

UNITED STATES CRYPTOLOGIC HISTORY



ANN'S WAR

One Woman's Journey to the
Codebreaking Victory over Japan

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CENTER FOR CRYPTOLOGIC HISTORY

David Sherman was head of the Strategy, Plans, and Policy organization for the National Security Agency before his retirement in 2017. For their assistance in locating material relevant to the preparation of this monograph, the author expresses his appreciation to Kelly Grant of the Sage Colleges Archives and Special Collections; Eloise Morgan, village historian, Bronxville, New York; Rene Stein, former librarian, National Cryptologic Museum; and Sarah Parsons and Betsy Rohaly Smoot of NSA's Center for Cryptologic History.

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David Sherman



National Security Agency
Center for Cryptologic History
2019

CONTENTS

Foreword	iii
Introduction.....	1
Chapter 1. Childhood in Suburban New York	3
Chapter 2. College Years at Russell Sage.....	7
Chapter 3. War Comes to America ... and to Russell Sage	11
Chapter 4. On to Washington	13
Chapter 5. A Codebreaker in Training.....	17
Chapter 6. Getting Down to Work	19
Chapter 7. The “Japanese Army Problem”	23
Chapter 8. Tackling Encrypted Japanese Messages: The Address Section	27
Chapter 9. The Water Transport Code	31
Chapter 10. The Impact.....	35
Chapter 11. The End of the War	39
Chapter 12. Later Career and Retirement	41
Afterword	49
Notes.....	50

Foreword

Thousands of American women entered government service during World War II to serve their country in its time of need and take advantage of newly created career opportunities that men in uniform had left behind. Few stayed on throughout the Cold War, and only one advanced through the cryptologic civilian ranks to become NSA's deputy director.

Ann Caracristi.

Those who knew Caracristi have remembered her as humble, hardworking, and professional. Those who didn't know her often see her as a towering female figure from the World War II generation who somehow advanced magnificently through the NSA civilian ranks. Caracristi dedicated more than 60 years to US national security efforts, proving herself time and again as both a technical cryptanalyst and senior leader in what was then a male-dominated profession. She never relished being singled out later as the "first female" this or that. She did her job for a reason, and that reason was not for personal accolades.

Dr. David Sherman (the associate director for policy and records and leader of the Agency's records management, archives, and declassification services offices before his retirement in 2017) crafts a fasci-

nating profile of this NSA trailblazer. In addition to reviewing sources, such as government records and the donated Caracristi Collection at the National Cryptologic Museum, Dr. Sherman also unearths the stories of Caracristi's impressionable younger years by consulting sources at both the Bronxville Historical Conservancy in Bronxville, NY, and the Sage Colleges Archive in Troy, NY.

His research using oral history interviews allows him to paint the scenes of the seemingly chaotic, but highly effective, cryptologic work performed by Caracristi and other US Army codebreakers during World War II. From traffic handling to traffic analysis to full-blown cryptanalysis, Dr. Sherman describes the technical aspects of the work Caracristi and her colleagues performed against the "Japanese Army problem" and illustrates how tedious, manual, and ostensibly small efforts can build up into an impressive intelligence system. For the first time, the NSA/CSS workforce and the general public can now have a glimpse into the personal and professional experiences that molded Caracristi into the highly decorated Intelligence Community leader she became.

Despite the fact that many details of Caracristi's work remain classified in Cold War era records, Dr. Sherman provides a captivating account of her

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

life, early cryptologic years, major career milestones, and postretirement activities. In doing so, he reminds the reader that all cryptologic professionals who perform highly classified and often mysterious work are, in the end, just people. They enter government service as ordinary Americans, but often find themselves in extraordinary situations, accomplishing feats bigger than themselves. Caracristi lived a quiet life, but she performed impactful work that strengthened the safety and security of the United States.

This is her story.

**Sarah L. Parsons, Historian
Center for Cryptologic History**

Introduction

In June 1942, a young woman with a freshly minted degree in English from an upstate New York college boarded a train bound for Washington, DC. She and a classmate traveling with her had accepted positions with the War Department, hoping—as she would put it years later—to have the chance for “doing something that might be useful”* in the wake of the Japanese attack on Pearl Harbor and America’s entry into World War II. The young woman and her friend had been given little idea of what they would be doing once they reported for duty in the nation’s capital. They had been told it would involve work that was “secret.” The one clue they had was a training booklet that had been sent to them before graduation with instructions that they should study it if they had time. The booklet bore a peculiar title on its cover, as well as a marking that it was to be used only for “official” purposes. It was called “Elements of Cryptanalysis.” Whether she or her friend had any idea what that final word meant when they first

encountered it is not known. Cryptanalysis was about to shape their lives in ways that neither of them could have expected.

The young woman on the train was named Ann Caracristi. Her friend was Florence Woolsey. Both were bound for one of the most secret organizations in Washington. This was the Signal Intelligence Service, or SIS, a group within the US Army dedicated to breaking enemy codes and ciphers in order to get at the most precious military secrets of America’s adversaries, which included Germany and Japan. Caracristi would stay on after World War II ended and, in 1952, join the ranks of the newly formed National Security Agency. She would be decorated by two presidents; achieve the distinction of being one of the first women in the history of the Department of Defense to enter the elite Senior Executive Service; and ultimately become NSA’s first female deputy director, its highest ranking civilian. Her service to country did not end when she retired from that position in 1982. Caracristi was named to a series of blue-ribbon panels studying various ways to improve America’s security and, in 1993, was appointed by President Bill Clinton to his Foreign Intelligence Advisory Board. None of which—if her thoughts had turned to the future

*Ann Caracristi, interview by Robert D. Farley, NSA-OH-15-82 (July 16, 1982), 2-3, accessed May 10, 2018, <https://www.nsa.gov/news-features/declassified-documents/oral-history-interviews/assets/files/NSA-OH-15-82-caracristi.pdf>.

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

and what she believed would be a career in journalism after the war—a young woman on a train bound for Washington in June of 1942 could possibly have imagined.

CHAPTER 1

Childhood in Suburban New York

During the early years of the twentieth century, Bronxville's appeal extended to young, successful businessmen, who bought land, built lavish homes for their families, and urged friends to do the same. These newcomers were eager to play important roles in the life of the village and would actively involve themselves in their children's education—a characteristic that distinguishes the Bronxville School to this day.

—Claudia Keenan, *Portrait of a Lighthouse School*, 1997¹

Ann Zeilinger Caracristi was born in the village of Bronxville, New York, on February 1, 1921. Her parents, Virginus and Jessie Caracristi, had moved to this village a few dozen miles north of midtown Manhattan in the middle of the previous decade. In 1919, Virginus and Jessie joined three other couples to purchase a tract of land east of Bronxville's small downtown that had been the site of an Episcopal school for girls. The parcel, renamed Elm Rock Estates, was subdivided into 12 lots. "Relatively large for Bronxville," according to a history of the village, "these lots lent themselves to the construction of rather grand homes."² On one of them, 3 Beechwood Road, Virginus and Jessie built a house in 1923 for their growing family, which in addition to Ann included her two older broth-



Ann Caracristi's senior yearbook photo, Bronxville High School, 1938. *Bronxville (NY) Historical Society*

ers, Virginius, Jr., and James. The Caracristi home apparently seemed to Ann so large that, when she graduated from high school and her yearbook listed what various members of her class were known for, it said that her classmates would remember her for often talking about what it was like to live in a big house.³

One likely reason that Caracristi's parents chose to settle in Bronxville was that the railroad station in the center of the village offered Virginius an easy commute into the city and the advantages of a suburban lifestyle. The family's affluence may have stemmed in part from his several patents for steam engines. He also was on the Board of Directors of the New York-based Valve Pilot Corporation and of Bronxville's Gramatan Company, a securities trading firm.⁴

Ann's parents and their fellow Elm Rock Estates owners were part of a construction boom that began in Bronxville after the end of the First World War in 1918. "The business of the next two decades," a local historian notes, "was building Bronxville, and the community can be said to have reached its 'maturity' in the 1920s and 1930s."⁵ The village's population rose to around 6,000 during this period. The families who built homes in Ann's neighborhood provide some sense of the community she grew up in, one drawn from New York's professional and executive ranks. Two nearby homes were owned by senior managers of the recently founded *Daily News*, which briefly was Ann's employer after World War II. Other prominent neighbors included engineers, doctors, and executives of Borden and the General Railway Signal Corporation. Ann's two godmothers and her godfather at her christening in 1925 were among them.⁶

* * *

Ann's childhood appears to have been typical for Bronxville at the time, with her birthdays and those of her friends reported in the society pages of the local newspaper. One of her earliest memories was

of a visit she made at age six or seven to the American Museum of Natural History in Central Park West and what she recalled as her "fascination with the mummy cases covered with hieroglyphs." "Little could I have known," she continued, "that I would spend a career involved with the modern day equivalent of hieroglyphs."⁷ She took piano lessons, and that instrument formed the basis of a story about Ann later related by a friend, Eleanor Williams. It involved the composer Jerome Kern. Kern and his wife, Eva, had lived in Bronxville from 1916 to 1918, when he, along with lyricist P. G. Wodehouse and playwright Guy Bolton, had written musicals such as 1917's *Oh Boy!*, one of the longest running Broadway productions of its time. Retaining his ties to Bronxville after moving in 1918 to nearby Yonkers, Kern visited Ann's parents one evening, and she listened as he played the family piano.⁸

Like her brothers Virginius, Jr., and James, Ann attended Bronxville's public school, constructed in 1924 to accommodate the village's growing number of children. In 1926, around the time Ann entered kindergarten, the school recruited a new superintendent, Willard W. Beatty. A leading advocate for the progressive education movement, Beatty supported the pedagogical theories of philosopher John Dewey, who departed from the traditional American public school method of rote learning, memorization, and strict physical discipline in favor of a focus on the individual child and giving him or her the freedom to develop naturally and to learn by doing and sometimes failing. Beatty's reforms to the Bronxville curriculum also emphasized the child's physical growth through an active sports program, as well as awakening a social consciousness and stimulating creativity and imagination with instruction in the fine and performing arts.

During her high school years in Bronxville, Ann played several sports, including tennis, lacrosse, and soccer. She may have taken French—at graduation, as part of humorous and sometimes cryptic efforts by the senior class to bequeath underclassmen var-

ious remembrances, Ann left “her French accent to Charles Moir.” The caption accompanying her senior yearbook photo provides some sense of how she had spent her time. “Christy,” as she was known to her classmates, “has been here ever since kindergarten, so she ought to know this place as well as anyone. In the senior high, journalism and public speaking have been her big interests; she also has gone out for all sports in a big way.”⁹

The school’s newspaper contains no suggestion Ann played a role in its writing, editing, or publication. She does not appear in a picture of participants in the school’s public-speaking contest her senior year. The public-speaking courses were taught by a member of the history department, Ignatius Donnelly Taubeneck. Superintendent Beatty, who placed a premium on “assembling

what he regarded as the best public school faculty in the United States,”¹⁰ recruited Taubeneck in 1927 to teach social studies and public speaking. A machine gunner in the Meuse-Argonne campaign during World War I, the flamboyant Taubeneck made a habit of opening a newspaper at the start of each class and asking, “Well, world, what do you have for me this morning?”¹¹

According to Claudia Keenan, author of a history of the Bronxville school, Taubeneck’s “high-strung temperament belied his superb oratory abilities, which he shared with generations of Bronxville students through public-speaking contests and community forums which he ran until his retirement in 1952.”¹² Ann signed Taubeneck’s copy of her senior yearbook, “to one of my most very favorite teachers.”¹³

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

CHAPTER 2

College Years at Russell Sage

Russell Sage played a large role in my professional career. It was, after all, Dean Doris Crockett who sent me off to the Army Signal Intelligence Service in 1942. Much more importantly, it was my four years at Sage which stimulated whatever creativity I may have been able to muster.

—Ann Caracristi, 1991¹⁴

In the spring of Caracristi's junior year, after a ten-day hospitalization, Virginius Caracristi died a few months short of his 59th birthday. The family remained well enough off that there was no question that Ann, like her elder brother, Virginius, Jr., who had attended Georgia Tech, could pursue a college education. Of the 130 students who graduated from Bronxville High School in 1938, Ann was one of 66 who went on to a four-year college or university. More than two dozen of these were her female classmates, with a significant percentage headed for schools such as Radcliffe, Mount Holyoke, Smith, Vassar, Wellesley, and nearby Sarah Lawrence.¹⁵

In the fall of 1938, joined by her Bronxville classmate Eleanor Williams—at whose 1945 wedding she would be a bridesmaid—Caracristi enrolled

as a freshman at Russell Sage College in Troy, New York. Located across the Hudson River from the state capital, Albany, Russell Sage had been founded in 1916 with the goal of providing young women with both a liberal and a vocational education, seeking to “develop those qualities of initiative, outlook, adaptability, and personality which to employers are the most highly considered qualifications.”¹⁶ This balance remained in place in the late 1930s at the time of Caracristi's arrival, if anything shifting toward the academic as new programs were added to the curriculum. Enrollments were rising during this period, with the total number of students at the college climbing to more than 350 during Caracristi's time there. The overwhelming majority of her classmates were from New York or the neighboring states of Connecticut, Massachusetts, and New Jersey.¹⁷

James Russell Meader was the president of Russell Sage when Caracristi enrolled. A New Englander with a doctorate from Columbia University who had been appointed in 1928, Meader introduced a number of reforms during his tenure. These reforms included modernizing the college's administration and governance, adding new programs in nursing and theater, creating separate dormitories for students studying foreign languages, and secur-

QUILL

*Caracristi, Raff, Woolsey,
Anderson, Spielberg, Cook.*



“RUSSELL SAGE PLANS INTER-AMERICAN WEEK TO CELEBRATE TWENTY-FIFTH ANNIVERSARY” . . . “BOX AND CANDLE CHOOSES FALL PLAY” . . . “MAJORITY VOTE FAVORS CONTINUED EFFORTS TOWARD FORMULATION OF HONOR CODE” . . . QUILL headlines scream the latest news as student reporters delve into every campus hide-away in search of coveted “scoops”. Headlines, dead-lines, by-lines keep the editors busy week after week, for the paper must come out. Since it is still in the process of achieving perfection, QUILL has instigated many changes in make-up and in policy during this year. Its changed face does not, however, alter its determined purpose: to report faithfully and interestingly all campus activities.

Staff of the Russell Sage College newspaper, the *Quill*. Caracristi is at far left. *Sage Colleges Archive*

ing full accreditation for the school from the Association of American Universities. He also emphasized academic excellence by hiring faculty with strong credentials and establishing a program for granting honorary degrees at Russell Sage’s annual commencement exercises.¹⁸

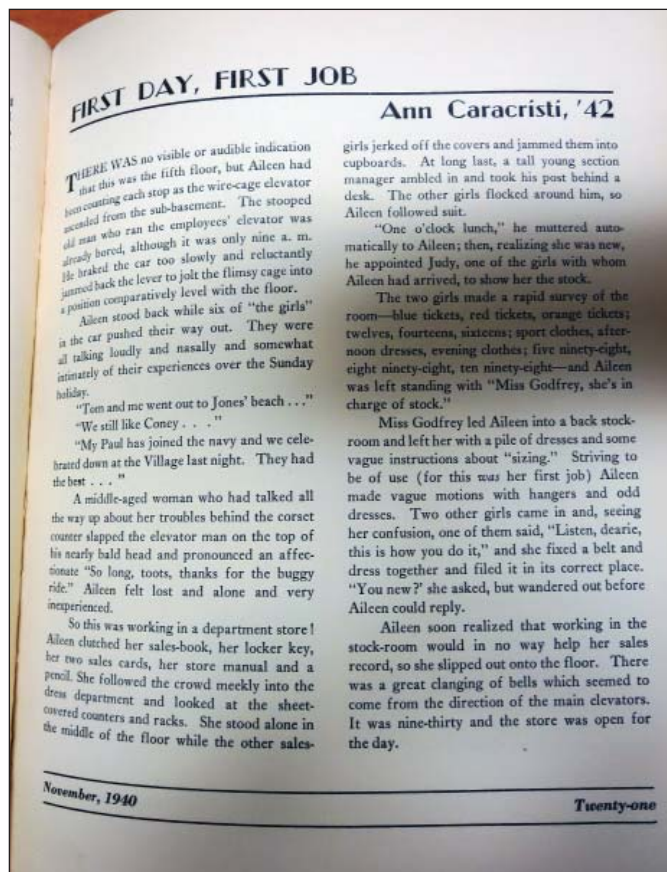
Caracristi’s arrival at Russell Sage in September 1938 coincided with the latest in a series of Europe-

an crises, this one triggered by German Chancellor Adolf Hitler’s ambition to add Czechoslovakia to a growing list of countries brought within the Nazi orbit. Late that month, British Prime Minister Neville Chamberlain traveled to Munich and reached an agreement that paved the way for Hitler’s occupation of the East European nation, an agreement subsequently characterized as epitomizing the failed

effort of Great Britain and France at “appeasement” of Berlin’s expansionist aims. By the time Caracristi began her sophomore year in the fall of 1939, Germany’s invasion of Poland had triggered declarations of war by Britain and France. Meader began calling on Congress to repeal the Neutrality Act, legislation that prohibited arms exports to any belligerent nation. Not doing so in the case of Britain and France, he argued, would only increase the odds that the United States eventually would have to enter the conflict and confront Hitler alone.¹⁹

Caracristi’s decision during her freshman year to join the staff of the student newspaper, *Russell Sage Quill*, exposed her to discussions among students and faculty on international events and Europe’s descent into another war. During her four years on staff, she moved from being a reporter to copy editor and proofreader, later becoming managing editor before being named editor-in-chief in February 1941, a position she held until the spring of the following year.²⁰ Florence Woolsey joined the *Quill* in Caracristi’s junior year. Woolsey, who invariably went by “Kitty,” became Caracristi’s news editor and, like Caracristi, served in leadership positions in her Russell Sage dormitories. The narrative accompanying Woolsey’s senior yearbook photo described her as someone who was in “perpetual motion” and loved a good joke. Behind Woolsey’s always upbeat (“*toujours gaië*”) demeanor, however, lay an intense intellectual curiosity.²¹

Caracristi also was an editor of the campus literary journal, *Review*, and between the fall of her sophomore year and the spring of her junior year published four short stories in it. Two of these are lightly comic narratives about young women and work. In one, the heroine has become so desperate to get a job that she unintentionally parleys a series of mistaken identities into a position with a Madison Avenue advertising firm.²² In the second, “First Day, First Job,” a young woman is hired to work in a department store’s stockroom but quickly realizes that the action is out on the sales floor. She quiet-



Caracristi’s short story, “First Day, First Job,” in the Russell Sage literary journal *Review*, 1940. *Sage Colleges Archive*

ly joins the other girls in the dress department and ends up earning their respect by finishing the day with eighty dollars in sales.²³ In each, the heroines gain success by setting aside whatever fears they may have and taking a risk that in the end—whether they intend it or not—pays off.

To whatever extent these two stories reflected Caracristi’s personal hopes and fears as she looked forward to the day she would enter the workforce, the other two seem more retrospective. In the first, “Anna,” the narrator—again, a young woman—sees the spinster domestic servant who was her childhood nurse as an individual for the first

Russell Sage Quill

Vol. XIX TROY, N. Y., MAY 29, 1942 No. 18

Nine Seniors Receive Keystone

College Will Graduate Twenty-Fifth Class

Senior Class Members To Receive Honors

In recognition of their high scholastic standing throughout their four years at Russell Sage College, nine members of the graduating class of 1942 will be graduated with honors at the Commencement Exercises on Monday.

Miss Thomas will be graduated with Highest Honors in Business Education. Virginia Hoopes and Mildred Spence will receive High Honors from the same department and Ruth Wray, graduate, Wash. Miller, Elizabeth Powell, and Barbara Stronach will be graduated with Honors.

In the Fine Arts department, Betty Cook will receive High Honors and Richard Fidler, Barbara Miller, and Helen Hickey will be graduated with Honors.

Honored students who will receive honors are Mary Elizabeth Burton, Lily Levin, and Eleanor Shuler.

Sharon Jones, Marie Lloyd, and Elizabeth O'Leary will receive High Honors in Physical Education. Nancy Woodson, Janet Woodberry, Thelma Spence, and Beulah Young will be graduated on page 8, col. 2.

Student Leaders Gain Acknowledgement For All-Around Ability

Keystone award was presented the afternoon of the Class Day exercises to nine members of the senior class. Albert Howard, Thelma Stronach, Nancy Burke, Mary Elizabeth Spence, Ann Casanovi, Ann Carlson, Janet Woodberry, Ruth Spence, and Barbara Stronach.

The student student body president is awarded to those members of the senior class who have made outstanding contributions in their class and the College.

Albert Howard, president of the Student Christian Association and was the president of Sage High School, Troy, N.Y., for one year. She was president of the senior class and was a member of Legislative Council during her sophomore year. During her sophomore year, she was secretary of Athletic Association and general chairman of her class for July Day. She was head of Interscholastic League during her sophomore year.

President of Gamma House and a holder of two internships awards, one from Yale University and one from the College, Thelma Stronach will participate in the Class Day exercises Monday. She was president of the Speech Club and a member of Choir and Yarn Club. Miss Spence, an active member of Beta and Gamma, has acted as secretary of the organization.

(Continued on page 8, col. 2)

Faculty Vets Support Of Honor Code Draft

Members of the Honor Code Committee met with the entire faculty on May 28 to discuss the possibility of the faculty to the proposed Honor Code. This meeting was held because there had been so much opposition on the part of the students as to the faculty's attitude toward the Code.

The faculty gave a unanimous vote of confidence to the Honor Code Committee and the work which has been done so far. Unanimous approval of the Committee's suggestion that a Faculty-Student Honors Committee be formed for the year specific implementation of the Honor Code is in new status was also voted.

The need for a joint faculty-student committee, whether or not the Honor Code is adopted by the students was stressed by the Honor Code Committee.

Such specific problems as the present examination, attendance at chapel, the student program itself and the cutting of classes will be solved by both groups working together.

The row, left to right: Barbara Stronach, Nancy Burke, Ann Carlson. Middle row, left to right: Ruth Wray, Ruth Spence, Mary Elizabeth Spence. Bottom row, left to right: Janet Woodberry, Wash. Miller, Elizabeth Powell.

The Five O'Clock Whistle and The Chattanooga Choo - Choo Have Nothing on Russell Sage's Railroad Activities

By Sylvia Woodson

The 5 o'clock whistle, it won't know!

It isn't your line so what 'ya know?

Miss Campbell asked us the railroad yard.

So it isn't your line, at least not here!

The rapid expansion of the N & M railroad have made it a practice of including in Greenwood their whistle which each time they pass the railroad yard. The unexpected aspect of those of the railroad brotherhood is based on the fact that Greenwood was there long before the railroad.

Miss Campbell, when she realized that these railroad gossies might interrupt, Clinton, was moved to better action. There is, indeed, no thought, then thought to meet, she smiled.

"Hello," she said, "Would you mind?"

"Oh, yes," she said, "I would be glad to see you."

Miss Campbell's mind is now quite free.

"Please," they said, "Have an armed guard at the gate so that it will not go unnoticed."

Miss Campbell promised. This she called a job.

"Yes," she said, "I will be glad to stand by Greenwood's gate."

And so, as a result of the cooperation of Miss Campbell, the N & M engineers, and the policeman.

The three o'clock whistle, it won't know.

The whistle won't know, we said you so.

Miss Campbell's mind is now quite free.

For Class Day songs were heard nearby.

Announcement of Caracristi (second row, left) receiving her college's highest honor, the Keystone award. *Sage Colleges Archive*

time, one whose life hers might come to resemble if her suitor were to disappear.²⁴ The second story, "They Could Not Stop for Death," is unlike the

other three stories, which are told by an unidentified narrator who has the benefit of knowing the characters' innermost thoughts. This story is purely descriptive and depicts a scene where a woman is receiving visitors at her family home after the death of her husband, ultimately being left alone as first the visitors and then her son and daughter depart.²⁵

At Russell Sage, Caracristi continued her involvement in sports by playing on the college basketball team. She broadened her interests to include the student theater group, Box and Candle, playing a behind-the-scenes role as a make-up artist. In addition to her journalistic endeavors, Caracristi also assumed other leadership roles at the school, serving as president of her dormitory, the General Wool House, which housed students in the college's honors program. When she graduated in June 1942, Caracristi was elected life secretary of her class.

Caracristi did well academically and was one of 33 members of Russell Sage's class of 1942 who were awarded academic honors at the school's June commencement exercises. Perhaps even more significantly, she was one of only nine who received the college's Keystone award. "The highest student honor," the *Quill* reported when the recipients were announced, "Keystone is awarded to those members of the senior class who have made outstanding contributions to their class and the College."²⁶ With such credentials, Caracristi seemed assured of taking the first steps toward a promising career in journalism. Her life, however, was about to turn in a completely different direction.

CHAPTER 3

War Comes to America ... and to Russell Sage

Of course the most important goal was to recover from the shock of Pearl Harbor—an event fully recognized as the most serious of intelligence failures. Not necessarily a failure to produce information but certainly a failure to evaluate it and distribute it in any meaningful way to those who had the action.

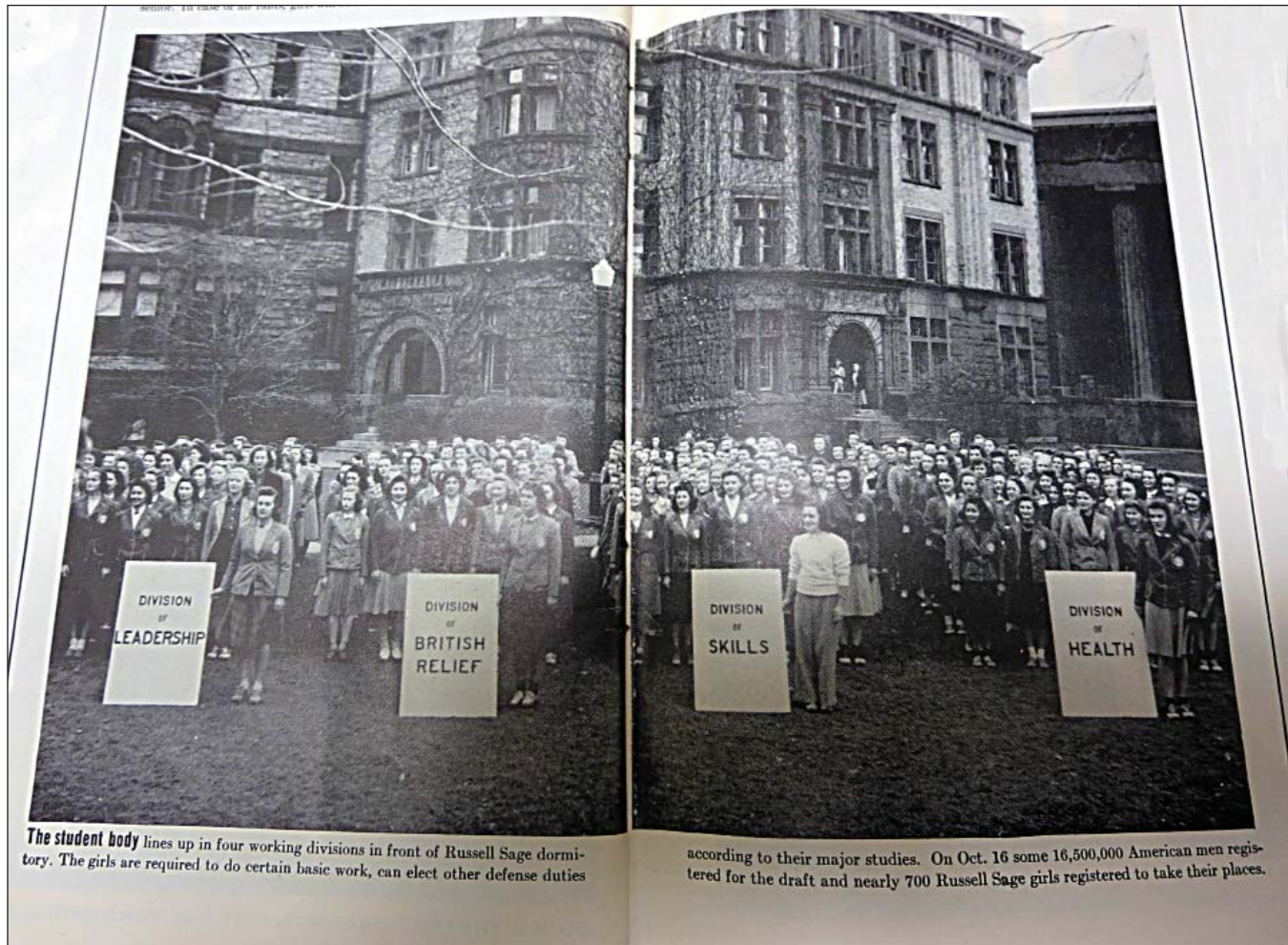
—Ann Caracristi, 1980s²⁷

In the fall of 1940, during Caracristi's junior year, President Meader and the faculty developed a Defense Program for the college, aimed at educating the Russell Sage community on the increasingly global conflict. Another goal of the program was "to initiate training in the skills which might prove useful in an emergency."²⁸ It was mandatory that all students participate, and certain activities at the college were suspended to allow time for them to do so. The program's curriculum ranged from Red Cross training to discussion groups and black-out drills. One course covered censorship and the various skills needed to review mail, telegrams, and other communications bound for overseas to ensure that they did not contain any military secrets. This course included topics such as how to monitor foreign and shortwave radio broadcasts and how to lis-

ten in on wiretapped conversations and write reports about their contents. The year after Caracristi graduated, Russell Sage added to the program a course on cryptography or the making of secret codes.

Caracristi heard the news of the December 7, 1941, Japanese attack on the US naval base at Pearl Harbor while sitting in the common room of the General Wool House that Sunday afternoon.²⁹ A few months later, President Meader announced that he was taking a leave of absence to join the US Army. He initially served in Washington but later was transferred to the Pacific and helped reestablish local rule in the Philippines after it was liberated from Japanese occupation.³⁰ In a farewell statement to Caracristi's class, Meader described the world she and her fellow students would face upon graduation:

You are leaving college at a time when our nation is engaged in the most momentous undertaking in its entire history... . As Joan of Arc feared not to lead a nation to victory, so the American woman must take her place in the forefront of the ranks of those who labor to strengthen and defend democracy. A second duty will confront you after the war has been won. This duty concerns your contribution, as a college trained wom-



The student body lines up in four working divisions in front of Russell Sage dormitory. The girls are required to do certain basic work, can elect other defense duties

according to their major studies. On Oct. 16 some 16,500,000 American men registered for the draft and nearly 700 Russell Sage girls registered to take their places.

The student body at Caracristi's college assembled for the war support effort by category, 1940s. *Sage Colleges Archive*

an, to the building of a new world, guided by the spirit of the "Atlantic Charter" and President Roosevelt's "Four Freedoms."³¹

The Four Freedoms were articulated by Franklin D. Roosevelt in his January 1941 State of the Union address and affirmed the right of all people to be free from economic want and from the fear of war and to speak and worship as they saw fit. Roosevelt and British Prime Minister Winston Churchill reaffirmed these principles in the Atlan-

tic Charter that summer when they met off Newfoundland, expanding them to include the right of persons everywhere to choose their own form of government and renouncing any desire for territorial gains at the end of the current conflict. They also pledged to pursue postwar disarmament, economic cooperation, and free trade. How Caracristi reacted to President Meader's valedictory charge to her class is unknown. How she would act on its spirit was about to become clear.

CHAPTER 4

On to Washington

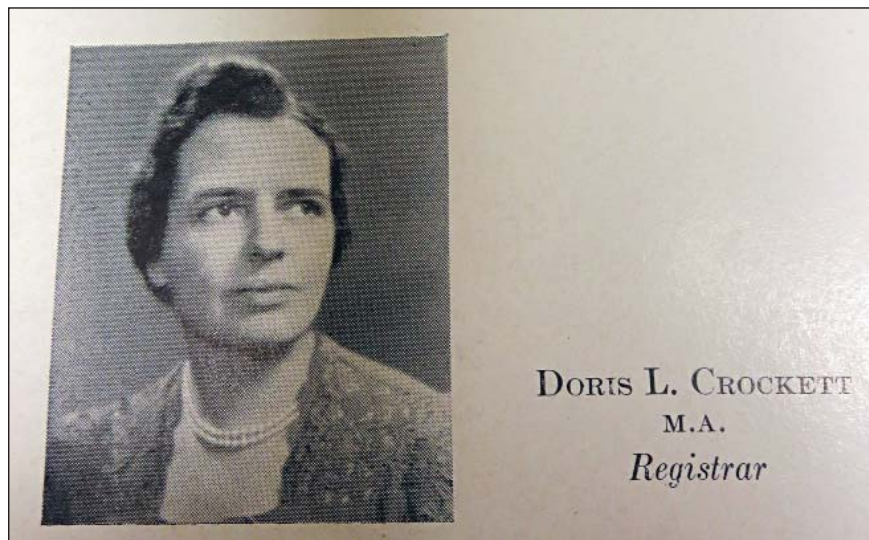
It seemed like an opportunity of doing something that might be useful. I didn't particularly want to join the WACs or the WAVES, but I obviously, as I think we all did, wanted to do something to contribute to this effort. So it suited me just fine.

—Ann Caracristi, 1982³²

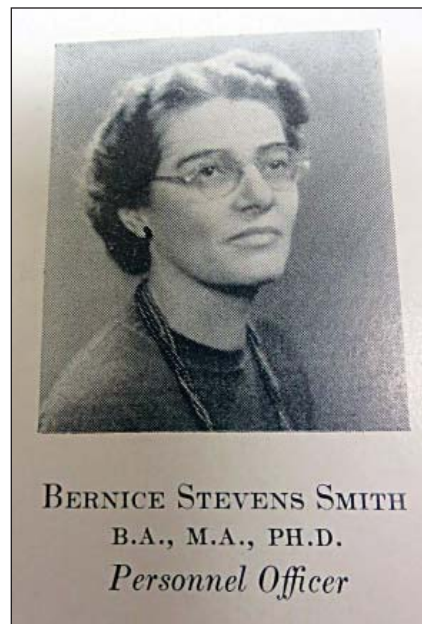
In the latter part of March 1942, the month President Meader left Russell Sage, another member of the college's administration, Dr. Bernice Smith, attended a two-day conference in Washington sponsored by the Institute of Women's Professional Relations. The institute was based at Connecticut College, which like Russell Sage was dedicated to the education of young women. Its director, future Democratic Congresswoman Chase Going Woodhouse, served as conference chair. Smith and representatives from other colleges and universities heard presentations on the government's need for additional personnel to support the war effort. At some point, Smith and about 20 of her fellow conference attendees met with officers from the Signal Corps, the parent organization of the clandestine Signal Intelligence Service; the officers offered positions that could be filled by a few

graduating seniors of each institution's choosing. "But these are 'secret orders,'" a related article in the *Quill* stated about the event, "and Miss Smith failed to divulge their nature."³³ It is hard to say how much the Signal Corps told Smith about what these Russell Sage seniors actually would be doing, but it seems likely that she would not have learned anything about the SIS or its codebreaking effort.

Some weeks thereafter, the dean at Russell Sage, Doris Crockett, received a letter from the War Department formally requesting her nominees for government service. As Caracristi later recalled, Dean Crockett "nominated me and two other people, who were friends of mine," one of whom was Kitty Woolsey.³⁴ The Signal Corps accepted Russell Sage's nominations without interviewing Caracristi or Woolsey. One can only speculate why Dean Crockett approached Caracristi in particular. Caracristi had done well academically, graduating near the top of her class. She had demonstrated her leadership talents by editing the *Quill*, the *Review*, and her senior yearbook, and by participating in the life of the college more generally. She also may have had no firm commitment on what to do after graduation, other than heading to New York to look for a job in journalism.



Russell Sage College administrators Doris Crockett, left, and Bernice Smith recommended students to the War Department. *Sage Colleges Archive*



The caption that accompanied Caracristi's photo in her senior yearbook described some of her personal characteristics:

Witty repartee ... every job completely done ... *Quill's* editor ... bull sessions and midnight studying ... sophisticated poise ... sense of humor of *The New Yorker* ... drug-store interludes ... clever originality of idea and expression.³⁵

The photo itself shows a confident, serious, intense, yet seemingly detached young woman looking almost directly at the camera, but with her eyes averted slightly to its right as if she were thinking about something other than being photographed. Whoever wrote the accompanying description of Caracristi, whether a fellow student or a faculty member, may have captured some of the traits Dean Crockett thought would enable Caracristi to succeed in Washington.

Perhaps significant for Dean Crockett was the fact that to fulfill Russell Sage's foreign language requirement, Caracristi had studied German, the

language of the country that was now America's powerful enemy. During her sophomore year, Caracristi may have lived at the college's German House, a residence that sought to create a language-immersive environment. She wrote an essay on that dormitory's history for an English seminar her senior year. Most likely, Dean Crockett considered many or even all of the above factors when recommending to Caracristi that she consider joining the War Department. This may have been true with regard to Woolsey as well, as her experiences at Russell Sage were similar to Caracristi's.

As for the training materials on codebreaking that the department sent for Caracristi to review prior to reporting to Washington, she later said that "being rather busy trying to graduate, I'm not sure I paid much attention to these."³⁶ She later discovered that they had been written by William Friedman, the preeminent American codebreaker of his day, who in the 1930s had used them to train the first recruits for the SIS. At that time each of those recruits had as little idea as Caracristi regarding what something called "cryptanalysis" was all about. Having met Friedman,

Caracristi described him as “sort of the genius of the outfit,” someone who even after an extended hospitalization in early 1941 due to a nervous breakdown, remained “a great hero figure ... the father of cryptanalysis.” “He was an extremely sociable person,” she added, “a very interesting man.”³⁷

Caracristi departed for Washington a week after Russell Sage’s commencement exercises on June 8, 1942. When she arrived, she went to the offices of the SIS, which were in the Munitions Building on Constitution Avenue. This facility housed the War Department before its move across the Potomac River to the Pentagon and remained a government office building for the duration of World War II.³⁸ One of the first things Caracristi did was to sign not just the standard oath taken by all new civil service employees affirming her support for the Constitution but also a second form swearing her to secrecy about her new duties—“I will not now nor at any future time discuss my activities or any details of the organization, activities or operations performed by this Agency”—which advised that she could be prosecuted under the Espionage Act if she broke her word.³⁹ Years after the war ended, Caracristi told an interviewer that like each of her fellow recruits she took this oath very seriously.⁴⁰

At first, she and Woolsey shared a room in a boarding house on Wyoming Avenue in Washington’s Kalorama neighborhood, a structure that had been the embassy of the Republic of Armenia during that nation’s brief period of independence after World War I. Although she and Woolsey were to spend only a week at this address, they ended up staying for a few months. This suited Caracristi just fine, as it was only a short walk to Connecticut Avenue and the trolley line leading downtown. Sometime during the latter half of 1942, she moved across the Potomac to a small apartment in Arlington, Virginia, and at some point thereafter took up residence for the duration of the war in a larger one nearby.⁴¹



Ann Caracristi

Witty repartee . . . every job completely done . . . Quill’s editor . . . bull sessions and midnight studying . . . sophisticated poise . . . sense of humor of *The New Yorker* . . . drugstore interludes . . . clever originality of idea and expression.

Senior yearbook photo, Russell Sage College, 1942. *Sage Colleges Archive*

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

CHAPTER 5

A Codebreaker in Training

It was becoming evident that no particular background or training could be concretely indicative of an individual's potential as a cryptanalyst. There were cases of high school graduates who showed a surprising aptitude for difficult cryptanalytic assignments; likewise, there were the cases of individuals with five and six years of specialized university training who were strangely limited in aptitude for this particular type of work.

—*Administrative History of the Military Cryptanalysis Branch, 1944*⁴²

Regardless of how much time she had been able to spend before graduation studying the training materials the War Department had sent to Russell Sage, upon arriving at SIS headquarters in June 1942 Caracristi would not have been able to sit down and start breaking encrypted messages being sent by German and Japanese military units. An SIS memorandum from early 1942 estimated that it would take 12 months of training before a new recruit could perform elementary duties, and up to two years or even longer before he or she could do more advanced work.⁴³

The reasons for the extended training period were simple, according to the memo's author. "Qualified personnel," he wrote, "cannot be obtained from civil life because there are few or no civilian pursuits which qualify individuals for cryptanalytic duties. . . . It is necessary, therefore, to employ individuals having the basic educational qualifications and train them for each of the highly specialized duties they are to perform."⁴⁴

Consequently, after her first day at the Munitions Building, Caracristi was placed in a training course in cryptanalysis at George Washington University, a few blocks west of the White House. Several identical classes were being conducted there simultaneously to train the increasing number of SIS recruits arriving every day. Caracristi had about 20 classmates in hers. It was led by Evelyn Akeley, a former professor of mathematics from Skidmore College who remained with the SIS for the duration of the war.⁴⁵ Caracristi and her classmates soon realized just how much "everyone was playing it by ear" in the War Department's crash program to expand its codebreaking capabilities. "We all learned," she recalled, "that she [Akeley] was exactly one lesson ahead of the rest of us. So we were all in it together."⁴⁶



Signal Intelligence Service training class at Arlington Hall during World War II. *NSA*

Like the materials that had been sent to Russell Sage, the course had been designed by the SIS's most senior cryptanalyst, William Friedman, and used a multivolume textbook on how to break foreign codes and ciphers that he had written in the 1930s. Caracristi later described Friedman's text as "just sort of like puzzles." "But they were explaining the basis of the way you encrypt material and the way you go about attacking an unknown system," she continued. "You make counts of letters or numbers and try to find patterns. ... And they started quite simple and progressed to being fairly tricky."⁴⁷

The pressure on the SIS to put its new recruits to work and start cracking enemy codes meant that Caracristi had completed only the first half of her training course before she was assigned to an operational position involving Japanese communications.

There was only one problem: she did not know a word of Japanese. "I was assigned to the Japanese problem," she told an interviewer in 1982, "and I remember being astounded that anyone could assume that it was possible to work against these communications, if you didn't know anything about Japanese. ..."⁴⁸ The few weeks Caracristi had spent in Evelyn Akeley's class, however, had allowed army security officers to visit some of her friends and family members in order to assess her background and determine whether she could be trusted in her new, secret position.⁴⁹

In this way, with just over a month of training before being assigned to a job where she would be working on encrypted messages in a language she did not know, Caracristi's career as a codebreaker began.

CHAPTER 6

Getting Down to Work

We may have been on the top floor of the building—but we were on the lowest rung of the organization (such as it was). Actually, we who worked in the bowels of the organization were constantly asking ourselves, “Where is the real work being done?”... As we looked around at what we thought to be incredibly inept management and direction, we thought it couldn’t possibly be being done here.

—Ann Caracristi, 1980s⁵⁰

In a 1982 interview, the woman who was Caracristi’s supervisor for much of the war, Wilma Berryman, described her a few months after she arrived in Washington. “She was an English major, but when she sat down and started to work, it was just obvious that she had an engineer’s mind.... It was the most fascinating thing.”⁵¹

The end of Caracristi’s training period in mid-July 1942 coincided with the SIS moving out of the Munitions Building. The organization’s leadership had realized early in the year that it would be impossible to stay in its already cramped Washington offices—in late spring, the group Caracristi would be assigned to had only 12 desks for its 26

people⁵²—and that the space crunch would grow worse as more and more new recruits finished their George Washington University training courses and needed to be put to work.

Accordingly, a search for a new facility began. The primary requirement was that the SIS remain close to its main East Coast intercept station near Warrenton, Virginia. Initially, the campus of Hood College in Frederick, Maryland, seemed best suited for meeting its needs, but the board of trustees of that institution objected that a War Department takeover would permanently close it, as it would be financially impossible to reopen after the war’s end. Ultimately, SIS leadership settled on Arlington Hall, a women’s junior college in northern Virginia that had struggled financially and in early 1942 was in receivership. The army purchased the property in mid-June for \$650,000 under a court-ordered settlement. The expanding SIS was renamed the Signal Security Agency (SSA) and moved in a month later, despite the fact that renovations to the property were still taking place.⁵³

Arlington Hall featured a large building with administrative offices and classrooms on its lower two floors and a dormitory on the upper two. Its campus was big enough to allow the SSA to build

additional facilities to house its burgeoning numbers of people and machines. Caracristi's section moved to Arlington Hall in July and was placed on its top floor. It got so hot that summer that employees were issued salt tablets to avoid dehydration. (Caracristi tried one and called doing so "a terrible mistake."⁵⁴) As there was no cafeteria when the SSA moved in, Caracristi and her coworkers had to bring their food from home, order a box lunch the day before, or walk across the street to a drugstore with a small lunch counter.⁵⁵

Despite the move to a larger facility, space remained at such a premium that the ever-increasing amounts of paper with intercepted Japanese communications were stored in closets and in the bathtubs between the former student rooms on the upper floors, the latter being possible because the water had been shut off during reconstruction.⁵⁶ An SSA history published after the war's end described the conditions faced by another organization in the Japanese branch after it moved to Arlington Hall: "A unit known as B-II-a-3 was crowded into two former bedrooms with their connecting bathrooms. In addition to the desks of the 13 persons, this unit possessed heavy filing cabinets and some other very bulky equipment, which filled all available space and made operations very difficult."⁵⁷

In addition to the ongoing overcrowding, the amount of heavy machinery that the SSA brought to Arlington Hall when it moved out of the Munitions Building was so large that it raised concerns about the facility's structural integrity. The IBM tabulating machines used on the first floor, for example, "were a constant threat to the building because of the unusually heavy strain placed on the flooring."⁵⁸ Just a few weeks after Caracristi and her coworkers arrived in mid-July 1942, bulldozers began excavating a site for the first of two buildings to house the SSA's operational offices. Notwithstanding a small fire during construction, the building was ready in less than two months for the first cryptanalytic organizations to move in; two

weeks later, the ground was broken for the second building. Sometime in the winter of 1942-43, Caracristi moved into the first building, known as Temporary Building A, even though it remained standing through the war and for years after. At some later date, she moved to the second newly constructed building. Not surprisingly, it was called Temporary Building B.⁵⁹

Asked years later by historian David Kahn what a camera would have seen if it had recorded Caracristi at work during a typical day at Arlington Hall, she replied, "me, a cup of coffee, pencil and paper, and stacks of IBM runs, and [my] pencil going across the paper."⁶⁰ She considered herself lucky when she eventually got her own desk, as most of her coworkers sat at long tables with filing cabinets separating one team from another.⁶¹ At first, like virtually everyone else, she worked in one of three round-the-clock shifts, although supervisors attempted to be fair by rotating her and the other staff between the day and night watches so that no one constantly worked one or the other. Later, Caracristi's routine settled down into a daily shift from 8:00 or 8:30 in the morning to 6:00 in the evening. Despite the working conditions and long hours, Caracristi claimed that her colleagues loved their jobs. As for Caracristi herself, "I found the work exhilarating. . . . it was like doing crossword puzzles every day and getting most of the answers."⁶²

Caracristi's positive assessment notwithstanding, there were morale problems at Arlington Hall. In her first months there, these often stemmed from the generally chaotic atmosphere of the institution and managers who were perceived as unable to bring order to it. As rumors began to circulate about decrypted messages having a positive impact on the war effort, a joke made the rounds that someone must be doing something right somewhere, and since it wasn't being done at Arlington Hall it must be happening somewhere like the navy offices on Nebraska Avenue in Washington. Later, when the SSA's codebreaking efforts became more organized,



Caracristi (right) at work on Japanese material (Hona subsection B II d 3) in Arlington Hall, 1945. *NSA*

their resemblance to a production line created other morale issues. Many personnel performed the same tasks day after day, including ones that they felt were mostly clerical and hence beneath them. An early 1944 SSA assessment put this problem in the following way:

Personnel have been trained to a high degree of specialization sometimes to the detriment of their overall cryptographic knowledge. Personnel have been required to

do the same job day in and day out. Personnel have been required to do the same job for weeks on end. Certain personnel have felt that their capacity is greater than the position they are now in.⁶³

Arlington Hall's management took steps to address these issues. Solomon Kullback, who would hold senior positions in the SSA throughout the war, organized softball games, and Frank Lewis, another member of Arlington Hall's top brass, led

a chorale. Kullback and Lewis also regularly visited those working the night shift, showing that they were willing to share its inconvenience.

Not surprisingly for someone who had been in Russell Sage's theater company, Caracristi joined a group that went to performances at the National Theater near the White House. One production she saw there was the Rodgers and Hammerstein musical *Oklahoma!*, which was touring the country following its 1943 Broadway opening.⁶⁴ Occasionally, she, Wilma Berryman, and a friend saved up their ration coupons for enough gasoline to take Berryman's car out for a day or even a weekend in the Blue Ridge Mountains of western Virginia.⁶⁵ Years later, she bought a house there as a retreat; her in-town residence was a small eighteenth-century house in Washington's Georgetown neighborhood.

Life at Arlington Hall had its humorous moments. Berryman recalled one that involved Caracristi coming down with an illness that seemed unusual given the average age of the workers.

I don't know how long, she [Caracristi] may have been there a year, maybe it was a year, maybe it was two. I got a call one morning and this little voice said, "I won't be in today, I've got the chicken pox." And I just laughed. I couldn't help it. I thought, well, gee, there are times when we don't have anybody with the chicken pox.⁶⁶

One summer, Caracristi, Berryman, and several others bought a sailboat that they kept at a dock on

a narrow channel off the Potomac River near the Jefferson Memorial. "We used to sail, if you will, down off Maine Avenue," Caracristi told an interviewer years later. "And there isn't much wind, I tell you, in that little channel. But we didn't know much about sailing either, so we didn't really suffer much, I guess." One evening, the combination of low wind and their lack of experience left Caracristi and Berryman becalmed in the middle of the channel and blocking the departure of a boat that made a nightly run from Washington to Norfolk. "That caused," Caracristi noted dryly, "a certain amount of excitement at all ends."⁶⁷

Even with these lighter moments, Caracristi and what would come to be her thousands of Arlington Hall coworkers were fully aware that there was a war on and that they were supporting American troops on the front lines of Europe and the Pacific. Caracristi typically stayed until she had finished whatever she was working on, not wanting to leave it to someone on the night shift to complete. She claimed to have experienced no real hardship during the war, the only uncomfortable part being the crowded trains she took to New York to see her mother.⁶⁸ For Berryman, one day epitomized the determination everyone in the codebreaking effort brought to the job. "I remember the day that we had a very heavy snow and the buses didn't run and nothing else ran. Everyone came to work. They walked."⁶⁹

CHAPTER 7

The “Japanese Army Problem”

When I was assigned, they said, “Well, you’re going to work on the Japanese problem.” And I said, “Oh, heavens, I don’t know anything about Japanese.” “Don’t worry,” they said, “you’ll learn.”

—Ann Caracristi, undated interview⁷⁰

When Caracristi left Evelyn Akeley’s training course at George Washington University in mid-July 1942 and started work at Arlington Hall, she was assigned to a section recently set up to work the encrypted communications of the Imperial Japanese Army. Prior to Pearl Harbor, American codebreakers, who at the time numbered only a few dozen, paid scant attention to Japan’s army codes. Instead, they focused on attacking systems used by its navy and its diplomats, which had been deemed more important to defending American interests and understanding Tokyo’s intentions with respect to peace or war. There also were few Japanese Army communications for American codebreakers to work on. Before the outbreak of hostilities with the United States, Japanese Army units operated mainly in China, Indochina, and Japan itself. One American intercept site, a navy facility in the Philippines, was sufficiently close to

these units to intercept some of their communications; however, this outfit also focused on intercepting Japanese diplomatic and naval messages.

The Japanese Army Codes Section that Caracristi joined in July 1942 had been in existence all of three months, its first four personnel having been named in April. By the time Caracristi arrived, it had grown to 25, all housed on the hot fourth floor of Arlington Hall’s main building. That number more than doubled, to 51 military personnel and 15 civilians, by the end of the year. By the end of the war in August 1945, after a string of successes that required increasing numbers of personnel, it had grown to more than 1,500.⁷¹

The number of personnel working what came to be known as “the Japanese Army problem” was growing when Caracristi joined, but the number of intercepted messages flowing into Arlington Hall was rising even faster. Initially, all Japanese Army intercepts were forwarded by mail and could arrive days if not weeks after they had been obtained by American sites monitoring Japanese communications. Roughly 12,000 such messages came in every month during the first half of 1942. With the installation of a teletype link between Arlington Hall and a major intercept facility in California, the number

of messages arriving each day began to grow, reaching 55,000 per month by the beginning of 1943. Within a few months, that latter figure doubled.⁷²

At first, the most that the small staff in Caracristi's Japanese Army Codes Section generally was able to do was to sort and file the hundreds of messages coming in each day. As a new recruit with only a few weeks' training under her belt, Caracristi was assigned to the section's Traffic Handling Team for this specific purpose. One of her teammates was Nancy Coleman, another newcomer who was one of Caracristi's roommates during her years in Washington.⁷³ Caracristi recalled her first few months as being "pretty clerical." Increasing numbers of messages arriving at Arlington Hall via teletype meant more paper for Caracristi and her colleagues to sort through.

Not surprisingly, given the quantity of people and paper arriving at Arlington Hall during Caracristi's early days there, the atmosphere was a bit chaotic. "The wheel was probably invented at least twice and maybe more times," she recalled years later, "but it was being reinvented ... because we took aboard hundreds of people in a very short order and there wasn't much capability to train people. I mean, they were just plunged into doing the job. So there was certainly opportunity for ineptness." At the same time, this meant there were opportunities for creative individuals to rapidly improve the way Arlington Hall was conducting its business. As Caracristi put it, "Whoever had a smart idea was able to revolutionize the process."⁷⁴

Innovation at Arlington Hall was stimulated by its lack of bureaucracy, something particularly noticeable because it was a military organization. "The structure was extremely informal," Caracristi told an interviewer shortly before she retired in 1982. "There was very little bureaucracy involved at all." Yet the relative lack of rank-consciousness did not prevent a certain amount of friendly rivalry within the group of highly educated people. "There

was a lot of competition," Caracristi said in the same interview, "I can remember competing with Frank Lewis [the chief cryptanalyst working Japanese Army codes] to recover a new type of keying information. ... There was a fellow who worked with me whose name was Ben Hazzard. Ben and I were determined we were going to beat Frank Lewis in recovering this. And we did! Oh, that was nifty."⁷⁵ However, Arlington Hall's codebreakers also developed a sense of camaraderie because each of them knew they had to solve the challenging cryptanalytic problems facing them either alone or as part of a team of equally inexperienced people. "You never really sought guidance," recalled Caracristi, "because you assumed that you were going to have to figure your way out of most problems, since they were new problems, newly invented."⁷⁶

* * *

How to manage the rising numbers of recruits and intercepted messages arriving at Arlington Hall daily was only one of the challenges facing the man named to lead the effort, Solomon Kullback. "Kully," as the personable Kullback was known, had been teaching mathematics in New York when he was recruited by William Friedman as one of the first four personnel for Friedman's newly established SIS. Aside from Friedman himself, he was one of the most experienced cryptanalysts at Arlington Hall. No one else who had been assigned to the newly formed Japanese Army Codes Section had anywhere near Kullback's level of experience, and only a few, like Berryman, had more than a few months on the job. None could have taken on the complex task of breaking Japanese Army codes alone. Accordingly, Kullback recalled, "The job had to be broken down into simple tasks" so that new recruits like Caracristi, who had at most a short training course, "could just grind it out."⁷⁷

And grind it out is exactly what Caracristi and others recently assigned to Arlington Hall pro-

ceeded to do. She and the handful of other women based in the Traffic Handling Section quickly figured out how to organize their work. "Our assembly line routine," she said, "was sort, edit, punch." Caracristi and her colleagues sorted the incoming intercepts of Japanese communications into stacks that they thought were related in some way. (Many of the intercepts were still being written out by hand by American enlisted personnel stationed at monitoring sites elsewhere in the United States or overseas.) The section then "edited" the intercepts, or prepared them for a group of women who operated machines that punched holes corresponding to the four-digit number groups in each intercept into cards that were then fed through tabulating machines that the International Business Machines Corporation (IBM) had developed for the government with the original purpose of processing census data. This time, the tabulating machines sorted the cards not to determine patterns in incomes, spending, or numbers of persons in American house-

holds but to find patterns in the seemingly endless streams of numbers in the intercepts flowing into Arlington Hall that might give Caracristi and her colleagues some clues as to how to break them.

Not surprisingly, it was all fairly tedious. However, Caracristi said, it also was all being done for the first time, and that offered her and those working with her opportunities to innovate. "We all pitched in to sort and edit," she said at the late-1990s opening of an exhibit on women in codebreaking at the National Cryptologic Museum. "And while we did that humdrum work, we talked about what the next steps would be. It was clear that we could all have a voice in making the plan and any good idea was accepted and put into effect immediately." Another Arlington Hall newcomer, Jeanne Cocroft, "was the first to realize how much wasted effort was being put into the processing of duplicate intercepts—and come up with a way to 'de-dupe' the traffic, which saved a lot of 'punch' time."⁷⁸

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

CHAPTER 8

Tackling Encrypted Japanese Messages: The Address Section

... You have a message you want to transmit. You convert it from literal text into numerical text using a book. ... And you want to encrypt it because if you send it without encryption in due course, very quickly, someone else would be able to figure out what the text was. And you encrypt it by adding random numbers to the numerical text. And the numbers are produced and distributed, in this case, by the Japanese Army to their forces, and there are instructions about how to use the books.

—Ann Caracristi, undated interview⁷⁹

It was the practice of Kullback and other Arlington Hall leaders to allow recruits who had gained some on-the-job experience to move on to more complicated tasks and to replace them with more recent arrivals. Part of this was common sense, but it was also done out of necessity. “Since processing of traffic was essentially a routine task,” an official history of Arlington Hall notes, “there was a large personnel turnover, for, as older members gained experience, they felt entitled to undertake work of a more interesting nature, and this left the handling of traffic to new personnel.”⁸⁰

Accordingly, sometime in the last three months of 1942, Caracristi moved from Traffic Handling and began working for Berryman in what was called the Address Systems Section. Caracristi remained in this area for most of the remainder of the war. As the section grew in size, she was named to head its research effort and described her job as “essentially doing the initial break-in of, and research on, some of the systems that hadn’t been broken.”⁸¹

As one part of the “assembly-line” process that Kullback had designed for Arlington Hall, the Address Systems Section was assigned the task of breaking the encryption that the Japanese Army used to protect two specific parts of the opening sections of its messages. These parts consisted of four-digit numbers that corresponded to the Japanese Army radio detachment that had sent the message, the radio detachment receiving it, and the specific army unit that was its ultimate destination. “It was apparent,” according to a postwar history, “that when both the address [for the receiving army unit] and DD codes [for the sending and receiving radio detachments] became readable they would furnish valuable intelligence concerning the distribution of Japanese Army forces and, in addition, might afford cryptanalytic aid in the solution of the message text.”⁸²

A Japanese Army code clerk encrypted these addresses in the following way. He opened a codebook containing lists of radio detachments and army units and a four-digit number for each. The clerk replaced the names of the radio stations and army units at the start of his message with their corresponding four-digit numbers. The encipherment of the actual text of the message was done in a similar fashion, with the clerk substituting four-digit number groups for each of the words in it. For this, however, he used a separate, much larger codebook that included all of the possible words that could appear in the messages.

Given enough messages to work with, an experienced cryptanalyst could break a code that simply substituted number groups for their corresponding words. The cryptanalyst then needed to accumulate enough messages that had been encrypted by using the same codebook to see certain number groups being repeated more often than others because they stood for more commonly used words. By successfully deducing more and more of these number groups, the cryptanalyst ultimately would reproduce his enemy's entire codebook.

* * *

The Japanese were more concerned with protecting the names of actual army units than those of their radio stations. Accordingly, a code clerk needed a more sophisticated way of protecting them. To do this, the clerk consulted a second book with page after page of tables containing random four-digit numbers. He selected a page and then chose a four-digit number as a starting point, noting the number's corresponding row and column. He took this four-digit number and added it to the one from the codebook designating the message's first recipient, then took the four-digit number following it and added it to the one for the second recipient, and so on for all subsequent recipient addresses. The clerk used noncarrying arithmetic to ensure that adding two four-digit numbers together never cre-

ated a five-digit number. If a Japanese code clerk did his job properly and did not use any page from the second or "additive" book more than once or use it to encrypt the addresses in multiple messages, breaking them became difficult if not impossible. This was because a random use of the additive pages suppressed the otherwise naturally occurring frequency of some words.

Not surprisingly, Caracristi and her colleagues initially had far more success breaking the designators for the radio stations that were sending and receiving messages than they did breaking the designators for individual army units. A postwar history of Arlington Hall described the progress it made in the relatively easier task of identifying the sending and receiving stations:

The initial problem in traffic analysis for the SSA was the solution of the code numbers used to indicate message-center place names occurring in Japanese military messages, and the first success was achieved in September 1942. By the following June nearly all of the twelve main systems had been reconstructed, permitting accurate location and mapping of radio stations and circuits. Four distinct major military networks were identified, those used by the Imperial GHQ in Tokyo, the Southern Field Force, the Water Transport organization, and the Army Air Force.⁸³

Breaking the four-digit codes for Japanese Army radio stations provided valuable intelligence on the disposition of Japanese Army units throughout the Pacific. If a radio station sent higher volumes of messages, it very likely was attached to a headquarters. The stations receiving these messages generally were associated with the units that reported to that headquarters. Should the number of messages being sent back and forth between them rise suddenly, it might be an indicator that the Japanese were planning a major offensive. The soundness of

the approach Caracristi and her colleagues used to break the coded designators for Japanese military radio stations was illustrated later in the war when Tokyo completely changed the codebook and substituted new four-digit numbers for older ones that had been used for some time. This "completely new place-name code ... was almost wholly solved within a month, about half of the names being identified within 48 hours."⁸⁴

Caracristi and the others in Berryman's section also took some small steps toward figuring out the more difficult, two-step process by which the Japanese encrypted the designators they used to identify specific army units. "By January 1943," an official history of Arlington Hall notes, "encouraging results were being achieved in the recovery of code groups for addresses, which had previously seemed so hopeless a problem." Interestingly, this history does not claim that any had been broken. Such a lack of success would be consistent with Arlington Hall's failure more generally through early 1943 to break into the actual content of Japanese Army messages, which like the addresses were encrypted by the more complex two-step process. As Kullback's senior cryptanalyst Frank Lewis said, "In the

early spring of 1943, the situation in regard to the solution of current Japanese army text code systems was far from promising. ... no intelligence was gained from Japanese army secret communications during the entire period from 7 December 1941."⁸⁵

Mapping radio networks might give American commanders an idea of where Japanese Army units were located and what their opponents were planning to do with them. Obtaining detailed intelligence that leaders such as General Douglas MacArthur or Admiral Chester Nimitz could use in combat, however, would require that Arlington Hall break through the more complex, two-step encryption protecting the actual content of Japanese messages. That task was about to become even more complicated, because the Japanese were adding a third step to their encryption process, one known as an "enciphering square." Ironically, by doing so, the Japanese may have opened the door for Caracristi and the rest of Arlington Hall to achieve their first real success. This would allow the United States to strike directly at Japan's Achilles' heel, the massive shipping system it relied on to keep its troops supplied across an empire that spanned half an ocean.

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

CHAPTER 9

The Water Transport Code

The miracle is not that the job was done well, but that it was done at all.

—Frank Lewis, Caracristi's wartime colleague, 1947⁸⁶

The factors that led to the outbreak of hostilities between Japan and the United States in December 1941 were numerous, complex, and rooted in the history of the two nations and their relations over the previous 20 years. A key moment came in late July 1941. In response to the Japanese occupation of French Indochina, President Roosevelt froze all of Tokyo's assets in the United States. Great Britain and the Netherlands did the same. With its funds blocked, Japan was no longer able to buy vital supplies of oil from the Dutch East Indies (now known as the Republic of Indonesia).

As a result, Tokyo developed a plan to seize this resource-rich area as well as the British colonies of Singapore, Malaya, and Burma. As the American-administered Philippines stood astride the route of the Japanese advance, it too would have to be subdued. The surprise attack on Pearl Harbor would prevent the US Pacific Fleet from interfering before Japan could complete this southward march of conquest. Simultaneously, Japanese forces were to

occupy a series of island chains stretching from the central Pacific to the northern approaches to Australia. This would allow Tokyo to establish a defensive perimeter that would require such unacceptably high losses for America to breach that Washington would sue for peace, or so Japan hoped. This plan initially succeeded beyond the wildest of Tokyo's dreams. However, the size and broad geographic distribution of its conquests created two vulnerabilities that Tokyo needed to prevent the United States from exploiting. These were the shipping lanes north from the Dutch East Indies to the Japanese home island that carried vital supplies of oil and raw materials, and the supply routes from Japan to the troops guarding the island chains in the central and southern Pacific.

The arm of the Japanese military responsible for moving supplies and men across Tokyo's now far-flung empire was the army's Water Transport Command. Headquartered in Hiroshima, it had major concentrations of merchant ships and tankers in Sapporo, a port in northern Japan, and Shanghai in occupied China. As Japan's territorial conquests mounted, it added major bases in Singapore, at Davao in the Philippines, and in Rabaul, New Guinea. Six weeks before the attack on Pearl Harbor, the Japanese official responsible for planning

the number of ships required to sustain Tokyo's war effort, Teiichi Suzuki, estimated that Japan would need 3 million tons of capacity in its shipping fleet to maintain its ability to wage war. To replace anticipated losses from combat and normal wear and tear, the country's shipyards would have to build an additional 400,000 tons of capacity in 1942 and another 600,000 tons in 1943. Should they not be able to do so, or should losses climb above projections, Suzuki judged that "it would be questionable whether our national power could be maintained."⁸⁷

By the end of 1942, the long hours that Caracristi and her Arlington Hall colleagues had put in sorting traffic and mapping enemy radio networks had yielded a number of results, two of which pertained to the Japanese Water Transport Command. First, they had learned that Japanese Army traffic broke down into groups, with all of the messages in each group having a common four-digit number as the first number. One of these common four-digit numbers was 2468, which Arlington Hall staff identified as being used by the Water Transport Command. Arlington Hall staff also were able to map the radio network that the Water Transport Command used to send messages between its Hiroshima headquarters and its major bases, a network that was designated "Barracuda." The command's 2468 messages also were sent via a second network, designated "Tiger," that was the Japanese Army's main administrative communications system.⁸⁸ The 2468 number group, which was not encrypted but sent "in the clear," indicated which of several codebooks the Japanese code clerk sending the message had used to encrypt it, so that the receiving clerk would know which book to consult to decrypt it.

Around the same time Arlington Hall was making these discoveries, the Japanese Army made a significant change to the process its code clerks used to encrypt messages in 2468 and other four-digit systems. Under normal conditions, the Japanese would have distributed new codebooks for 2468 to all army radio stations using it. This would have been done to

defeat the efforts of American cryptanalysts to find repeated number groups in large numbers of messages, correlate them to commonly used words or phrases, and reconstruct the 2468 codebook without actually having one. However, the rapid expansion of the Japanese empire during 1942 and the dispersion of Japanese Army units across increasing numbers of small Pacific island groups created problems in the distribution of new codebooks. Accordingly, the Japanese had to find a different way of thwarting Arlington Hall's effort to break the 2468 code.⁸⁹

* * *

The method that the Japanese settled on used a "substitution square," a 10-by-10 matrix of rows numbered 0 to 9 and columns numbered 0 to 9. Instead of simply taking the four-digit numbers corresponding to each word in his message from the 2468 codebook and adding to them a series of four-digit numbers from the second, additive book, a Japanese code clerk took a new, third step and paired the first digit in each. He then used the digit from the codebook for the column designator in the square and the one from the additive book for the row, and found the digit at the intersection of that column and that row. This digit became the new first digit in the first enciphered group in the message, and the code clerk repeated the process for each successive digit pair.⁹⁰

Designed to thwart the efforts of Japan's adversaries to reconstruct the 2468 and other codebooks, the Japanese substitution square had the paradoxical effect of weakening 2468's encryption in the address section that began all messages. It had the same effect on a separate four-digit number group known as the "indicator," which a Japanese code clerk included when sending a message so that the receiving clerk would know the point in the additive book where the sending clerk began drawing four-digit numbers to add to the original code groups. At the time, three different codebreaking centers were working on 2468 messages. These were Arlington Hall, where Caracristi's research team in the Japa-

nese Army Address Section was working on 2468 message preambles; a British facility in New Delhi, the Wireless Experimental Center (WEC); and a joint American-British-Australian unit in Brisbane, Australia, known as Central Bureau. British personnel at the latter two locations were from an intercept site in Singapore that was evacuated before it fell to the Japanese in early 1942 and from Bletchley Park, Great Britain's wartime codebreaking center and the home of the Government Code and Cipher School (GC&CS).⁹¹

The Japanese added the substitution square to the encryption process for messages sent in the 2468 Water Transport Code in mid-December 1942 and distributed it by radio, using the two-step 2468 system to encrypt it.⁹² Over the following weeks and months, codebreakers at Arlington Hall, the WEC, and Central Bureau began to detect changes in the encrypted texts of the intercepted messages. Joe Richard, one of the US Army's enlisted personnel at Central Bureau, may have been the first to do so. Richard noticed that the first digit in the third four-digit number group, the indicator, was not random but in fact was restricted to certain numbers. After a few weeks, he noticed that numbers used in the first digit changed but were still not random, with some appearing more frequently than others.⁹³ Around the same time, but perhaps a few weeks later, Wilfred Noyce and Maurice Allen at the WEC in Delhi made the same discovery.⁹⁴ Soon the two centers were sharing their results, the WEC doing so through Bletchley Park as it lacked a direct communications link with Central Bureau. Their results were provided to Arlington Hall as well.

Arlington Hall staff used the IBM tabulating machines to attempt to confirm what Richard and, separately, Noyce and Allen had worked out by hand, but were unable to do so. This was not because Richard and his counterparts at the WEC were wrong. Instead, not realizing that the patterns of nonrandomness in the indicator group of the 2468 messages changed every three weeks, Arlington Hall

staff ran punch cards containing traffic from too many weeks through its machines and thereby made the traffic seem completely random again. Learning of Arlington Hall's error, Richard used Central Bureau's own recently arrived tabulating machines to perform runs that were divided into periods of the correct numbers of weeks. With this correction, he validated his findings.⁹⁵

Richard then remembered that William Friedman's courses in cryptanalysis had discussed how matrices of numbers or letters could be used to encrypt messages and how one went about breaking them.⁹⁶ Accordingly, he began to lay out the numbers in columns of 10, with each column reflecting one of the three-week periods into which the third four-digit number group in the 2468 messages were divided. Using this method, and working late one night during the first week of April 1943, he was able to work out the first three columns of what would turn out to be a 10-by-10 substitution square. The following morning, Richard took his results to Central Bureau's chief and senior cryptanalyst, Abraham Sinkov, who confirmed his analysis.

At the same time, working from these findings by Central Bureau and the WEC, Caracristi's research team at Arlington Hall was realizing that the Japanese also were using a substitution square to encrypt the addresses in the 2468 messages. Here, Caracristi had the help of her colleague Ben Hazzard. Hazzard had attended Harvard, had been declared unfit for active duty by the Selective Service, and was available to work as a civilian at Arlington Hall. Caracristi recalled that, like her, he "wanted to sign up for useful work."

"Ben and I worked on the research problem of the address system," she told historian David Kahn. "We saw the enciphering squares first, before anyone else."⁹⁷ As Joe Richard had done with Abraham Sinkov at Central Bureau, Caracristi and Hazzard took their preliminary findings to the senior cryptanalyst for Arlington Hall's Japanese Army effort,

Frank Lewis, who validated them. Over the next few days, both Arlington Hall and Central Bureau worked to complete the full 10-by-10 substitution squares. By April 7, each had done so. The WEC, working in isolation from both Arlington Hall and Central Bureau because of the lack of direct communications, may have cracked the square a week or two earlier. Regardless, Caracristi said of the work at Arlington Hall that “when we actually were able to recover the first enciphering square, we thought that was a great accomplishment.”⁹⁸

After months of failure in their efforts to break any Japanese Army encryption system, the sense of triumph was palpable at both Arlington Hall and Central Bureau. A report filed by Lewis on April 16, 1943, reflects the upbeat mood that had broken out at each.

The preparation of this report represents one of the most pleasant duties that we ... have had in the last several years, in that it deals to a large extent with what amounts to the solution of a major system. From the hard realities of facing a very complex additive problem involving extremely complicated controls ... where months of painstaking effort were necessary to gain the very slight satisfaction of knowing that we had *perhaps* made a dent in a system and could tentatively relate a few messages ... we actually have seen the day when each message of a major system as it comes in can be quick-

ly related to other messages with its exact beginning point, cryptographically speaking, definitively known. ...

Within a month at the very outside, the translators should have broken into the [code] book ...; past experience leads us to the belief that the very high frequency of words such as MARU, together with the stereotyped phraseology of a shipping code with which our translators are now very familiar, should effect rapid recovery of code values, and within a few months translated messages on *current material* should be emanating from this section.⁹⁹

Lewis's latter prediction proved to be correct. Two months later, in early June 1943, Arlington Hall was forwarding its first translations of decrypted Water Transport messages to army intelligence at the Pentagon.¹⁰⁰ The number of decrypts rose rapidly over the next few months as Kullback shifted more and more personnel into the effort to exploit the now readable 2468 system. By the fall, Arlington Hall was providing full translations or summaries of more than 6,000 messages per month sent by the Japanese Water Transport Command.¹⁰¹ Caracristi's research section “continued to build squares for the water transport system as new ones were introduced by the enemy.”¹⁰² She later described the efforts of Hazzard and the rest of their team as “a test bed for learning how to deal with Japanese use of enciphering squares to disguise their reuse of keybooks.”¹⁰³

CHAPTER 10

The Impact

Operations in the Pacific are largely guided by the information we obtain of Japanese deployments. We know their strength in various garrisons, the rations and other stores ... available to them, and what is of vast importance, we check their fleet movements and the movements of their convoys. The heavy losses reported from time to time which they sustain by reason of our submarine action, largely result from the fact that we know the sailing dates and the routes of their convoys and can notify our submarines to lie in wait at the proper points.

—General George C. Marshall,
US Army Chief of Staff, 1944¹⁰⁴

With the Water Transport Code broken, Arlington Hall and Central Bureau began producing decrypts of Japanese messages containing the schedules for upcoming convoys, including their routes and the times they were expected to reach specific locations. These decrypts were forwarded to several key US naval organizations, including the Pacific Fleet's Combat Intelligence Unit (CIU) in Hawaii. The CIU's commander was Captain Jasper Holmes. Every morning,

Holmes's operations officer, Captain Richard Voge, brought him a chart showing the locations of all US submarines in the Pacific. Holmes and Voge then reviewed the translated intercepts received from Arlington Hall during the past 24 hours. Using these intercepts, Holmes and Voge then "added to the submarine situation plot the tracks and routes of all known Japanese convoys at sea."¹⁰⁵

If a decrypt showed a convoy passing close to an American submarine, the CIU passed that information to the headquarters of the US submarine force in the Pacific, also located in Hawaii. Once there, orders were issued to the appropriate submarine to intercept and, if possible, attack the convoy. "There were nights," Holmes recalled, "when nearly every American submarine on patrol in the central Pacific was working on the basis of information derived from cryptanalysis."¹⁰⁶ US submarine commanders reportedly became so reliant on the decrypts to find their targets that they complained if a Japanese convoy did not arrive at its anticipated location on schedule.¹⁰⁷

The Americans took measures to ensure that their successful attacks on Japanese merchant ships did not cause Tokyo to suspect its codes had been broken. "All kinds of ruses were used to make it

appear that the information came from sources other than Japanese communications systems," Kullback later recalled. "For example, if airplanes were available ... they would [send one out and] make sure that the airplane would be seen or spotted so if the submarine hit the ship they might assume it had been attacked because of information from the airplane." The Japanese also were convinced, Kullback continued, "that all of the islands and the coasts were infiltrated with spies [Americans or Australians known as 'coast watchers'] who were probably sending information about the shipping that they saw."¹⁰⁸

* * *

The breakthrough into the Water Transport Code that Caracristi and her colleagues achieved had an immediate and dramatic impact on the war. The American submarine force in the Pacific had begun to attack merchant ships and oil tankers along Japan's key supply routes immediately after Pearl Harbor, but the April 1943 success against the Water Transport Code enabled them to do so with far more deadly precision. Thereafter, sinkings of Japanese vessels climbed precipitously. Imports to Japan from the East Indies and other occupied territories, which had reached almost 20 million tons in 1942, were cut almost in half to just over 10 million tons in 1944.¹⁰⁹

Oil imports were particularly hard hit; historian Ronald Spector assessed that by the beginning of 1945 they were almost at a standstill.¹¹⁰ The top commander of American submarines in the Pacific from 1943 to 1945, Rear Admiral Charles Lockwood, estimated that along the key supply routes between Japan and the Philippines and the Mariana Islands, "codebreaking stepped up our sinkings ... a lot—probably 1/3 more."¹¹¹ Summing up the impact of America's submarine offensive, Spector joined other historians in characterizing it as "one of the decisive elements in ensuring the empire's [Japan's] defeat. A force comprising less than 2 percent of

US Navy personnel had accounted for 55 percent of Japan's losses at sea."¹¹²

The growing US Navy successes against the Japanese merchant fleet raised morale at both Arlington Hall and the Central Bureau. Following the months of frustration they had experienced trying and failing against Japanese encrypted messages, the codebreakers finally were providing intelligence that American forces could act on. Joe Richard recalled that, after the 2468 solution, their work was much more satisfying.¹¹³ Kullback had a specific anecdote that he used to describe the boost given to everyone's spirits:

... one of the first messages we had was that there were going to be so many, I think it was four, ships in Wewak Harbor [a Japanese-occupied port on the north coast of New Guinea] and that information was made available. ... I remember listening on the radio one Sunday around then. The announcer saying that the Army or the Navy—somebody had reported an attack on Wewak Harbor and they had sunk four ships. ... That was a pretty good feeling.¹¹⁴

Caracristi was well aware of the importance of the work she and her colleagues were doing. "The product we were putting out," she said, "was allowing the decryption of the merchant marine traffic, was indeed allowing the Navy to know the location of merchant marine ships and to send out submarines and aircraft to dispose of them. And it made a big difference in the winning of the war in the Pacific. And we were aware of that."¹¹⁵ The fact that the contributions she and others were making to the war effort had to remain secret, and would for decades thereafter, did not bother her at the time or even years later, when she told historian David Kahn that she was unaware of any recognition that anyone at Arlington Hall had received from the submariners.¹¹⁶

There were other reasons for the increasing success of the US submarine force during the final two years of the war, not least of which were the skill and courage of the submariners themselves. Skippers who showed a lack of aggressiveness were relieved; 30 percent were replaced in 1942 alone. Critical defects that caused American torpedoes to miss their targets or fail to detonate were repaired a few months after the Water Transport Code had been broken, with a new and more effective model being put into service in 1944. Finally, Rear Admiral Lockwood introduced "wolf pack" tactics, in which groups of submarines would mass to launch coordinated attacks against convoys.¹¹⁷

There also was a cost. Losses among those manning American submarines were among the highest of any group during the war.¹¹⁸ Roughly 16,000 Japanese merchant seaman died at the hands of the US boats, with more than 50,000 wounded. As historian Ronald Spector observed, one of the most significant costs remains unknown. "The number of civilians," he noted, "including women and children, who lost their lives in merchant and passenger ship sinkings has not been calculated."¹¹⁹

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

CHAPTER 11

The End of the War

I went in at about two o'clock in the afternoon. We knew that the messages [in which Tokyo informed Japanese military units of its decision to surrender] had been read, that the war was going to be over. ... the Japanese linguists who were in a wing of this large building ... couldn't contain themselves. And the word ... swept like a fire through there. And we were told that we were not to tell any of our friends and relatives until, you know, four o'clock or something.

—Ann Caracristi, undated interview¹²⁰

Other successes followed the breaking of the Water Transport Code. Several months later, in September 1943, Arlington Hall solved the code used by Japanese military attachés worldwide. While this did not provide the type of tactical intelligence offered by Water Transport Code decrypts, it did offer insight into how Tokyo sized up the situation in the various war zones where its forces confronted those of the United States and its Allies. Then, in January 1944, an Australian division unearthed a library of codebooks abandoned by Japanese troops as they retreated through the jungles of New Guinea.

This windfall enabled Arlington Hall, Central Bureau, and the Wireless Experimental Center to read tens of thousands of Japanese Army radio messages per month, excepting only a few brief periods when Tokyo changed its codes. Even then, Allied cryptanalysts generally were able to adjust, often due to further captures of Japanese material.¹²¹ Asked in 1982 how successful Arlington Hall had been against Japanese codes during the war, Kullback gave a one-word response: “Completely.” Eventually, he noted, the constraint on the amount of intelligence it produced was not the difficulty of the Japanese Army’s codes—it was the number of linguists that Arlington Hall had on hand with sufficient skill to translate the horde of decrypts it was generating every day.¹²²

Despite these successes, the casualties sustained by the advancing American forces as they landed on one Japanese-held island after another were substantial, albeit not nearly as large as those suffered by their Japanese opponents, who often chose to fight to the death rather than surrender. By the summer of 1945, the ultimate goal of the American offensive—the Japanese home islands—was the only remaining bastion of significant Japanese resistance. The islands promised to be the bloodiest of all to subdue, with casualties projected to run into the

hundreds of thousands on the American side alone. Caracristi and her Arlington Hall colleagues had some sense of the slaughter that was in the offing. Their decrypts showed increasing numbers of Japanese troops being moved to their homeland from China and Korea; and the decrypts were one reason that US Army planners had to keep increasing their estimates of the numbers of American lives that an invasion of Japan would cost.¹²³

* * *

Then, in early August, the United States dropped atomic bombs first on Hiroshima and then on Nagasaki. The Japanese government, fearing that other cities would be obliterated from the air, secretly approached Washington about terms for surrender. From messages they had decrypted the day before President Harry S. Truman announced Japan's capitulation, Caracristi and nearly everyone else at Arlington Hall knew the war was about to end. Arlington Hall's commander, Brigadier General Preston Corderman, considered locking the gates and severing the phone lines to keep the news from getting out and possibly creating suspicion that Tokyo's codes had been compromised. Corderman was talked out of it, and in the end such drastic steps proved unnecessary. "No word leaked out of anyone in SSA where practically everybody, everybody knew," Kullback recalled proudly. "Nobody, nobody outside the people in the Agency had any inkling about what happened until Truman got on the radio and made the announcement."¹²⁴ Finally, late in the afternoon, Caracristi went with everyone else at Arlington Hall to downtown Washington to join in the celebrations there.¹²⁵

With the end of the war, Arlington Hall began to demobilize as quickly as the rest of the American military effort. "After V-J Day," the official his-

tory of Arlington Hall's cryptanalytic effort against Japanese Army codes, noted dryly, "The personnel problem changed considerably." General Corderman gathered the staff on Arlington Hall's parade ground and, after thanking everyone for the work they had done, gave what Caracristi described as his "Here's your hat; what's your hurry?" speech. "It was made quite clear," Caracristi recalled, "that now the war was over we probably didn't want to do SIGINT [signals intelligence] anymore and anybody who could get themselves off the government payroll, really ought to." By the end of the year, only a handful of people who had been involved in Japanese cryptanalysis remained.¹²⁶

Caracristi took up her life where she had left it upon graduating from Russell Sage more than three years earlier. She went to New York and got an entry-level job working at the *Daily News*. Not surprisingly, this was not all that exciting compared to her work during the war. After Corderman's farewell speech at Arlington Hall, she said, "It seemed like if you were able to depart, you ought to. And I really did think that that was my patriotic duty. Plus which I thought it was time to explore other—you know, real life ... and so I went back to New York." Soon enough, Caracristi "found that working in a regular, even though perhaps I would have thought that it would be interesting, job was—paled by comparison of working in the cryptologic business." About a year later, with the wartime alliance between the United States and the Soviet Union fraying and the start of the Cold War, Caracristi received a letter from Arlington Hall saying that it was rehiring some former staff and asking if she would like to come back. One suspects she did not even have to think about it. As she said to an interviewer years later, "I took the bait."¹²⁷

CHAPTER 12

Later Career and Retirement

She has promoted invaluable advances in the science and art of cryptology, developed policies and practices that materially improved the operations of the National Security Agency, and provided outstanding leadership to other professionals engaged in highly complex foreign intelligence activities.

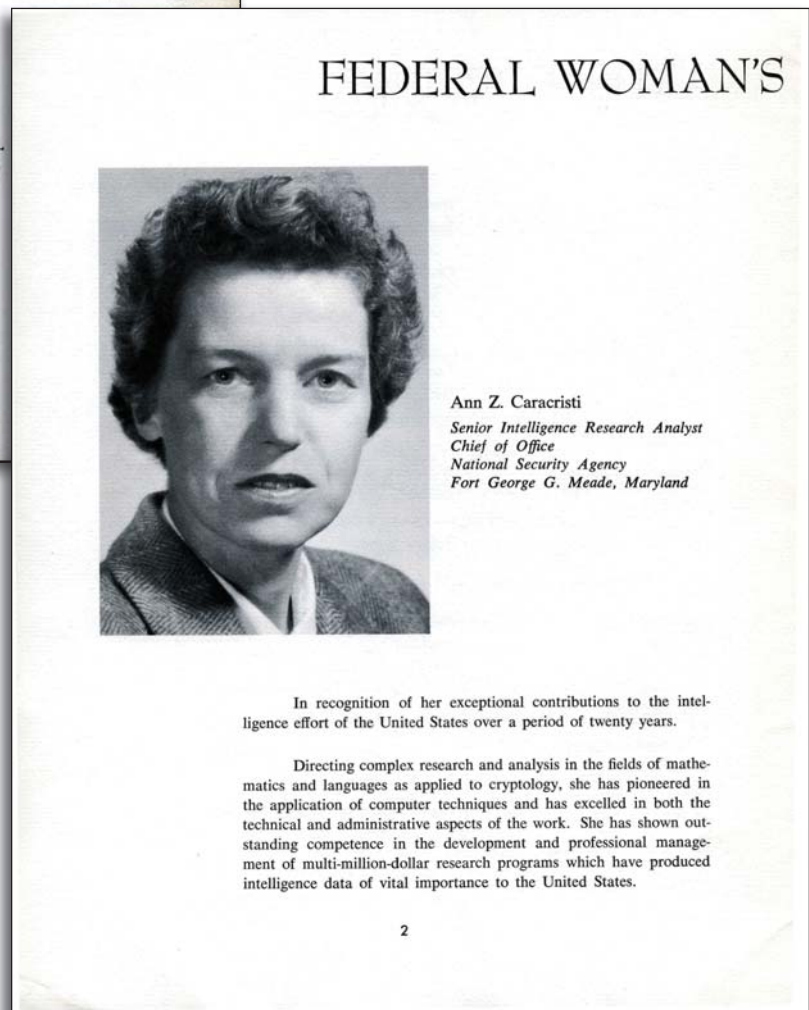
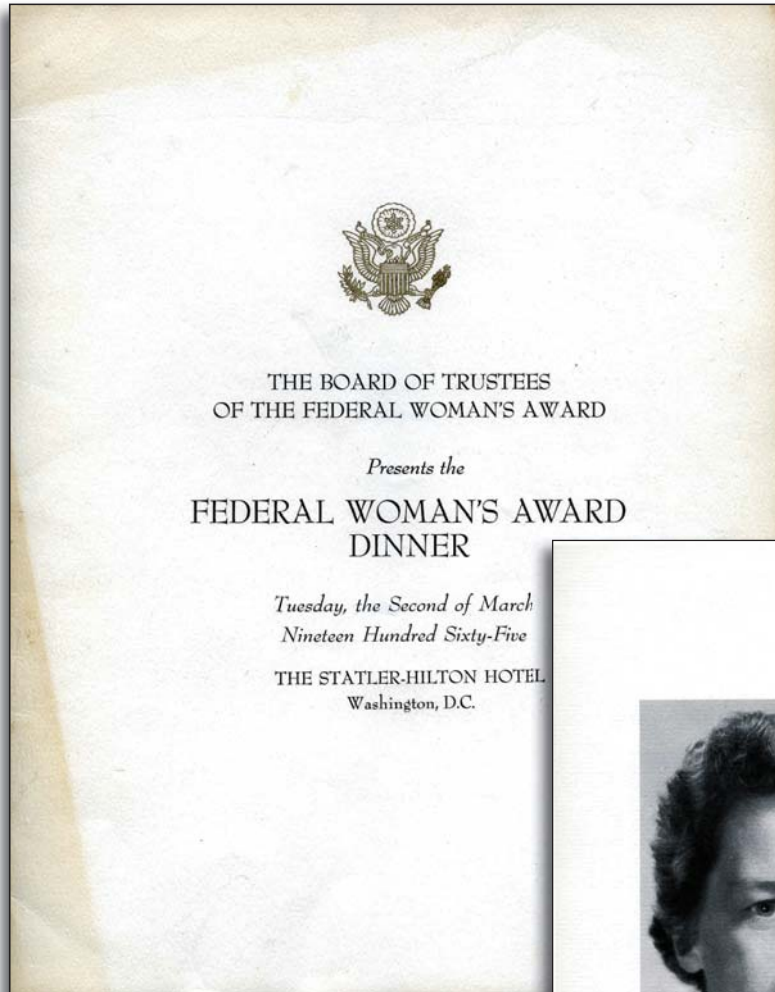
—President Ronald Reagan, 1982¹²⁸

Having returned to Arlington Hall, Caracristi stayed on for another 36 years as it evolved into the Army Security Agency, the Armed Forces Security Agency, and, with the 1952 consolidation of many American cryptologic activities into a single organization, the National Security Agency (NSA). Most of her career was devoted to cracking the codes of America's latest adversary, the Soviet Union, and to advanced research and development activities. Much of her work during these three-and-one-half decades remains classified.

One can gauge the extent of her contributions through the recognition she received. She rose rapidly through NSA's management ranks during the

1950s, becoming at the end of the decade one of the first women to be promoted to GG-16, the first level of today's Federal Senior Executive Service. Her progress continued during the 1960s. In 1965, she received her first national recognition as one of six women selected for the Federal Woman's Award from President Lyndon B. Johnson in honor of "outstanding contributions to the efficiency and quality of the career service of the Federal Government."¹²⁹ "I admire your talent," President Johnson told the awardees at a White House ceremony, "but I admire more your perseverance and your patience and your pioneering."¹³⁰ Caracristi was cited for her trailblazing approach to the application of computer techniques to cryptology and for her "development and professional management of multi-million dollar research programs which have produced intelligence data of vital importance to the United States."¹³¹ Speaking to the *Washington Post*, Caracristi emphasized the importance of young American men and women considering careers in mathematics, computer science, the liberal arts, and linguistics.¹³² Having received her award, Caracristi joined fellow honoree Penelope Thornberg from the Central Intelligence Agency on a Presidential Study Group that in early 1967 recommended strengthening equal employment opportunity for women, a

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN



Federal Woman's Award Program, 1965. Caracristi received the award from President Johnson. *National Cryptologic Museum*



Caracristi receiving the National Security Medal from President Reagan, 1982. *Courtesy Ronald Reagan Presidential Library*

step President Johnson implemented by executive order on October 13, 1967.¹³³

Caracristi moved into the top leadership of NSA in the 1970s. In 1975, she became the first woman to attain the top rank in the career civil service and was simultaneously put in charge of the organization responsible for following the Soviet Union. Five years later, she was named NSA's deputy director, the top civilian at the Agency, a position

she held until her retirement in 1982. Asked a few weeks before she retired whether she missed being a working cryptanalyst, she responded, "Yes, in some ways." Then, with characteristic modesty she added, "But there are so many bright people here, so many who are so much more capable than I am or was, that I knew the job was in very good hands."¹³⁴

Upon her retirement, President Ronald Reagan awarded Caracristi the National Security Medal,



Caracristi's National Intelligence Distinguished Service Medal. *National Cryptologic Museum*

the highest decoration that can be bestowed upon a civilian working in intelligence.¹³⁵ Caracristi received other honors as well, including the National Intelligence Distinguished Service Medal from Director of Central Intelligence (DCI) William Casey, who noted her role as “a pioneer and guiding light in her field.”¹³⁶ Over the following three decades, she received numerous other honors as well.

Caracristi's days as a public servant did not end with her retirement. In 1993, President Bill Clinton appointed her to his Foreign Intelligence Advisory Board. She remained a member for most of his administration. During her tenure, she participated in a number of studies, the most notewor-

thy of which was one conducted at the direction of President Clinton that investigated allegations the Central Intelligence Agency was complicit in or aware of the death or torture of several US citizens at the hands of Guatemalan security forces during the 1980s and 1990s. Caracristi and her colleagues found no credible evidence indicating that this was the case. However, they also determined that CIA had not been sufficiently forthcoming with the executive branch or the Congress when it learned of allegations of human rights abuse by CIA assets and at times had violated its statutory obligation to keep congressional committees that were responsible for overseeing intelligence activities “fully and currently informed.” Caracristi and her fellow board members noted that CIA had instituted new guidelines generally barring contact with foreign intelligence services or officers against whom credible allegations of serious human rights abuse had been made, but remained “disturbed” that these had been issued only after the controversy over its activities in Guatemala had surfaced.¹³⁷

Outside of her work for the White House, Caracristi regularly spoke before a variety of audiences about the importance of preparing the next generation of intelligence professionals. Just before the Clinton administration took office, she and other members of a task force commissioned by DCI Robert Gates assessed how well America's intelligence agencies were training their personnel. They found that these agencies had no way of determining exactly how much they were spending on training, much less its quality or effectiveness. Using available funding efficiently would be of increasing importance, the task force argued, as intelligence budgets declined and personnel had to be retrained in new skills to meet the challenges of the post-Cold War world. Caracristi and her colleagues recommended that the senior leaders of the intelligence agencies increase significantly the amount of time they spent managing training activities. They also urged that various mechanisms be put in place to



Caracristi with President Clinton, who appointed her to his Foreign Intelligence Advisory Board. *Courtesy William J. Clinton Presidential Library*

more closely track the funding and content of training programs.¹³⁸

On a more personal note, when speaking to groups of NSA leaders, Caracristi emphasized their “responsibility to help train and advise the next generation.” She explained that, while she and others at Arlington Hall had excelled at improvising the processes and techniques that made them so successful at breaking Japanese codes, the dramatic acceleration of technological change made it essential for their Cold War successors to be much more structured and disciplined in developing the skills that intelligence professionals needed to cope successfully with the

increasing sophistication of communications and computer systems.¹³⁹

Finally, a major concern for Caracristi during retirement remained opportunities for women in intelligence and in public service more generally. The issue was the subject of a study Caracristi and her colleagues on President Clinton’s Foreign Intelligence Advisory Board completed in 1995, which reached the pointed conclusion that “in some areas, the limitations on the progress women have made have been so apparent that it would seem they could only have resulted from discrimination or a biased environment.”¹⁴⁰ Noting the underrepresentation of women in senior executive positions—ranging from

8 percent at NSA to 12 percent at CIA, whereas their workforces were 39 percent and 42 percent female, respectively—the board observed that while the top leaders of the intelligence agencies had an increasing awareness of the issue, the steps they had taken to address it had been “ineffective.” Caracristi and her colleagues suggested that the directors of CIA, NSA, and the Defense Intelligence Agency move beyond simple statistics and focus on the cultures of their organizations. “Real change,” they wrote, “will require clear policies, as well as probing, and at times uncomfortable, examination of the system and employee attitudes.” “It must be perceived,” they added, “that discrimination of any kind will not be tolerated and that diversity in the work force is a necessary and positive goal.”¹⁴¹

Caracristi came to view her own career from the standpoint of the opportunities and obstacles that existed for women in public service. World War II, she believed, allowed thousands of women to enter the Arlington Hall workforce at a time when the professions open to them were limited to fields such as teaching and nursing. Many may have been motivated, as Caracristi was, by patriotism, but the salaries offered by Arlington Hall at the time—ranging between \$1,400 and \$1,800 annually—were an incentive to others accustomed to the lower wages that women earned during the Great Depression. Leaders like Solomon Kullback, moreover, “didn’t hesitate to put women in charge,” with Wilma Berryman and Caracristi herself being two examples.¹⁴² In the years following the war, however, those women who chose to remain at Arlington Hall—or who, like Caracristi, returned there—received lower salaries than men, being limited to one, two, or even three civil service grades below their male counterparts. After NSA was established in 1952, its first director, Army Lieutenant General Ralph Canine, insisted that women personnel be allowed to compete for promotion to more senior grades. “For the look of the work force,” Caracristi recalled, Canine “insisted



The Doris Crockett Medal awarded to Caracristi by Russell Sage College. *National Cryptologic Museum*

that we dress like professionals. Coat-and-tie came back in favor. Bobby socks were out.”¹⁴³

Caracristi openly admitted that she personally benefited from Canine’s policies. “Three women—and I was one of them—seem to have been identified as the NSA ‘showcase.’ We were promoted together—nominated for awards together. Given jobs of roughly equivalent stature.” Caracristi and her two fellow promotees, Polly Budenbach and Juanita Moody, reacted with a mix of “annoyance, amusement, and acceptance.” “Each of us,” she recalled, “in our own way tried to establish ourselves as individuals and professionals *first*—women in NSA, *second*.” She pointed out that it still took some years—“and a lawsuit”—before NSA’s

promotion boards had adequate female representation and procedures to ensure that women were considered for promotion on a regular basis.¹⁴⁴ Nevertheless, throughout the 1960s and 1970s, some NSA management positions, particularly at the more senior levels, remained closed to women. Speaking in 1991 to a group of women who were leaders at CIA, Caracristi noted “the barriers that still exist for women in intelligence.” “Unfortunately,” she continued, “the world still thinks of women in the workplace in ways that set up boundaries. We are *women* executives, *women* lawyers, *women* in CIA or NSA. The emphasis on gender frequently becomes a subtle way to *de-emphasize* professional accomplishment.”¹⁴⁵ Ten years after she had left her position as NSA’s top civilian, she still worried. “I was the first [female] Deputy Director—certainly hope I’m not the last.”¹⁴⁶

Two honors Caracristi received in retirement likely brought her particular satisfaction, in that they traced the arc her life had followed over six decades. Both came from her alma mater, Russell Sage College. In 1982, it presented her the Doris Crockett Medal (named after the dean who 40 years earlier had urged her to take her first government job) for her ongoing interest in the affairs of the college and her achievements in service to her country. Ten years later, on the 50th anniversary of her graduation, Russell Sage bestowed upon her the honorary degree of Doctor of Public Service, recognizing “not only your extraordinary career, but also the creativity, vision, and leadership that you have shown since you began your work in cryptology fifty years ago.”¹⁴⁷ The young woman who had left Russell Sage by train for Washington in June 1942 had indeed traveled far beyond anywhere she could have dreamed.

ANN'S WAR: THE CODEBREAKING VICTORY OVER JAPAN

Afterword

Ann Caracristi died on January 10, 2016. She was 94. Her obituary in the *Washington Post* said she was a woman who didn't just crack codes but cracked glass ceilings as well.¹⁴⁸ For all of the challenges the world has confronted since the end of World War II, what Caracristi and her Arlington Hall colleagues accomplished during that conflict made it a better place. Amidst all the bloodshed, their work saved lives. Whether they shortened the war is a matter of historical debate. Perhaps it is better to say that without their efforts, the chances would have increased that World War II would have ground on for longer than it did and at a time when casualty rates among combatants and civilians were rising.

The ranks of those who served at Arlington Hall have thinned, and now only a handful of Caracristi's fellow World War II codebreakers are left. She probably would have said that each should have an equal if not greater share of any praise contained in the laudatory obituaries that appeared after her death. But at one particular point Caracristi might have allowed herself a brief moment of understandable pride. Before a group of NSA senior leaders, she and Solomon Kullback gave a retrospective talk about their careers. Someone in the audience asked Kullback how good a cryptanalyst Caracristi was during the war. Kully answered the question by retelling an anecdote from the years he had spent watching Caracristi work on Japanese codes. At one point, he recalled, he had posed the following ques-



Caracristi during retirement, *NSA, n.d.*

tion to an Arlington Hall colleague: "If you were stranded on a desert island with a coded message containing instructions on how to escape and had to rely on only one person to break it, who would that be?"

Kully's fellow codebreaker didn't even need to think before he responded: "Ann Caracristi."¹⁴⁹

Notes

Sources frequently cited are identified by the following abbreviations:

AZC-OH/NSA Oral History Interview with Ann Zeilinger Caracristi, July 16, 1982, Robert D. Farley, interviewer (NSA-OH-15-82)

AZCP/NCM Ann Zeilinger Caracristi Papers, National Cryptologic Museum

BHC Bronxville History Center

DKP/NCM David Kahn Papers, National Cryptologic Museum, Box 150, Folder 6

HRVH/HN Hudson River Valley Heritage Historical Newspapers

TSC/A&SC The Sage Colleges, Archives and Special Collection

* * *

1. Claudia Keenan, *Portrait of a Lighthouse School: Public Education in Bronxville, New York* (Saline, MI: McNaughton and Gunn, 1997), 4.
2. Eloise Morgan, ed., *Building a Suburban Village: Bronxville, New York 1898-1998* (Bronxville, NY: Bronxville Historical Conservancy, 1998), 250.
3. Bronxville High School, *Class of 1938 Yearbook*, Bronxville History Center (hereafter, BHC).
4. "Four Local Men Granted Patents," *The Bronxville Review*, August 31, 1929, 18; "Two Villagers Allowed Grant of Patent Rights," *The Bronxville Review*, March 25, 1937, 2, Hudson River Valley Heritage Historical Newspapers (hereafter, HRVH/HN), accessed May 10, 2018, <http://news.hrvh.org/veridian/cgi-bin/senylrc?a=d&d=bronxrev19290831> and <http://news.hrvh.org/veridian/cgi-bin/senylrc?a=d&d=bronxrev19370325>.
5. Morgan, *Building a Suburban Village*, 16.
6. Information about the original owners of houses built in Ann's neighborhood during her childhood can be found in Morgan, *Building a Suburban Village*, 250-54.
7. Ann Caracristi, "Women in Cryptology," remarks delivered at the dedication of late 1990s exhibit on Women in American Cryptology, National Cryptologic Museum, Fort George G. Meade, MD, Ann Zeilinger Caracristi Papers, National Cryptologic Museum, Fort George G. Meade, MD (hereafter, AZCP/NCM), Folder 164.
8. The anecdote about Ann listening to Jerome Kern playing the piano was recorded by her Bronxville High School classmate Arthur Dornheim, who had heard it from Ann's friend Eleanor Williams, Bronxville History Center, Bronxville High School Class of 1938 Papers. For Kern's time in Bronxville, see Morgan, *Building a Suburban Village*, 116-17.
9. Bronxville High School, *Class of 1938 Yearbook*.
10. Keenan, *Portrait of a Lighthouse School*, 57.
11. *Ibid.*, 58.
12. *Ibid.*, 79.
13. Taubeneck copy of *Class of 1938 Yearbook*, BHC.
14. Ann Caracristi, letter to Dr. Sara Chapman, president, The Sage Colleges, September 1, 1991, Archives and Special Collection, The Sage Colleges, Troy, NY (hereafter, TSC/A&SC).
15. "All but Twenty-Five of June Graduates of Local High School Will Go to College," *The Bronxville Review-Press*, August 4, 1938, 5, HRVH/HN, accessed May 10, 2018, <http://news.hrvh.org/veridian/cgi-bin/senylrc?a=d&d=bronxvillereviewpressBRONXVILLE19380804>.
16. Julia Patton, *Russell Sage College: The First Twenty-Five Years, 1916-1941* (Troy, NY: Walter Snyder Press, 1941), 29.
17. George J. Spears, *Russell Sage College: The Second Quarter Century, 1941-1966* (Troy, NY: Binkmayer, n.d.), 247.
18. Meader's tenure as Russell Sage president is described in Patton, *Russell Sage College*, 157-88.
19. Kathleen A. Donnelly, *Women of Influence: Honorary Alumnae of Russell Sage College of The Sage Colleges* (Troy, NY: The Troy Book Makers, 2015), 4.
20. *Russell Sage Quill*, February 26, 1941, 1, TSC/A&SC.
21. *Sage Leaves, 1942*, Russell Sage College yearbook, TSC/A&SC.
22. Ann Caracristi, "... By Any Other Name," *Russell Sage Review*, May 1941, 35-37, TSC/A&SC.

23. Ann Caracristi, "First Day, First Job," *Russell Sage Review*, November 1940, 21-22, TSC/A&SC.
24. Ann Caracristi, "Anna," *Russell Sage Review*, November 1939, 17-18, TSC/A&SC.
25. Ann Caracristi, "They Could Not Stop for Death," *Russell Sage Review*, February 1940, 7-8, TSC/A&SC.
26. *Russell Sage Quill*, May 29, 1942, 1, TSC/A&SC.
27. Ann Caracristi, remarks to CY-600 Leadership Course, National Security Agency, undated, AZCP/NCM.
28. Patton, *Russell Sage College*, 224.
29. David Kahn, notes of interview with Ann Caracristi, December 12, 2002, David Kahn Papers, National Cryptologic Museum, Box 150, Folder 6 (hereafter, Caracristi Interview Notes/DKP/NCM).
30. Donnelly, *Women of Influence*, 5.
31. *Sage Leaves*, 1942.
32. Ann Caracristi, interview by Robert D. Farley, NSA-OH-15-82 (July 16, 1982), 2-3, accessed May 10, 2018, <https://www.nsa.gov/news-features/declassified-documents/oral-history-interviews/assets/files/NSA-OH-15-82-caracristi.pdf> (hereafter, AZC-OH/NSA).
33. *Russell Sage Quill*, April 2, 1942, 3, TSC/A&SC.
34. Ann Caracristi, interview by Leslie Sewell, Library of Congress, Veterans History Project (undated), accessed May 10, 2018, <http://memory.loc.gov/diglib/vhp/story/loc.natlib.afc2001001.30844/transcript?ID=mv0001> (hereafter, AZC-OH/LOC).
35. *Sage Leaves*, 1942.
36. AZC-OH/LOC.
37. AZC-OH/NSA, 17.
38. The SSA's first recruits were processed at the Personnel Office of the Signal Corps. Starting with a group of 34 that arrived in mid-July, they reported to an office at George Washington University, the site of their initial training office, and were inducted there. *Organization*, vol. 1 of *History of the Signal Security Agency* (Washington, DC: Army Security Agency, 1948), 169, accessed May 10, 2018, https://www.nsa.gov/news-features/declassified-documents/cryptologic-histories/assets/files/history_of_the_signal_security_agency_vol_ISRH364.pdf (hereafter, SSA History, vol. 1).
39. Ibid., document appended after page 150.
40. Caracristi interview notes/DKP/NCM.
41. AZC-OH/NSA, 5; AZC-OH/LOC; Caracristi interview notes/DKP/NCM.
42. *Administrative History of the Military Cryptanalytic Branch (to June 30, 1944)*, undated, Part II, Section IIA, 5-6, National Archives and Records Administration (NARA), Records Group (RG) 457, Historical Cryptologic Collection (HCC), Box 938.
43. Brigadier General Frank Stoner, memorandum to the Assistant Chief of Staff for Intelligence (G-2), "Signal Intelligence Service, February 26, 1942," SSA History, vol. 1. Document appended after page 290.
44. Ibid.
45. AZC-OH/NSA, 4; David Alvarez, *Secret Messages: Codebreaking and American Diplomacy, 1930-1945* (Lawrence: University of Kansas Press, 2000), 115.
46. AZC-OH/NSA, 4.
47. AZC-OH/LOC.
48. AZC-OH/NSA, 6.
49. Caracristi interview notes/DKP/NCM.
50. Ann Caracristi, remarks to CY-500 Leadership Course, National Security Agency, undated, AZCP/NCM, Folder 168.
51. Wilma Davis, interview by Robert D. Farley, NSA-OH-25-82 (December 3, 1982), 39, accessed May 10, 2018, <https://www.nsa.gov/news-features/declassified-documents/oral-history-interviews/assets/files/nsa-oh-25-82-davis.pdf>.
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53. SSA History, vol. 1, 121-27.
54. AZC-OH/NSA, 26.
55. Caracristi interview notes/DKP/NCM.
56. Ibid.
57. SSA History, vol. 1, 127.
58. Ibid., 128.

59. Ibid. A timeline of construction at Arlington Hall can be found in a document appended after p. 150.
60. Caracristi interview notes/DKP/NCM.
61. Ibid.
62. Ibid.
63. "Report on the General Progress in Production and Operational Improvements in Section B-2 For the Past Year," undated Signal Security Agency report, NARA, RG 457, HCC, Box 991, 14.
64. Caracristi, "Women in Cryptology."
65. Davis, interview, 43.
66. Ibid., 39.
67. AZC-OH/LOC.
68. Ibid.
69. Davis, interview, 43.
70. AZC-OH/LOC.
71. SSA History, vol. 3, 20-23, 270.
72. Ibid., 22, 83-85.
73. Davis, interview, 28.
74. AZC-OH/NSA, 7, 23.
75. Ibid., 22-23.
76. Ibid., 22.
77. Ibid., 73.
78. Caracristi, "Women in Cryptology."
79. AZC-OH/LOC.
80. SSA History, vol. 3, 83.
81. AZC-OH/NSA, 11.
82. *Administrative History of the Military Cryptanalytic Branch*, 6.
83. *Achievements of the Signal Security Agency in World War II*, NSA, Center for Cryptologic History files, Special Research Histories series 349, 13.
84. Ibid.
85. *Administrative History of the Military Cryptanalytic Branch*, 1.
86. SSA History, vol. 3, 1.
87. *Japan's Decision for War: Records of the 1941 Policy Conferences*, Nobutaka Ike, ed. and trans. (Stanford, CA: Stanford University Press, 1967), 191.
88. "Japanese Water Transport System," February 24, 1944, 16, NARA, RG 457, HCC, Box 1018.
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90. A description of the substitution square can be found in Alan Stripp, "Japanese Army Air Force Codes at Bletchley Park and Delhi," *Codebreakers: The Inside Story of Bletchley Park*, F. H. Hinsley and Alan Stripp, eds. (Oxford: Oxford University Press, 1993), 296-99.
91. Richard J. Aldrich, *Intelligence and the War against Japan: Britain, America, and the Politics of Secret Service* (Cambridge: Cambridge University Press, 2000), 234-58.
92. *Administrative History of the Military Cryptanalytic Branch*, Part II, Section IIIA, 2.
93. Joseph Richard, letter to David Kahn, October 2, 2002, DKP/NCM, Box 150, Folder 6.
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101. "Survey of Japanese Army Systems Studied by the Signal Security Agency," January 18, 1944, NARA, RG 457, HCC, Box 1018.
102. *Administrative History of the Military Cryptanalytic Branch*, Part II, Section IIIA, 3.
103. Ann Caracristi, undated notecards, AZCP/NCM.
104. George C. Marshall, letter to Thomas E. Dewey, September 27, 1944, from *The Papers of George Catlett Marshall*, ed. Larry I. Bland and Sharon Ritenour Stevens, vol. 4, "Aggressive and Determined Leadership," (Baltimore and London: The Johns Hopkins University Press, 1996), 607-11. Electronic version available from the George C. Marshall Foundation at <http://marshallfoundation.org/library/digital-archive/to-thomas-e-dewey1/>.
105. W. J. Holmes, *Double-Edged Secrets: U.S. Navy Intelligence Operations in the Pacific during World*

- War II* (Annapolis, MD: Naval Institute Press, 1979), 125.
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107. Rear Admiral Charles A. Lockwood (ret.), letter to David Kahn, May 22, 1964, DKP/NCM, Box 62, Folder 43.
108. Solomon Kullback, interview by Robert D. Farley and Henry F. Schorreck, NSA-OH-17-82 (August 26, 1982), 20, accessed May 10, 2018, <https://www.nsa.gov/news-features/declassified-documents/oral-history-interviews/assets/files/nsa-oh-17-82-kullback.pdf>.
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111. Lockwood, letter.
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113. Sharon Maneki, *The Quiet Heroes of the Southwest Pacific Theater: An Oral History of the Men and Women of CBB and FRUMEL* (Fort George G. Meade, MD: National Security Agency, Center for Cryptologic History, 2007), 33.
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118. The United States lost 48 submarines in combat with the Japanese during World War II. Over 3,000 seamen were lost, roughly 15 percent of those who served. See Office of the Chief of Operations/Naval History Division, *United States Submarine Losses: World War II* (Washington: Department of the Navy, 1963; rev. 2017). Available at: <https://www.history.navy.mil/research/library/online-reading-room/title-list-alphabetically/u/united-states-submarine-losses/introduction.html> (accessed May 10, 2018).
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121. Edward J. Drea, *MacArthur's Ultra: Code-breaking and the War against Japan, 1942-5* (Lawrence: University of Kansas Press, 1992), 62.
122. Kullback, interview, 36, 87.
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128. Extract from citation accompanying the award of the National Security Medal to Ann Z. Caracristi, December 2, 1982, AZCP/NCM, Box 4.
129. Program for the Federal Woman's Award Dinner, Statler-Hilton Hotel, Washington, DC, March 2, 1965, AZCP/NCM, Box 4.
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132. *The Washington Post*, February 8, 1965.
133. Lyndon B. Johnson, "Letter Concerning the Progress Report by the Federal Woman's Award Study Group," March 8, 1967, *The American Presidency Project*, accessed May 10, 2018, <http://www.presidency.ucsb.edu/ws/?pid=28688>.
134. National Security Agency Newsletter, August 1982, 5, NCM.
135. Learning of Caracristi's pending honor, her wartime supervisor Wilma Berryman told an interviewer, "I don't care if she's going to be in the oval room next Thursday or not. She's still my little girl." Davis, interview, 22.
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137. Intelligence Oversight Board, "Report on the Guatemala Review," June 28, 1996, 1-10, AZCP/NCM, Box 2, Folder 74.
138. "Report of the DCI Task Force on Training," January 15, 1993, iii-viii, AZCP/NCM, Box 4, Folder 17.

139. Caracristi, undated talk on career development, AZCP/NCM, Box 160, Folder 9.
140. President Bill Clinton's Foreign Intelligence Advisory Board, "Report to the President on Improving the Role of Women in the Intelligence Community," November 1995, 2, AZCP/NCM, Box 4.
141. Ibid., 10.
142. Caracristi, "Women in Cryptology," 6-7.
143. Ibid., 9.
144. Caracristi, "Speech to 'Ladies of CIA,'" October 31, 1991, 3, AZCP/NCM, Box 160, Folder 9.
145. Ibid., 1.
146. Ibid., 6. Six years later, Barbara McNamara became NSA's second female deputy director.
147. Honorary Degree Citation, Ann Caracristi, Doctor of Public Service, May 17, 1992, TSC/A&SC.
148. Martin Weil, "Ann Caracristi, Who Cracked Codes, and the Glass Ceiling, at NSA, Dies at 94," *Washington Post*, January 11, 2016.
149. AZC-OH/LOC.

From Chapter 12: “President Lyndon B. Johnson cited Caracristi for her trailblazing approach to the application of computer techniques to cryptology and for her ‘development ... of multi-million dollar research programs which have produced intelligence data of vital importance to the United States.’ ”

“... all cryptologic professionals who perform highly classified and often mysterious work are, in the end, just people. They enter government service as ordinary Americans, but often find themselves in extraordinary situations, accomplishing feats bigger than themselves.”

—*Foreword, Sarah Parsons*

