensic technology does not automatically transform into a sense of closure.

My experience with POW/MIA campaigners of different wars indicates that they use similar discourses to define their campaigns and attitudes toward technology. This suggests that POW/MIA studies should not be confined to the Vietnam War. When scholars interpret the social phenomena of the post-Vietnam War years, it is advisable to determine if the basis of such phenomena included the failure of the United States to vanquish its enemies. If so, then it is valuable to trace their origins to situations after the Second World War and the Korean War, or to connect them with current events, given that a Cold War-style balance of power persists. Researchers may further compare the mindsets of Americans across these eras. Moreover, many countries, including China, Vietnam, and South Korea, are actively searching for their own soldiers' remains. Although these countries have not seen POW/MIA campaigns comparable to those in the US, their decisions to reinvestigate deceased combatants is nonetheless politically charged and warrants study from a transnational perspective.

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