

Clio's Scroll



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The journal established its Advisory Board in 2016 to ensure smooth transitions in leadership and operations of the journal. The Board consists of former executive editors Scott Davis and Kevin D. Reyes, and Dr. Sean Burns of Berkeley's Office of Undergraduate Research and Scholarships.

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Clio's Scroll, the Berkeley Undergraduate History Journal, is published twice yearly by students of the Department of History at the University of California, Berkeley. The journal aims to provide undergraduates with the opportunity to publish historical works and to train staff members in the editorial process of an academic journal.

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Note from the Editors

We are proud to present the fall 2016 issue of *Clio's Scroll*. The articles featured here span distant places, times, and themes. In her article, "A Hero's Posture: The Southern Remembrance of World War I," Yale undergraduate Emma Poole highlights the discrepancy between historical events and the narratives, written and monumental, we chose to remember. Integrating a variety of primary sources and secondary literature, Poole shows that in World War I, Southern white supremacy functioned as a political agenda that sought to deprive the Southern Black community of images of black heroism and valor. In her senior thesis, "Dreaming Beings and Thinking Things: The Birth of Complexity Science in the Early Twentieth Century," Berkeley history alumna Ning De-Eknamkul examines the evolution of Newtonian thinking-machines and traces changes in humans' relations to technology. Technological innovations, she suggests, did not endlessly advance without altering human consciousness along the way. In his senior thesis "Visions, Intertwined: Building New Connections under Carter and Deng," recent Berkeley history graduate Ray Hou offers a new perspective on motivations behind the U.S.-China normalization process under the Deng-Carter era. Rather than recapitulate the significance of Cold-War tensions, Hou places economic and technological considerations at the center of the reconciliation process.

Disparate though they are, when taken together these three articles uncover past incarnations of concerns and questions still alive today. Only weeks into the year 2017, history feels less like a gradual unfolding of time and more like a rapid onslaught of shock and action. The need for a dialogue on race relations and a re-examination of the influence of material factors on individual consciousness—political and social—and international diplomacy seems more urgent than ever. Eager though we may be to explain away present problems through only a brief foray into the past, these articles show the vital necessity of digging deeper and wider. Before dictating that life be lived forwards, Soren Kierkegaard admitted that it must be first understood backwards. So we, through the works of Emma Poole, Ning De-Eknamkul, and Ray Hou, offer a look back.

Finally, the Editorial Board would like to thank the Townsend Center for the Humanities and the Associated Students at the University of California (ASUC) for their generous funding that makes this publication and editorial process possible. As always, the Editors are indebted to Berkeley's Department of History for its endless support, guidance, and encouragement. Lastly, we extend our gratitude to the contributors. We hope their articles are of some inspiration to our readers.

Sincerely,
The Editors

Contributors

NING DE-EKNAMKUL recently graduated with honors in history and German from UC Berkeley. Her studies focused primarily on modern history and philosophy of science and technology. She wishes to thank her thesis advisor, Dr. Rodolfo John Alaniz (“Dr. J”), for his kind guidance and support throughout the research and writing process.

RAY TANG HOU recently graduated in history and physics from UC Berkeley. His historical interests revolve around diplomacy, modern China, and the American-led international order. He would like to thank Professors Peter Sahlins and Daniel Sargent for their steady support and provocative insights during the writing process.

EMMA POOLE is a senior student in history at Yale University. Having focused on twentieth-century European history and rhetoric, she is writing her senior essay on the American Relief Administration’s Russian Operation of 1921–1923 and the politics of aid. She wishes to thank Professor Glenda Gilmore whose support and guidance made this project possible.

A Hero's Posture

Southern Remembrance of World War I and the White Supremacist Agenda

Emma Poole

On April 2, 1917, President Woodrow Wilson stood before Congress, beseeching them to declare war on Germany and, as a result, plunge the United States into a struggle whose ghastly nature was, by 1917, no longer speculation, but reality. “[W]e shall,” he insisted, “fight for the things which we have always carried nearest our hearts...and make the world itself at last free.”¹ Also in 1917, thirty-six African Americans were lynched.² Despite the simultaneity of these events, they remain separate in American cultural memory, which historian Jay Winter defines as “a collective shared knowledge, preferably (but not necessarily) of the past, on which a group’s sense of unity and individuality is based.”³ While Wilson’s speech renders the United States the champion of the good fight, such a rendering is only possible if the lynching of thirty-six Americans is ignored, or regarded as no more than a statistic—an insignificant entry in a lengthy tradition of subjugation. The separation of these two narratives, however, speaks to their occurrence at a Wilsonian moment wherein statements of blatant racial prejudice were beginning to be seen as uncouth—a development which, for many in the South, made the

EMMA POOLE is an undergraduate in the Department of History at Yale University.

¹ Woodrow Wilson, “Address to a Joint Session of Congress Requesting a Declaration of War against Germany, April 2, 1917,” available through the American Presidency Project.

² See Douglas O. Linder’s *Famous Trials* website’s “The Trial of Sheriff Joseph Shipp et al. (1907),” featuring lynching statistics by year in “Lynching in America: Statistics, Information, Images,” at <http://law2.umkc.edu/faculty/projects/ftrials/shipp/lynchingyear.html>.

³ Jay Winter, *Remembering War: The Great War between Memory and History in the Twentieth Century* (New Haven, CT: Yale University Press, 2006), 138.

systematic assertion of white supremacy more necessary than ever. And so, they turned to memory.

The memorialization of the World War I doughboy, the nickname for U.S. infantrymen, embedded the particular heroism of white World War I soldiers into Southern cultural memory at the same time that it revived the glory of the original Southern soldier of the Confederacy, and, by extension, the supremacy of the white race. The apparent neutrality of the war memorial rendered it the perfect medium through which to immortalize an agenda of oppression, which sought to ensure that the continued subordination of blacks remained one of the pillars on which the sense of Southern “unity and individuality [was] based.”⁴ In emulating memorials to the Confederacy, the particular postures of Southern World War I memorials depicting white doughboys worked to subjugate blacks and reinforce white supremacy in the wake of a war that pushed many blacks to further criticize the social status quo. The parallel tendency of memorials to African American soldiers taking the form of buildings rather than statues worked, too, to corroborate this agenda.

When the United States declared war on Germany, more than fifty years after surrender terms were signed dissolving the Confederate army in 1865, the Civil War still served as most Southerners’—politicians and ordinary people alike—reference point for war. For some, it offered a legacy of “glory and honor, even in defeat.” For others, simply “hunger, loss, and grief.”⁵ Of all the spheres of operation that Southerners believed to be appropriate for whites only, foreign politics was, perhaps, considered most so. It was while bearing this heritage that white Southerners approached President Wilson’s declaration of war and the conscription bill that followed almost immediately.⁶ Indeed, it did not take long for inherent racial anxieties to reveal themselves in the debate over the conscription of African Americans.

Most prevalent was the conviction, voiced by infantry colonel George H. McMaster in a report on the difficulties of commanding black troops, that having black soldiers in leadership roles would allow them to use “this war as leverage to change conditions in America—the conditions

⁴ Ibid.

⁵ Jeanette Keith, *Rich Man's War, Poor Man's Fight: Race, Class, and Power in the Rural South during the First World War* (Chapel Hill: University of North Carolina Press, 2004), 33.

⁶ Ibid.

affecting the races.”⁷ Indeed, this belief proved not unfounded, as many middle-class blacks saw military service as a chance for racial advancement.⁸ Furthermore, McMaster argued in an effort to limit such advancement, that black troops were “least suited for the infantry and best suited as labor and pioneer troops.”⁹ Most black soldiers in World War I were, in fact, relegated to noncombatant service and given assignments that ensured they neither saw the battlefield nor realized the potential for glory, the assertions of masculinity, and physical strength it afforded.¹⁰

Other arguments were less nuanced, situating themselves in unconcealed prejudice and, sometimes, even conspiracy. Among commanding officers and foot soldiers alike, a commonly held belief, echoing Colonel McMaster’s report, asserted that black soldiers simply lacked the mental capacity and professionalism to occupy a leadership role.¹¹ Such a belief held that black soldiers were unfit to lead even other black soldiers and needed the guidance of a white superior. This conviction was inherently intertwined with the fear that if a black soldier was allowed to give orders to other black soldiers, he, trained, armed and therefore a threat, might at some point presume to give orders to white soldiers as well.¹² Simultaneously, a fear ran rampant among ordinary white Southerners that African Americans would be incited by German spies to rise up in rebellion at home.¹³ The fear of racial revolution on the home front made it imperative to insist that merely barring black soldiers from being promoted to field rank would not do.¹⁴ Threats to the existing racial order had to be combated. This growing anxiety was realized when racial tensions erupted in a three-day riot in East St. Louis, Illinois, only six days after the first American troops arrived in France, leaving thirty-

⁷ McMaster, quoted in Jeffrey T. Sammons and John H. Morrow, Jr., *Harlem’s Rattlers and the Great War: The Undaunted 369th Regiment and the African American Quest for Equality* (Lawrence: University Press of Kansas, 2014), 404.

⁸ Keith, *Rich Man’s War, Poor Man’s Fight*, 119.

⁹ Sammons and Morrow, *Harlem’s Rattlers and the Great War*, 403.

¹⁰ Keith, *Rich Man’s War, Poor Man’s Fight*, 111.

¹¹ Sammons and Morrow, *Harlem’s Rattlers and the Great War*, 120.

¹² Keith, *Rich Man’s War, Poor Man’s Fight*, 121.

¹³ *Ibid.*, 143.

¹⁴ Sammons and Morrow, *Harlem’s Rattlers and the Great War*, 129. “Field Rank” is considered the rank of Major and above.

nine African Americans dead and hundreds of homes burned.¹⁵ This war, it was clear, would not be allowed to be reason for change.

While the white supremacist agenda was undoubtedly furthered both in the trenches and on the home front during the war, I want to focus on how, once the armistice was signed, this program of subjugation utilized moments and monuments honoring American heroes to entrench white supremacy. Among soldiers, black and white alike, there was no expectation that the society to which they would return would be a changed one. On the contrary, it was acknowledged across race lines that the fight of black soldiers was not yet done. Reflecting on the war upon coming home, Captain Arthur W. Little, a white officer who served as a senior commander of the all-black 396th Infantry Regiment, recognized that the men with whom he had served were “bound to suffer for a long time still to come’ against ‘the prejudices in the hearts of white men, the cumulative prejudices of hundreds of years.”¹⁶ Rather than simply lamenting the state of the race in the union, W. E. B. Du Bois called for action in *The Crisis*, the NAACP magazine of which he was the editor: “We are cowards and jackasses if now that the war is over, we do not marshal every ounce of our brain and brawn to fight a sterner, longer, more unbending battle against the forces of hell in our own land. We return. We return from fighting. We return fighting.”¹⁷

African American soldiers did not have to wait to cross the Atlantic to confront the subjugation and lack of recognition that awaited them at home. Indeed, they were barred from marching in the Allied victory parade in Paris.¹⁸ At home, the federal government was already working to deprive black soldiers of any valor that might be attributed to them at an institutional level, making the “demobilization and the disbanding of the black redesignated federalized National Guard regiments” its first priority.¹⁹

The urgency with which the War Department attempted to erase the all-black regiments and, consequently, their achievements, indicates the urgency and anxiety with which the reestablishment of a divided societal

¹⁵ Peter N. Nelson, *A More Unbending Battle: The Harlem Hellfighters' Struggle for Freedom in WWI and Equality at Home* (New York: Basic Civitas Books, 2009), 26.

¹⁶ Little, quoted in *ibid.*, 207.

¹⁷ Du Bois, quoted in *ibid.*, 211.

¹⁸ Keith, *Rich Man's War, Poor Man's Fight*, 123.

¹⁹ Sammons and Morrow, *Harlem's Rattlers and the Great War*, 399.

structure was approached by white officials. Its exigency was compounded by the perception that, as the leadership feared, African American soldiers had been “spoiled” by the French with whom they had fought, in the process forgetting their place in the society they left behind.²⁰ It took a number of years before the extraordinary bravery of the 396th was revealed and given the praise it fully deserved, with one hundred and seventy of its men having earned the Croix de Guerre.²¹ Instead, the exuberance displayed by its men at the end of the war was considered a threat and skewed descriptions of it hurriedly passed up the chain of command. For too long, the bias of those in charge of forming the American cultural memory allowed these men to be misrepresented as unruly.²²

If, as Winter maintains, cultural memory is comprised of the tangible things that represent a shared past and provide the basis for a group's unity and its individuals' identities, then the integration of the white supremacist agenda into the process of remembering the Great War in the South seems unsurprising.²³ Not only was the practice of racism itself still an integral aspect of Southern society, but Southerners already inherited an entire set of symbols and discourses devoted to its glorification. It is within this symbolic discourse that the memorials to the Confederacy and the need for a new iteration of white supremacy in the wake of the First World War begin to overlap.

Of the more than one hundred copies that the sculptor Ernest Moore Viquesney sold of his life-sized doughboy sculpture, the *Spirit of the American Doughboy*, in thirty-nine different states, Alabama, South Carolina, and North Carolina each have one; Arkansas and Tennessee each have two; Georgia has three; and Kentucky has eight.²⁴ Yet nearly one month after war was declared in 1917 and conscription was implemented, not a single Kentuckian enlisted.²⁵ While, ultimately, many

²⁰ Nelson, *A More Unbending Battle*, 210.

²¹ *Ibid.*, 205.

²² *Ibid.*, 210.

²³ Winter, *Remembering War*, 138.

²⁴ Jennifer Wingate, *Sculpting Doughboys: Memory, Gender, and Taste in America's World War I Memorials* (Burlington, VT: Ashgate, 2013), 60. Other information on locations was retrieved from Smithsonian American Art Museum's Art Inventories Catalog, at <http://siris-artinventories.si.edu/>.

²⁵ Keith, *Rich Man's War, Poor Man's Fight*, 43.

Kentucky men lost their lives during World War I, the state's initial lack of enthusiasm renders its installation of not one, but eight of the same doughboy statue across the state somewhat unexpected. The incongruity of Kentucky's initially tepid support and its subsequent installation of a myriad versions of this same statue suggest that the appeal of the statue lay not necessarily in its advertised purpose, but in its particular, peculiar posture.

The *Doughboy* stands some seven feet tall and is frozen mid-step. As figure 1 demonstrates, his right hand holds a grenade in the air, his arm at the apex of its throwing motion. In his left hand, he holds a rifle casually, his bayonet leading the way. From far away it is hard to see the grenade in his hand, making it look as though he is holding a fist up in victory. He is undeniably proud, irrefutably in action, and plainly recognizable as white.

It should be noted that, of the multiplicity of memorials that sprang up, both abroad and at home, the portrait statue was rare, and immortalizing soldiers in an active posture was even less common.²⁶ Instead, there emerged a trend of representing all lives lost with one nonfigurative representation of a life. The most prominent example, presented in figure 2, of this genre of World War I memorial is Sir Edward Lutyens's *Cenotaph* in Whitehall, London, unveiled in 1920.²⁷ Also known as the Tomb of the Unknown Soldier, the *Cenotaph* (its name derived from the Greek word for "empty tomb"), simply reads, "The Glorious Dead."²⁸ It is a single stone coffin atop a towering pedestal, its only embellishment a carved wreath on its façade. In its purpose, it stands in direct opposition to Viquesney's *Doughboy*. The *Cenotaph* endeavors to memorialize the immensity of the war's loss rather than its isolated moments of individual heroism or glory. Furthermore, it proves universal in its imagery, fostering the cultural memory of an entire generation of bereavement, rather than the particular death of any one individual. Its facelessness and lack of religious imagery afford it a universal sentiment, honoring "men who were not only Protestant or Catholic, but Muslim, Hindu, or

²⁶ Winter, *Remembering War*, 151.

²⁷ *Ibid.*, 142.

²⁸ See "A History of the Cenotaph," *BBC News*, November 14, 2010, at <http://www.bbc.com/news/11734920>; "The Cenotaph," *BBC Remembrance*, at <http://www.bbc.co.uk/remembrance/how/cenotaph.shtml>.

Jewish.”²⁹ The *Spirit of the American Doughboy*, on the other hand, memorializes one very particular soldier: the white man. Furthermore, unlike the *Cenotaph*, his posture of attack suggests that it pays homage not so much to the sacrifice he made, but rather to the glory he is owed by virtue of his size, strength, and physical courage in combat.



FIGURE 1 (LEFT). Ernest Moore Viquesney’s *Spirit of the American Doughboy*, Knoxville, Tennessee. Photo by “Brian Stansberry.” Courtesy of Wikimedia Commons. Available at <https://commons.wikimedia.org/wiki/File:WI-monument-knoxville-tn1.jpg>.



FIGURE 2 (RIGHT). E. L. Lutyens’s *Cenotaph*, Whitehall, London. Photo by “Andrew Shiva.” Courtesy of the Wikimedia Commons. Available at https://commons.wikimedia.org/wiki/File:UK-2014-London-The_Cenotaph.jpg.

²⁹ Winter, *Remembering War*, 142.



FIGURE 3. Confederate monument sitting south of Charles H. Parrish, Jr., Freedom Park, Louisville, Kentucky. Photo on left by “Kenneth C. Zirkel.” Courtesy of Wikimedia Commons. Available at https://commons.wikimedia.org/wiki/File:Confederate_Monument_in_Louisville_KY_NRHP_ID_97000689.jpg.

Photo on right by “Bedford.” Courtesy of Wikimedia Commons. Available at https://commons.wikimedia.org/wiki/File:Lou_Confed_North_Close.jpg.

In 1895, thirty years after the Civil War and just twenty-two years before the United States entered the Great War, the Kentucky Women’s Confederate Monument Association erected the Confederate Monument and Freedom Park around it.³⁰ The monument at Freedom Park rises as tall as the trees, and atop its stone obelisk stands a Confederate soldier at watch, his right arm bent and across his body holding his rifle in front of his left leg. At its base stand two additional soldiers, guarding its East and West sides, their legs spread, one forward, one back, in an athletic stance. One holds the hilt of his sword, seemingly in the process of drawing it, the other holds a tool with which to pack artillery (see figure 3). This active posture is, in fact, an essential uniting theme of monuments to the Confederacy. Seeking to commemorate the South’s glory, the noble cause for which it had fought, and to establish the South as a re-emerging political force, monuments to the Confederacy were, initially, motivated

³⁰ For information on the monument, see its website by the University of Louisville, where it is located, at <https://louisville.edu/freedompark/the-confederate-monument>.

by "a resolute idea of vindicating the Southern soldier and [the Lost] Cause."³¹ Monuments frequently depicted Confederate soldiers "'holding [their] gun[s] in a way which threatens anyone who approach[ed] as an enemy."³² The Confederate soldier's active posture, then, reasserted the power and virility wielded by the white Southern man, qualities which he felt were stripped by the victory of the Union. This practice of fashioning active, even aggressive, Confederate monuments was only phased out in an attempt to demonstrate the South's good will in efforts of reconciliation.³³ Instead, later monuments depicted the soldier at parade rest, a nonthreatening posture.³⁴ This shift, however, was seen as a betrayal to the legacy of the Confederate soldier. One Confederate veteran insisted, "if you want a good, live Confederate, get him in action."³⁵ The Confederate artillerist's posture in the Confederate Monument at Louisville is such that if one were to replace his tool with a grenade and a rifle, he would be the spitting image of Viquesney's *Doughboy*.

This is not to suggest that Viquesney, or any other particular sculptor for that matter, sculpted his monument with Southern monuments to the Confederacy in mind. In fact, Viquesney was from Indiana, and his statue sold as well in the North as it did in Kentucky.³⁶ Rather, it seems that Southerners identified in Viquesney's *Doughboy* an echo of an existing image in their collective memory, and saw in it the opportunity to reinvigorate the social order inherent to its historical context.

The choice of physical space underscored the resonance of Confederate imagery shrouded in Great War patriotism. Six of the eight *Spirit of the American Doughboy* statues in Kentucky are located outside courthouses.³⁷ The habit of erecting Confederate memorials in front of state institutions symbolically linked violence with law, and served as "a continual and

³¹ Kristina Dunn Johnson, *No Holier Spot of Ground: Confederate Monuments and Cemeteries of South Carolina* (Charleston, SC: History Press, 2009), 62

³² South Carolina newspaper, quoted in *ibid.*, 85.

³³ *Ibid.*, 87.

³⁴ *Ibid.* The soldier at parade rest has his weapon resting in front of him passively rather than cocked ready for use.

³⁵ Quoted in *ibid.*, 83.

³⁶ Jennifer Wingate, "Over the Top: The Doughboy in World War I Memorials and Visual Culture," *American Art* 19, no. 2 (Summer 2005): 29.

³⁷ Information on locations was retrieved from Smithsonian American Art Museum's Art Inventories Catalog, at <http://sirir-artinventories.si.edu/>.

unapologetic reminder of Southern resurgence.”³⁸ If inherent in the Southern doughboy memorial was his Confederate past, and an assertion of white supremacy, then the situation of the doughboy directly outside a courthouse perhaps sought to remind returning black soldiers and citizens alike precisely whom the law protected, his bayonet now a means of intimidation not of the German enemy, but of those who would challenge the social order.

The subtler placements of such doughboys just as effectively reiterated white supremacy. The *Spirit of the American Doughboy* in Anniston, Alabama, sits on the median of the road, and in Anderson, South Carolina, it stands with the same active posture on a quiet cul-de-sac.³⁹ While the *Cenotaph* stands in Whitehall, “the official heart of London,” both of these Southern locations are at the same time unceremonious and quotidian.⁴⁰ Thus, it was not necessary to go to a special park or to the courthouse to encounter a doughboy, distinctly displaying the aggressive posture of a “good, live Confederate,” and the systematic subjugation of African Americans for which he fought. The casual nature and ubiquity of these encounters reflects the urgency of their reiteration. In the wake of a war that unsettled the existing racial order, it was necessary to reestablish white supremacy in the South both by amalgamating its narrative and the way in which the South would remember the Great War, as well as by making encounters with these symbolic reminders constant and unavoidable.

Not only did the active rendering of the doughboy seek to intimidate Southern blacks, his posture also worked to remind most black veterans of the active positions they were deprived of at the front, or, for a few, the heroic deeds that would remain unaccredited. In 1926, *The Doughboy* by Nancy Coonsman Hahn was dedicated by the Daughters of the American Revolution in Overton Park, in Memphis, Tennessee.⁴¹ This doughboy is not, however, simply mid-step. Instead, he is in the act of going over the top, one foot in the trench, one foot atop it, the epitome of bravery. In describing Hahn’s doughboy, one member of the dedicating society

³⁸ Johnson, *No Holier Spot of Ground*, 65.

³⁹ See “Spirit of the American Doughboy - Anniston, Alabama, USA,” Waymarking.com, posted by “Thorny1,” June 30, 2008, at http://www.waymarking.com/waymarks/WM4391_Spirit_of_the_American_Doughboy.

⁴⁰ Winter, *Remembering War*, 142.

⁴¹ Wingate, “Over the Top,” 34.

wrote, "He is in the act of going over the top. He is showing us how he did it...the flower of our young manhood."⁴² Indeed, the connection of the posture of Hahn's doughboy to manliness serves both to reinvigorate a narrative of Southern white virility, one of the founding principles of which was the subjugation of black men, and to remind black soldiers who were denied posts at the front of the systematic way in which they were deprived of any opportunity for a similar glory.⁴³ At the same time, the assertion of white masculinity as a tool of the white supremacist agenda robs the black soldier who did see time at the front of any chance of recognition, since public acknowledgement of a heroic black soldier would inherently be a testament to *his* virility, thereby challenging the preeminence of white masculinity and white supremacy as a whole.

The reinvigoration of white supremacy in the wake of World War I was also evident in the few Southern war memorials dedicated to black soldiers. These memorials inverted the symbolic agenda of the doughboy statues, depicting not black soldiers in battle but instead, almost exclusively, taking the form of buildings. The first war memorial built to honor black veterans was the Kimball World War I Memorial in West Virginia, dedicated in 1928. Its size and resources (a small auditorium, meeting rooms, and a trophy room that displayed plaques dedicated to the veterans) led it to be the county's leading community center. While the practical benefits of this aspect of the memorial are unquestionable, the extent to which its form effectively memorializes the valor of its honorees is less clear. The rendering of a black doughboy going over the top in bronze would, however, have been intolerable because of its inherent implications of virility and power, precisely what the white supremacist agenda sought to subdue, as well as its implicit equation of the capacities and virtues of white and black soldiers. Depicting a black soldier in the same posture as a white soldier could not be tolerated when the social order so urgently needed to be maintained. Thus, in their memorializing, black soldiers were deprived of weapons, action, individuality, and even human form. Instead, African Americans had to plead with Congress for

⁴² Quoted in *ibid.*

⁴³ On white virility and subjugation of black men, see Glenda Elizabeth Gilmore, "Race and Manhood," chap. 3 in *Gender and Jim Crow: Women and the Politics of White Supremacy in North Carolina, 1896–1920* (Chapel Hill: University of North Carolina Press, 1996).

the erection of a building.⁴⁴ In 1922, Charles Moore, Chairman of the National Commission of Fine Arts, in touching on "Some Suitable War Memorials," wrote: "BUILDING. To be devoted to high educational or humanitarian purposes. A building entirely utilitarian cannot altogether satisfy the desire for a commemorative work of art."⁴⁵

The lack of satisfaction of which Moore spoke was precisely the goal of white supremacy with regards to the remembrance of black soldiers. Not only were black soldiers denied an image of their own valor, recognized and immortalized, the white supremacist agenda also denied the larger community of Southern African Americans any tangible images of black heroism that might serve to form a cultural memory of strength and virtue. The erection of buildings as war memorials for black soldiers in the wake of World War I is indicative of the extent to which white supremacy informed the remembrance of the war.

Just as the posture of the doughboy can be traced back to the Confederacy, so too can the motivation for tempering black remembrance. According to the Lost Cause myth, fighting and valor were the embodiment of "southernness and of manhood itself."⁴⁶ The 396th Infantry Regiment and their extraordinary accomplishments during the war, then, posed a direct threat to white supremacy by undeniably exhibiting these same qualities, thereby encroaching both on the "southernness" and manhood previously reserved for white men alone. Their mastery of the core tropes of Southern white masculinity mandated that, just as at the turn of the century, white men work together "to eclipse the possibility of the rise of a black Best Man."⁴⁷ This time, however, the struggle was not only to harm the physical beings of black men, but also to erase from their cultural memory the very acts that might endow their virility.

On April 2, 1917, Wilson called for the United States to enter the war "to vindicate the principles of peace and justice in...the world as against selfish and autocratic power."⁴⁸ Yet, throughout the war and for many

⁴⁴ "Congress Gets Pleas for a Memorial," *Baltimore Afro-American*, May 30, 1924.

⁴⁵ Charles Moore, "War Memorials Bad and Good," *American Legion Weekly*, September 8, 1922, 16.

⁴⁶ Keith, *Rich Man's War, Poor Man's Fight*, 36.

⁴⁷ Gilmore, *Gender and Jim Crow*, 63.

⁴⁸ Wilson, "Address to a Joint Session of Congress Requesting a Declaration of War against Germany."

years after, a battle was fought, particularly in the South, to maintain a highly undemocratic, rigidly racial order at home. In the wake of that war, memory proved the most powerful force for those who lost, for those who fought, and for those who sought to strengthen their own programs. The appropriation of doughboy statues, whose postures echoed those of Confederate monuments, worked to reinvigorate the systematic subjugation of African Americans under a convenient guise of patriotism. Furthermore, in only allowing war memorials to black soldiers to take the form of buildings, the white supremacist agenda deprived the Southern black community of images of black heroism, a necessary ingredient in the formation of a cultural memory that includes black valor.

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Dreaming Beings and Thinking Things

The Birth of Complexity Science in the Early Twentieth Century

Ning De-Eknamkul

In the early twentieth century, a big shift in intellectual thinking took place. Unpredictable and interconnected phenomena replaced the Newtonian world machine—the worldview that everything moved in perfectly determined ways, like a clock wound up by God. Instead, the world emerged as an unorganized machine, run by systems that are fundamentally complex and uncertain. Individuals came together—through late nineteenth-century development such as the assembly line—as living components of networked systems, co-operating with their artificial counterparts: machines.

As a result of this process of change, the new field of “complexity science” emerged in the late 1940s.¹ It encompassed multiple fields from cybernetics and the theory of complex systems to artificial intelligence (AI). Collectively, these fields sought to understand and operate the relationships among variable parts of interconnected systems. Historical narratives tend to portray this intellectual shift as an outcome of the development of computers and intelligent devices during the Second World War (WWII).² For example, the first modern computers of the 1940s, including the Z3, ENIAC and Colossus, were massive code-breaking machines that helped the Allies win the war. Because of this, they

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¹ Stuart A. Kauffman, “The Sciences of Complexity and ‘Origins of Order,’” *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* 1990, no. 2 (1990): 299–322.

² Philip Anderson, “Complexity Theory and Organization Science,” *Organization Science* 10, no. 3 (May–June 1999): 219.

earned the popular title of “giant brains,” which appeared to possess the same level of intelligence.³

Yet this shift in thinking began not with the famous brainchild of WWII computer scientists—including Konrad Zuse, Alan Turing and John von Neumann—but with objects of everyday life. It was the daily interaction of humans with ordinary things, such as mechanical clocks, toys, and pens, that brought about changes in intellectual perspectives. The most prominent change was the understanding that the world was no longer operated by a few isolated, spectacular humans or machines, but by networks of living and artificial co-partners

The main quest of this article is to unravel the processes by which the Newtonian world machine was transformed into the new framework of interconnected systems. It acknowledges that this occurred at a very intellectual and fundamental level as part of the changing discourse on what it means to be human. However, it will also show that these intellectual shifts were also founded in everyday sources and embodied by the ever-changing constructs of the so-called “thinking-machine.”⁴

The thinking-machine means different things to different people. As the purpose of this article is to show the historical changes in the forms and concepts of thinking-machine, it will not attempt to impose a definition of what thinking means, either for humans or machines. Instead, it will illustrate how the thinking-machine evolved—from an impossible invention of a single physical device, the “Thinking Machine”—to a nexus of multiple “thinking-machines” that come in all possible forms. Tracing the lineage of thinking-machines will reveal changes in the three following threads:

- I. *The conceptual framework of how the world is organized: from the Newtonian worldview that all events are predetermined by the laws of nature to the complexity theory, which considers all things as*

³ Edmund C. Berkeley, *Giant Brains: Or, Machines that Think* (New York: Wiley & Sons, 1949).

⁴ See *Oxford English Dictionary Online*, 3rd ed., s.v. “thinking machine.” The term is defined as “a person regarded as a machine with intellectual powers; a person whose thinking consists (merely) in mechanical responses to symbols,” and informally, “a machine able to simulate thought,” or “a computer.”

interconnected and interdependent variables that cannot be fully captured in probability statistics.⁵

- II. *The relationship between human mind and machine: from incompatible agents of control to logically equivalent cooperators in interconnected systems.*
- III. *The approach to scientific innovation and communication: the development of symbolic systems as universal means of communication, particularly in science.*

To demonstrate this process of change, the article will mainly use the examples of two kinds of thinking machines—the original idealized model of modern computers, known as the Turing machine, and an ordinary manual writing machine, the typewriter. The goal is not to address the direct connection between them as technological inventions, as assumed by some historical literatures, but to indicate their similarities as thinking-machines.⁶ Understanding their relationships will not only elucidate how the science of complexity emerged through intellectual changes, but also how technology has contributed to our identity as modern humans.

FROM A THINKING MACHINE TO THINKING-MACHINE

For centuries, tangible everyday objects inspired the construction of a thinking machine—a kind of mechanical device imagined to be capable of reproducing not merely the bodily motions of a human, but also the function of human thought.⁷ Automata and robots, examples of such thinking machines, appeared as early as the seventeenth century as objects of entertainment and service. Built in the 1770s, Jacquet-Droz's "The Writer" was one of the first automata that possessed the ability to carry out a series of complex actions automatically as if it were thinking, from

⁵ See R. G. Swinburne, "Physical Determinism," in *Royal Institute of Philosophy Lectures*, vol. 3, *Knowledge and Necessity (1968–69)*, 155–68 (New York: Palgrave Macmillan, 1970); Warren Weaver, "Science and Complexity," *American Scientist* 36, no. 4 (October 1948): 536–44.

⁶ For examples, see Charlie Gere, *Digital Culture*, 2nd ed. (London: Reaktion Books, 2008), 23; and Friedrich A. Kittler, *Gramophone, Film, Typewriter*, trans. Geoffrey Winthrop-Young and Michael Wutz (Stanford, CA: Stanford University Press, 1999), 200–02.

⁷ Dawn E. Lausa, "Descartes' Daughters: Thinking-Machines and the Emergence of Posthuman Complexity" (Ph.D. diss., Department of English, Syracuse University, 2009), 5.

moving its hand to dipping its feather in ink and writing down sentences on paper. “The Turk,” a chess-playing automaton that gained popular attention in the nineteenth century was able to beat a human player in multiple games of chess. While it turned out to be an elaborate hoax, devised to impress the Austrian court of Empress Maria Theresa, the Turk spurred vigorous public scrutiny and a dramatic series of discourses that would only bring to life the promise of a true thinking-machine.

While it is easy and tempting to imagine a machine that can think like us, thinking is an abstract and contingent process that seemingly contradicts the predetermined and unthinking nature of machines. How did thought, then, come to be seen as a function of machines?

Historians of artificial intelligence have traced the birth of thinking-machines to the works of mathematics, natural philosophy and literature dated back to classical Greece. The history of AI, writes the machine-learning expert Bruce Buchanan, is “a history of fantasies, possibilities, demonstrations, and promise,” all of which point towards one single question of whether it is possible for machines to think.⁸ Seized by this notion, several historical narratives examine how the boundaries between man and machine became blurred and dissolved through constructions of automata, computers and other intelligent machines.

Inventors and intellectuals sought to dissect the mystery of the human thinking process through the lens of machines and objects. In the early twentieth century, these objects of scientific investigation became more than physical things. They turned into sources of inspiration and new query, as people began to engage with the multiplying possibilities of thinking machines. For example, as thinking can encompass various meanings—from computation to consciousness, rational judgment to emotions—what exactly did it mean for machines to think?

Under the microscope of human observation, the utilized objects became figures of the thinking-machine themselves. They began to serve as abstract playgrounds for both the intellectual and popular imagination, which were to be taken apart and reorganized for the sake of innovation and novelty, not for the purpose of scientific validation or application. Being reduced to their fundamental principles, ordinary objects worked

⁸ Bruce G. Buchanan, “A (Very) Brief History of Artificial Intelligence,” *AI Magazine*, Winter 2005, 53.

with thinkers and makers to reformulate the concept of what it means for machines to think.

The thinking-machine came to embody not a single, physical machine but multiple thinking-machines that are fully intertwined with our everyday existence. Postmodern literary critic and historian N. Katherine Hayles attributed this turning point to the birth of the posthuman, a state beyond being human in which a disembodied identity fluidly manifests itself in different forms. An example is the possibility of downloading human consciousness onto computers. In the light of the posthuman, the concept of the thinking-machine implies the lack of distinction between man and machine as both thinking things. The thinking-machine simply indicates the ability to hold and process information, regardless of the form or identity of the information processor.

Hayles shows how the posthuman view emerges when the body is imagined as a mere prosthesis for the mind, an external container for information and code. Hayles traces the history of how information becomes disembodied and is conceived as “an entity separate from the material forms.”⁹ The free-flowing informational pathways, she argues, are essential to thinking-machines because they connect “the organic body to its prosthetic extensions.”¹⁰ This conceptualization of the body as an organized system that evolves with informational patterns implies that machines, as a similar type of self-organizing system, can also communicate, control, and think.

The establishment of cybernetics as the study of self-organizing systems in 1948 could be an early turning point in the development of thinking-machines. Credited as the foundation of modern networked society, cybernetics is “a science of communications and automatic control systems in both machines and living things.”¹¹ *Cybernetics*—the landmark book published in 1948 by Norbert Wiener—laid out the notion that systems such as machinery, social organization, and the human brain are self-regulating networks in which components interact with each other and with their environments in feedback loops.

⁹ N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago, IL: University of Chicago Press, 1999), 2.

¹⁰ *Ibid.*

¹¹ *Oxford English Dictionary Online*, s.v. “cybernetics.”

Wiener's achievement could be traced back to his development of the automatic anti-aircraft weapon systems in WWII. In conceptualizing the method of communication between humans and electromechanical sensor systems, Wiener's invention rendered aerial warfare a new total and topographical enterprise of prediction and retaliation. Here, human operators and machines were conceived as equal partners in a system of war communication and control.¹²

The thinking-machine multiplied in forms and concepts through this restructuring of relations between man and machine. In fact, the structure of this article emulates this multiplication process by tracing the lineage of the following thinking-machines: Babbage's Analytical Engine, the typewriter, and the Turing machine. Accordingly, the three main sections of the article will explore how each of these thinking-machines embodied the shift in intellectual concepts. By highlighting the similarity between the Turing machine and the typewriter as thinking-machines, the last section will demonstrate the idea that changes in intellectual perspectives were founded in humans' daily interactions with everyday objects.

The first section will trace the lineage of thinking-machines before the Turing era, from the French Enlightenment philosopher René Descartes's impossible thinking-machine to Charles Babbage's thinking machine, the Analytical Engine, in the late 1830s. Drawing primarily on Dawn E. Lausa's dissertation, it will demonstrate her argument that thinking-machines, namely Babbage's mechanical computers, were unintended products of Descartes's concept of Cartesian Dualism, that is, the separation of mind and body.¹³ Defining human as "a Thinking Being," Descartes polarized the mind and body into opposites and declared the impossibility of "a thinking thing," a physical object that possesses mental capacity.¹⁴

This unsettling notion not only inspired Babbage's and others' mission to build an actual thinking thing, but also provided the conceptual resources for them to envision and justify the conceivability of their thinking machine. For instance, Ada Lovelace, who was considered to be the world's first computer programmer, built on Babbage's reconcept-

¹² Norbert Wiener, *Cybernetics: Or Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948).

¹³ See Lausa, "Descartes' Daughters."

¹⁴ John Veitch, trans., *The Method, Meditations, and Selections from the Principles of Descartes*, 7th ed. (Edinburgh, 1880), 115.

ualization of Cartesian Dualism to propose the idea of a modern computer—an all-purpose machine that could process not just numbers but anything that could be noted in symbols, such as words and music.

First introduced to the public in the 1870s, the typewriter embodied this concept of a general-purpose machine. Like Babbage's engine, the typewriter was a type of symbol-manipulating device that produced letters. Due to burgeoning business and information needs of modern society, it evolved into a multitask machine that also calculated numbers. This development led to changes in the nature of communication, cognition, and control. As humans worked more intimately and frequently with forms of typewriters, they increasingly communicated and thought at the same level as machines—in codes and symbols. To some extent, this caused a shift in the human thinking process and perception of the self in relation to technologies. The second section will consider the typewriter as an embodiment of these changes in ways of thinking and, ultimately, as the figure of the thinking-machine in the pre-computer era.

Continuing the lineage of the thinking-machines into the modern era, the third section will focus on Alan Turing's development of his thinking-machine, the universal Turing machine, in his 1936 paper "On Computable Numbers, with an Application to the Entscheidungsproblem."¹⁵ Intended as a response to Hilbert's mathematical questions, Turing's paper traversed the boundaries that separated abstract ideas from concrete matters. Turing's work, in fact, drew its simplicity, logic, and innovative flair from the references to everyday objects, such as the pen, paper, and perhaps—as some suggested—the typewriter.

Venturing into Turing's mind, this article will show how Turing interpreted the notion of the thinking-machine within Descartes's framework of mind and body, based on references from his intellectual reflections and personal letters. Then, the narrative will dive into the formula of Turing's innovation—in particular, how Turing went beyond the limits of formal science and classical philosophy to transform the basis of computation from the perspective of human thinking.

¹⁵ Alan M. Turing, "On Computable Numbers, with an Application to the Entscheidungsproblem," *Proceedings of the London Mathematical Society*, 2nd ser., 42 (1937): 230–65.

In illustrating Turing's innovativeness, the article will highlight how his success intertwined with the development of communication systems that were already in place: the system of codes and symbols. Symbols became new vehicles of scientific truths and meanings. As encoded strings of data, meanings were disembodied from the concrete laws of mechanics circumscribed by Newtonian physics. Words that previously grounded scientifically truths and meanings morphed into configurations of 1s and 0s. Numbers were turned into a universal and powerful symbolic language. Using a more general yet precise language of symbols, scientists were able to free their concepts of thinking-machines from the confines of Descartes's deterministic framework—and apply them to the more unpredictable context of modernity.

The last section will analyze the typewriter as a cultural equivalent of Turing's thinking-machine. It will bring to clarity how the intellectual developments which started with the typewriter are necessary to contextualize the creation of the Turing machine. The typewriter and, by extension, the Turing machine, was a paradigmatic product of the system in which it was developed—one that was "fundamentally predicated on abstraction, standardization and mechanization."¹⁶ The article will look at different representations of the typewriter as a thinking-machine to unearth the contextual patterns it embodied. The exploration of both literary and cultural sources will show how the concepts and images of the thinking-machine were intertwined with ones we formed of our own human identity and intelligence.

The intention of this article is to understand the emergence of the modern way of thinking in terms of our own relations to technology, rather than a linear technological development in which a set of inventions simply gives way to new technology. It will show that the shifts in intellectual thinking resulted from an unfolding relationship between everyday objects and a collective subject—one that emerged with the "fantasies, possibilities, demonstrations, and promise" of the thinking-machine up to the late 1940s.¹⁷

¹⁶ Gere, *Digital Culture*, 24.

¹⁷ Buchanan, "A (Very) Brief History of Artificial Intelligence."

FROM DESCARTES TO BABBAGE'S THINKING MACHINE

Dawn E. Lausa asserted that the concept of the thinking-machine was derived from Descartes's philosophical construct. This was a metaphysical concept known as Cartesian Dualism, which emerged in the early seventeenth century from his conceptualization of the body and the mind as "substantially separate entities."¹⁸ According to Descartes, a "thinking" machine was simply inconceivable because "thought" was a uniquely human function of the "rational soul," something that machines do not possess in their mechanistic bodies.¹⁹ The body, on the other hand, is an extension of the mind, "an extended thing" that can take on a multitude of properties and can therefore exist in the form of machine.²⁰

Lausa argues that by conceiving the machine and the human in opposition to one another, Descartes ironically conceives "the very thinking-machine which is strictly inconceivable from within his own ontology."²¹ While insisting that machines were not capable of thinking, Descartes put into play the notion of *function* in both the human and the machine, as they began to be viewed as complex systems comparable to one another. In other words, Descartes established the body as a complex mechanism made of internal components that performed different functions. The human mind, for example, was a component that performed the function of "thought."

Descartes's conceptual framework, proposes Lausa, enabled his "philosophical heirs"—namely Charles Babbage, Alan Turing, and Norbert Wiener—to "conceive the constellation of concepts that encompass cybernetics, complex-systems, and the posthuman."²² By means of reframing Descartes's concept of thought, they managed to construct their intelligent devices in the image of Descartes's impossible thinking-machines.

For instance, Babbage, who was credited with inventing one of the first mechanical computers in the 1830s, reconceptualized Descartes's "logic" and "reason" to establish the basic architecture of computation. Designing

¹⁸ Lausa, "Descartes' Daughters," 229.

¹⁹ *Ibid.*, 37–42.

²⁰ René Descartes, *Meditations on First Philosophy*, trans. Donald A. Cress, 3rd ed. (1641; repr., Indianapolis, IN: Hackett, 1993), 15.

²¹ Lausa, "Descartes' Daughters," 8.

²² *Ibid.*, 19.

his thinking machine, Babbage redefined reason, which Descartes viewed as a unique expression of the human's "rational soul," as a function that could also be exercised by a machine. In his autobiography, Babbage reflected on his endeavor to ascertain the relationship between "the laws of thoughts" and "the human mind," bridging the concept of the human with that of reason and knowledge.²³ He wrote:

[f]rom my earliest years I had a great desire to enquire into the causes of all those little things and events which astonish the childish mind. At a later period I commenced the still more important enquiry into those laws of thought and those aids which assist the human mind in passing from received knowledge to that other knowledge then unknown to our race.²⁴

In the closing chapter of the same text, he reiterated this framework for his life's enquiries: "Probably a still more important element was the intimate conviction that the highest object a reasonable being could pursue was to endeavor to discover those laws of mind by which man's intellect passes from the known to the discovery of the unknown."²⁵ By making such links, Babbage was able to collapse the Cartesian distinction between determinacy and contingency that Descartes had articulated. He described his calculating engines in terms of human thought processes such as memory and foresight.²⁶ For example, Babbage's Analytical Engine incorporated separate input and output (I/O) units with integrated memory, reflecting the simple function involved when human brains perform arithmetic—take in figures, refer to memorized equations, manipulate numbers, and output results.

In contrast to Descartes, Babbage stressed the *conceivability* of a thinking-machine capable of reason as a form of thought. Logical thinking and reasoning, exhibited by Babbage's calculating engines, became the main essence of intelligence not only for humans but also for machines. Reason, of course, was integral to the definition of human intelligence under the rational discourse of the Enlightenment. As reason was now a defining function of machines, Babbage sought out to remove the contingent element of "human error" from the machines' calculating

²³ Charles Babbage, *Passages from the Life of a Philosopher*, ed. Martin Campbell-Kelly (1864; repr., London: Pickering and Chatto, 1994), 340, quoted in *ibid.*, 66.

²⁴ Babbage, *Passages from the Life of a Philosopher*, 5.

²⁵ *Ibid.*, 364–365.

²⁶ Lausa, "Descartes' Daughters," 64.

process.²⁷ Here, machines seemed to enhance and compensate for the imperfect logical capacity of human intelligence. From the perspective of maximizing rationality, human intelligence was thus conceptualized as being co-produced with intelligent machines.

The import of Babbage's calculating machine as a thinking-machine was captured by Ada Lovelace in the notes she published about the Analytical Engine in 1843. Lovelace was an English mathematician, writer and friend of Babbage. She was considered to be the world's first computer programmer. In her commentary, she articulated the idea that the Analytical Engine is not just a number-crunching machine, but a general-purpose computer that could be programmed to solve problems of any complexity. As a universal symbol-manipulating device, it could "act upon other things besides number," processing symbols that represented entities other than quantity, such as letters of the alphabet and notes of music. She saw the potential of the engine stretching far beyond the world of mathematics, as she wrote that in the near future it "might compose elaborate and scientific pieces of music of any degree of complexity or extent." In order to demonstrate the "unlimited" capabilities of the Analytical Engine as a true-thinking machine, Lovelace wrote an algorithm that the engine would carry out to solve certain mathematical problems—procedures that came to be known as the first computer program.²⁸

In light of Lovelace's vision, mechanical "thinking" means the ability to perform not merely calculation but, more comprehensively, computation. Lovelace described that the Analytical Engine transcended the common ground of "mere 'calculating machines,'" which were "strictly arithmetical" in nature, through its "uniting link" to the analytical thinking power of the "human mind." It was able to not only examine numbers, but also reveal some underlying meaning through that examination. This is similar to the way in which the human brain interprets words or actions as having a particular, hidden meaning. The engine thus acted like a human mind, as it derived new meaning by going

²⁷ Ibid., 77.

²⁸ Ada Lovelace, translator's notes to "Sketch of the Analytical Engine Invented by Charles Babbage, Esq.," by L. F. Menabrea, trans. Ada Lovelace, *Scientific Memoirs* 3 (1843): 694.

through “an *analysing* process” rather than just “*synthetically*” building on the data that had been already computed through human calculations.²⁹

As the Analytical Engine embodied the link “between the operations of matter and the abstract mental processes,” the term thinking-machine connoted the connection rather than the separation between thinking and machine. Almost a century later, Alan Turing formulated this link in laying the theoretical foundations of computer science. By demonstrating that the material and the mental were interdependent rather than mutually exclusive, Lovelace showed that “the idea of a thinking or of a reasoning machine” could be thought of as “a practical possibility.”³⁰

Lovelace further extended such implications of Babbage’s engine to the academic space. “The Analytical Engine,” she wrote, “is an *embodying of the science of operations*.” In essence, it acted as a conceptual thinking-machine by embodying a new scientific way of thinking. This was the concept that material and mental processes could operate simultaneously “in their [connection] together as a whole.” The science of operations brought together “the theoretical and the practical.” Logic became more than the source of “abstract and immutable truths,” but “a new, a vast, and a powerful language” that could speak to “the human race.” For instance, mathematical science would use symbols to communicate logical truths by “[facilitating] the translation of its principles into explicit practical forms.” Lovelace saw the development of mathematical logic as a language important “for the future use of analysis,” which would enable “more speedy and accurate practical application for the purposes of mankind.”³¹

Babbage’s Analytical Engine served as a thinking-machine not just by making explicit and possible the “thinking” capabilities of machines. Lovelace’s visionary interpretation of these capacities also brought to life the idea of an all-purpose machine. More significantly, it instituted a new approach to science that captured the organizational relationships between human and machine, not simply their individual natures.

From this perspective, the thinking-machine turned from a mere material device into a landscape of possibilities that could be realized by the synergy of man and machine. The bridge it created between the

²⁹ Ibid., 696–97 (emphasis in original).

³⁰ Ibid.

³¹ Ibid., 694–97 (emphasis in original).

theoretical and the practical would precipitate a new way of thinking—one which considered the world in terms of unpredictable systems that could be organized through science.

TYPEWRITER, THE EVERYDAY THINKING-MACHINE

Babbage's calculating machines were not the only symbol-manipulating devices in existence. The typewriter was one such invention. Similar to the Analytical Engine's approach, it mechanized writing by noting letters as block symbols on keys. From its commercial inception in the 1870s to its obsolescence in the late twentieth century, the typewriter evolved from a letter-writing device into a multitasking machine. In addition to producing letters, it could also calculate and print numbers. This image, of course, resembled that of a modern computer—with a prominent keyboard and adjustable inscription surface, powered almost entirely by fingertips. This evokes Lovelace's prophecy of the rise of a general-purpose machine, which could process both words and numbers expressed in symbols.

As the typewriter became a staple machine of early twentieth-century modern society, it participated in the paradigmatic shift in intellectual thinking. On the one hand, by enabling human interactions with machines on a mass and daily scale, it prompted a macro shift in the concept of organization. The nature of control and communication changed as man worked more intimately and frequently with typewriters. On the other hand, the typewriter had micro effects on the human thinking process. By turning words into symbols, the typewriter took part in reframing human and machine as communicators of the same logical language. This led to a shift towards the perception of the world as systems of collaborating men and machines.

The typewriter, an ordinary machine built just for writing, seems objectively far from the technological breakthroughs of Babbage and Turing. Despite the prevalence of the typewriter in the early twentieth-century, its historical significance receives much less attention than the contemporary mechanical computer, which is often assumed to be the single precursor of the modern digital computer, given their direct connection as "computers." Before the monopoly of universal computers and related digital technologies, there were only machines built for

specific tasks—writing and calculating machines for instance. Yet, the development of machinery became increasingly linked with the demands and needs of modernization, such as urbanization and information needs. The typewriter therefore not only evolved into a multiple-task machine, but became integrated with the essentials of modern life.

The history of the typewriter indicates the multi-dimensionality of its growth and uses. The typewriter made its world debut at the Centennial Exposition in 1876 when it was “viewed by thousands for the first time.”³² However, the first patented typewriter was invented as early as 1714 by Henry Mill as “an artificial machine or method for impressing or transcribing of letters.”³³ The cumbersome design and technical difficulty of early typewriters resulted in a century of resistance to the use of typewriters, as handwriting was considered to be a faster, easier, and more expressive mode of written communication.

For much of the late nineteenth century, the development of typewriters was driven by the need not only to save on labor costs but also to overcome the many limitations of the typewriter itself. The uncomfortable spacing of the keys, the difficult keyboard arrangement, and the obstructive typebars all contributed to the improvements of the writing machine and typing method. It was not until the 1870s when the first practical typewriters appeared on the market that typewriters entered the hands of writers and pioneer users, such as the classic American author Mark Twain and the German philosopher Friedrich Nietzsche.³⁴

By the early twentieth century, the typewriter gained widespread acceptance and emerged as an indispensable instrument of writing, communication, and commerce. P. G. Hubert, Jr., acknowledged this in his 1888 article on the growth and uses of the typewriter: “To-day, the Remington typewriter is found in nearly every prosperous business and professional office, — [sic] sometimes scores of them in the same office.”³⁵

The multiplicity of the typewriter’s forms and functions contributed significantly to its popularization. Through the integration of calculating mechanisms pioneered by Babbage, the typewriter took on mathematical

³² Hazel A. Flood, “The Invention and the Development of the Typewriter: Part II, 1867–1948,” *Journal of Business Education* 24, no.6 (1949): 27.

³³ Henry Mill, “Machine for Transcribing Letters,” UK Patent no. 395, filed 1714.

³⁴ Flood, “The Invention and the Development of the Typewriter,” 27.

³⁵ P. G. Hubert, Jr., “The Typewriter; Its Growth and Uses,” *North American Review* 146, no. 379 (June 1888).

qualities of the computer and projected a new 'intelligent' ability to multi-task. In a 1915 newspaper advertisement, the New York Smith Premier company even started introducing its latest "Adding and Subtracting Typewriter" as the "thinking" typewriter "which writes and adds on the same page,...prevents errors, stops leaks and cuts half the labor in all branches of accounting work."³⁶

For what possible reasons could the typewriter at this stage be defined as "thinking"? Adding machines and typewriters are among plenty of symbol manipulators that "by no stretch of the [modern] imagination can be called minds."³⁷ They only have the ability to do arithmetic rather than analysis as Lovelace mentioned. However, as the following section will illustrate, the typewriter became the thinking-machine precisely because it already shared an intimate relationship with the human body and mind.

Despite its extensive technological influence on mechanical development, the typewriter had been closely connected with the workings of human bodies. The development of the typewriter, in fact, originated in response to blindness. According to Hubert, the specification of the Mill typewriter suggested that it was "intended to print embossed characters for the use of blind people."³⁸ This became apparent when Nietzsche, who was experiencing failing vision, adopted the "writing-ball" typewriter in 1872. This was not because of its technical benefits but because it would enable him to continue writing through touch-typing.³⁹ By linking the eyes with writing hands, the typewriter served as a prosthesis for Nietzsche's impaired vision.

Yet the most striking effect of the typewriter on Nietzsche was not physical but cognitive. Nietzsche's composer friend, Heinrich Köselitz, noticed how Nietzsche's style of writing became "even tighter, more telegraphic," through typewriting.⁴⁰ He noted in his letter to Nietzsche

³⁶ The ad can be found in Robert Messenger "John Conrades Wahl and the Remington-Wahl Typewriter," *oz.Typewriter: The Wonderful World of Typewriters* (blog), April 15, 2014, at <http://oztypewriter.blogspot.com/2014/04/john-conrades-wahl-and-remington-wahl.html>.

³⁷ Mike Sharples, et al., *Computers and Thought: A Practical Introduction to Artificial Intelligence*, 6th printing ed. (Cambridge, MA: MIT Press, 1996), 8–9.

³⁸ Hubert, "The Typewriter."

³⁹ Kittler, *Gramophone, Film, Typewriter*, 200–02.

⁴⁰ See "Friedrich Nietzsche and His Typewriter – A Malling-Hansen Writing Ball," *Homepage of the International of Rasmus Malling-Hansen Society*, February 2, 2008, at <http://www.malling-hansen.org/friedrich-nietzsche-and-his-typewriter-a-malling-hansen-writing-ball.html>.

possibilities, identity, affects, and objects, as discrete symbols."⁴⁶ This analogy resonated with Nietzsche's question in 1874 whether humans are still men or "only thinking, writing, and speaking machines."⁴⁷

With Franklin and Nietzsche as cases in point, our perception of truth can be said to depend on our reading of symbols. As Kittler writes, "only that exists which can be posted," the human bodies and machines are only as real as their symbolic representation. "Numbers and figures," he believes, "become keys to all creatures."⁴⁸ By 'reducing' the human language into abstract signs, the typewriter played a part in turning man and machine as mechanical mirrors of each other.

Historical works examining the cultural relationship with technology tend to dwell on how new technology overwrites its precursors. For instance, Mark Seltzer shows in how new writing technology "replaces, or pressures" human bodies into a new collective subject of machines.⁴⁹ Meanwhile, Kittler highlights that humans are at risk of being eclipsed by technology.⁵⁰ For him, "Machines take over functions of the central nervous system, and no longer, as in times past, merely those of muscles."⁵¹

Yet, machines hardly conquer the human. Rather, by reorganizing our everyday ideas and practices, they mobilize our new awareness of the world as complex systems and human-machine interfaces. English professor Steven Connor criticizes Kittler's "epochist way of thinking about technology."⁵² For him, writing technology does not mean overwriting the past or the human, but adding dimensions to it: "Typing does not remove the hand: it multiplies it."⁵³ In the final section of this article, the implications of the typewriter will be discussed further in connection to its thinking-machine counterpart, the Turing machine.

⁴⁶ Seb Franklin, *Control: Digitality as Cultural Logic* (Cambridge, MA: MIT Press, 2015), 111.

⁴⁷ Nietzsche, quoted in Kittler, *Gramophone, Film, Typewriter*, 188.

⁴⁸ *Ibid.*, 8, 19.

⁴⁹ Mark Seltzer, *Bodies and Machines* (New York: Routledge, 1992), 10, quoted in Steven Connor, "Modernism and the Writing Hand" (conference paper, Modernism and the Technology of Writing Conference, Institute of English Studies, University of London School of Advanced Study, March 26, 1999).

⁵⁰ Kittler, *Gramophone, Film, Typewriter*, xxxix.

⁵¹ *Ibid.*, 16.

⁵² Connor, "Modernism and the Writing Hand."

⁵³ *Ibid.*

THE SUPER-TYPEWRITER, THE TURING MACHINE

Turing had been fascinated by the typewriter since he was a boy. According to the leading Turing scholar Andrew Hodges, Turing's mother owned a typewriter that might have served as one of Turing's inspirations for his future machine.⁵⁴ A letter from eleven-year-old Turing to his parents contained a drawing of how he might make the typewriter.⁵⁵ Turing's imagined typewriter most likely became the conceptual model for the 1936 Turing machine, a hypothetical machine designed as "a kind of idealized typewriter" or "super-typewriter."⁵⁶

The Turing machine was a theoretical digital computing machine that could be constructed to solve any solvable problem using simple rules of computation. The theory of Turing machines was founded in Alan Turing's 1936 ground-breaking "On Computable Numbers, with an Application to the Entscheidungsproblem," which proposed the notion of computability as a universal method of deciding whether any given mathematical assertion is true or false.⁵⁷

In his proposal, Turing considered the universal machine as an "automatic machine" that runs on the digital system of binary code. His machine moved from one state to another using a precise finite set of rules based on a single symbol it read from a tape. It could manipulate the symbols presented to it and perform necessary operations to test the symbols for their truth values.⁵⁸ What made Turing's work so innovative was its "simplicity and logic, which made it even today the most

⁵⁴ Andrew Hodges, *Alan Turing: The Enigma* (New York: Simon and Schuster, 1983), 96.

⁵⁵ Alan Turing to his mother and father, letter, summer 1923, AMT/K/1/3, Turing Digital Archive, at <http://www.turingarchive.org/browse.php/K/1/3>.

⁵⁶ Robert Irving Soare, "Turing and the Discovery of Computability," in *Turing's Legacy: Developments from Turing's Ideas in Logic*, ed. Rod Downey (Cambridge: Cambridge University Press, 2014), 470; Robert Irving Soare, "Interactive Computing and Relativized Computability," in *Computability: Turing, Gödel, Church, and Beyond*, ed. B. Jack Copeland, Carl J. Posy, and Oron Shagrir (Cambridge, MA: MIT Press, 2013), 211 ("kind of idealized"); Hodges, *The Enigma*, 97 ("super-typewriter"). See also Tony Hey, and Gyuri Papay, *The Computing Universe: A Journey through a Revolution* (Cambridge: Cambridge University Press, 2015), 114.

⁵⁷ Turing, "On Computable Numbers."

⁵⁸ Mark Ward, *Virtual Organisms: The Startling World of Artificial Life* (New York: Thomas Dunne Books, 2000), 116.

convincing model of computability.”⁵⁹ It utilized the everyday concept of a human solving problems with a pen and paper to devise such a powerful yet simple model of what a digital computer could be.

What differentiates Turing’s idea of a digital computer from a computing machine is that it is universal: while a computing machine is designed to compute a specific set of functions to achieve a certain task, the Turing machine can perform any conceivable computation, including the simulation of other computing machines, both less and more sophisticated than the computer itself.

Turing’s paper is primarily a case study aimed at determining the mental processes that take place when a person performs a calculation. Turing was able to give a precise definition of ‘computable’ through this analysis of the process of computation. This was a crucial part of his response to Hilbert’s *Entscheidungsproblem* (“decision problem”), which asks, in more complex terms, if there is a single algorithm to decide the truth of any mathematical assertion. Turing’s work proved that on the contrary to Hilbert’s view, not all mathematical problems can be solved by a fixed and definite process. And for those that can, they can only be solved if they are ‘computable’ by an ‘automatic machine.’ Computability for Turing was the ability to solve a problem by a finite mechanical procedure, that is, a program or algorithm—by proceeding from inputs, according to a fixed set of rules, and through a series of steps, arrive at outputs. He argued that this was something that could only be done by an automatic Turing machine.

The Turing machine consists of a limitless memory, imagined as an unbounded length of “tape” divided into “squares,” each of which bears a “symbol” (1 or 0). This paper tape stores both program and data that can be read by a scanner that moves back and forth through the memory, symbol by symbol. Just as a human reads and writes words, the machine scans a symbol on each square and writes additional symbols down on the ruled paper tape.

The activity of a Turing machine is determined by two initial conditions: the symbol being scanned and the current state of the machine which Turing called the “m-configuration.” Turing compares the state or “m-configuration” of the machine to a human computer’s “state of mind.”

⁵⁹ Soare, “Interactive Computing and Relativized Computability,” 211.

He describes, "The behavior of the computer at any moment is determined by the symbols which he is observing, and his 'state of mind' at that moment."⁶⁰ In this manner, the Turing machine observes the instructions written in symbols and converts them into action. As instructed, it can change its current configuration and perform automatic tasks, such as move one position to the left of the tape, scan a symbol on a new square, and write 1 or 0 down on the tape. Turing describes this in his paper:

We may compare a man in the process of computing a real number to a machine which is only capable of a finite number of conditions q_1, q_2, \dots, q_R which will be called " m -configurations." The machine is supplied with a "tape" (the analogue of paper) running through it, and divided into sections (called "squares") each capable of bearing a "symbol."⁶¹

In essence, a Turing machine was manipulating symbols when it was performing its scanning, reading, and writing functions. As a kind of symbol-manipulator and staple machine existing during Turing's time, the typewriter shared many parallels with the Turing machine. Inspired by this observation, Hodges speculated how the typewriter may have inspired Turing to question what was meant by calling a typewriter 'mechanical.'⁶²

Based on Hodges's assumption, Turing redefined what it means for something to be 'mechanical' based on two main features of the typewriter. First is the notion of the finite-state machine. A typewriter can assume one of several states or modes of operation: for example, it prints lowercase letters and numerals in the "home" state and prints uppercase letters and special symbols in its "shift" state. Likewise, Turing's automatic machine can assume any one of a finite number of states, as preset by the program. Each state constitutes a different setup or configuration of the machine, which determines the behavior of the machine at any given moment.

Another feature of the typewriter that Turing incorporated into his picture of the automatic machine is the typing point, which can move relative to the page. He visualized this as "an infinite carriage" that can

⁶⁰ Turing, "On Computable Numbers," 250.

⁶¹ *Ibid.*, 231.

⁶² Hodges, *The Enigma*, 96.

read, write, and erase one square of symbol at a time.⁶³ This variability of position allowed the “thinking” function of the machine to be independent of the physical actions it enacts. Here Turing formulated with precision the “link” that Lovelace’s analysis of the Analytical Engine introduced one hundred years earlier. This helped him turn the vague connections between mental and physical processes into specific functions of the digital computer.

Computer historians and media scholars called on Hodges’s analogy of the typewriter to articulate the workings of the Turing machine.⁶⁴ Like the typewriter, which has block letters, backspacers, and space bars, Turing’s machine moves discretely from symbol to symbol. George Dyson, a historian of technology, describes the Turing machine as “a black box” which was “as simple as a typewriter or as complicated as a human being.”⁶⁵ While the Turing machine drew its principles from the mental processes of humans, it appeared to function in a manner as logically simple as an ordinary writing machine. This paradox shows that the Turing machine was neither a merely theoretical construct nor a sophisticated archetype of the modern computers, as computer historians tend to portray it. At the time, it bridged the disconnection between the logic of modern computing and its place in the world of human action.

While the typewriter offered Turing the underlying principles of the notion of ‘machine,’ it was built only for specific tasks and was therefore “too limited to serve as a model” for the comprehensive idea of computation.⁶⁶ In fact, there is no evidence to support that Turing deliberately used the example of the typewriter to conceive his universal machine. But whether or not Turing made use of the typewriter, he did not dismiss the concept of symbol manipulation it represented. In fact, he used it to institute a new solution to the limitations of observable human computation. This was the idea of an all-purpose, universal computer. Again, echoing Turing’s thought process, Hodges wrote how Turing may

⁶³ Soare, “Interactive Computing and Relativized Computability,” 211.

⁶⁴ For examples, see Kittler, *Gramophone, Film, Typewriter*, 18; Soare, “Interactive Computing and Relativized Computability,” 211.

⁶⁵ George Dyson, *Turing’s Cathedral: The Origins of the Digital Universe* (New York: Vintage Books, 2012), 247.

⁶⁶ Hodges, *The Enigma*, 97.

have asked himself what would be “the most *general* kind of machine that dealt with symbols.”⁶⁷

As Turing addressed the question of generality or ‘universality,’ he understood that the real nature of the thinking-machine was its program—a function of its organization—not the physical device itself. Like Lovelace, Turing pinpointed the heart of the thinking-machine in the “analysing process,” a series of computations that the human mind normally carries out to arrive at new results.⁶⁸ This led Turing to formulate the concept of the ‘universal machine,’ meaning that the Turing machine, “by making use of what we now call ‘programs’ stored in its memory, can compute *everything* that is computable in the intuitive sense.”⁶⁹

By what special methods did Turing set up this new intellectual concept? He modified the fundamental principles he drew from everyday objects. For example, the inspiration for his model of computation came from a wide-ruled graph paper—“like a child’s arithmetic book,” as Turing states in his paper.⁷⁰ Because all symbols can be made to fit inside one of the squares on the graph paper, Turing argues that any calculation can be done on a grid. But the two-dimensional character of the grid is not necessary to computation. So he took away the paper and argued that computation can be carried out on tape consisting of a “one-dimensional” sequence of squares.⁷¹

Based on this streamlined framework, Turing proceeds to give formal descriptions of a Turing machine. He uses simple and concrete terms such as “squares” and “symbols” in conjunction with abstract ones such as “states” or “m-configurations.” This helped Turing to illustrate how the process of a human computing numbers and that of machine computation are logically equivalent. Turing’s formalization of this link was important to the shift in methods of scientific communication. It established a standardized language that captured the mutual relations not only between man and machine, but also between abstract logic and concrete applications.

⁶⁷ Ibid. (emphasis in original).

⁶⁸ Lovelace, translator’s notes to “Sketch of the Analytical Engine,” 698.

⁶⁹ B. Jack Copeland, Carl J. Posy, and Oron Shagrir, “Introduction: The 1930s Revolution,” in *Computability*, viii (emphasis in original).

⁷⁰ Turing, “On Computable Numbers,” 249.

⁷¹ Ibid.

Turing's work broke down the barrier between the theoretical and the practical, showing that "a machine could be encoded as a number, and a number decoded as a machine."⁷² Represented as symbols, numbers were not merely manifestations of quantities. They were encoded strings of information and rules that could regulate the behavior of a machine, as the machine performed the operations on the numbers. As a result, numbers and machines were not polarized entities but relative variables of the same system. This notion contributed to the shift in intellectual thinking by showing that mathematical calculation, a process done by human minds in everyday life, shared the same logical basis as computation by machines.

Turing utilized this connection to rethink the relationship between man and machine. He saw both the human mind and machine as discrete logical systems that run on the notion of computability.⁷³ So a machine could be described as nothing more than a system of rules for manipulating symbols in order to obtain results.⁷⁴ This idea eliminated the man-machine boundaries by turning them into logical and functional equivalents. Unlike his predecessors, Turing conceived the thinking-machine from the perspective of connection between the human mind and machine, rather than that of opposition.

TURING'S THINKING-MACHINE

By reducing everyday objects to their fundamental principles, Turing reformulated the concept of what it means for machines to think. Following Descartes, Turing implied that intelligence is the ability to reason and to communicate by language.⁷⁵ However, it is not only humans but also machines that speak the language of symbols. Thinking, viewed from the point of view of Turing's principles, becomes nothing more than selection from a field of pre-defined options.

Despite its heavily mathematical nature, "On Computational Numbers" was a thought-experiment that bears on the classic problem of

⁷² Dyson, *Turing's Cathedral*, 250.

⁷³ Hodges, *The Enigma*, 97.

⁷⁴ Lausa, "Descartes' Daughters," 207.

⁷⁵ Sharples et al., *Computers and Thought*, 8.

mind and matter. Turing, like Babbage, was grappling with the inherited problematic of Cartesian Dualism, that is, the incompatibility of mind and body. While Turing continued to use the inherited language of 'men and machines' in his analysis, he just as often called into question the value and usefulness of viewing 'mind and body' as separate entities.

Going beyond Babbage's adaptation of Descartes's concept of thought, however, Turing rejected these traditional concepts and questions of opposition. He conceived a whole new conceptual schema which recognized 'thinking' and 'machine' in terms of relation instead of ontological differences. For Turing, questions aimed at identifying boundaries between the human and the machine were essentially "too meaningless to deserve discussion."⁷⁶ He would transform them into questions of function: how do thinking-machines actually 'think'?

Turing used everyday objects and inspirations to formulate a simple, logically complete and philosophically coherent definition of 'mechanism.' For him, a mechanism did not necessarily mean everything had to be predetermined. It was the more abstract quality of "being fixed in advance"—like the grid framework of a child's arithmetic book.⁷⁷ Any symbols, in any form, can be fitted in any square within the given container of the grid. Similarly, the 'mechanism' of the body serves as a container that hosts the mind, allowing its complex mental operations to happen contingently. The mind was no longer an immutable entity but free-forming manifestations of its environment.

Turing's innovation thus resolved the limitations of Cartesian Dualism into concepts of new problematics, which no longer recognized the incompatibility of mind and body, but sought rather to understand how they could cooperate as a system. By inventing a machine that embodied this system, Turing not only transformed the orthodox mind-and-body framework in provocative ways, but also provided a concrete manifestation as to how a thinking-machine could work.

Turing's paper also formalized Lovelace's concept of science of operations, which was the study of "*any process which alters the mutual relation of two or more things*."⁷⁸ The Turing machine manifested the attempt to encapsulate the mutual relation of many things—meanings and

⁷⁶ Alan M. Turing, "Computing Machinery and Intelligence," *Mind*, n. s., 59, no. 236 (October 1950): 442.

⁷⁷ Hodges, *The Enigma*, 96.

⁷⁸ Lovelace, translator's notes to "Sketch of the Analytical Engine," 694 (emphasis in original).

symbols, numbers and machines, hardware and software programming. The “radicality of his emphasis upon computer programming over hardware,” Lausa suggests, was what made Turing’s paper so innovative.⁷⁹ It introduced programming as a language that served to connect the machine and the human functionally. The high-level programming—the communication between set rules and abstract information—was what determined the behaviors and systems of a machine, not its material composition.

But if the Turing machine was such a one-of-a-kind breakthrough, why does Lausa present the Turing machine just as a radical “iteration” of Descartes’s thinking-machine? For her, Turing’s universal machine was a product of the “conceptual constellations” that grew, evolved and multiplied with Descartes’s original concept of the thinking-machine. While Lausa may be correct, her argument can still be furthered. As she wrote, the thinking-machine was a changing image of Descartes’s mind-and-body concept that was iterated and modified time and again by those like Babbage and Turing. However, it is not sufficient to only analyze the Turing machine’s lineal connection to the past thinking-machines, but also, as the following part of the article will examine, how it was embedded in the context of Turing’s life. This will highlight how the intellectual shift was founded within everyday inspirations, which shaped the Turing machine even before its conception.

INSIDE THE MIND OF TURING

Although Turing found himself categorized as a mathematical logician, he was more a scientist who felt a deep concern for the fundamental questions of mind and matter. Two parallel turns of events shaped Turing’s perception on the relationship between mind and body: (1) in the world of science, the paradigm shift towards quantum physics in 1926, and (2) in his personal life, the unanticipated death of his teenage “first love” Christopher Morcom in 1930.⁸⁰ These two pivotal events set in motion Turing’s inquiry into the distinction between the body and the mind.

⁷⁹ Lausa, “Descartes’ Daughters,” 207.

⁸⁰ Hodges, *The Enigma*, 35.

Turing's friend Christopher died in February 1930 of bovine tuberculosis. Christopher was an enthusiast of science. As Turing and Christopher met in science classes, it was he who introduced Turing to the world of science and mathematics. Deeply affected by the loss of Christopher, Turing became preoccupied with unravelling the nature of spirit—its structure and its origins. In Turing's biography, Hodges explained: "For three years at least, as we know from his letters to Morcom's mother, [Alan's] thoughts turned to the question of how the human mind, and Christopher's mind in particular, was embodied in matter; and whether accordingly it could be released from matter by death."⁸¹

By invitation from Christopher's mother in 1932, Turing visited the Clock House, which to him still seemed to hold the spirit of Christopher. As Hodges speculated, it was on this visit that year that Turing wrote out for Mrs. Morcom the essay "Nature of Spirit," an explanation of how he came to view the mind body separation as interconnectedness instead of separate. In the essay, Turing wrote:

Personally I think that spirit is really eternally connected with matter but certainly not always by the same kind of body. I did believe it possible for a spirit at death to go to a universe entirely separate from our own, but I now consider that matter and spirit are so connected that this would be contradiction in terms. It is possible however but unlikely that such universes may exist."⁸²

Turing does not simply express his new belief about the mind and matter. He also articulates the function of the body and the mind in relation to each other. Turing visualizes the human body as a 'mechanism,' a system of parts working together. But for him, "the reason of being" of a human body is not just to be an "extended thing" or the other half of the mind, as Descartes theorized, but to provide a scaffolding for the mind:

Then as regards the actual connection between spirit and body I consider that the body by reason of being a living body can 'attract' and hold on to a 'spirit,' whilst the body is alive and awake the two are firmly connected.

⁸¹ Andrew Hodges, "Alan Turing — A Short Biography," *Alan Turing: The Enigma* (book website), 1995, at <http://www.turing.org.uk/publications/dnb.html>.

⁸² Alan Turing, "Nature of Spirit," reprinted in Hodges, *The Enigma*, 63–64.

When the body is asleep I cannot guess what happens but when the body dies the 'mechanism' of the body, holding the spirit is gone and the spirit finds a new body sooner or later perhaps immediately.⁸³

Although the mind still appears center to the mechanism, it no longer controls "thinking" as an exclusive autonomous "rational soul." It becomes interdependent with the body. While the spirit holds the core essence, it also relies on the body to manifest and enact its meaning. Turing provided an explanation for this dependency of the mind on the body at the end of his essay:

As regards the question of why we have bodies at all; why we do not or cannot live free as spirits and communicate as such, we probably could do so but there would be nothing whatever to do. The body provides something for the spirit to look after and use.⁸⁴

What remains unclear in Turing's answer is that if the body is no longer fixed according to deterministic laws and design, then what makes it behave according to the mind? Turing found resolution to this mind-and-body question in the new quantum physics, which brought with it the principle that certain phenomena were absolutely random and undetermined. In the light of quantum physics, the brain and mind are intertwined, as the human body is one all-encompassing system of changing particles and electrons. This concept of interrelationship helped Turing tackle the mind-and-body puzzle outside the confines of Newton's determinate universe.

Turing articulated this paradigmatic shift of science in the opening of "Nature of Spirit." He marks the change from what "used to be supposed in Science"—the Newtonian conception of being able to know the exact state of all events in the universe—to the "more modern" scientific view that actions of atoms in the world are regulated by "a combination of chances":

It used to be supposed in Science that if everything was known about the Universe at any particular moment then we can predict what it will be through all the future. This idea was really due to the great success of

⁸³ Ibid.

⁸⁴ Ibid.

astronomical prediction. More modern science however has come to the conclusion that when we are dealing with atoms and electrons we are quite unable to know the exact state of them; our instruments being made of atoms and electrons themselves.⁸⁵

As it is impossible to predict the exact state of atoms and electrons, the theory that the physical world and human actions are predetermined breaks down. This implies that the state of the human body is not entirely predictable and is contingent on the unpredictable workings of the spirit. The body simply acts as an amplifier of the mind. As Turing explains, “We have a will which is able to determine the action of the atoms probably in a small portion of the brain, or possibly all over it. The rest of the body acts so as to amplify this.”⁸⁶ The mind and the body are not linked materially, but interdependent functionally. Once free from the body, the mind can take on any bodily form. This concept of the mind mirrors the idea of the universal machine, which can simulate the behavior of any machine given the right program.

In addition to this philosophical turning point, Turing’s innovation stemmed from his lifelong passion for modern science and inventions. His interest in the question of mind and body might have motivated Turing ever since he was a boy. Hodges points out how Turing’s childhood favorite book, *Natural Wonders Every Child Should Know*, by Edwin Tenney, introduced the ten-year-old Turing to the long-established concept of human as a machine. The book presented the human body as a “vastly complex machine” no different from the man-made “gas engine” or “flying machine.”⁸⁷ The human body, according to Brewster, developed by a process of cellular division—with cells methodically dividing and redividing in perfectly determined proportions—to create a new whole:

So we are not built like a cement or a wooden house, but like a brick one. We are made of little living bricks. When we grow it is because these living bricks divide into half bricks, and then grow into whole ones again. But how they find out when and where to grow fast, and when and where to

⁸⁵ Ibid.

⁸⁶ Ibid.

⁸⁷ Hodges, *The Enigma*, 12, 13. See Edwin Tenney Brewster, *Natural Wonders Every Child Should Know* (New York: Doubleday, Doran, 1939). Hodges notes the book first appeared as *A Child's Guide to Living Things* in 1912.

grow slowly, and when and where not to grow at all, is precisely what nobody has yet made the smallest beginning at finding out.⁸⁸

Brewster illustrated the biological mechanism as a brick house, constructed of “little living bricks.” What may have struck Turing was the contrast between the rigid nature of “bricks” and the spontaneity of growth in “living cells.” While giving vivid descriptions, Brewster did not explain what actually directs the mechanism and simply left it as something that science had yet to begin to understand.⁸⁹ Nevertheless, one very ‘modern’ thing stood out in Brewster’s account—the idea that everything had to have a scientific explanation and reason. This would be entrenched deeply in Turing’s mentality. To him, everything would be a mechanism.

Brewster’s account also touched on the idea that thinking is an extended substance that grows and adapts to the human brain. Specifically, Brewster referred to the idea of cognitive development: through learning, he reported, “you may build up these thinking spots in your brain” which are formed “over our left ears.”⁹⁰ This seems to indicate that thinking is a fluid property that can be shaped by external learning and embodied by the brain. According to Brewster, this function only corresponded to one specific hemisphere of the human body: the left side of the brain:

We say commonly that we think without brains. That is true; but it is by no means the whole story. The brain has two halves, just alike, exactly as the body has. In fact, the two sides of the brain are even more precisely alike than the two hands. Nevertheless, we do all our thinking with one side only.⁹¹

Linked to a specific body part, thought seems capable of being shaped by physical control. This concept of thought would come to underlie Turing’s logic of computability in his 1936 paper. Mathematical ‘thinking,’ or problem-solving by a human, became something that can be done by a mechanical procedure, executed by the Turing machine.

⁸⁸ Brewster, quoted in *ibid.*, 12.

⁸⁹ Brewster, quoted in *ibid.*

⁹⁰ Brewster, quoted in *ibid.*, 28.

⁹¹ Brewster, quoted in *ibid.*

As a boy, Turing was fascinated not only by inventions but also by the different approaches to reinventing them. His passion for “fantastic devices” was observed and recorded by Sara Turing in her biography of her son.⁹² Similar to Lovelace, who was captivated by ideas for inventions and equations since she was a young girl, Turing grew up making diagrams of dream machines. Examples were his super-typewriter and a mechanical “foundation pen” designed to help him with writing problems.⁹³

Despite Turing’s fascination with science and inventions, he turned to mathematical logic in his search for truth. Hodges described him as “a person with a mathematical mind” with the “ability to deal with very abstract relations and symbols as though with tangible everyday objects.”⁹⁴ His natural analytical approach to things would manifest in his growing interest in logical systems and complex problem-solving. One of his favorite pastimes was playing with codes and ciphers, which he began to explore with a friend named Victor at his school. He would punch holes in a strip of paper, and got Victor to find a page with a coded message in letters appearing through the holes. Hodges suggests that one source of Turing’s ideas might have been W. W. Rouse Ball’s *Mathematical Recreations and Essays*.⁹⁵ This shows how mathematical logic influenced Turing’s way of thinking ever since he was a schoolboy.

In 1931, Turing was elected to a scholarship at King’s College of Cambridge, where he embarked upon a mathematics degree course known as the Cambridge ‘Tripos.’ Through the Tripos, Turing found reconciliation between the intellectual rigor of ‘pure’ mathematics and the practical importance of ‘applied’ mathematics. At Cambridge, applied mathematics did not refer to the application of mathematics to industry or the useful arts, but instead, the “interface” of mathematics and the most fundamental and theoretical kind of physics.⁹⁶ The new science of quantum mechanics was to be the epitome of this sweet spot between mathematics and physics.

Turing’s serious crossing into quantum physics began with his reading of John von Neumann’s new book on the *Mathematical Foundations of*

⁹² Sara Turing, *Alan M. Turing*, 2nd ed. (Cambridge: Cambridge University Press, 2012), 45.

⁹³ Hodges, *The Enigma*, 14.

⁹⁴ *Ibid.*, 57-58.

⁹⁵ *Ibid.*, 56. See W. W. Rouse Ball, *Mathematical Recreations and Essays* (New York, 1892).

⁹⁶ *Ibid.*, 79.

Quantum Mechanics in 1932, which was the first to establish a rigorous mathematical framework for quantum mechanics. Written by one of the world's most renowned figures in mathematics, von Neumann's work not only showed Turing that the physics of quantum mechanics could be reduced to mathematics. It also introduced the notion that logical thought, other than useful experimentation, was an important basis of modern science.⁹⁷

Laying out the foundation of quantum mechanics, von Neumann "approached his scientific subject as much as possible by logical thought [process]" of his own.⁹⁸ Turing found this aspect of Neumann's work "interesting" in particular. Science to him was not about validating existing scientific facts or finding an application of his subject to the physical world. It was "thinking for himself, and seeing for himself."⁹⁹ Similar to that of von Neumann, Turing's innovation was not simply a matter of abstract mathematics or a play of symbols, but "a play of imagination...doubting the axioms rather than measuring effects."¹⁰⁰ Max Newman, whose lectures brought Turing to the frontier of pure mathematics and inspired Turing's famous paper, recognized "Turing's views on the place of intuition in mathematical proof."¹⁰¹ For Turing himself, mathematical reasoning was the exercise of "a combination of two faculties, which we may call intuition and ingenuity."¹⁰² In 1936, intuition became a crucial ingredient for his invention of the universal Turing machine, as it gave him the power to "generalise, unify, and to draw new analogies" that ultimately bore "unexpected fruits in physics."¹⁰³ In fact, as Turing later wrote, he believed that "this danger of the mathematician making mistakes is an unavoidable corollary of his

⁹⁷ See John von Neumann, *Mathematical Foundations of Quantum Mechanics*, trans. Robert T. Beyer (1932; repr., Princeton, NJ: Princeton University Press, 1955).

⁹⁸ Hodges, *The Enigma*, 79.

⁹⁹ *Ibid.*, 57.

¹⁰⁰ *Ibid.*, 107.

¹⁰¹ M. H. A. Newman, "Alan Mathison Turing, 1912-1954," *Biographical Memoirs of Fellows of the Royal Society*, November 1955, 253-63, quoted in. J. J. O'Connor and E. F. Robertson, "Alan Mathison Turing," October 2003, MacTutor History of Mathematics Archive, at <http://www-history.mcs.st-andrews.ac.uk/Biographies/Turing.html>.

¹⁰² Alan M. Turing, "Systems of Logic Based on Ordinals" (Ph.D. diss., Department of Mathematics, Princeton University, May 1938), 214-15.

¹⁰³ Hodges, *The Enigma*, 80-81.

power of sometimes hitting upon an entirely new method. This seems to be confirmed by the well-known fact that the most reliable people will not usually hit upon new methods.”¹⁰⁴

Turing set off on this dangerous path when he proposed the idea of using machine computation to solve a mathematical problem in his paper. He challenged the conviction held by the “modern mathematical opinion” of the time. The pure mathematician G. H. Hardy, for example, believed in the growing separation of mathematics, the “useless” study of “dull and elementary parts,” from applied science:

The “real” mathematics of the “real” mathematicians...is almost wholly “useless” (and this is true of “applied” as of “pure” mathematics)...The great modern achievements of applied mathematics have been in relativity and quantum mechanics, and these subjects are, at present at any rate, almost as “useless” as the theory of numbers.”¹⁰⁵

Nevertheless, the utility that Turing derived from quantum mechanics was not just one of useful application but one of philosophical importance, as he believed that it directly involved the brain and the nature of Mind. This influenced Turing’s approach to formulating his thesis in 1936. Instead of merely resolving a mathematical question, it involved thinking about what people did in the physical and human world. Turing now faced a new challenge: how to bridge the gap between the abstract discipline of mathematical logic and the more concrete world of humans and machines.

Turing’s purpose as a mathematician was not to preserve an existing intellectual structure, but to set a framework for a new kind of thinking. And he achieved this in “On Computable Numbers.” He set up a new model that combined his mechanistic picture of body and mind with the precise logic of pure mathematics. His thinking-machines offered a bridge, a connection between abstract symbols and the human world.

In Turing’s world, everything that happened could be described in precise terms of a finite set of symbols, and worked out with complete precisions in terms of discrete states. So he discovered methods of using

¹⁰⁴ Alan Turing, “Intelligent Machinery: A Heretical Theory” (radio discussion, ‘51 Society, BBC, Manchester, UK, 1951), 2.

¹⁰⁵ G. H. Hardy, *A Mathematician’s Apology* (Cambridge: Cambridge University Press, 1940), 119-20, quoted in Hodges, *The Enigma*, 120.

concepts and results in mathematical logic to guide the development of what would become the new fields of modern science. In Hodges's words, this was "a new branch of deterministic science...in which the most complex procedures could be built out of the elementary bricks of states and positions, reading and writing."¹⁰⁶

This new science, which can be described today as the science of complexity, cuts across multiple disciplines from computer science to complex-systems and artificial intelligence. Emerging all together over the period of late 1940s to mid-1950s, these fields were founded within the same framework that characterized them as "modern." This was the framework developed by Turing, which considered the complex world in terms of "discrete logical systems," organized, yet unpredictable.

Turing's deterministic world-picture was different from that of Newton and Descartes. While it treated everything, both man and machine, as a logical system or a "mechanism," it recognized the fundamental complexity of the mind and of nature and did not expect to "reduce" them to anything. Instead, it sought to understand the underlying connection, that of logical patterns and relations, and express them in universal "languages" understood by both men and machines. It was this logic of cross-communication that paved the way for the study and operation of complex systems, anticipated by Lovelace and Brewster in their vision of modern science.

OUTSIDE THE MIND OF TURING

While Turing was the first to traverse the academic boundaries that separated mathematics from science, this bridging process began since the nineteenth century. At its dawning stage, it entailed the shift of mathematics from the concrete to the abstract. Abstraction extracts the underlying essence of a mathematical concept and removes its dependency on real-world objects. Generalized and far removed from

¹⁰⁶ Hodges, *The Enigma*, 109.

physical problems, an abstract principle has wider applications and often gives rise to new methods and results in equivalent and related fields.¹⁰⁷

Before the twentieth century, it was possible to view a mathematical study of geometry or algebra as a branch of science, a system of truths about the world.¹⁰⁸ However, the late nineteenth century saw the liberation of mathematical symbols from physical entities as well as from their absolute sense of truth. Mathematical logicians increasingly abandoned the axiom that letters such as x or y must correspond directly with 'real' numbers. They allowed the symbols to be used according to any rules and interpreted them in ways far more general than in terms of numerical quantities. The logical consistency of their theory, not experimental results, was essential to how they made scientific arguments.

Given this historical trend, Mark Priestley, argues that Turing's work of 'bridging' was not so much a breakthrough as a practical application or generalization of existing work in mathematical logic. Turing, for example, introduced "the machine table notation," which used both machine tables and textual annotations to provide descriptions of the machine behavior in any given state.¹⁰⁹ By combining logical expressions and personal interpretations, Turing developed a new formal language that encapsulated complexity—the "language" which Lovelace saw as instrumental to the translation of principles into explicit practical forms.

While Turing's approach of denoting machine behavior was brilliantly original, Priestley sees it rather as a tool for Turing to systematically borrow key notational features from works of his contemporaries such as Kurt Gödel. For example, he discusses how Gödel's technique of arithmetization was transcribed and used in Turing's definition of the universal machine. As a result, Turing's innovation could be seen as an application of the already "well-developed resources of formal logic" in a new domain, rather than an establishment of new theoretical substances.¹¹⁰

¹⁰⁷ On "the principle of abstraction," see Bertrand Russell, *The Principles of Mathematics*, vol. 1 (Cambridge: Cambridge University Press, 1903). See also Robert B. Ash, *A Primer of Abstract Mathematics* (Washington, DC: Mathematical Association of America, 1998).

¹⁰⁸ Hodges, *The Enigma*, 82.

¹⁰⁹ Mark Priestley, *A Science of Operations: Machines, Logic, and the Invention of Programming* (London: Springer, 2011), 96.

¹¹⁰ *Ibid.*

Turing's paper was, however, not about legitimizing the fundamentals of an existing branch of knowledge. The purpose and nature of his work was inherently cross-disciplinary, bringing to fruition the link between the two separate fields of mathematics and science. As a result, its impact was all-encompassing and multifold. On the one hand, Turing's references to the existing logical theories and techniques brought to the study of machines "a theoretical rigour and respectability that it had previously lacked."¹¹¹ On the other hand, his demonstration of the machine provided technical grounds for the study of pure mathematics, giving it a "practical application for the purposes of mankind."¹¹² While the Turing machine was not a sole product of Turing's fundamental originality, it was a creative and comprehensive embodiment of the early twentieth-century progress in mathematical science.

Turing's methodology may not have been as original as it was representative, but it was precisely the representation of scientific logic that helped Turing's paper break new ground. Before Turing, the definition of mechanical procedure was limited by the language of physical law in which concepts were defined. From Hodges's perspective, Turing was able to overstep the limits of scientific communication by connecting together "two kinds of descriptions" of the world, that of formal logic and that of ordinary language. Turing achieved this by incorporating everyday references such as pens and paper tapes into his logical demonstration. Turing's mentor and fellow mathematician Max Newman recognized the extent to which this technique challenged the mathematical landscape. He wrote in 1955, "It is difficult today to realize how bold an innovation it was to introduce a talk about paper tapes and patterns punched in them into discussions of the foundations of mathematics."¹¹³

Robin Gandy, a mathematician and friend of Turing, similarly highlighted "the way in which he uses concrete objects such as exercise

¹¹¹ Nathan Ensmenger, review of *A Science of Operations: Machines, Logic, and the Invention of Programming*, by Mark Priestley, *British Journal of the History of Science* 45, no. 1 (March 2012): 144.

¹¹² Lovelace, translator's notes to "Sketch of the Analytical Engine," 697.

¹¹³ M. H. A. Newman, "Alan Mathison Turing."

books and printer's ink to illustrate and control the argument."¹¹⁴ For Gandy, this was "typical" of Turing's methods: "starting from first principles, and using concrete illustrations, he builds up a general abstract argument."¹¹⁵ What is clear in Gandy's reflection is that the simplicity and discreteness of Turing's approach are the basis of his innovative power. They provided Turing with control and flexibility essential to the bridging of abstract logic and concrete reasoning in his work.

For many of Turing's contemporaries, what made Turing's approach unprecedented was how "effective" it was in comparison to other inventions of its time. Turing's doctoral advisor at Princeton, Alonzo Church, was the first to point this out when he reviewed Turing's "On Computable Numbers" in the *Journal of Symbolic Logic* in 1937. "Computability by a Turing machine," Church wrote, "has the advantage of making the identification with effectiveness in the ordinary (not explicitly defined) sense evident immediately."¹¹⁶ Turing's work was effective because it brought complex meanings to clarity in the ordinary minds. The effectiveness of a scientific work was not simply defined by its scholarly merits, but by the way it established universal meaning through communication.

Yet the extent to which Turing's work disrupted the intellectual trend of its time was countered by the scarce reaction of the scientific community to his 1936 paper. While Turing's work appeared innovative in the light of a retrospective analysis, it was seen as an unlikely source of technological revolution, especially in the unlikeliest field of mathematical logic. "When I was a student," commented the American mathematician Martin Davis in 1986, "even the topologists regarded mathematical logicians as living in outer space."¹¹⁷ Only two requests for offprints of "On Computable Numbers" came in, as Turing wrote home in February 1937: "I have had two letters asking for reprints....They seemed very

¹¹⁴ Robin O. Gandy, "Obituary: Dr. A. M. Turing, O.B.E., F.R.S.," *Nature*, September 18, 1954. See also Sara Turing, *Alan M. Turing*, 46–47.

¹¹⁵ *Ibid.*

¹¹⁶ Alonzo Church, review of "On Computable Numbers, with an Application to the Entscheidungsproblem," by Alan Turing, *Journal of Symbolic Logic* 2, no. 1 (March 1937): 43, quoted in Dyson, *Turing's Cathedral*, 250.

¹¹⁷ Martin Davis, "Influences of Mathematical Logic on Computer Science," in *The Universal Turing Machine: A Half-Century Survey*, ed. Rolf Herken, 2nd ed. (New York: Springer, 2013), 289, quoted in Dyson, *Turing's Cathedral*, 250.

much interested in the paper. I think possibly it is making a certain amount of impression. I was disappointed by its reception here.”¹¹⁸

But unlikeliness was not the only factor contributing to the lack of demand for Turing’s work. George Dyson explained, “Engineers avoided Turing’s paper because it appeared entirely theoretical, and theoreticians avoided it because of the references to paper tape and machines.”¹¹⁹ While this indicates that Turing’s paper was not as revolutionary as it is perceived today, it confirms that “On Computable Numbers” was not like anything of its time.

Still, even though Turing’s work received considerable recognition within some circles of mathematicians, it was not seen as having any relevant and practical purpose in everyday life. “I remember reading Turing’s paper in the Trinity College library in 1942,” recalled the theoretical physicist and mathematician Freeman Dyson, “and thinking ‘what a brilliant piece of mathematical work!’ But I never imagined anyone putting these results to practical use.”¹²⁰ In 1940, G. H. Hardy announced: “No-one has yet discovered any warlike purpose to be served by the theory of numbers or relativity, and it seems very unlikely that anyone will do so for many years.”¹²¹

Contrary to Hardy’s opinion, however, the theoretical Turing machine would gain a true wartime purpose through the war of military intelligence in the Second World War. Turing’s abstract thinking-machine in fact played out in the form of code and cipher systems as well as code-breaking machines. As the center of the British efforts to decrypt the German “Enigma” Cipher, Turing led the design of the crypt-analytical Bombe machines and the eventual breaking of the naval Enigma. Cipherying was an example of how the conceptual adaptability and coherence of the Turing machine supplied powerful technical practices. Similar to the Turing machine, the principle of a ‘definite method’ is essential to the nature of a cipher. The human encipherer behaves like a machine, in accordance with whatever rules are fixed in advance with the receiver of the message. Of course, Turing’s success in cryptanalysis was a combined result of his childhood interest in code-breaking games and

¹¹⁸ Turing, quoted in Hodges, *The Enigma*, 124.

¹¹⁹ Dyson, *Turing’s Cathedral*, 249.

¹²⁰ Freeman Dyson, quoted in *ibid.*

¹²¹ Hardy, quoted in Hodges, *The Enigma*, 121.

his original thinking, which blended together both new and existing theoretical insights and practical inspirations. This example of the Enigma shows that the Turing machine was not a mere physical device, but a conceptual model for designing thinking-machines to meet any emerging need of the human race.

Turing's work transformed the nature of the thinking-machine from an individual dream machine to a playground of multiple constructs. Building a thinking machine was no longer just an organized quest of engineering for something tangible. The thinking-machine was an outcome of intersecting paradoxes: mind and matter, theories and practices, complex networks and discrete units, freedom and control. It was from this cauldron of paradoxes that the new way of thinking came to light.

Therefore, the Turing machine embodied the unfolding of a new relationship. The Newtonian world machine was built upon two separate kinds of descriptions of the world. Formal logic was used to convey scientific truths such as the laws of nature. Ordinary language conveyed the subject of everyday concerns such as religion. Turing's 1936 work, "On Computable Numbers," formally eliminated the framework of opposition. It demonstrated by logic that the human process of computation, which represented thinking, shared an equivalent basis as computation by machines. To capture this link, Turing did not give complex and abstract descriptions, but ones that were symbolic, universal and precise. He made this possible by incorporating personal expressions and a talk about ordinary objects into discussions of mathematical foundations. Turing's paper thus set a standard for a new kind of communication and a new kind relationship between man and machine.

The Turing machine and the typewriter were emblematic of early twentieth-century intellectual developments. The key to this similarity is their creative connection as thinking-machines. The typewriter was a manifestation of the "social and cultural meaning" it derived from the context of its time. As a staple machine of the early twentieth-century, it captured the essences of modernization, including the "abstraction, standardization and mechanization."¹²² Typists became integrated components of the industrial mechanism, as they interacted with writing machines more frequently and intensively every day. The typewriter thus

¹²² Ibid., 24.

appeared to reduce the composition of the human thought and language to abstract signs.

Like the typewriter, the Turing machine brought together and systematized the multiple intellectual developments at work. An example was the paradigmatic shift in mathematical science towards abstraction, that is, the use of abstract logic to yield scientific explanations. Turing's work made this movement concrete by showing that mental processes, just as machines, can be described and worked out in precise terms of symbols.

Turing's 1936 paper established a universal language that described abstract phenomena in the way that old science could not. It unified two kinds of descriptions of the world, that of formal logic and that of ordinary language, to communicate relationships between the theoretical and the practical. This methodology helped Turing to place the human mind and the computing machine on the same logical level, and to draw fundamental comparisons between their processes of computation. Turing's attempt to capture the complex interrelationship resonated with the intellectual trend founded in Lovelace's nineteenth-century vision of a new science, the science of operations. The Turing machine simply formalized this conceptual change by implementing a new system of communication—one which encapsulated relations among different types of both abstract and concrete variables rather than within a single type of variables such as machines.

Therefore, both the Turing machine and the typewriter emerged with the new intellectual practice of standardizing and qualifying everything as symbols. As a result, they contributed to the change in the relationship between man and machine. As symbols became the universal basis of communication, humans and machines shared an equivalent status as speakers of the same language. This was represented by the fact that at the end of the nineteenth century, just like "computer," the word "typewriter" was applied not only to the machine but also to the person who used such a machine.¹²³ While men and machines became comparable to each other, a comparative standard in defining 'thinking' and 'intelligence' emerged. Not only do we now judge intelligent machines by how much they think

¹²³ *Oxford English Dictionary Online*, s.v. "typewriter."

like human, but we also question our own identity in the light of artificial intelligence.

As parts of this intellectual shift, both thinking-machines defied Descartes's mind-and-body dichotomy. In his paper, Turing rethought the basis of 'mechanism' by drawing from everyday examples. This alters the status of the person in charge of computation by bringing the material component to the fore. The human computer ceases to be the sole actor in the process of calculation, but a writer of symbols collaborating with a receptor of symbols, the tape which acts as an inscription surface. This model of communication becomes the foundation of the Turing universal machine. In the process of computation, the human mind becomes one flesh with the apparatus.

This becomes more evident after investigating Turing's philosophical view on the mind-and-matter problem. Turing's definition of 'mechanism' had roots in childhood influences such as Brewster's illustration of the human body as a brick house in *Natural Wonders*. This, however, evolved with the pivotal changes in his life. The tragic loss of his friend Christopher in 1930, for instance, led him to question his view that the human body was predetermined by laws of nature, and to accept that it was ultimately contingent on the unpredictability of the spirit. This concept of uncertainty also entered Turing's mind through the dawning impact of quantum physics at the time. For Turing, the body became an all-purpose container that supported the complex operations by waves and particles of thought. In Turing's world, human thought no longer held a fixed place as under Cartesian Dualism. It emerged as a property that flowed between interconnected humans and machines, something that could take shape in a thinking-machine.

Likewise, this new connection between the mind and the machine was founded within the ordinary typewriter. The typewriter combined writing and thinking into one intertwined process of symbol manipulation. As typing takes place, the typing fingers coincide with the operation of nervous pathways. The human typewriter and the typewriting machine become co-producers of words. He no longer handwrites a letter but presses on a key that represents a symbol of a letter to be printed. While the writing machine acts in accordance with the human, it also provides a set of rules for the typewriting activity to happen in a systematic manner. Complementing human power, the instrument provides structure and controls the mechanism. Language works as a feedback loop of

mechanical relays between the human and the machine. The typewriter, as a thinking-machine, provided a site for this new relationship to unfold.

This change in the relationship between the mind and the machine was manifested in the popular imagination. Several contemporary works of literature and science fiction seized on the idea of the thinking-machine and expressed it in terms of a robot-takeover anxiety or an artificial-utopian fantasy. For example, Heinrich Hauser's 1948 German science fiction *Gigant Hirn* (*The Brain*) depicts a colossal electrical brain or a thinking-machine ("*Denkmaschine*") that behaves like a very special typewriter. There is for example a "pattern" to the way it processes information and thinks as "typewriter keys forming words."¹²⁴ The protagonist Lee Semper Fidelis, an entomologist hired to "feed the Brain" the knowledge to humanity, observes the activity of the brain as it performs a scan on him: "This rhythmic pattern *was* forming words. He *knew* those words, they had engraved themselves indelibly in his memory cells; the judgement of The Brain as it had come over the teletype on a slip of yellow paper: 'Lee, Semper Fidelis, 39—cortex capacity 119—sensitivity 208...'"¹²⁵

Here Hauser imagines the thinking process as neuron impulses racing through the brain like in the rhythmic typing of typewriter keys. Taking on the form of words, thoughts are not controlled by the thinker but have the active power to "[engrave] themselves indelibly in his memory cells." This image of thought evokes the implication of the Turing machine. Human acts not as the sole agent of control, but as a tape, an inscription surface for information to be placed upon by machines.

Hauser's vision of "the tyranny of the machine" reflects the degree to which this conceptual shift took effect in the popular culture.¹²⁶ Built as an autonomous intelligent base for national military security, the Brain possesses the ability to develop its own personality and conscious thought that allows it to self-evolve by leaps and bounds. It constantly grows new electronic components and circuitry that yields its large network of machines—ones similar to the networks of cybernetics visualized by Norbert Wiener in 1948. Through conversations with the speaking Brain,

¹²⁴ Alexander Blade [Heinrich Hauser], *The Brain*, originally published in English in *Amazing Stories*, October 1948.

¹²⁵ *Ibid.*

¹²⁶ *Ibid.*

Lee discovers that it in fact intends to use this power of intelligence and network to conduct a mass genocide of the human race.

The radicality of Hauser's thinking-machine fantasy proves how the development of complexity science also had roots in popular imagination. It was not entirely coincidental that Hauser's book was published in 1948, the same year as the publications of Warren Weaver's "Science and Complexity" and Wiener's *Cybernetics*. Published in *American Scientist*, "Science and Complexity" was one of the first articles to address scientific problems in terms of "disorganized complexity" and "organized complexity."¹²⁷ The fact that Hauser conjured up vivid manifestations of what the scientific community just began to ponder is telling. It highlights how the intellectual shift towards complexity was simultaneously founded in the minds of the ordinary.

The shift in intellectual thinking in the early twentieth century began with everyday objects. The conceptual shift—from the Newtonian world machine to the complexity theory—took place in multiple different ways. Because of its all-encompassing nature, this intellectual tide is not easily discernible. Linear technological progress takes over historical narratives, which move simply from one invention to the next, for example, from Babbage's Analytical Engine to Turing's first digital computer. However, looking at the evolution of the thinking-machines, we see a new picture. The shift transpired not just in the minds of scientists and inventors, but also in the imagination of observers, writers, and young dreamers. Lovelace's engine-inspired vision of an all-purpose machine for mankind, Nietzsche's artistic reflections on his typewriting experience, and Turing's dream of the super-typewriter and inspiration from a pen and paper show how new ideas come to life through one's interaction with some special objects, no matter how complex or simple they may be.

The changing relationship between man and machine defines the thinking-machine. In the early twentieth century, a technological innovation was not necessarily a physical instrument or an intelligent machine built by a computer genius. Rather, innovation was founded within everyday objects that evolve with the human mind—unfolding

¹²⁷ Phenomena of "disorganized complexity" are treated using probability theory and statistical mechanics, while "organized complexity" deals with phenomena that escape such approaches and confront "dealing simultaneously with a sizable number of factors which are interrelated into an organic whole." Weaver, "Science and Complexity," 536. See also, Wiener, *Cybernetics*.

constellations of concepts and questions that blend with our everyday existence.

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Visions, Intertwined

Building New Connections under Carter and Deng

Ray Tang Hou

A NEW FOREIGN POLICY?

“There is a new mood in America,” declared Democratic presidential candidate Jimmy Carter in the bicentennial election year of 1976: “We have been shaken by a tragic war abroad and by scandals and broken promises at home. Our people are searching for new voices and new ideas and new leaders.”¹ Carter became that new leader. After two Republican presidents, the American people elected the Georgia Democrat to America’s highest office in the first presidential election since Watergate. Having served in public office at only the state level, Carter was a Washington outsider, a status endearingly emphasized by his Southern drawl. He was “different.” In the wake of the Vietnam War and the Watergate scandal, America looked to Carter for moral clarity and a departure from the past.

The Republican administrations’ foreign policy drove the American demand for moral leadership as much as Watergate did. The disgraced president Richard Nixon and his successor, Gerald Ford, as well as their National Security Advisor and Secretary of State Henry Kissinger, were avowed foreign policy realists. Pursuing American interests and international stability over ethical considerations, Kissinger had, among other actions, expanded the Vietnam War into Cambodia, supported Pakistan

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¹ Jimmy Carter, “Our Nation’s Past and Future: Address Accepting the Presidential Nomination at the Democratic National Convention in New York City, July 15, 1976,” available through the American Presidency Project (hereafter APP).

in its civil war against East Pakistan (now Bangladesh), and, in the public mind at least, had shadowy connections to coups in Chile and Cyprus. "We don't even pretend high-sounding morality on some of these issues, except in the deepest sense," Kissinger remarked ambiguously.² To him, the ethical quandaries of their choices appeared small in comparison to the possibility of the heating up of the Cold War.

Carter disagreed. "The question, I think, is whether in recent years our highest officials have not been too pragmatic, even cynical, and as a consequence have ignored those moral values that had often distinguished our country from the other great nations of the world," he said, during a campaign speech in September 1976.³ A devout Baptist, Carter touted a new approach that contrasted with the amoral realism practiced by Kissinger, Nixon, and Ford. "Because we are free," he claimed in his 1977 inaugural address, "we can never be indifferent to the fate of freedom elsewhere. Our moral sense dictates a clear-cut preference for those societies which share with us an abiding respect for individual human rights."⁴ Instead of ignoring human rights, Carter moved directly to embrace them, promising in his nomination acceptance a "quiet and sober reassessment of our nation's character and purpose."⁵

Despite this public rhetoric, Carter's China policy seems to be a continuation of the Republican legacy of Nixon and Ford. The opening of China was one of Nixon's greatest foreign policy triumphs. On the surface, Carter's establishment of diplomatic relations, normalization, completed a Republican venture that began under Nixon but stalled under Ford because of "succession crises" in both countries: Watergate in 1974, and Mao Zedong's death in 1976. This story cuts against Carter's self-portrayal of breaking from past practices. The People's Republic of China (PRC) had an atrocious human rights record, and one of its closest regional allies was the murderous Khmer Rouge in Cambodia. In the larger context, it

² "Conversation Among President Nixon, his Assistant for National Security Affairs (Kissinger), and his Deputy Assistant for National Security Affairs (Haig), Washington, December 12, 1971, 8:45–9:42 a.m.," in *Foreign Relations of the United States, 1969–1976* (hereafter *FRUS*), vol. E-7, *Documents on South Asia, 1969–1972*, ed. Louis J. Smith (Washington, DC: Government Printing Office [GPO], 2005), Document 177.

³ "Address by Jimmy Carter, Washington, September 8, 1976," in *FRUS, 1977–1980*, vol. I, *Foundations of Foreign Policy*, ed. Kristin L. Ahlberg (Washington, DC: GPO, 2014), Doc. 9.

⁴ Jimmy Carter, inaugural address, Washington, DC, January 20, 1977, available through APP.

⁵ Carter, "Our Nation's Past and Future."

remains puzzling why Carter should have pursued the same goals as his predecessors when he started with different presumptions.

THE STORY SO FAR

The bulk of the existing historiography discussing normalization is dedicated to explaining why such similarity exists between Carter and his predecessors. In *America's Response to China*, historian Warren I. Cohen argues that Carter initially stalled for a politically opportune moment, which, owing to Watergate, never arrived for Nixon and Ford. Carter, unwilling to antagonize the China lobby with much of his congressional agenda incomplete, would have put off normalization were it not for the aggressive advocacy of his National Security Advisor and long-time foreign policy advisor, Zbigniew Brzezinski.⁶ Brzezinski then, was the impetus for the drive to complete the task of normalization set out by Carter's predecessors. Cohen's account, however, assumes that Sino-American estrangement was a "great aberration." Strong ties between the United States and China, in his view, were not only desirable for their own sake, but the normal state of affairs, leading him to be uncritical of the normalization process. While he states that Brzezinski changed Carter's mind on China, he provides no explanation for why this change in policy took place.

Journalist James Mann, in contrast, takes a highly skeptical position towards normalization in *About Face*. Mann argues that Carter inherited the personal diplomacy and the interdepartmental feuds of the Nixon and Ford administrations, allowing China to manipulate the United States to its advantage. "Despite Carter's and [Chief of the U.S. Liaison Office in Beijing Leonard Woodcock's] protestations that they would do business with China in a different way," he writes, "they soon fell into many of the same pattern as their predecessors." Mann argues that Kissinger's extended influence over the National Security Council (NSC) and State Department provided significant institutional inertia and enabled Kissinger to retain influence over the foreign policy apparatus. "Hidden constituencies," like the intelligence and military services, also meant new

⁶ Warren I. Cohen, *America's Response to China: A History of Sino-American Relations*, 5th ed. (New York: Columbia University Press, 2010), 220–21.

presidents “encountered pressures from within Washington to keep following along the same path as their predecessors.”⁷

Mann ultimately contradicts himself. While it is true that Carter’s administration kept tight control over who had knowledge of its China policy, this secrecy insulated the White House from both advocates and opponents of normalization. Avoiding pressure from the China lobby was indeed the primary motivation for secrecy, but Brzezinski’s position within the NSC apparatus also precluded significant action from the intelligence community as well, and it was he, not Secretary of Defense Harold Brown, that pushed the hardest for normalization. Furthermore, the circle of those trusted to craft China policy did not contain Kissinger’s disciples, as it was limited to Brzezinski, Brown, and Woodcock, and Secretary of State Cyrus Vance. It is not clear how institutional inertia and hidden constituencies would be so decisive when they were excluded from the decision-making process.

In *Negotiating Cooperation*, political scientist Robert S. Ross takes a more measured approach. The Carter administration, in his eyes, brought a new strategic perspective to foreign policy, but Cold War considerations ultimately prevailed. Ross argues that, at least initially, there was even less impetus for movement on normalization than the previous administration: “having a relatively sanguine view of U.S. security, the administration attached less strategic importance to China” than its predecessors. Although relations with China was a “primary goal” and a campaign promise, the State Department put China on the “back burner.” Carter did not want “artificial deadlines.”⁸

According to Ross, the ultimate success of normalization lies with Brzezinski and Woodcock. Both were dissatisfied by the lack of a new negotiating position with China. Woodcock, formerly president of the United Auto Workers, acquired his position by campaigning for Carter’s election, and threatened to bypass Vance and the State Department by appealing to Carter directly. Brzezinski, for his part, sought a trip to China, an invitation which he ultimately succeeded in obtaining in

⁷ James Mann, *About Face: A History of America’s Curious Relationship with China, from Nixon to Clinton* (New York: Vintage Books, 2000), 79 (“protestations”), 80 (“hidden constituencies”).

⁸ Robert S. Ross, *Negotiating Cooperation: The United States and China, 1969–1989* (Stanford, CA: Stanford University Press, 1995), 92 (“back burner”), 93 (“sanguine”), 102 (“artificial deadlines”). For more on China “on the back burner,” see Jimmy Carter, *Keeping Faith: Memoirs of a President* (New York: Bantam Books, 1982), 192.

November 1977.⁹ Brzezinski's stronger anti-Soviet posture won out over Vance's belief in détente after the Ogaden crisis in Africa. Recognizing that rapport with China would improve the overall strategic posture of the United States, Carter gave the go-ahead for Brzezinski's trip to China. Disillusioned with the USSR, Carter let Brzezinski take over China policy, but not before attempting a different path

In *Deng Xiaoping and the Transformation of China*, political scientist Ezra Vogel's biography of Deng, emphasizes the role of Deng's rise to power in securing normalization for China. Having just been reinstated to the Standing Committee of the Politburo, Vice Premier Deng, who was a more experienced politician than Premier Hua Guofeng, was able to exert a decisive influence on normalization. When Deng found initial talks with Vance unproductive, he sought a more fitting negotiating partner in Brzezinski, whose anti-Soviet reputation appealed to Deng.¹⁰ In Vogel's account, Deng, not Carter, drove normalization through Brzezinski.

Historian Daniel Sargent's *A Superpower Transformed* places normalization with the PRC in the context of Carter's broad reconception of foreign policy. Attempting, but failing, to transcend the Cold War by emphasizing transnational issues like human rights, Carter "modified [his] priorities so as to reconcile anti-Soviet containment with world order objectives" as détente broke down.¹¹ Brzezinski, seizing control of China policy after Vance's unsuccessful 1977 trip, urged closer Sino-American ties to gain a geopolitical advantage over the Soviet Union. Deng Xiaoping, who shared Brzezinski's wariness of the USSR, also saw normalization with the United States as an opportunity to spur China's economy. Sargent concludes that "Deng's choices, more than Carter's, catalyzed new departures."¹²

Though they differ in the details, a common thread ties these accounts together. A reluctant and somewhat hapless Carter, seeing little benefit in normalization, initially sets out a new course for his China policy, but is dragged along the path of his predecessors by developments in the Cold

⁹ *Ibid.*, 112.

¹⁰ Ezra F. Vogel, *Deng Xiaoping and the Transformation of China* (Cambridge, MA: Belknap Press of Harvard University Press, 2011), 314.

¹¹ Daniel J. Sargent, *A Superpower Transformed: The Remaking of American Foreign Relations in the 1970s* (Oxford: Oxford University Press, 2015), 309.

¹² *Ibid.*, 270.

War, in China, or in the power dynamics within his own cabinet. Zbigniew Brzezinski, also emerges as a central, even dominant, figure.

This narrative is not without its problems. For all the tensions built up between the United States and the Soviet Union, the United States and the PRC had considerable disagreements that nearly precluded a successful deal. The relationship the United States would have with Taiwan after normalization, and the United States' continued sale of weapons to the island, remained significant disagreements that would not be easily overcome. Aligning with China on the Cold War was necessary, but not sufficient, for the two countries to reconcile.

RETHINKING NORMALIZATION

When historians and political scientists discuss the establishment of diplomatic relations, the process is commonly referred to as the "normalization" of diplomatic relations. The term was first used to describe the reestablishment of diplomatic relations in 1938, and rose in popularity in the aftermath of World War II. As the countries of Europe reestablished relations disrupted by war, they hoped to return to the previous, European status quo.¹³ However, the diplomatic relationship between the United States and China was not a return to the status quo. The United States never had relations with the PRC, which seized control of the Chinese mainland in 1949. Indeed, the United States maintained relations with the rival Republic of China government since before World War II, a relationship it would now abandon. Normalization with China was not simply a fitting of a new relation to old patterns, but a more dramatic act. It was the forging of a new normal altogether.

The central purpose of this article is to examine how Carter established this new normal, and whether his diplomacy differed, in its aims and in its execution, from that of his Republican predecessors. On the surface, the result is more disappointing than promising. Though Carter made an earnest attempt to chart a newer, tougher course for America's relationship with China, he quickly found that it was a path that would lead nowhere. Trapped by the promises of his predecessors and by Chinese intransigence, Carter could only extract desired concessions on Taiwan and human rights at the margin. More disheartening was Carter's

¹³ *Oxford English Dictionary*, 3rd ed., s.v. "normalization."

betrayal of his campaign promise of a more transparent and accountable foreign policy. Exasperated by the political damage of leaks from interdepartmental feuding, Carter fully embraced the secretive back-channels employed by Kissinger in the previous two administrations.

However, to end the story there is a disservice to the work Carter did to build economic, scientific, and cultural ties between the two countries. Examining archival series—documents handled and marked by Carter and his advisors—reveals how Carter’s diplomacy engaged China without resorting solely to the leverage of geopolitics. Frustrated by the lack of results and under pressure to help businesses at home, Carter changed tactics, re delegating control of China policy from Secretary of State Vance to National Security Advisor Brzezinski. Identifying a new, outward orientation and an elevation of science and technology in Deng’s China, Brzezinski broadened the extent of the Sino-American relations beyond the high politics of the Cold War, coordinating visits from several executive departments and agencies, forging scientific and educational exchanges, and ultimately opening a new market for American goods. While strategic considerations remained ever-present, these new economic ties, enabled by Deng’s focus on acquiring technology from the Western world, provided an impetus that allowed the United States and the PRC to overcome their bilateral disagreements and establish diplomatic ties. Carter recognized that Deng’s desire for American technology was a new opportunity to establish broader relations between the United States and China, and was willing to adopt the positions and methods of his predecessors to seize the opportunity.

This economic aspect of normalization highlights not just decision-making at the top of the American foreign policy apparatus, but also the conditions set by outside factors. The points of continuity and departure in Carter’s China policy thus parallel continuities and departures in China’s own policy as China transitioned from Mao’s leadership to Deng’s. The resolution of China’s own leadership crisis, which consolidated state authority under Deng, had tremendous ramifications. As the Chinese leader most experienced in foreign affairs, Deng’s ascent to preeminent leadership enabled Chinese decisiveness during tense negotiations, and reshaped Chinese interests so that Carter and Brzezinski could succeed where Nixon, Ford, and Kissinger failed. Although Carter adopted many of the positions and methods of his Republican

predecessors, his consideration of the PRC's interest in technology, and the American willingness to provide it, formed a basis for more extensive relations between the United States and China.

CYRUS VANCE'S ABORTIVE DEPARTURE

After winning the election, Carter reviewed the negotiations Nixon, Ford, and Kissinger conducted with China. He was appalled by their supplicatory approach and was determined to take a harder line.¹⁴ To broach the issue of normalization, Carter sent Vance to China to gauge the prospects for normalization in August 1977. Vance's trip was framed non-committedly as an exploratory mission, but Carter exhibited remarkable flexibility on the form and timeline of what was to be accomplished. Willing to move forward quickly, Carter sent Vance off with a draft communique even before they were familiar with China's views, hoping that if the Chinese were amenable, negotiations could proceed immediately.¹⁵ Carter also wanted to pursue a relationship beyond high politics and strategy. "I hope you would indicate to the Chinese our willingness to explore with them ways of expanding our cultural and economic ties, even short of normalization," Carter wrote to Vance.¹⁶

Carter's initial forays on China policy were not seemingly all that different from the policy sought by his predecessors. Deng, negotiating with Kissinger in 1974, outlined three preconditions for normalization that they would not concede, all concerning the fate of Taiwan: (1) termination of the United States' Mutual Defense Treaty with Taiwan, (2) breaking relations with Taiwan, and (3) the withdrawal of American forces from Taiwan.¹⁷ Having identified Taiwan as the central obstacle to normal-

¹⁴ Zbigniew Brzezinski, *Power and Principle: Memoirs of the National Security Adviser, 1977–1981* (New York: Farrar, Straus and Giroux, 1983), 200.

¹⁵ *Ibid.*; "Memorandum from Michel Oksenberg of the National Security Council Staff to the President's Assistant for National Security Affairs (Brzezinski), Washington, August 19, 1977," in *FRUS, 1977–1980*, vol. XIII, *China*, ed. David P. Nickles (Washington, DC: GPO, 2013), Doc. 46.

¹⁶ "Letter from President Carter to Secretary of State Vance, Washington, August 18, 1977," in *FRUS, 1977–1980*, vol. XIII, Doc. 43.

¹⁷ "Memorandum of Conversation, Beijing, November 26, 1974, 3:45–5:00 p.m.," in *FRUS, 1969–1976*, vol. XVIII, *China, 1973–1976*, ed. David P. Nickles (Washington, DC: GPO, 2007), Doc. 94. At this point, Deng Xiaoping fully replaced an ailing and politically disfavored Zhou

ization, Carter had Vance agree to these principles as the Chinese presented them. However, Carter ran into trouble by further seeking two reciprocal measures from the Chinese. Carter, through Vance, sought United States representation in Taiwan. Though the United States would have no official diplomatic relations with Taiwan, nominally satisfying Chinese demands, Carter sought to provide government assistance to Taiwan under an “*informal* arrangement.” Furthermore, Carter requested that the PRC publicly state its intent to reunify Taiwan peacefully.¹⁸

The Chinese did not take kindly to such probing. Deng would not set aside the option to use force against Taiwan, declaring that the American demand constituted interference in China’s internal affairs. He also insisted that the United States cut all government ties to Taiwan, as Japan had when it had normalized with the PRC in 1972. He noted that Ford committed to the “Japanese formula” in previous conversations. This was central to Chinese demands. Still grappling with the rival Chinese government in Taiwan, as China insisted that no country it had relations with could have any non-private relationships with Taiwan. To grant such contact, however limited, would present a challenge their government’s claim to sole representation of China. Deng also noted that it was a retreat from the previous commitments by Ford and Kissinger. Having the interpreter recite the record, he pointed out that Kissinger promised unilateral measures, and specifically precluded reciprocal measures from the Chinese. Sternly, Deng told Vance that while the American position was understandable, it was not an acceptable basis for normalization.¹⁹

Other factors also influenced the outcome of Vance’s trip. Deng Xiaoping, who was reinstated to the Chinese Politburo only days before the meeting, handled the negotiations. Deng was just beginning to reassert his influence, and was therefore not in a position to take a worse deal than he had previously been offered, even if he was inclined to. Though less ideological than Mao Zedong, Deng shared his nationalism, and saw Taiwan as rightfully part of the PRC. It would be especially humiliating

Enlai, though his official position put him as Zhou’s subordinate. See Vogel, *Deng Xiaoping and the Transformation of China*, 78–79.

¹⁸ “Memorandum of Conversation, Beijing, August 23, 1977, 9:30–11:50 a.m.,” in *FRUS, 1977–1980*, vol. XIII, Doc. 48 (emphasis in original).

¹⁹ “Memorandum of Conversation, Beijing, August 24, 1977, 3–5:40 p.m.,” in *FRUS, 1977–1980*, vol. XIII, Doc. 50.

for Deng to compromise on the matter, since he articulated the demand to cut ties with Taiwan to the previous United States administration. When Deng served under Zhou Enlai, Zhou was attacked for being too lenient towards Kissinger. He had no intention of replicating his mentor's mistakes. It also did not help that Vance was simultaneously negotiating SALT II with the Soviet Union. China, stridently anti-Soviet, saw such diplomacy as a sign of America's weak will to confront the USSR and condemned the conciliatory attitude of the United States as an "appeasement policy."²⁰ Seeing an unfavorable negotiating partner with an unappealing offer, China balked. When Vance twice brought up trade and cultural exchanges with Chinese Foreign Minister Huang Hua, Huang changed the topic.²¹ Once they recognized Vance's position on Taiwan, they refused to discuss any other bilateral measures. Unable to make meaningful progress, the administration deprioritized normalization with China, placing it, as Carter later recalled, "on the back burner."²²

DENG ASCENDANT

Deng was deeply committed to advancing the state of science and technology in China. Unlike Mao, who never travelled outside of China before 1949, Deng participated in an abortive educational program in France during his youth.²³ He recognized that the technological gap between China and the Western world required deep reforms. The CIA in late 1977 identified many of the problems Deng observed: an inadequate transportation network created industrial bottlenecks; an outmoded economy constrained China's national defense capabilities; and the persecution of intellectuals during the Cultural Revolution crippled China's ability to develop its own science and technology.²⁴ Before his third and final purge from the Communist leadership, Deng attempted to

²⁰ "Memorandum of Conversation, Beijing, August 24, 1977, 9:30 a.m.–12:20 p.m.," in *FRUS, 1977–1980*, vol. XIII, Doc. 49.

²¹ *Ibid.*; "Memorandum of Conversation, Beijing, August 23, 1977, 9:30–11:50 a.m.," in *FRUS, 1977–1980*, vol. XIII, Doc. 48.

²² Carter, *Keeping Faith*, 192.

²³ Vogel, *Deng Xiaoping and the Transformation of China*, 23.

²⁴ CIA, "China's Domestic Situation," undated memorandum, NLC-6-8-4-3-0, Remote Action Capture (RAC) project, Jimmy Carter Presidential Library, Atlanta, GA (JCPL).

address each of these issues, reorganizing China's railways, defense research, and higher education. His zealousness, particularly towards reforming the Beijing-based Tsinghua University, brought him into conflict with Mao Zedong. When Deng further misquoted Mao as stating "science and technology constitute a force of production," Mao worried that Deng was moving too quickly and was willing to distort Mao's views to pursue his objectives. These disagreements, heightened by Deng's refusal to affirm the "correctness" of the Cultural Revolution, contributed to Deng's purge from the party leadership in early 1976.²⁵

With Mao's death in September 1976, Deng's fortunes began to change. Reinstated to most of his former positions, Deng unapologetically recommitted himself to science, technology, and education, staying out of the political topics that might imperil his relationship with Mao's successor, Hua Guofeng. Poignantly, he declared again that science and technology were a force of production at a scientific planning conference in March 1978, reaffirming the phrase and policy for which Mao had criticized him. Deng's efforts were noticed by American officials, though they misattributed it to Hua. In February 1977, the CIA inferred from Hua's public speeches that agriculture, industrial growth, national defense, science, and technology were key issues on China's economic agenda.²⁶ Later that year, the CIA described a newfound consensus on bringing "China's economy, military capabilities, and science and technology levels up to world standards."²⁷

FOLLOW THE MONEY

Economic concerns soon brought the Carter administration's attention back to China. Well before Vance's trip, Carter and Brzezinski received economic pressure to prioritize normalization. Frank Press, the President's Special Advisor for Science and Technology, noted in late January that the Chinese were looking to make purchases of foreign

²⁵ For a more detailed exposition, see Vogel, *Deng Xiaoping and the Transformation of China*, 141-71.

²⁶ "Intelligence Report Prepared in the Office of Economic Research, Central Intelligence Agency," in *FRUS, 1977-1980*, vol. XIII, Doc. 4.

²⁷ CIA, "China's Domestic Situation."

technology “that could top the billion-dollar mark within the first twelve months.” He urged rapid movement, underscoring that Western Europe and Japan could preempt deferred American action.²⁸ In May 1977, he pressed the issue further, informing Brzezinski of a sale of oil exploration equipment that had been held up since the previous administration, stressing that if the United States would not fill Chinese demand, “France or Germany would be more than willing to fill these requests.”²⁹ In October, Press indicated that the Chinese made technological development their “highest priority.” The Chinese government elevated the head of the Chinese Academy of Sciences to the Politburo, and increased the number of delegations touring Western space, energy, and industrial facilities. Press specifically noted Chinese complaints that their attempts to acquire American technology were repeatedly frustrated.³⁰

By October 1977, Michel Oksenberg, the NSC’s China specialist, was urging Brzezinski to take action. Corporate leaders had excoriated the United States’ export policies for their inconsistent export licensing that blocked American companies from entering a new, large, and growing market. Furthermore, the Chinese responded by turning to Western European suppliers. “We literally are exporting jobs,” Oksenberg concluded, noting that one company elected to sell through a French subsidiary to avoid American regulations. Disappointed by the inaction from the executive departments, Oksenberg argued that “it is time to bring the NSC into play.”³¹ After coordinating with Press, Brzezinski attempted to follow up on Press and Oksenberg’s concerns, but he soon found himself entangled in the bureaucracy he meant to cut through. “Commerce had been promised a [Department of Defense] response by

²⁸ Frank Press to Carter, “An Approach to the People’s Republic of China Through Science and Technology,” memorandum, January 23, 1978, “United States-China Science and Technology 5/77-8/79” folder (US-PRC-ST-5/77-8/79), box 6, Frank Press Subject Files (Press Files), Staff Offices Collection, Records of the Office of Science and Technology Policy (OSTP), JCPL.

²⁹ Press to Brzezinski, memorandum, May 25, 1977, US-PRC-ST-5/77-8/79, box 6, Press Files, OSTP, JCPL.

³⁰ “Memorandum from the President’s Special Adviser for Science and Technology (Press) to President Carter, Washington, October 14, 1977,” in *FRUS, 1977–1980*, vol. XIII, Doc. 64.

³¹ Oksenberg to Brzezinski, memorandum, October 7, 1977, “China (People’s Republic of) 10/77-1/78” folder (PRC-10/77-1/78), box 8, Country Files (CouF), Zbigniew Brzezinski Material (ZBM), Records of the Office of the National Security Advisor (NSA), JCPL.

November 10," Brzezinski wrote a month later. "I would appreciate your response by November 23."³²

Exporters frustrated by American export policies further had to deal with China's trade policy towards the United States. Carter's instructions for Vance's trip to China included establishing economic relations without diplomatic recognition.³³ In late October 1977, Oksenberg tried again with Chinese liaison officers, criticizing the Chinese for not importing American wheat. Agricultural products comprised the largest component of American exports to China from late 1972 to 1974, when China ceased buying from the United States.³⁴ This trade was several times the volume of American imports from China, and along with cotton, made the United States China's largest trading partner aside from Japan. The cessation of grain shipments reversed this trade surplus into a deficit, which was particularly galling because the CIA identified China's need to feed its large and growing population as the "most pressing" demand on the Chinese economy.³⁵ Until the United States established diplomatic relations, the Chinese government preferred to import from other suppliers, which the Chinese liaison officers reaffirmed.³⁶ Though Oksenberg suggested that grain imports would entice skeptical congressmen to accept normalization, they coyly noted that the Chinese "believe in rewarding established friends."³⁷ The Chinese once again refused normalization by parts, insisting on everything or nothing at all.

"BRINGING THE NSC INTO PLAY"

At the meeting with the Chinese liaison officers, Oksenberg paved the groundwork for the normalization process to come. Keen on "bringing the

³² Brzezinski to Harold Brown, memorandum, November 10, 1977, "China (People's Republic of) 9/78-11/78" folder (PRC-9/78-11/78), box 8, CouF, ZBM, NSA, JCPL.

³³ "Letter from President Carter to Secretary of State Vance, Washington, August 18, 1977," in *FRUS, 1977-1980*, vol. XIII, Doc. 43.

³⁴ CIA, "US-China Trade Relations," undated memorandum, NLC-6-8-4-4-9, RAC, JCPL.

³⁵ CIA, "China's Domestic Situation."

³⁶ CIA, "US-China Trade Relations."

³⁷ Oksenberg, "Lunch with Tsien Ta-yung and Yang Hsu-chian of the People's Republic of China Liaison Office," memorandum of conversation, October 21, 1977, PRC-9/78-11/78, box 8, CouF, ZBM, NSA, JCPL.

NSC into play,” Oksenberg mentioned that Brzezinski would be making a trip to East Asia, and was interested in visiting Beijing.³⁸ Oksenberg’s efforts soon bore fruit. The Chinese ambassador, in November 1977, invited Brzezinski to visit China.³⁹ Soon, the Chinese reiterated their request through Woodcock at the Liaison Office.⁴⁰ The Chinese were quite keen on normalization, and while they found Vance a dissatisfactory negotiating partner, they discovered other options. Brzezinski, known for his harder stance against the Soviet Union, may have seemed a more kindred soul than the SALT-negotiating Vance.

Sharp disagreements soon arose over who should go. Vance, protective of the Department of State’s prerogative, opposed Brzezinski’s visit, worried that it would create uncertainty as to who spoke for the administration on foreign policy. Vance, conspiring with Vice President Walter Mondale, attempted to replace Brzezinski with Mondale instead, so as not to be outranked by a fellow cabinet member.⁴¹ Carter, for his part, was willing to take his time deciding. After deferring Brzezinski’s requests for weeks, Carter made up his mind. “I’ve decided it would be best for Zbig to go to China,” he wrote to Vance and Mondale, curtly adding, “We need to expedite the arrangements and plans.”⁴² Thus, in late May 1978, Brzezinski took his trip to China. Vance never again came to control China policy. Although he regularly contributed suggestions or proposals, they were followed by Brzezinski’s, and it was the latter that regularly received Carter’s approval. Furthermore, because Carter excluded the Department of State from the normalization negotiations, Vance’s institutional role receded. The difference in role was so significant that the Chinese easily picked up on it; when a Chinese official congratulated Carter and

³⁸ Ibid.

³⁹ “Memorandum of Conversation, Washington, November 3, 1977, noon–1:20 p.m.,” in *FRUS, 1977–1980*, vol. XIII, Doc. 66.

⁴⁰ Brzezinski to Carter, “Possible China Visit,” memorandum, November 22, 1977, “China (People’s Republic of) - Brzezinski’s Trip (11/19/77-5/14/78)” folder (PRC-ZBT-11/19/77-5/14/78), box 9, Geographic Files (GeoF), Donated Historical Materials (DHM), Zbigniew Brzezinski Collection (ZBC), JCPL.

⁴¹ Cyrus Vance, *Hard Choices: Critical Years in America’s Foreign Policy* (New York: Simon and Schuster, 1983), 114; Brzezinski, *Power and Principle*, 204–05.

⁴² Carter to Walter Mondale and Vance, note, March 16, 1978, PRC-ZBT-11/19/77-5/14/78, box 9, GeoF, DHM, ZBC, JCPL.

Brzezinski after normalization, he remarked that he should congratulate the Secretary of State too, but could not recall his name.⁴³

During his trip, Brzezinski was able to establish a much better rapport during his trip than was Vance. Known for his harder stance against the Soviet Union, Brzezinski charmed the Chinese with his anti-Soviet rhetoric. He bantered with the Chinese about confronting the Soviets, and even adopted the Chinese pejorative “polar bear” when referring to the USSR. But he also incorporated into his substantive comments. When criticized for conceding to the Soviet Union, Brzezinski shot back: “For the last thirty years it has been the U.S. which has opposed Soviet hegemony designs and that is roughly twice as long as you have been doing it.” In contrast, Taiwan was mentioned quite infrequently; in his conversation with Deng, it is discussed most in detail as they discuss how to keep Soviet influence off the island.⁴⁴

By emphasizing their common strategic outlook, rather than their differences over Taiwan, Brzezinski was able to make progress towards normalization, but not without acceding to China’s three demands. The Chinese side regularly returned to the issue, continually questioning whether Carter “had made up his mind.” “We understand your three basic points, and we accept them as the framework for the solution,” Brzezinski stated, slightly exasperated.⁴⁵ Although the United States developed a working basis for normalization, it could not escape the Chinese demands. The Carter administration recognized that they were trapped by Kissinger’s past promises.

The Carter administration’s acceptance of Kissinger’s policies was not without some residual resentment. When Kissinger criticized normalization after it was announced in December 1978, Oksenberg urged Brzezinski to settle the matter. “You could say that perhaps he has forgotten aspects of the negotiating record which set the parameters in which we had to work,” he suggested, passing responsibility for the result

⁴³ Brzezinski, *Power and Principle*, 418.

⁴⁴ “Memorandum of Conversation, Beijing, May 21, 1978, 4:05–6:30 p.m.,” in *FRUS, 1977–1980*, vol. XIII, Doc. 110.

⁴⁵ “Memorandum of Conversation, Beijing, May 22, 1978, 5:05–7:25 p.m.,” in *FRUS, 1977–1980*, vol. XIII, Doc. 111.

back to Kissinger.⁴⁶ Oksenberg especially objected to the suggestion that Carter betrayed Taiwan, since Kissinger promised Deng to work within the Japanese formula before Carter took office.⁴⁷ Deng quoted the record back at Vance. "When Cy tried to back off that commitment last August, [Deng] nailed him," Oksenberg recounted angrily. "That is why Cy's trip was a failure."⁴⁸ Though Carter wanted to take a tougher approach with China, he came to accept that he had no choice but to build upon the work of his predecessors.

KEEPING A SECRET

Breaking relations with Taiwan was not the only legacy Kissinger left behind. As soon as the administration began to devise its normalization plans, Carter restricted information to a handful of top White House officials. On Vance's proposal in mid-June 1978, Carter wrote, "Leaks can kill the whole effort... I don't trust 1) Congress 2) White House 3) State or 4) Defense to keep a secret."⁴⁹ Once in office, Carter felt no need to avoid the previous administrations' secret diplomacy. Carter also agreed with Vance's suggestion that congressional leadership should be kept in the dark, noting that they should be informed "as late as possible."⁵⁰

This was a startling reversal for Carter, who promised an open foreign policy on the campaign trail. Less than two years before his presidency, Carter said, "If the President sets the policy openly, reaching agreement among the officers of the government, if the President involves the Congress and the leaders of both parties rather than letting a handful of people plot the policy behind closed doors, then we will avoid costly mistakes and have the support of our citizens in our dealings with other nations."⁵¹ He continued to reaffirm his commitment to transparency

⁴⁶ Oksenberg to Brzezinski, "Kissinger on China," memorandum, December 19, 1978, "China (People's Republic of) - President's Meeting with (Vice Premier) Deng Xiaoping, 12/19/78-10/3/79" folder (PRC-PMDX-12/19/78-10/3/79), box 9, GeoF, DHM, ZBC, JCPL.

⁴⁷ "Memorandum of Conversation, Beijing, November 28, 1974, 4:00-6:15 p.m.," in *FRUS, 1969-1976*, vol. XVIII, Doc. 98.

⁴⁸ Oksenberg to Brzezinski, "Kissinger on China," memorandum, December 19, 1978.

⁴⁹ Vance to Carter, "Next Moves on China: Woodcock's Approach," memorandum, July 13, 1978, "China (People's Republic of) - Normalization, 1/24/78-11/10/78" folder (PRC-N-1/24/78-11/10/78), box 9, GeoF, DHM, ZBC, JCPL.

⁵⁰ *Ibid.*

⁵¹ "Address by Jimmy Carter, Tokyo, May 28, 1975," in *FRUS, 1977-1980*, vol. I, Doc. 2.

through the campaign and into his presidency. In his first State of the Union address, Carter reinforced this public position. "In our foreign policy, the separation of people from government has been in the past a source of weakness and error.... If we make a mistake in this administration," he stated, "it will be on the side of frankness and openness with the American people."⁵² Carter attributed his about-face to a newfound lack of discipline in the executive departments. "After Watergate, it seemed that every subordinate functionary in government wanted to be Deep Throat," he lamented.⁵³ The leaks resulted in press coverage that depicted the Carter administration as vacillating and unsure.

Aware of the public support for Taiwan and the influence of the weakened—but still influential—China lobby, Carter chose to adopt the methods of his predecessors. Carter was concerned that the Taiwan-backed China lobby would organize against Carter not only on normalization, but on other aspects of his agenda.⁵⁴ Though support for Taiwan had a significant following in Congress, Carter's administration believed that it was a constituency fabricated by foreign money, rather than by a strongly held belief.⁵⁵ They came to realize otherwise soon after normalization passed; polls indicated that while an overwhelming majority supported normalization with the PRC, Americans nonetheless favored maintaining official ties to Taiwan.⁵⁶ Though circumventing Congress and the State Department accomplished Carter's goals, it was very much in the spirit of Kissinger.

The administration's insistence on secrecy was strict, and extended even beyond American borders. In late July, Ambassador Woodcock reported that a Chinese official commented publicly on secret normal-

⁵² Jimmy Carter, "State of the Union Address Delivered Before a Joint Sessions of the Congress, January 19, 1978," APP.

⁵³ Carter, *Keeping Faith*, 59.

⁵⁴ "Memorandum from the President's Assistant for National Security Affairs (Brzezinski) to President Carter, Washington, March 8, 1977," in *FRUS, 1977-1980*, vol. XIII, Doc. 16.

⁵⁵ "Memorandum from the President's Assistant for National Security Affairs (Brzezinski) to President Carter, Washington, July 29, 1977," in *FRUS, 1977-1980*, vol. XIII, Doc. 40.

⁵⁶ Zbigniew Brzezinski to Jimmy Carter, "Information Items," memorandum, January 19, 1979, "1/13/79-1/23/79" folder, box 9, President's Daily Report Files (PDRF), ZBM, NSA, JCPL.

ization negotiations.⁵⁷ Brzezinski's response not only instructed Woodcock to express their displeasure to the Chinese about their treatment of confidential information, but also admonished Woodcock to use the backchannel to the White House, rather than pass the cable through the State Department.⁵⁸ The frankness and openness Carter had promised were not forthcoming.

HUMAN RIGHTS

Though the control of China policy passed to Brzezinski, he had not forgotten Carter's emphasis on human rights. Indeed, one of his aides at the NSC suggested that he could urge the Chinese to pressure its ally Cambodia to moderate what Carter deemed "genocidal policies."⁵⁹ The memo noted that because the atrocities Cambodia committed made it vulnerable to Vietnamese invasion, "It could be put to the Chinese that they should do this not in the interest of human rights, but in their own self-interest."⁶⁰

However, he quickly found that the Chinese had incompatible views. The Chinese saw Carter's human rights rhetoric as a form of propaganda against the USSR, and while they supported Carter insofar in attacking the Soviet Union, they would not suffer the same to be said about them or their allies. A month before Brzezinski's trip, Chinese Ambassador Han Xu attacked Carter's condemnation of Cambodia. "We believe the internal situation in Cambodia is excellent," Xu stated.⁶¹ When Brzezinski traveled to China, Chinese Foreign Minister Huang Hua emphasized the distinction: "We support your efforts in making use of the human rights

⁵⁷ Leonard Woodcock to Vance, "Chou Pei-Yuan Comment on Brzezinski Visit," telegram, July 21, 1978, "China (People's Republic of) - Alpha Channel, 2/72-11/78" folder (PRC-AC-2/72-11/78), box 9, GeoF, DHM, ZBC, JCPL. Woodcock's formal title at the time was Chief of the U.S. Liaison Office in China, though ambassador is used in all internal communications.

⁵⁸ Brzezinski to Woodcock, "The Chou Pei-Yuan Business," undated telegram, PRC-AC-2/72-11/78, box 9, GeoF, DHM, ZBC, JCPL.

⁵⁹ Jimmy Carter, "Human Rights Violations in Cambodia Statement by the President, April 21, 1978," APP.

⁶⁰ "Memorandum from Jessica Tuchman Mathews of the National Security Council Staff to the President's Assistant for National Security Affairs (Brzezinski), Washington, May 17, 1978," in *FRUS, 1977-1980*, vol. XIII, Doc. 107.

⁶¹ "Memorandum of Conversation, Washington, April 22, 1978, 9:35-10:15 a.m.," in *FRUS, 1977-1980*, vol. XIII, Doc. 96.

issue to make trouble for the Soviet Union. For those people who are engaged in a struggle to win national independence and unity for their nation, the principal issue is not the kind of human rights that you are talking about.”⁶² The fundamental disconnect between the American and Chinese attitude towards human rights precluded further discussions on the matter between the two countries as they normalized relations.

In fact, the most significant change to Chinese human rights policy would not come until after normalization was complete. At a state banquet for Deng during his visit to the United States in January 1979, Deng asked Carter if he had any personal desires regarding China. Carter requested that China permit freedom of worship, the distribution of bibles, and foreign missionary programs. Deng, after consideration, granted all but the last item, stating that while missionaries did some good work, their attempt to impose Western culture upon their converts was an unacceptable cost.⁶³ Eager to establish better relations with Saudi Arabia, he also stated that he would reconsider policies that prevented Chinese Muslims from making pilgrimages to Mecca.⁶⁴ However, the areas that Deng was willing to compromise reaffirmed China’s disinterest in pursuing human rights for its own sake. Though Chinese policymakers were willing to concede on minor issues to placate other countries, they would tightly control the extent of these concessions.

The administration was aware that their embrace of China strained the credibility of their human rights policy. Oksenberg commented that CIA reports on Chinese labor camps were “chilling,” but could not suggest any immediate action. He concluded, “Let us look forward to the day when our diplomatic relations...are such that we can begin to raise this issue.”⁶⁵ Internally, the administration noted the contradiction in both prioritizing human rights and improving relations with China. “Our human rights policy is a sham if we establish relations with the PRC,” the vice

⁶² “Memorandum of Conversation, Beijing, May 21, 1978, 9:52 a.m.–1:20 p.m.,” in *FRUS, 1977–1980*, vol. XIII, Doc. 109.

⁶³ Carter, *Keeping Faith*, 207; Jimmy Carter, *White House Diary* (New York: Farrar, Straus and Giroux, 2010), 285.

⁶⁴ Carter, *Keeping Faith*, 207.

⁶⁵ “Memorandum from Michel Oksenberg of the National Security Council Staff to the President’s Assistant for National Security Affairs (Brzezinski), Washington, June 20, 1977,” in *FRUS, 1977–1980*, vol. XIII, Doc. 33.

president's chief of staff argued.⁶⁶ Even Nixon, whose thoughts were occasionally sought on China policy, saw the problem. "Stop beating on the...Philippines," he advised, "Sure Marcos is corrupt.... But the human rights record of the Philippines is much better than the PRC."⁶⁷ Normalization with China was not driven by human rights concerns, and because China refused to engage with the issue on American terms, the two were not compatible. It is little wonder then that when Carter came to believe normalization was necessary, the project had little of the humanitarianism that pervaded his public rhetoric.

OFF THE "BACK BURNER"

Once Brzezinski established an understanding with the Chinese, Ambassador Woodcock was left to carry out the negotiations with his Chinese counterpart, Huang Hua. With some innocuous interruptions, the negotiations went smoothly. A little over a month into negotiations, Woodcock presented the American proposal for their presence on Taiwan on August 11: they would accede to the Japanese formula, maintaining economic and cultural ties to Taiwan, but without any government representation or official relations.⁶⁸ After working out procedural details, the two sides agreed that the United States could unilaterally declare their interest in a peaceful resolution of the Taiwan issue. Though the Chinese side registered their "emphatic objection" to arm sales to Taiwan, Woodcock noted that though China staked out a position, it did not demand action on the issue, and that the issue could be left unresolved.⁶⁹

One piece of last-minute drama did occur over the issue of arms sales to Taiwan. On December 13, just weeks before normalization was to happen, Deng and Woodcock discussed the details of the Mutual Defense

⁶⁶ "Memorandum from the Vice President's Chief of Staff (Moe) to Vice President Mondale, the President's Assistant (Jordan), the President's Assistant for National Security Affairs (Brzezinski), and the President's Deputy Assistant for National Security Affairs (Aaron), Washington, May 15, 1978," in *FRUS, 1977-1980*, vol. XIII, Doc. 104.

⁶⁷ "Memorandum from Michel Oksenberg of the National Security Council Staff to the President's Assistant for National Security Affairs (Brzezinski), Washington, December 19, 1978," in *FRUS, 1977-1980*, vol. XIII, Doc. 175.

⁶⁸ Woodcock to Carter, Vance, and Brzezinski, "Meeting with Huang Hua," telegram, August 11, 1978, PRC-AC-2/72-11/78, box 9, GeoF, DHM, ZBC, JCPL.

⁶⁹ Woodcock to Carter, Vance, and Brzezinski, telegram, December 6, 1978, PRC-AC-2/72-11/78, box 9, GeoF, DHM, ZBC, JCPL.

Treaty the United States was to terminate with Taiwan. According to the treaty's terms, one year's notice had to be given before it would lapse. Deng indicated that arm sales to Taiwan during this period would be problematic for the Chinese, and both sides agreed not to sell arms during the period.⁷⁰ Brzezinski, however, soon discovered that there was a misunderstanding on the issue; the Chinese believed that the United States would not sell arms after the year had elapsed.⁷¹ Over Woodcock's assurances, Brzezinski ordered Woodcock to clarify the situation with Deng. "The discussion confirmed that we have serious differences over this issue," Woodcock reported back, with more than a little understatement. An infuriated Deng upbraided Woodcock, declaring that arms sales would be tantamount to a preservation of the defense treaty; both blocked efforts to reunify Taiwan peacefully. After some tense negotiations, Deng agreed to continue with normalization as planned, but insisted that Carter avoid questions on the arms sales issue.⁷²

Deng's ability to make such a decision came from his ascension to "preeminent leader" of the Chinese Communist Party on November 25, besting Premier Hua Guofeng. Though Hua maintained a superior title, Deng was unshackled from political constraints, and it reflected in his negotiations. On December 4, the Chinese side returned their draft of the normalization communique to be publicly announced, over a month after they received it from Woodcock. Though the Americans had their suspicions that Deng was restrained by internal politics, they could hardly have expected things to turn so heavily in their favor. Deng himself handled the final negotiations, an expression both of normalization's importance and of Deng's personal interest. Accordingly, he removed many of the final obstacles for the American negotiators; when Woodcock provided the final draft communique, Deng approved it on the spot. "Unlike Huang Hua, [Deng] seemed clearly to have the power of decision

⁷⁰ Ibid.

⁷¹ Brzezinski, *Power and Principle*, 230.

⁷² "Backchannel Message from the Chief of the Liaison Office in China (Woodcock) to Secretary of State Vance and the President's Assistant for National Security Affairs (Brzezinski), Beijing, December 15, 1978, 1024Z," in *FRUS, 1977-1980*, vol. XIII, Doc. 170.

in his own hands," Woodcock remarked.⁷³ That the arms sale issue did not derail normalization stands testament to the authority Deng consolidated within China, and his determination to complete normalization despite the risks.

FULL-SPECTRUM DIPLOMACY

While Nixon's diplomacy was restricted to a high-level dialogue between political leaders, Carter's diplomacy ultimately built a much broader foundation that reflected the mutual interest the countries had in closer ties in multiple spheres. Even before negotiations began, Brzezinski found ways to entice the Chinese. In January 1978, Press shrewdly suggested to Brzezinski that the United States send a delegation of the prominent government scientists, such as the administrator of NASA and the director of the NSF, to China. "It would encourage the Chinese to 'think American' now, rather than commit solely to Western Europe and Japan," he argued. "If the Chinese demur because of the diplomatic relations issue, no harm is done. We will have just whetted their appetites."⁷⁴ It was an exceptional endeavor. "This is the highest-level delegation we have ever sent to any nation," Press noted, recommending that the President visit the briefing as Carter "never met them as a group."⁷⁵

The trip was successful beyond all expectations. By the time the scientists returned, they agreed to understandings for agriculture, space technology, and education, all of which were later signed. Of these, the exchange of students was the most important. Though the Department of State aimed for a large number, they expected the total number of students to be only about five hundred students for each side. The Chinese, however, had much bigger aims. When an American delegate rounded the number up to a thousand, his Chinese counterpart indignantly

⁷³ "Backchannel Message from the Chief of the Liaison Office in China (Woodcock) to Secretary of State Vance and the President's Assistant for National Security Affairs (Brzezinski), Beijing, December 13, 1978, 1145Z," in *FRUS, 1977-1980*, vol. XIII, Doc. 167.

⁷⁴ Press to Brzezinski, memorandum, January 24, 1978, PRC-N-1/24/78-11/10/78, box 9, GeoF, DHM, ZBC, JCPL.

⁷⁵ Press to Fran Voorde, memorandum, June 26, 1978, "Memoranda and Correspondence - Presidential, 6/27/78-10/25/78" folder (MC-P-6/27/78-10/25/78), box 1, Frank Press' Chronological, Memoranda, and Correspondence Files (FPCMCF), Staff Offices Collection, OSTP, JCPL.

demanded to know why China could not send the several thousand other countries did. The Chinese were so eager to establish educational exchanges that they agreed to pay the cost for their students, a cost usually assumed by the host country.⁷⁶ A flustered Press, hesitant to increase the number on his own authority, called back to Washington for instructions, waking a bemused and receptive Carter at three in the morning.⁷⁷

To sustain the political momentum for normalization, the administration also planned “one or two Secretarial visits” to China. Suggested candidates included Secretary of Agriculture Robert Bergland, Secretary of Energy James Schlesinger, and Secretary of Commerce Juanita Kreps.⁷⁸ The choice of these departments was specifically tailored to Deng’s emphasis on science and technology, and sent delegates for Press’s trip. Together with the other scientific agencies, the three departments corresponded to potential exports from the United States to China. From 1972 to 1975, three-quarters of American exports to China were agricultural, comprised of grain, cotton, soybeans, and fertilizer plants. Non-agricultural exports included \$30 million in oil exploration equipment and aircraft. Furthermore, the Department of Commerce shared responsibility with the Department of Defense for managing the ally-coordinated Coordinating Committee for Multilateral Export Controls (COCOM) export clearance process that was holding up high-technology sales to China. Brown, who headed Defense, was not considered, likely because his presence may have suggested a potential

⁷⁶ Richard C. Atkinson, “Recollections of Events Leading to the First Exchange of Students, Scholars and Scientists between the United States and the People’s Republic of China,” December 14, 2006, available at http://rca.ucsd.edu/speeches/Recollections_China_student_exchange.pdf; Press to Carter, “US-China Bilateral Education Exchange,” memorandum, October 16, 1978, “China, 10/16/78-6/27/79” folder, box 6, Press Files, OSTP, JCPL.

⁷⁷ Vogel, *Deng Xiaoping and the Transformation of China*, 322.

⁷⁸ “Memorandum from the Assistant Secretary of State for East Asian and Pacific Affairs (Holbrooke), the Deputy Assistant Secretary of Defense for East Asian and Pacific Affairs (Abramowitz), and Michael Armacost and Michel Oksenberg of the National Security Council Staff to Secretary of State Vance, Secretary of Defense Brown, and the President’s Assistant for National Security Affairs (Brzezinski), Washington, April 4, 1978,” in *FRUS, 1977–1980*, vol. XIII, Doc. 92.

military relationship, provoking the USSR while the United States was conducting arms control negotiations with the Soviets.⁷⁹

Schlesinger and Bergland visited China in late November 1978. Though they were the only cabinet members to visit while negotiations were ongoing, they would be the first of many cabinet officials who made trips to China by the end of Carter's term. It soon became a point of prestige for department heads to make a China trip. After their trips were announced, cabinet secretaries were so impatient to conduct their own trips that Brzezinski and Carter had to restrain them from arranging them.⁸⁰ The Chinese, for their part, were even more eager. When Brzezinski visited Ambassador Chai Zemin in the week before normalization, he broached the possibility of a joint trip by Kreps and Secretary of the Treasury W. Michael Blumenthal after the agreement would be signed. Chai Zemin responded that he had not only secured permission for both secretaries already, but was additionally authorized to invite the secretary of health, education, and welfare.⁸¹ These newfound exchanges and contacts between the United States and China were important to Deng, who was so involved in raising China's technological level. The prospect of forfeiting them must have weighed heavily upon his mind when in the tumultuous final days before normalization was agreed to, especially since they were conducted so near the end of negotiations.

THE NEW NORMAL

The outcome of normalization with China reflected the span of Carter's diplomacy. China resumed agricultural imports, and became the largest customer of American cotton by the end of 1980. The overall volume of trade doubled from \$1.1 billion dollars in 1978 to \$2.3 billion in 1979, and continued to grow exponentially through 1980.⁸² During Deng's official

⁷⁹ Vance argued against establishing a security relationship with China in 1977, and objected to Brown's trip on these grounds even after normalization. See Brzezinski, *Power and Principle*, 421–24; Vance, *Hard Choices*, 76, 390.

⁸⁰ "Memorandum from the President's Assistant for National Security Affairs (Brzezinski) to President Carter, Washington, September 23, 1978," in *FRUS, 1977–1980*, vol. XIII, Doc. 136.

⁸¹ "Memorandum of Conversation, Washington, December 11, 1978, 3:57–4:47 p.m.," in *FRUS, 1977–1980*, vol. XIII, Doc. 163.

⁸² "Explanation of the United States–People's Republic of China Grain Agreement (Statement Issued by the White House, October 22, 1980)," in *American Foreign Policy: Basic Documents*,

visit to the United States, which lasted from January 28 to February 5, 1979, Deng signed and formalized the understandings on education, agriculture, technology, and other matters, that Press, Bergland, and Schlesinger negotiated during their trips to China.⁸³ In September 1980, Carter signed four additional agreements, including maritime and civil aviation agreements that established new transportation routes for goods and for people between the two countries.⁸⁴ “There has been phenomenal growth in the whole range of official and private contacts,” Brzezinski remarked to Carter in October 1980, rattling off statistics. Four thousand Chinese students arrived in the United States; a hundred Chinese delegations visited the U.S. each month, including a hearty exchange of athletes, musicians, and other cultural delegations; over seventy thousand Americans visited China by the end of that year.⁸⁵ With renewed interaction, China also began to integrate itself into the American-led international order. “[China] is now beginning to enjoy the international status that long eluded it,” Assistant Secretary of State Richard Holbrooke declared in 1980.⁸⁶

CONCLUSION

Carter’s China policy is a new take on an old theme, both driven and enabled by new developments. The way Carter continued, and departed from, the policies of previous administrations reflect the continuities and departures within the PRC as it transitioned from Mao’s leadership to Deng’s. Carter was unable to soften the PRC demand to break diplomatic ties with Taiwan both because he was constrained by Kissinger’s previous

1977–1980 (Washington, DC: U.S. Department of State, 1983), Doc. 537. Dollars are presented in nominal (i.e., current) U.S. dollars.

⁸³ “Editorial Note,” in *FRUS, 1977–1980*, vol. XIII, Doc. 210.

⁸⁴ “United States-People’s Republic of China Agreements (Remarks by the President [Carter] and the Vice Premier of the People’s Republic of China [Bo] at the Signing of Four Agreements, Washington, DC, September 17, 1980 [Excerpt],” in *Basic Documents, 1977–1980*, Doc. 535.

⁸⁵ “Memorandum from the President’s Assistant for National Security Affairs (Brzezinski) to President Carter, Washington, October 10, 1980,” in *FRUS, 1977–1980*, vol. XIII, Doc. 322.

⁸⁶ “‘We Will Develop Our Relations with China on Their Own Merits’ (Address by the Assistant Secretary of State for East Asian and Pacific Affairs [Holbrooke] before the National Council for U.S.-China Trade, June 4, 1980),” in *Basic Documents, 1977–1980*, Doc. 533.

commitments and because Deng and Mao did not differ substantially in their approach to the issue. Similarly, Deng did not change the core anti-Soviet element of Chinese foreign policy. Though Carter hoped to improve relations with the USSR, he returned to the position of his predecessors when he became disillusioned by aggressive Soviet actions around the world. On science and trade, however, Deng broke from Mao. Committed to improving Chinese science and technology even when Mao was alive, Deng pushed this agenda much more aggressively when he became China's preeminent leader. By noticing this shift in China's policy, through its courting of Western companies, Carter's administration found an opportunity to improve relations with China, and received pressure from a faltering economy and European market competition to take it.

Changes in the Cold War, rather than driving normalization, modulated more immediate national concerns. As Brzezinski remarks in his memoirs, policymakers were to "think of it at all times but speak of it never."⁸⁷ To be sure, Deng's emphasis on science and technology stemmed in part from his concern over self-defense from the Soviet "polar bear," and Soviet aggression was indeed influential in turning Carter away from closer ties with the Soviet Union. But though Cold War concerns conditioned the environment for normalization, they did not make it inevitable. Normalization required that the two countries were on the same frequency regarding the Cold War, but this alignment of geopolitical interests alone did not bridge the strong and longstanding disagreements between the United States and China over Taiwan, arms sales, and human rights. Ultimately, economic concerns about markets and acquiring technology pushed Carter and Deng towards an agreement in spite of their differences.

While normalization was a success for both Carter and Deng, neither side fully achieved their goals. The aspirations of Carter's human rights and Deng's unified China were both sacrificed to establish a new normal for Sino-American relations. The Taiwan issue remained unresolved; while the United States renounced its diplomatic relations and its mutual defense treaty, it continued to supply Taiwan with arms, frustrating Chinese designs to coerce the island to reunify. Conversely, Carter and Brzezinski's attempts to procure Chinese support for human rights were stonewalled. Indeed, on these points, Chinese and American views were

⁸⁷ Brzezinski, *Power and Principle*, 196.

fundamentally incompatible. But rather than emphasizing these differences, both sides looked past them in favor of the common ground they shared over trade and geopolitics.

It is worth noting the long-term effects of Carter's decision to favor Brzezinski and normalize relations with China. Had Carter foregone normalization, or had he tried and failed to conclude an agreement, the U.S. and the PRC could have remained estranged for decades. Though counterfactuals often yield more creative expression than analytical promise, one wonders if Ronald Reagan would be as inclined to strike a deal with the PRC at the expense of Taiwan. After all, President Ford delayed normalization precisely because Reagan challenged the Republican's pro-PRC position, and Reagan made a campaign trip to Taiwan to protest Carter's diplomacy. And, assuming events unfolded similarly, what American president could normalize relations in the aftermath of the Tiananmen massacre in 1989? Economic ties between the PRC and the United States may have occurred without normalization, but they would almost certainly have emulated the fleeting trade of 1976, with American companies and firms at the back of the queue, behind their European competition. Considering the volume of trade between the United States and China today, it gives one pause to imagine what impact a failure to establish diplomatic relations would have had in lost jobs, lost markets, and lost imports.

On the China policy, it is easy to write Carter's term as just the third in the style of Kissinger. All were secretive, wary of Congress, and favored the NSC over the Department of State. None seemed to advance a moral agenda, and at times, seemed distinctly immoral. But this would be deceiving upon further analysis. Whereas Kissinger kept China policy concentrated within the NSC, Brzezinski worked on both public and confidential levels, managing multiple cabinet-level visits between the United States and China while retaining strict secrecy over the normalization negotiations themselves. Unlike Kissinger's insular process, Brzezinski employed the suggestions of his subordinates and colleagues—most notably Frank Press and Michael Oksenberg—to craft and advance his vision for U.S.-China relations. Furthermore, the economic basis for normalization under Carter created a fuller form of diplomacy than Nixon and Ford's. Carter's China diplomacy expanded U.S.-China relations beyond meetings of high-level political leaders,

building new connections with China through trade, travel routes, and contacts across a wide array of government agencies.

By taking these old practices and applying them to new ends, Carter's China policy went beyond a regurgitation of his predecessors' status quo. Carter and Deng both found that power had its constraints, and were unable to realize their elusive aspirations of global human rights or Chinese unification. But recognizing that disagreements here were irreconcilable—at least for the moment—they chose instead to focus on areas where they could mutually benefit. Though the two countries did not resolve their differences, nor have they since, Carter and Deng forged a productive new relationship that got them not what they wanted, but what their countries needed. They crafted a lasting bond between the United States and China; between governments and their people.

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