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The Neglected Giant:
Agnes Meyer Driscoll






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The Neglected Giant: Agnes Meyer Driscoll

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The Giant

Although Agnes May Meyer, later Agnes May Driscoll,* was the Navy's principal cryptanalyst of many years, spent over 40 years in cryptology, became a member of the Cryptologic Hall of Honor, and has principal credit for personally breaking two major codes/ciphers, she was curiously neglected during her career and after.

Fig. 1. Agnes May Meyer, age 21; her Cryptologic Hall of Honor photograph

Never credited with as much as she believed was her due, never promoted in grade with her peers, even now she is not always ranked with those she regarded as peers. Although considered one of the giants of American cryptology, she is nevertheless rarely mentioned in the same breath as a William Friedman or a Laurance Safford, even though she began her code and cipher work in 1918, contemporary with Friedman. Should she be ranked with them? Has she been neglected by history? We will consider exactly that.

*Because she achieved historical significance both as Agnes Meyer and after her marriage, as Agnes Driscoll, historians have referred to her as Agnes Meyer Driscoll. However, there is no evidence this author can discover that she ever used that name herself; all her postmarriage personnel forms are as Agnes May Driscoll. This paper will refer hereafter to her as Meyer before her marriage and Driscoll after.

The Person I: 1889-1918

While 1918 was the beginning for Agnes Meyer Driscoll's calling, her personal beginning was when she was born in Geneseo, Illinois, on 24 July 1889, to German immigrant Dr. Gustav Meyer and his wife, Lucy Andrews Meyer.[1] The third child of eight—after George Isaac Meyer and Lucy Carolina Meyer, and before Gustav Freckmann Meyer, Margaret Eliza Meyer, Mary Randall Meyer, Otto (no middle name or unavailable), and Joseph Lawrence[2]—she was a direct descendant of Rhode Island founder Roger Williams through her maternal grandfather, George W. Shaw[3] (d. 20 February 1912,[4] when Agnes would have been 22 years old). The family was reportedly severe, demanding obedience.[5]

The family moved from Geneseo to Westerville, Ohio, in time for Agnes to attend one of the Westerville public schools[6] and for 110 E. College Ave., Westerville, to be her address of record when she enlisted in the Navy.[7] But, although she, like many others enlisting, was fresh from school when she enlisted, it was as a teacher, not a recent graduate.

After the Westerville public schools, she attended Business School (high school) in Amarillo, Texas (dates unknown), Otterbein University in Westerville from 1907 to 1909, then Ohio State University from 1910 to 1911, graduating with an A.B.[8]

She was then employed at Lowrey-Phillips Military School in Amarillo from 1912 to 1915 as director of music—in 1912, at a school recital, she played Dvorak's *Humoreske* (Humoresque) in a piano solo.[9] After that she was in charge of the Math Department at Amarillo High School from 1915 to 1918.[10]

A woman with six years' experience in stenography, bookkeeping, typing, clerical work, teaching, French, and German,[11] a Presbyterian a month short of her 29th birthday, Meyer enlisted in the U.S. Naval Reserve on 22 June 1918.*[12] Her world would change as a result; later, she would change the world.

The World of Agnes May Meyer

The world that Agnes Meyer grew up in was very different from the world of today. Understanding her world is necessary to understand her. For example:

- The U.S. had thirty-eight states when she was born (she would be seventy years old, and retired, when the fiftieth state, Hawaii, joined).
- She might have remembered the *Maine*; the Spanish-American War started when she was almost nine.
- She would have understood Victorian values; she was eleven years old when Queen Victoria died.
- When she looked up in the sky as a child, she would have seen only birds and clouds: she was 14 when the Wright brothers made their first flight.
- Moving pictures would have been a novelty as well; the landmark film *The Great Train Robbery*, all twelve minutes of it, came out that same year, 1903.
- She was a teenager when U.S. homes began receiving electricity.
- She undoubtedly knew how to ride a horse or would have ridden in a horse-drawn vehicle. She would have been about twenty-four when the first Model Ts rolled off the new Ford assembly lines in 1913.
- She joined the Navy at twenty-eight, only about a year after the Navy began accepting women … in clerical positions only.
- Her perspective on women's rights and feminism would certainly have a different starting point than ours. She would not have the right to vote until 1920, the year she turned 31.
- Finally, she grew up in a time when, in general, only clerical, teaching, nursing, and domestic or service jobs were open to women.

Yeoman (F): 1918-1919

Agnes May Meyer enrolled in the Naval Reserve on 22 June 1918 as a Yeoman 1st Class (F)†, a month before her 29th birthday, at the Naval Recruiting Station in Cincinnati, Ohio, and was assigned Service Number 1749818. She was promptly directed to report, on active duty, to the commandant of the Navy Yard in Washington, DC, for assignment. She was then reassigned on 24 June to the Bureau of Navigation.

Within the next three months, she must have been assigned to the Office of the Chief Cable

*Unfortunately, queries in 1987 to the Westerville City Schools, the Ohio State University, Ohio Historical Society, Dallas Historical Society, City of Amarillo Public Library, and Texas State Library yielded no information on Meyer. (Letters in NSA Archives Accession 49511, Box CCH36, Folder 10)

†Yeoman is an enlisted rating denoting a sailor whose duties are administrative or clerical; "Yeoman (F)" was a World War I-era designation of female Yeomen. In Agnes May Meyer's records, her rank and service are also sometimes listed as "Yeo.1c, USNRF," where the (F) has been moved from the rank to the end of the abbreviation, without parentheses.

Fig. 2: The Meyer siblings, approx. 1890; Lucy Carolina (left), probably age 2; Agnes (center), probably age 1; and George, probably age 3

Fig. 3: Agnes, George, and Lucy Meyer

Fig. 4. The Meyer family: (front) Lucy, Agnes, and George; (back) Lucy (mother) and Gustav (father)

Fig. 5. Meyer sisters Lucy (l) and Agnes

Fig. 6. June 1903: Agnes (l) and Lucy Meyer

Fig. 7. Agnes Meyer, age 20

Censor, but evidently sought another assignment soon thereafter:

- On 14 September, the 12 September request for her disenrollment, "if the services of the above-named yeoman [Meyer] can be spared from the office of the Chief of Cable Censor [*sic*]," was disapproved, and she was not "used as a statistician in the Bureau of Supplies and Accounts."
- Also on 14 September, another 12 September request for disenrollment—if she "could be spared" from the Censor office and assigned to the Bureau of Supplies and Accounts paymaster—was disapproved.
- Eventually she and the Navy found where she fit, lifting her out of clerical work and beginning her lifelong calling for cryptology: a leave form of 18 June 1919 has her assigned to the Code & Signal Section.[13]

She did relatively well in the Censor's office; that office noted on 25 April 1919: "… Miss Agnes M. Meyer worked … in the Office of the Chief Cable Censor … for upwards of one year ending March, 1919. During most of this time, Miss Meyer had charge of the receipt, segregation, indexing, filing and forwarding of incoming and outgoing tele-

Fig. 8. Agnes Meyer, probably age 10

grams. … One quality that stands forth prominently in Miss Meyer is her unfailing conscientiousness, which is coupled with a serious interest in whatever she is given to do."[14]

She always received solid performance scores of 3.5 to 3.7 for proficiency on a 4-point scale (and straight 4s for sobriety and obedience). Such qualities were undoubtedly the reason for her raise in grade to Chief Yeoman on 1 February 1919[15] while still assigned to the Office of the Chief Cable Censor.[16]

Although she was engaged in cryptologic work by June 1919, she was not breaking codes yet. "Father of Naval Cryptology" Captain Laurance Safford, USN, ret., years later said (lightly edited for capitalization):

> … Miss Agnes Meyer had been transferred over from Censorship to Naval Communications under Cdr. [William] Gresham or Cdr. [Milo] Draemel [see Appendix II], whichever came first. She stayed on with us,

Fig. 9. Yeoman 1st Class F Agnes Meyer, far right; others unidentified

> not attempting any foreign [code or cipher] solutions, but studying our own systems and particularly solving all manner of machine ciphers submitted to the Navy Department for adoption. She solved them all and none of them were taken.[17]

After the war ended, she stayed on active duty until 31 July 1919, and in the reserves until honorably discharged at her request on 5 February 1920. She was hired as a civilian the day after leaving active duty. She didn't have much choice about leaving active duty, but she may have had reasons to prefer civilian service in any case.

A Glass Ceiling?

Agnes Driscoll left nothing in writing at NSA to help historians to understand her motivations and reasoning.* Until a full-scale biographical effort can be mounted with a search for her papers and correspondence, we can only speculate.

So although we know she left active duty and then the Reserves, we don't know why. Factors that might have influenced her include these:

- The Yeomen (F) were demobilized with all reservists at war's end; this might have con-

*Although there might be papers in the National Archives, or with members of the extended Meyer family, there are none in the NSA Archives or CCH holdings.

vinced her that the Navy had little in the way of a future role for female reservists.
- She had already risen to the highest rank a woman could attain at that time.
- The veterans' preference would be advantageous to continue work as a civilian.
- Finally, it is highly unlikely that she wanted to continue doing "tedious" clerical work,[18] given the trajectory her career followed as a civilian.

"This Was the Beginning": 1919-1923

Agnes May Meyer largely launched herself onto her career trajectory to being a cryptologic prodigy.

Commander John W. McClaran, OP-20-G,* summarized the organization's history in a memorandum on 23 September 1935. The first three paragraphs are as follows, emphasis as in the original, quoted in full:

> 1. The Research Section is a natural growth that developed more by accident than design.
>
> 2. Prior to 1918 we had no means of secret communication. During the Mexican trouble, 1914, and Dominican trouble, 1916, the Secretary of the Navy actually used for secret communications the Western Union Code with the Larabee Cipher (procurable at bookstores for ten cents). Our 'Sig Code' and the State Department Code, both of which had about as much security as the Western Union Code, were also used.
>
> 3. In 1916 the Code and Signal Section was established and an officer placed in charge. In 1918 our first modern codes were issued. They were copied after British codes used by us during the war. After the Armistice that year an intelligent [*sic*] clerk from the Cable Censor's Office was transferred to the Code and Signal Section for research work in the development of code and ciphers. This was the beginning. …

Captain Jack Holtwick, USN, ret., provided the memo in his "Naval Security Group History to World War II,"[19] along with the reported comment by Captain Laurance Safford, USN, "the father of U.S. Navy cryptology," that this clerk who began the U.S. Navy's first real efforts in cryptography was Agnes May Meyer, "better known by her married name of Mrs. Agnes Driscoll."

As noted above, she did move from the Office of the Chief Cable Censor to the Code and Signal Section, but she did not begin the Navy's cryptanalytic efforts for intelligence purposes. She was studying the Navy's own codes and ciphers: cryptography, not cryptanalysis, although she applied cryptanalytic techniques to the codes and ciphers to determine their weaknesses.

So, where did she learn cryptanalysis, once she became a U.S. Navy civilian employee, albeit on a temporary basis,[20] on 1 August 1919? The short answer is, wherever she could.

She evidently started with MI-8, the "American Black Chamber," in New York City, the only U.S. governmental entity engaged in cryptanalytic intelligence work at the time. Likely this was 1919;† not only was she documented elsewhere during the first half of 1920, as the next paragraph relates, but Cdr. Draemel sent her a letter on 27 October 1919 congratulating

*The Navy's office where cryptanalysis was performed had a number of designators over the period of its existence. It will be referred to as "OP-20-G" throughout this paper.

†Holtwick gives 1920 as the year: "Capt. Hooper's 1931 memo states that Mrs. Agnes Driscoll (nee Miss Meyer), Navy cryptanalyst, was attached to the (Yardley's) New York office for five months in 1920"; SRH-355, Part I, 29, and Part II, 16.

her on solving a submitted cipher and cautioning her against overwork. The letter is addressed to her at 3 East 38th Street, New York City.[21]

She continued with Riverbank Laboratories in Geneva, Illinois, where the "father of American cryptology" William F. Friedman had trained military officers in cryptology during World War I, before himself departing with a commission. She was trained for work in the cipher department in 1920.[22] Also, a 26 February 1920 letter from the head of OP-20-G, Cdr. Draemel, to Riverbank owner George Fabyan began arrangements for Meyer to spend time at Riverbank as soon as her Civil Service status was determined. A 20 May letter from Fabyan to Draemel makes clear that Meyer had arrived by then,* since she was "coming along first rate."[23] She completed the course "on or about" 20 June.[24] Her temporary appointment in OP-20-G of 1 August 1919 had already been made permanent on 1 March 1920.[25]

She herself documented the training in both organizations, for example on her 11 January 1943 Application for Federal Employment (an apparently annual requirement then), under education and training, "Course in Cryptanalytics in NYC, and one in Chicago [Riverbank]."[26] Dates were not requested, and she would not have been able to give more details at the unclassified level at that time.

So she got herself taught to be a codebreaker, to be a better code maker.

She had to start near the bottom, though. In 1919 OP-20-G was small: six sections, with one officer for each. There were no nonclerical enlisted personnel or civilians—a total of five officers, one chief yeoman, and eighteen other clerical staff. Three of the clerks and two stenographers were paid $1,400 a year and the rest $1,200 each.[27]

Where did Agnes May Meyer fit in? As one of the two "senior" stenographers—but not for long. She soon became one of the higher-grade civilian clerks, as her positions, promotions, and pay increases from 1919 to 1923 show (see Appendix III):

- She was appointed to one of the $1,400-a-year stenographer positions on 1 August 1919,
- Then appointed as a clerk† at the same $1,400 annually on 17 March 1920, and
- Appointed as a clerk at $1,600 a year on 16 January 1922.
- She resigned, however, without "delinquency or misconduct," from that same clerk position on 15 January 1923.[28]

Why did she resign? According to Safford, it was "upon the advice and recommendation of, I think it was Gresham,"[29] possibly meaning the head of OP-20-G at the time. (Lt. Cdr. Donald Goodwin was in charge in January 1923; see Appendix II, "OP-20-G Commanders.") The advice and recommendation don't appear to have been recorded anywhere, leaving the question, why would he recommend that a star performer leave?

Rise of the Machines I

Again, we cannot be certain, but several factors, taken together, suggest why she may have resigned:

- She was a clerk at the time, making $1,600 a year ($22,278 in 2014 dollars; see Appendix III); her prospects of significant advancement right then may have been nil.

*Although *Early Background of the U.S. Cryptologic Community* by George F. Howe, historian, NSA, October 1970, NSA Archives ACC49106, 8, sets the year of the Riverbank training as 1922.

†She may have needed to be reclassified from stenographer to be able to go to Riverbank; this may be what Draemel was referring to about "definitely determining" her civilian status in the 26 February 1920 letter to Fabyan, above.

Fig. 10. Inventor Edward Hebern

In 1919 the only positions above the clerical were held by naval officers.

- Edward Hebern had submitted a cipher machine to the Navy. Although Meyer solved it,[30] and the machine was rejected, the Navy was interested and put it through trials for some time.[31] Gresham may well have wanted his best "clerk" to learn more about cipher machines.
- If, in the process, Meyer could make the Hebern Cipher Machine cryptographically secure, and the Navy could accept it, the Navy would benefit as well.

It is worth noting that Meyer did not just solve the cipher machines submitted in the early 1920s. She also helped to invent one: called variously the Communication Machine, Cipher Machine, or CM.

Gresham invented the machine itself, using a cryptographic principle devised by Meyer. Four units were initially issued, with instructions, on 16 January 1923 (the day after her resignation took effect), and later more units were produced and issued to each major ship and station, staying in use until 1938. Holtwick described the machine as follows:

> … consisted of a metal frame with metal slides, in which printed paper alphabets were inserted, were moved with a stylus to encipher code groups or plain text, but in addition to the interrupters built into the NCB [Navy Cipher Box[32]], movement of a CM strip caused motion to be transmitted through a gear train to other strips, thereby creating, in effect, a "stepping" somewhat analogous to the stepping of the rotors in an electrical cipher machine. The length of the cycle of the CM was, in consequence, many times that of the NCB, and it was considered to have a cryptographic security several orders of magnitude greater, since it also produced what was in effect a route transposition of the variable length segments of text.[33]

Superior to the NCB or not, the CM was difficult to use due to engineering shortcomings. Made of brass and consequently heavy, its concentric shafts were unreliable, and daily settings were difficult to put in place.[34] Shortcomings aside, it was used for enough years that, after Gresham's death in 1935, his widow put in a claim for compensation; the 75th Congress, in response, passed Private Act 267, splitting $15,000 between Meyer (by then, Driscoll) and Gresham's widow. Agnes Driscoll's share was some $6,000[35]—more than she earned in a year at that time (see Appendix III).

A third factor is the "Case of the Mysterious Radio Mechanism." Included in her Civilian Record is an undated newspaper article:

> **U.S. Perfects Gun With Deadly Aim To Locate Planes**
>
> The War Department has perfected an anti-aircraft gun that locates planes and shoots them out of the air with deadly accuracy, the United Press said last night in a copyright [*sic*] story.

Department officials would not discuss the gun but said it operates on a sound wave-electrical principle and aims automatically.

A weapon of this type, experts pointed out, would be of inestimable value as a defensive weapon in time of war, especially in protecting densely populated areas and the National Capital from air invasion.

Existence of the gun was disclosed after publication of reports that Germany had developed a similar weapon.

The radio mechanism was developed by the late Navy Commander William F. Gresham and a Mrs. Agnes M. Driscoll.[36]

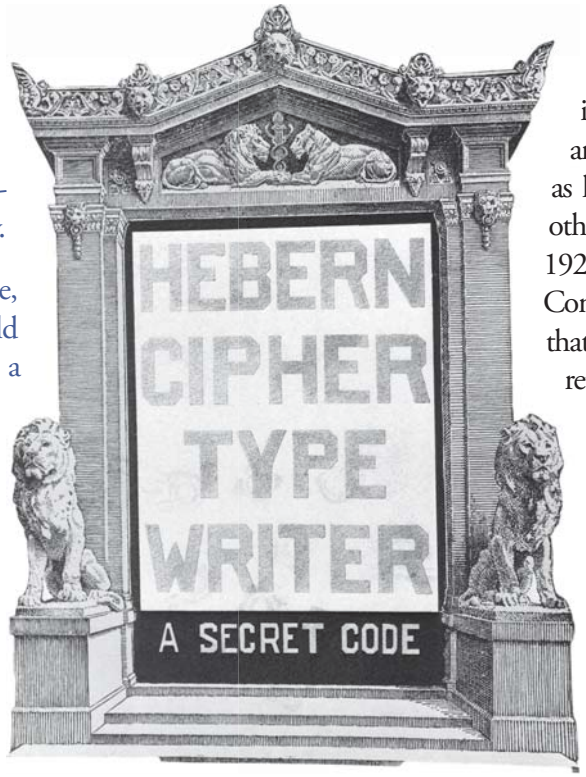

Fig. 11. The Hebern Company logo

It is difficult to know what to make of this account except that Driscoll and Gresham invented more than just the CM, or that its principles were applied to, presumably, radar. Either way, development of the CM may have led her to believe that crypto-machines were her future.

Whatever her reason, Agnes May Meyer resigned effective 15 January 1923, seeing how green were the pastures of private industry.

Private Industry: 1923-1924

Meyer had already examined whether the grass was greener in the public school system, the Navy enlisted ranks, or the Navy civil service. Starting in February 1923, at age 33, she tried private industry, as technical adviser for the Hebern Electric Code Company of Oakland, California, in Washington, DC.[37]

At least, "technical adviser" is what she later listed as her title and undoubtedly what she regarded as her role. Hebern might have had other ideas, however; in a 25 April 1923 letter, the Hebern Electric Code Company secretary notified Meyer that she had been elected assistant secretary, and thus could sign stock certificates. A follow-up letter of the same date, from Hebern himself, explained that she could sign them herself, once she received money for the shares. He went further into detail about the shares, such as the $5 per share price. (A third letter of 25 April notified Meyer that she was the recipient of 200 shares, with Hebern's promise to buy them back at $1,000 a year later.)

Did Hebern intend for her to spend time on clerical work? Or sales? Possibly. But he did not ignore the technical side completely with her.

Hebern did, in that second letter, spend a paragraph on technical matters. To Meyer's unrecorded complaint of the machine being "static," probably meaning that it lacked interrupters or irregular stepping, he noted that the Engineering Department had not foreseen the consequences of this, and that only a perforated tape (key tape) would be the solution.[38]

Sadly, Hebern's plans were based on getting significant federal contracts, and he had built a large factory before any such contracts were in place. In the spring of 1924, the company defaulted on the mortgage interest, Hebern was subsequently removed as president, and a state investigation showed that the shares were only legally authorized to be sold at $1 per share.[39]

However green the grass might have seemed in industry, it had turned brown pretty quickly. Meyer resigned in July 1924 and was back working for the Navy the following month.[40]

Back with the Navy: 1924-1930

Agnes May Meyer was back at her old job—clerk—on 1 August 1924, at age 35, but not at her old pay. She took a 17.5 percent pay cut in returning (see Appendix III). Even so, her departure had caused tremendous change, and her return would cause even more, over the course of her career.

Departure and Change

On 1 January that year, Lt. Laurance Safford became the head of a brand-new element in OP-20-G: the Research Desk. There he established the Navy's initial cryptanalytic effort and was so successful that he has been called "the father of U.S. Navy cryptology,"[41] without overstatement. All the Navy's subsequent successes can be laid at his feet.

Safford himself, though, laid some of his own role and success at Meyer's feet; although the Navy had brought in the illustrious Elizebeth Friedman for five months:[42]

> That [Meyer's 1923 resignation] left a hole in the section; this was before they got Bogel [Claus Bogel, an MI-8 veteran], and this body decided not to rely on the civilian expert, but to get a commissioned officer of the Navy to undertake the study and so that wherever he went he could be replaced and he could not go unless the [Navy] Department wanted to let him. Upon the recommendation of several classmates … I was selected for the job. …

Safford affirmed that Meyer's departure was thus one of the reasons he was brought to Washington.[43]

It *is* an overstatement to say that all the Navy's subsequent successes can be attributed to Agnes May Meyer. Yet her departure was the catalyst for the Navy to realize how badly it needed cryptologic expertise. Had she never joined the Navy, had she never joined OP-20-G, events would have demonstrated the need at some point. But her departure, leading to Safford's arrival, coupled with her return, ensured that the U.S. Navy had expertise in advance of events, not in belated reaction to them.

Now that she had returned, she and Safford had cryptologic work facing them, work that might not challenge them but would prepare them for the serious challenges that would follow.

The Red Book

In the 1920s and especially 1930s, the U.S. Navy could see that its most likely foe in the future would be Japan. The island of Japan did not have the natural resources that a world power would need, then or now; Tokyo saw its only acceptable option then as conquest. Ships needed iron to be built, and coal or oil to fuel them. Aircraft needed rubber for tires. Japan began asserting some influence in Manchuria after the 1904-1905 Russo-Japanese War. Its efforts gained impetus in the late 1920s, culminating in invasion in the early 1930s. Washington opposed Japanese expansion, not least because the U.S. territories of the Philippines and Guam were such nearby, tempting targets. But Japan showed no sign of backing off. The U.S. Navy began to make ready.

One way the Navy began making ready was to learn to read Japanese codes. The Navy started early, in 1920, and in the oldest-fashioned way: stealing. The Office of Naval Intelligence (ONI) apparently found out that there was a copy of the Japanese Navy's operational fleet code in the Japanese Consul General's custody in New York. ONI operatives broke into the safe it was in and photographed every page. Instant book-breaking; now all they needed was to translate it from the Japanese.

ONI did so through the services of retired missionary Emerson Haworth (sometimes spelled Haaworth), and he took until about 1926 to finish the translation. In late 1924, when Safford and

Meyer's Research Desk was still in its infancy in the Navy Building's* Room 1645, their office was organizationally under the Director of Naval Communications (DNC; see Appendix I). Physically, it was almost directly below where Haworth and ONI were working on the translation, in Room 2646.

Haworth's translation was kept in a red binder, and thus the Imperial Japanese Navy Secret Operations Code 1918 was known to the Navy and since to history as the "Red Book."[44] (See also Appendix V.)

The Red Book contained a total of 97,336 entries—letters, numbers, words, or phrases—and had three different code equivalents for each: a 5-digit number, an expression in Roman letters, and a three-character Kana (syllabic script representing particles, numbers, place-names, among others[45]) group. The Research Desk never encountered anything but the Kana form. The code book had a geographical section, ship section by country, and other sections. Some entries had variants, evidently for the user's convenience since the variants were always found nearby. The instructions in the photographed copy called for a simple substitution or additive superencipherment, but the Research Desk only encountered transposition.

Driscoll was responsible for the first superencipherment solution, made in 1926, of a transposition scheme, or "key," that remained in effect for several weeks. Succeeding keys were more complex, but the Research Desk stayed on top of them. By the autumn of 1930 four different keys were in simultaneous use.[46]

With the code book and the first break into the superencipherment schemes, Safford and Meyer might have seemed set for easy success. But Safford was gone in 1926, relieved by Lt. (later Capt.) Joseph Rochefort (see Appendix II). Starting that year, Driscoll, as she was known since her 1925 marriage, and Rochefort still had to deal with any superencipherment of messages using the Red Book code.† This involved a periodically changing transposition cipher, relatively primitive; Driscoll solved the initial one and most of the fourteen changes. She and the officers in training were the only ones capable of doing so.[47]

Fig. 12. Agnes Driscoll, probably mid-1920s

*The Main Navy and Munitions Building, built near the end of World War I and torn down in 1970 for part of the National Mall.

†See Appendix V for a list of terms for Japanese interwar codes and ciphers.

Fig. 13. Driscoll in the mid-1920s

Driscoll showed her mettle in 1926 when she approached then-Lt. Layton, needing linguist help; she had two (or more) possible decipherments for a message. Layton advised her that the first could not be Japanese, but the second, "Tomimura," could be a name. She couldn't use that either, but Layton said Tomimura could be rendered Tomison or Thompson. She thanked Layton for helping her; the name was indeed Thompson.

Thompson was a Radioman Second Class Thompson, the accomplice of a cashiered Navy officer named John S. Farnsworth, who was convicted of conspiracy to violate the espionage act for passing engineering and gunnery secrets to the Japanese. Driscoll's decryption and others were used, albeit indirectly, to build up evidence against "Agent K" Farnsworth and "Tomimura."[48]

Training

Not all of her time was spent breaking the latest transposition scheme used to superencipher the encoded messages. Much of it was spent helping to train a succession of junior officers brought in to learn cryptology, given the Navy's need to have a pool of talent to dip into in a future conflict. She trained them primarily because, as previously noted, there was no one else, although they trained themselves to some extent on the course Safford put together ca. 1925.[49] Clearly she trained well: She trained most of the Navy cryptanalysts who would become shining lights in, and after, World War II.[50] Two examples include:

- Rochefort himself: "When I first came in contact with Mrs. Driscoll in 1925 in Washington, she was exceptionally capable, very capable. I considered her sort of a teacher to me," although he gave Safford greater credit as his teacher.[51]
- Captain Thomas Dyer, looking back, noted that Bogel had been the teacher until let go in 1925, but after that, the "absolutely brilliant" Driscoll was the one who helped him with cryptanalysis while he was head of the Desk[52] (in 1932-33; see Appendix II).

Layton states that Rochefort and Safford learned Driscoll's code-breaking skills[53] as well; he does not say whether from working with her or in a training situation. Given Driscoll's background as a teacher, it seems likely she would have wanted to raise their skills if she could.

The Person II

The Trainer

Most of the extant material on her personality during this period comes from the people she helped train and presumably refers to her as a trainer.

Rochefort, aside from remarking on how capable and talented she was, noted her habit of turning pages with the eraser end of a pencil.[54] Dyer characterized her as eccentric along with brilliant.[55] Some noted her startling ability to curse like a sailor,[56] including Layton, who, in addition to describing her as "enigmatic but brilliant" … "patrician" … "tall, slender, quiet, and extremely dedicated," said:

> I had been warned not to patronize "Madame X," as her colleagues sometimes referred to her, because she was sensitive to her role as a woman in a man's world. Because of this she kept to herself as much as possible and none of us was ever invited to socialize with her and her lawyer husband. While she could be warm and friendly, she usually affected an air of intense detachment, which was heightened by her tailored clothes and shunning of makeup. It was surprising to hear Miss Aggie curse, which she frequently did—as fluently as any sailor whom I have ever heard.[57]

Being talented or brilliant is subjective, and thus testimony must suffice as evidence, lacking personal acquaintance; detailed information about her appearance is in Appendix VI.

Married Woman

Michael Bernard Driscoll was born in Cairo, Illinois, on 6 December 1890, thus being a little more than a year younger than Agnes, and was a lawyer for the Interstate Commerce Commission (ICC). They were married on 12 August 1925 in Washington, DC.[58] She was 36 years old.

According to family, "Brownie" was a very bright man, and Driscoll considered him one of the smartest men she knew. This was just as well, since she had no patience for "dumb" people. He had been a captain in the Army, on the punitive expedition against Pancho Villa, and with the American Expeditionary Forces in France in World War I, and had a "fine" military mind.

He had become a hearing examiner for the ICC and traveled from city to city hearing cases. A sentimental man, he wrote Driscoll poems. They accumulated property, including seven acres in Tyson's Corner;[59] along with the other real estate Brownie accumulated in Washington, it was worth a fortune at her death.[60]

But her personal and professional lives did not intersect. She did not socialize with her co-workers[61] and did not talk about her work at home.[62]

The Person and Her 1930s World: An Examination

So, who was this "tall" and "patrician" woman, sometimes called "Miss Aggie" and sometimes "Madame X,"[63] who wasn't notably tall for her time period (see Appendix VI), came from immigrant stock, and could curse like a sailor, perhaps from her time in the Navy enlisted ranks?

Schoolteachers, parents, and others of superior knowledge often appear taller than they are, which could explain the perception of Driscoll's height. As to being patrician, or even remote, perhaps Layton had the key phrase: "a woman in a man's world."

What was the "man's world" of the U.S. Navy at this time?

For one thing, it was two worlds: sea duty and shore. Sea duty was what made officers' careers and got them promoted. "Don't give up the ship" and "Damn the torpedoes, full speed ahead" weren't coined by someone ashore. The Navy was all about ships and the sea.

Cryptanalysis was not performed at sea, except against the most primitive tactical ciphers. Officers trained in cryptology needed to turn their back on codes and ciphers if they wanted to be promoted.

They needed to spend time helming the ship or plotting its course, not looking for letter patterns on graph paper. And ships had no billets for civilians.

Shore duty, by contrast, was a reward after sea duty. While civilians had their place, if it was a place a naval officer could occupy … that was denying some deserving officer his reward.[64]

So some resentment of the civilian taking an officer's place would have been only natural; there was resentment enough between officers. When that civilian had superior knowledge and ability, it would have put an edge on the resentment. And when the civilian was a thirty-something woman among junior, male officers, that would have added an entirely new dimension.

"A woman in a man's world" simply does not apply to today's U.S. Navy—or the Navy of a decade or two ago. But the U.S. Navy of the 1920s and 1930s? Simply put, she could expect to be patronized, condescended to, and, probably, sexually harassed to an extent a woman of today would find shocking.

It was only in 1920 that the U.S. Constitution was amended to recognize that women had enough judgment to vote. Jokes about "women drivers" and "blondes" would still be told decades afterward. Women were still widely viewed during the time in question as inferior to men. And, if they were inferior to men, how much more must they be inferior to officers and gentlemen, the proud graduates of the Naval Academy? Given the prejudice of the time against officers who had not been to Annapolis, any opportunity that arose to patronize Driscoll would likely have been taken, without thinking.

As to sexual harassment, it was not even a recognized concept in those days. Any woman working in the Navy would come under suspicion of being there solely to snag a husband, as that was seen as a woman's primary goal. Even "unattractive" women would draw such behavior; attractive ones much more so. And the fair, blue-eyed[65] Driscoll, even after she turned 40 in 1929, would probably have been considered an attractive woman.

Agnes Driscoll wasn't the first woman in the workplace to face the choice between looking attractive and attracting unwanted looks. But there simply weren't that many women in the workplace at all when she began her cryptologic career. There would have been no mentors, no peers to model herself after, to look up to.

However, she would have had one source for role-modeling: herself, her previous self, if you will—herself and her fellow teachers in Amarillo, Texas, from 1912 to 1918. West Texas was not that far removed from its "cowboy" days, then. Driscoll began teaching there the year she turned 23; she would undoubtedly have had to learn quickly how to deal with the stereotype of the "pretty young schoolmarm."

So it should be no surprise that the forty-ish Driscoll was remote with the young, male officers she worked with and trained. It makes sense that she would not wear makeup or be so unfeminine as to curse and swear. It would not have been easy for her to get the naval officers to take her seriously, even though they unquestionably needed her and her expertise.

Orange in Blue: 1930-1937

The stock market crash of 1929 would have still reverberated in the Navy the following year. Such an economic dislocation could not bode well for Navy budgets. Nevertheless, OP-20-G probably felt a bigger shock of its own in 1930.

Orange

The shock showed no signs of coming in the early and middle parts of the year; Driscoll and the others were solving the messages intercepted from the Japanese Grand Fleet Maneuvers in the summer of 1930. The maneuvers turned out to be extremely significant; they were not only an exercise to counter the U.S. Navy, but the "U.S. Navy" units in the exercise were following the U.S. Orange War Plan.[66]

"Orange" was the term in U.S. war plans for Japan;[67] the fact that the Japanese were exercising against the U.S. war plan meant that, for one, Tokyo

had known or at least predicted how the U.S. Navy planned to fight and, for another, if it did come to that, Japan would have an immense advantage.[68] Knowing what your enemy plans, while keeping the enemy in the dark as to your own intentions, strategy, and tactics, is priceless, as World War II would soon show, at first for Japan and later for the U.S.

"This Is a New Code"

But even Japan's apparent foreknowledge was not likely the greatest shock of these years for OP-20-G. In 1931 Dyer had arrived, the year before relieving Safford as head of the Research Desk (see Appendix II). The Research Desk was still tiny at this time: Safford, Driscoll, two clerk-typists, and Dyer as Safford's replacement.[69] In fact, there were only six officers in the Navy at the time eligible and competent to perform any significant cryptanalysis.[70] Dyer was struggling with some traffic, and Driscoll came up behind him, looked over his shoulder (as schoolteachers are wont to do), took it from him, and said, "This isn't the same code. This is a new code."[71]

The Japanese had changed their fleet operational code on 1 December 1930 (see Appendix V). The Red Book, its pages taken and photographed at such risk, and translated over so many years, was no longer in use. The window into Japanese thinking had closed. The advantage of knowing their plans was gone. It would take Driscoll and OP-20-G three years to break the new code. Their discoveries and breaks were stored in new binders of a different color.

It would require three long years, but, with the example of the Red Book for the kinds of entries to expect, augmented by officer trainees and led by Driscoll, the window would once again open. The Navy would no longer be deaf to Japanese communications. The two levels of superencipherment would be broken and stripped away. The underlying code values would be discovered. The "Blue Book" would be understood, the mystery revealed.[72]

Safford would later praise the breaking of the Blue Book as one of the great feats of cryptanalysis:

> To make a long story short, the Navy cryptanalysts, spear-headed by Mrs. Driscoll, "accomplished the impossible," solved the ciphers and then reconstructed the code. This was the most difficult cryptanalytic task ever performed up to that date and possibly the most brilliant as there were no "cribs" and "translations" to help out as in the subsequent Army solution of the Purple machine.[73]

This statement is pardonably extravagant, as breaking the Blue Book was certainly an accomplishment to be proud of. But likening it to the Army's solution of the Japanese diplomatic Purple machine is an exaggeration, no doubt an example of the Army-Navy rivalry that was so strong during this era.

The 1918 Red Book had been a one-part code, which by its nature is more easily broken. A one-part code essentially has its entries in the equivalent of alphabetical order, along the lines of, for a list of locations (in Japanese "alphabetical"—dictionary—order):

1643	KISAN
1644	KIRIGAN
1645	KEIMEI

Once a codebreaker establishes those values, he or she will instantly realize that 1640 to 1642 will mean something very close in dictionary order to "KI__."

By contrast, a two-part code will have an decoding table like this …

1643	KISAN
1644	Washington, DC
1645	Turret

… and an encoding like this:

KISAN	1643
KIRIGAN	1608
KEIMEI	2690[74]

The Blue Book code was a compromise between one-part and two-part codes. The Japanese had broken up the lengthy, one-part sequences characteristic of the Red Book with inserts from other sections. But those inserts were themselves alphabetical.[75] So the Blue Book was constructed as if "abandon" through

Fig. 14. Driscoll on the roof of the Navy Building, Washington, DC, late 1920s

"attack" were 0001 through 0200, "KISAN" through "KOMINATO" were 0201 through 0250, and so on.

The Blue Book was a sizeable code, with over 85,000 code groups, as Driscoll and her cohorts laboriously discovered. They began working on it in September 1931, after their analysis of the 1930 maneuvers was complete, and had to begin by breaking the new form of superencipherment, which fortunately was not too dissimilar from its predecessors. Driscoll led the effort and made the first break; she worked the Blue Book full time until the solution was well in progress. She, Dyer (for five months), and Safford (for eight months) put suspected meanings in a card file; at first, the blue binders that gave the code its Navy name held only the code values typed in.[76]

When Driscoll and the others completed the cryptanalytic success of breaking the Blue Book, the biggest intelligence success that followed was discovering in decrypted message traffic the top speed of the new *Kongo*-class battle cruiser *Nagato*. Upon learning the *Nagato* could make twenty-six knots, the Navy's General Board changed the requirements for the new U.S. *North Carolina*-class battleships to exceed twenty-six knots. This alone was considered to have justified OP-20-G's entire peacetime budget, and then some.[77] But that was true only after the code was solved.

Solving the code with so few cryptanalysts, and only a few clerk-typists to do the typing and filing, was indeed a major achievement. Doing so strictly by hand methods would have taken far too long, however. OP-20-G needed to automate whatever it could.

Rise of the Machines II: Doubt

The OP-20-G officers consulted Lt. Joseph Wenger, who had trained in OP-20-G starting in August 1930, would be its chief later (see Appendix II), and was in the Bureau of Engineering at that time. At first, they considered alphabetic sorters made by Remington Rand, used elsewhere in the Navy. Then Dyer learned of IBM machines that could transpose input as needed and had an alphabetic capability. OP-20-G was able to rent two card punches, a sorter, and a tabulator. Later, it obtained even more flexible machines.[78] With budgets as they were during the Depression, this was no mean feat.

Driscoll, of course, had co-invented a cipher machine, as noted previously. Wenger, while training in OP-20-G, had been present when Director of Naval Communications Capt. Hooper had requested OP-20-G consideration of machine aids for cryptanalysis. Safford and Driscoll discussed the subject at some length and concluded that machine aids were certainly desirable, but they doubted that such were feasible.[79]

Such an attitude isn't surprising for the co-inventor of a cipher machine with sound cipher principles but problematic engineering—especially when you consider the co-inventor was such an intuitive cryptanalyst that she could look over someone's shoulder and realize in moments the code had changed. It is even less surprising when considering the co-inventor did not grow up with automobiles and airplanes and had achieved all of her success with pencil and graph paper.

So, this is the person who later, in 1938, reportedly would "hardly stay in the same room" with the Army's analog machine for breaking messages encrypted with the Japanese diplomatic Purple encryption system, when the analog was demonstrated for OP-20-G on her desk.[80]

Rise of the Machines III: Success

And yet, Driscoll solved the Japanese system, apparently used before 1935 by naval attachés, designated the M-1 cipher machine by OP-20-G. However, her solution to the machine was manual: sliding a handwritten, recovered cipher sequence against a diagram on cross-section paper.[81]

By 1937, OP-20-G had grown to some forty personnel;[82] nevertheless, it relied very heavily on Driscoll. Although efforts were underway to record much of what resided only in her memory,[83] not only did a severe shortage of "really qualified" cryptanalysts remain, in fact there was only one individual, unquestionably Driscoll, capable of attacking any problem.[84]

Driscoll, for all her reliance on manual methods, was responsible then for solving machine ciphers; one of the other cryptanalysts, former enlisted man Prescott Currier, was responsible for hand systems.[85]

Finally, the Army solved Purple in 1939; the credit for this exceptional feat has always gone to the extraordinarily talented personnel there at the time, as it should. Nevertheless, Driscoll contributed in her own small way: the machine's "47 positions" matched with those of a cipher machine, likely the M-1, solved by Driscoll and her OP-20-G colleagues. The discovery of this match reassured the Army cryptanalysts that they were on the right track.[86]

Vulnerable

Although OP-20-G's principal cryptanalyst was riding an unbroken record of successful codebreaking, and although she had her doubts about machine aids, the organization needed such aids for a timely solution of the Blue Book in the early 1930s. Even so, with such a vulnerable cipher for the Japanese Navy, especially compared to the Japanese diplomats' Purple, it was no accident that the Japanese Navy replaced the Blue Book code in 1938.

Fig. 15. Driscoll with nephew James Hamilton, ca. 1932

Before that, though, Driscoll would have to take a break from her career after suffering an accident of her own, and showing her own, personal vulnerability.

The Accident: 1937-1938

Holtwick notes that, in October 1937, when she was forty-eight, "Driscoll was seriously injured in an automobile accident in which two others were killed.

She suffered two broken jaws [*sic*] and a broken leg and was out of action for nearly a year, not returning fully to duty until September 1938."[87]

Except … perhaps not. According to family, she suffered severe facial injuries, including a broken jaw; possibly a broken arm; and her right leg was broken in two places. Apparently four people were in the car: Driscoll, her mother, likely her co-worker and friend Helen Talley, and possibly another, unidentified woman. Driscoll did not drive, although it was her husband Brownie's car. However, no one was killed, and Driscoll was the most badly injured, in those days before air bags and even seat belts.

She ended up in Harrisonburg Hospital, in Harrisonburg, Virginia, and the leg never did heal properly. It was not put in a cast immediately and healed bowed. Driscoll was unwilling to go through having it redone (probably rebroken and reset), and she had to use a cane to walk for the rest of her life.[88]

The driver of the other vehicle may have been uninsured, and lost control of his car in causing the accident.[89]

It also seems likely that she returned to work in July 1938, rather than September, since she took 174 days of leave without pay, including from 15 February through 22 July 1938, after exhausting her sick leave.[90] Perhaps from July through September, she worked part-time.

Neglected, 1930s

Driscoll was thus forced to take a break from her career while recuperating. We will take a break as well, to consider some areas of neglect, that, by all reports, frustrated her in the 1930s.

A Civilian in the Navy …

The earlier mention of the severe shortage of "really qualified" cryptanalysts, with only one individual, unquestionably Driscoll, who could attack any problem, comes from Wenger's Military Study of Communication Intelligence Research Activities of 30 June 1937.[91] The section it comes from is worth quoting at more length (as reproduced in Jack Holtwick's *Naval Security Group History to World War II*):

> 3. … There still remains, however, a serious shortage of really qualified cryptanalysts. There is, in fact, only one fully trained individual among the permanent force who is capable of attacking any problem. Should the services of this person be suddenly discontinued for any reason there would be no qualified substitute. … For this reason at least one additional civil service position in each of the professional grades P2 and P3 should be established …

Only "at least one" more civilian? Why such a small number? The following paragraph may explain the reason:

> 4. Much the best source of permanent personnel for both peace and war is the Fleet Naval Reserve. … They are trustworthy and have an invaluable background of naval experience which is lacking in civilians. …[92]

Holtwick's history is rife with references to officers only, or officers and enlisted men, but not civilians.[93] Holtwick, as will be seen at the end of this paper, had a high opinion of Driscoll. But, as a Navy officer of his era, he thought in terms of officers and men, just as Wenger did.

This attitude persisted into the postwar era, as we will see later.

… Compared to a Civilian in the Army

William Friedman was, in a number of ways, Driscoll's Army counterpart:

- Friedman was hired by the Army as a civilian in 1920; Driscoll by the Navy in 1919.
- Both were the lone civilians in their branches of service for more than a decade afterwards.
- Friedman spent the 1920s creating training

for future cryptanalysts; Driscoll spent it training officers in cryptanalysis.

Beyond that, though, their experiences went in different directions:

- Friedman held a reserve officer's commission, an impossibility for Driscoll at that time.
- The Army entrusted Friedman to create the training, but the Navy had Safford, an officer, create its.
- Friedman was in charge of his organization during this entire time period, while Driscoll lacked authority.
- He was paid more, as well, as we will see below.

Those are easy comparisons for a historian to make. But did Driscoll herself do so? By all reports, absolutely she did.

Rochefort: "There was considerable competition between [Driscoll] and Friedman—considerable competition."[94] In fact, according to Capt. Wesley "Ham" Wright, USN (ret.), "a terrific antagonism developed between her and Friedman"[95] (which might explain her antipathy to the Army's Purple analog, as mentioned above).

Dyer had tried to do something about it during his time in OP-20-G between 1930 (as a trainee) and 1933 (in charge for the last year):

> There was a great unwillingness to grant her a grade … Friedman was always two, three grades ahead of her, and I think that her feeling that that was sexist was probably true. And … before I left here in 1931, I wrote a letter and got it approved, and they cussed me out for it afterwards, I think, but under the difficulties of the Depression and so forth, it was impossible to advance her in grade, but "it should be done as soon as it was possible." They were stuck with it.[96]

But Driscoll was the one stuck with it. She was not promoted between 1929 and 1934, and was turned down in 1935 when requesting reallocation of her position.[97] She would be raised in grade only twice more over the rest of her career, when already two or three grades behind. She never came close to catching Friedman.

Personality Change?

Many extant works that mention Driscoll include the "personality change" she supposedly went through after the 1937 accident. Enough such works have mentioned the change that it is often assumed to be true at this point. But was there such a change? There is evidence both for and against.

For

Layton described her earlier as "enigmatic" and "patrician" but "could be warm and friendly." The following excerpts from others certainly sound like a changed personality:

> … [S]he had a very bad accident and was crippled, limped. She really looked like a witch. And she was very secretive … I think she had developed a little bit of paranoia.[98]

> I am convinced that the same accident that moved her from a beautiful woman to a hag affected her mind and that when she came back she couldn't achieve a monoalphabetic substitution. She was *non compos mentis* or something of that sort. … She came back a bitter vindictive witch. … I talked to people. She was a very pleasant, well-mannered, nice, educated lady [before] … [99]

One caution: Both* of the preceding quotes are from top-notch Navy cryptanalysts, but ones who never knew her before the accident. And the second

*The author has not read every oral history that might bear on the putative change. However, the twenty-five most likely were examined, and these two examples found.

citation is from an exceptionally forceful cryptanalyst, one who found Driscoll an obstacle, as will be discussed later, when he worked for her during World War II.

One other consideration in favor of a personality change is that an extended period of pain could easily change a person's outlook and thus personality; however, there is no evidence to support or refute this in the case of Driscoll.

Against

There is evidence suggesting that Driscoll's personality did not change, as well:

- Safford, in a 29 August 1938 letter: "Mrs. Driscoll is back on active duty once more and is herself in every respect."[100]
- Family: "And she walked on them [her legs], she used a cane, but she walked on them. I remember one time at work I looked out an office window; there she is going down Pennsylvania Avenue walking downtown from 25th Street, and I was on 19th or 18th Street, and by golly I saw her walking back again! So … I mean, she was really messed up [physically]. But as far as I'm concerned, she was very philosophical about it."
- Also from the family: "She always encouraged you in anything you ever did. She was always encouraging." Which drew the comment from the interviewing historian: "I've had several people write to me about that, who worked for her, especially in the late forties [after the accident], a lot of Navy people wrote to me about how she would encourage everybody … "[101]

The evidence against a change also has its qualifiers. Safford's letter dates to right after she returned to work, and, given that she had to use a cane to walk, his assertion that she was "herself in every respect" seems overly optimistic. Likewise, changes in Driscoll's personality might not have been visible to her family or to the Navy people who wrote to the interviewing historian.

Alternative Possibilities

So there does not seem to be any diagnostic evidence that would clearly indicate whether Driscoll's personality changed or not. But change and no change are not the only possibilities. A year in which she could dwell on any frustrations might have increased them. Alternatively, being treated as a "witch" or "hag," hardly an uplifting experience, might have angered her. An antagonistic response to such treatment could be attributed to, or dismissed as, a "personality change."

Suffice it to say that, while Driscoll, by all accounts, reacted to at least some people differently after the accident, attributing this to a change in personality, and attributing such a change to the accident, is not the sole, tenable conclusion. One has to leap over all the other conclusions the same facts support.

Her behavior likely did change to some degree, with some people. Whether her personality did or not, we cannot be sure. She might have been seething with resentment, fuming with frustration, or burning with ambition, but the evidence is inadequate for us to be sure.

"We Didn't See Anything Burning": 1938-1941

Going "Black"

The year Driscoll returned to work, she was faced with another major change: the Japanese Navy changed from the Blue Book code to what the U.S. Navy called Black. But the Japanese changed codes yet again on 1 June 1939, adopting two codes: the "flag officers' code," which was not used enough for OP-20-G to successfully attack, and their main operational code, JN-25.[102]

JN-25

The Red Book wasn't so much broken as it was the result of a break-in. The Blue Book was a major accomplishment in codebreaking. JN-25 would be much, much harder. Anyone wanting to attack the code would have to break through better superencipherment than the Red or Blue Books had had.

This was no transposition system as before. Much harder, the Japanese Navy used a book of additive groups. The book of random numbers to be used as additives consisted of 300 pages of 100 numbers each. Noncarrying addition was used to combine the additive groups to the basic code groups; if code group 1643 ("KISAN") were combined with additive 5514,[103] the result would be 6157—thus superenciphering the code with additives rather than by transposition.

The number of each additive page and the number of the line on the page where the selection of additives began served as "keys" which were included in each message at the beginning and end. Otherwise the receiving code clerk would not have known where to start in the additive book in stripping off the additive prior to decoding. It should be noted that this additive book for JN-25 was not a one-time pad: the five-digit groups were re-used, as needed.[104]

The underlying true two-part code of 30,000[105] five-digit code numbers had nothing to do with the entries' alphabetical order. So Driscoll and OP-20-G, if they could determine that 20001 was, say, "cruiser," would have no hint to what "cruise" or "cruising speed" were. They wouldn't automatically be something like 20000 and 20002, the way the Red Book was set up, and, in chunks, the Blue Book.

A crucial feature of JN-25 was that, when the digits in a code group ("20001") were added together, the total was always divisible by three.[106] This let the Japanese code clerks determine if numbers had been garbled, but it also let the OP-20-G personnel determine if they had made an error removing additives.

Driscoll and a handful of cohorts[107] set to work. OP-20-G did not subdivide the organization into smaller formal groups before 1940, but in that year, Driscoll was in charge of the JN-25 effort. For help, she had, as of approximately summer 1940:

- Her friend, Mrs. Talley
- Civilian Larry Clark
- A Lt. Chisholm, USNR
- A Chief (CRM) McGregor, and
- A Yeoman Kochen.[108]

All five had been with OP-20-G since at least October 1939,[109] and Talley was one of the Red Book copyists back in 1929.[110] It should be safe to say that they were of significant help to the 51-year-old Driscoll, but that she still did most of the cryptanalytic heavy lifting.

And the lifting stayed heavy. Despite similarities to previous codes, OP-20-G was repeatedly set back by the Japanese. Between JN-25's 1 June 1939 introduction and 1 October 1940, the Japanese changed additive books four times. Driscoll and the others had to break five different books of superencipherment and break into the code itself.

On 1 December 1940, the Japanese then changed the underlying code as well as additive book, from the original JN-25A to JN-25B. Fortunately for OP-20-G, it intercepted messages using the previous additive book through January 1941. This allowed Driscoll's team to spend less time on the superencipherment and more time on the code than they might have.[111]

Nevertheless, success would take time and resources that were not available before 7 December 1941. Only some 4 percent of the codebook was solved by August 1941; that portion was doubled after comparing notes with British codebreakers in Singapore.[112] The additive book would be replaced again, in June, August, and on 4 December 1941.[113]

Messages in JN-25 would not reliably be read until March 1942,[114] with the initial break thanks largely to the way numerals were encrypted.[115]

Driscoll would be moved to work on something else before this time. Credit for breaking JN-25 would largely be vested in Rochefort and those working so hard for him in Hawaii. Driscoll's contributions were largely lost to history—but not to everyone.

Ham Wright, who would be Driscoll's boss in 1949,[116] later noted how few people had contributed more than she—in fact, probably only one individual*:

> I know the British commander that did most of the major work on it [JN-25]. … Malcolm Burnett, yeah. He probably did more in the initial JN-25 than anybody else, probably more than Aggie.[117]

7 December 1941

As it happens, Driscoll was on a Sunday drive with family on 7 December 1941. They stopped at the Silver Spring Hot Shoppe when they saw the headlines about the Japanese attack on Pearl Harbor. She was not surprised. They drove past the Japanese embassy in Washington and looked in the gates. "We didn't see anything burning."[118] The Japanese had already burned all but one copy of all codes.[119]

Driscoll was not the only one not surprised that the Japanese attacked; Navy officials in Washington were aware war was imminent.[120] But how much attention she was paying to what had been the Navy's main concern since at least 1930 is unknown. The U.S. codebreaker with the most experience on Japanese targets, who had been decrypting Japanese messages since 1924 and breaking the codes since 1930, she had already been moved off the Japanese problem, apparently in October 1940.[121]

The Enigma: 1941-1942

Assignment: German Navy

Driscoll was reportedly adamant after the war that she broke "the" Japanese code, undoubtedly meaning her work on JN-25, but that her bosses got the credit.[122] That wasn't the only major Axis cryptsystem she worked on, but her contributions on her next assignment did become acknowledged by history. She hasn't gotten much credit, but that is no doubt as it should be, given her contributions.

In presumably October 1940, and certainly as of 7 December 1941, she and four others were assigned to work on the "German Naval System"—Enigma. Only these five people against a system the Germans considered unbreakable:

- Driscoll
- Gaschk
- Clark
- Hamilton, and
- Talley.[123]

The wonder of their work on the machine isn't that they didn't provide an exploitable solution, it's that they solved anything at all. However, what outweighs the wonder is that Driscoll created expectations that she not only did not meet, but did not even approach.

Anglophobia

After more than a decade focused on Japan, the Navy presumably did not take well to being directed to change that focus to Germany, especially when the Purple analog for decrypting Japanese diplomatic messages, the unit that was destined for Hawaii, was sent to Great Britain instead. Safford at least, back in

*Rochefort and Station HYPO *as an organization* deserve most of the credit for breaking JN-25; Driscoll's achievement is to have contributed more *on an individual basis* than anyone but Burnett.

OP-20-G, seems to have developed a raging case of Anglophobia in response.*

The apparent Anglophobia might instead have been xenophobia; earlier, in 1937, in response to a State Department request for a British engineer to spend four months with Bell Telephone Laboratories and the Radio Corporation of New York, Safford's response on behalf of OP-20-G consisted of:

> The Director of Naval Communications can raise no specific objections to Mr. Gee's extended visit to the Bell Laboratories. However, it is considered an undesirable practice for this country to disclose its technical secrets to foreigners while getting nothing in return.[124]

There is nothing to indicate whether Driscoll shared Safford's feelings. However, she did turn down a British offer of a Bombe (essentially, a chain of Enigma-analogs) in August 1941, and she made clear her belief that she could come up with a solution that did not require the kind of machine and manpower resources that a Bombe did.† In addition, when Britain's great codebreaker Brigadier John Tiltman visited, she publicly grilled him on the "vital information" Britain was withholding and again claimed to be able to break Enigma "properly."[125]

Effort

The team was expanded within a year; by 3 July 1942, it numbered fifteen, with ten people added to Driscoll, Gaschk, Clark, Hamilton, and Talley.[126]

The German Enigma machine, between its multiple rotors, stecker plugs, and reflector, had some 150 million squared possible permutations when encrypting.[127] The British, of course, were already working with some success against the Enigma by the time OP-20-G began its effort. However, the Navy, given apparent Anglophobia and probably an attempt at independence, was unwilling to work with them initially.[128]

The Enigma was unlike every other cryptsystem Driscoll was acquainted with. It could not be solved and exploited in a timely fashion without a great deal of 1940s machine and human resources. This must not have been immediately obvious to her, given her belief in a low-resource solution.

Catalog Attack

Burke suggested[129] that Driscoll might have been making a catalog attack against Enigma. A catalog attack generally involves taking a stereotyped phrase—e.g., "situation normal"—and then encrypting it with every encryption setting that the cryptsystem allows. Then, all the possible encrypted versions are searched for in all available traffic. When found, the current setting for that day, week, or other time period is likely found as well.[130]

One other support for the possibility of a catalog attack is Capt. John A. Skinner's war diary, when he was a junior officer in OP-20-G; his entry for 6 December 1942 includes, "Yesterday the boss [Howard T. Engstrom] approved of making the trigraphic index of words in decrypted text on tabulating cards for Mrs. D."[131]

Skinner added on 10 December, "Got a gang punch from Hogan and [we] are set now to start the catalogue for Mrs. D[riscoll]. The plugging presents

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*See Dundas P. Tucker, "Rhapsody in Purple: A New History of Pearl Harbor," *Cryptologia* 6, no. 3 (July 1982): 193-228. Safford wrote the article, and Tucker published it after Safford's death. The section heading "Perfidious Albion" should convey the general tenor of the article.

†The definitive study on this period, which includes extensive documentation from the National Archives, is Colin Burke, "Agnes Meyer Driscoll vs. the Enigma and the Bombe," http://userpages.umbc.edu/~burke/driscoll1-2011.pdf. See also Robert Hanyok, "Madame X: Agnes in Twilight, the Last Years of the Career of Agnes Driscoll, 1941-1957," http://www.nsa.gov/public_info/_files/crypto_almanac_50th/Madame_X_Agnes_in_Twilight.pdf.

some problems, but we should easily get it under way tomorrow."[132]

A catalog attack, with hundreds or thousands of possibilities to search for by hand, was a practical method with the cryptsystems Driscoll was used to. But searching for millions of possibilities would make timely exploitation impossible and furthermore would have required far more paper than she likely could find storage space for. She may have started with a catalog approach, but she did not likely stay with it.

Solution ... ?

She did, in an extremely limited sense, succeed in solving the Enigma. Frank Raven noted that, despite lasting problems with the "slow" wheel,

> Aggie [Driscoll] had her own solution to the Enigma which required no machine support whatsoever. It was done completely by hand and roughly about 20 sailors should be able to read about 2/3 of the traffic. … [H]er solution was using paper models of the machine … in which you slipshoe [*sic*] the side up and down. … [U]sing paper models of the machine she would in essence work a rather poor Bombe by hand of the entire machine.
>
> You'll start off assuming wheel order 1, 2, 3. Then you have a crib message of course. The first assumption, the second assumption gearing toward this was that you had an *unsteckered* letter. So starting with the assumption of an *unsteckered* letter which was six chances out of twenty-six. Starting with an assumed window of the machine and an assumed notch pattern you would try to recover the sequences, see, by hand. Well when you didn't get it on one setting, which you check off very carefully, then you move to the next setting. After you got through the complete cycle of the machine then you changed the outside wheel. It was a trial of exhaustion. … She can't test one crib, one message in the lifetime of the war.…[133] [Presumably Raven meant the four-wheel Naval Enigma, but it is difficult to be certain.]

In other words, Driscoll solved the Enigma much as the British had with their paper analog (which was of the three-rotor Enigma, not the four-rotor Naval Enigma).[134] Presumably she had paper analogs of the wheels, *stecker*, etc., to manually test stereotyped phrases against. This would have been a glacially slow process, as Raven commented. Her solution did not require massive machine support nor did it enable timely exploitation, so it was effectively useless. As victories go, this was as hollow as hollow can be.

Skinner's war diary for 1 December 1942 suggests the analogs were indeed paper, or at least punch cards: "Discussed the advisability of making cards for the wheel and s. [*stecker*?] for all the past E[nigma] traffic, with Mrs. D."[135]

She had fourteen people working with her in 1942, but until the Navy began building Bombes, after Driscoll was moved from the effort, they would produce no usable results against the Enigma.

Grenades for Bombes

Nevertheless, Driscoll did make a lasting contribution to the work against Enigma. Once the Navy was producing Bombes, machines called Grenades, adjuncts to the Bombes,* aided the effort. Driscoll helped design the first U.S. Grenade, a month before the Bombe project had been approved in September 1942. Once the Bombes found the daily key, the Driscoll-Howard Standard Grenades reduced the effort needed to identify the window settings for succeeding messages to a short four- or five-letter crib.[136]

Enigmatic Motivations

Why didn't Driscoll accept what help the British offered, instead of putting them off? Was

*A Grenade was a Navy machine used to test cribs for Enigma-based messages, when the original plug settings were known but the wheel order was not.

Driscoll just backing Safford and trying to keep the British at arm's length? Trying to support him by exposing "Albion's perfidy"? Was she overconfident after breaking so many codes with so little help? Was she herself Anglophobic enough to underrate anything the British did? Or was she simply angry, frustrated, or displaying a changed personality? We cannot know. Her motivations remain an enigma, one with probably too little information ever to be uncovered.

As the principal cryptanalyst, Driscoll might seem the key figure in any OP-20-G cryptanalytic effort during this timeframe. But her approach to Enigma suggested that time and encryption developments might be passing her by. She was bypassed in another way in her next assignment, on Coral.

Bypassed: 1943-1944

Coral

Driscoll and some of her team had been moved by 29 January 1943 to work the Japanese Naval Attaché machine known as Coral (see Appendix V). She was in charge, with one enlisted man and five civilians:

- Kilcullen, E. T., Sea1c
- Mrs. L. V. Appleby
- Mrs. E. A. Clark
- Mr. D. B. Grier
- Mrs. M. M. Hamilton, and
- Miss [Mrs.] H. L. Talley.[137]

Although Frank Raven wasn't listed as a member of the team, he was part of the group that broke Coral.[138] In his words, briefly:

> Engstrom had gone to Wenger and got Aggie Driscoll assigned to work Coral to get her off his back on the Enigma. … I remember that … when we turned the problem over I had copies of my notes, there had been a couple of cribs on these messages. … Through my old friend Milt Gasch we bootlegged copies of the original ciphers and the material without Aggie knowing it. …
>
> I said [to a subordinate], assume that this thing is like the Jade machine [see Appendix V], telephone selectors lapped the square wire. … He brings the thing back and by God, he's got it on. He's placed the crib, and again it was a favorable motion of the machine. …

Raven then approached Engstrom about studying the plaintext underlying Coral, which Engstrom accepted, putting production and research together. Raven claimed that Engstrom did not realize that the only way to study the plaintext was to break the encryption. When Engstrom did realize, according to Raven, he gave the go-ahead. The Navy had National Cash Register build a machine for decryption. Raven: "We had the machine in my office, running. They had to tell Aggie about it at this point. … Aggie demanded that I be court-martialed for wasting government materials and going against orders."

> Secondly, she refused to turn over the current traffic. That was her responsibility. … What the Navy brass didn't know and what Aggie didn't know was we had tapped the line that the current traffic was coming in on, and we were processing the current traffic up in my office with the full cooperation of Engstrom and Howie Campaigne, too.[139]

Raven would do whatever he needed to, to get the job done. Earlier, when Driscoll was working on Enigma, he broke into her safe to examine what she had.[140]

If it sounds as if the author is denigrating Raven for ensuring that Coral was broken (and Enigma as well) during a war, when lives were on the line, not

so. Only, perhaps, his methods. Wenger, for one, does not appear to have approved:

> According to Raven himself: "I was the first person who didn't kowtow and had enough guts to say she was nuts. Wenger I don't think ever talked to me privately or personally from that day on."[141]

Rise of the Machines IV

Driscoll may not have been as machine-oriented as some and was certainly slow to adopt them, but she did not categorically disdain their use. On both Enigma and Coral, she took some advantage of machine processing.

Aside from the Grenade mentioned above, she requested automation support in November 1941 for Enigma, and the microfilm-reading machine eventually delivered became known as "Hypo"[142] (not to be confused with Station HYPO).

Capt. John A. Skinner's war diary, when he was a junior officer in OP-20-G dealing with machine support, mentions machine runs for Driscoll and her team in 1942:

- on 15, 16, and 18 May 1942 (the 18 May entry mentions "Raven's NAT [naval attaché] traffic")
- 23 June and 10 July 1942
- 18 August 1942: "Mrs. D gave us E-2-8 traffic to punch and prepare for the IC [a machine for making Index of Comparison checks] when it arrives. It took only three watches for the whole thing," and
- 14, 21, and 28 September 1942.[143]

Skinner also notes work on 8 October that might relate to Hypo development: "The books on Mrs. D's library will stack up as follows—78 pages per book, 6,066 books, or 473,148 pages to be photographed on microfilm. 35mm? or 325 sets times 336."[144]

Skinner might have earned some of Driscoll's ire, as well; he recorded for 4 November moving "Mrs. D" to unspecified other or new spaces* the following day. Then, on 5 November, he wrote, without elaboration, "Got the devil for the rooms being in rather bad shape. Must get after the men some more."[145]

Raven

Raven was heading an OP-20-G decryption watch in early 1941 but came in contact with Driscoll earlier, when he was initially working for her. His description of the work environment was anything but flattering. No one was permitted to talk, but could only pass notes through Driscoll. Restroom breaks required her approval. Any sailor who displeased her would be shipped off to Hawaii. And she had many senior Navy officers behind her giving her clout.[146]

This last item has partial corroboration:

> One of our Navy people recalls when they had to fill out the questionnaire for periodic security investigation and update. Where it asked for references, Mrs. Driscoll listed the names of five admirals. When a young Navy lieutenant saw this, he came over to her office and said, Ma'am, you can't do that. She looked at him with a squint eye, and said, "Sonny, I knew them when they were ensigns

*Probably not a reference to OP-20-G's move to Nebraska Avenue; the entry for 12 December 1942, (p. 216) mentions what space Mrs. D. "will" require, and on 19 January 1943 (p. 225) what phones will be needed at "the new place." The 2 February 1943 entry (p. 232) adds that the "Driscoll" section will move from room 1532, presumably at the Navy Building, to room 1120 at "the School bldg."—undoubtedly Nebraska Avenue—which had been a girls' school. Skinner himself moved or at least visited on 6 February (p. 234): "I finally went out to the new office--Naval Communications Annex, Massachusetts and Nebraska Ave., Room 2104, phone 17 (ORdway 2600)."

> and lieutenants, and if you keep this up, I'm going to tell them not to promote you." The young lieutenant said, "Yes, Ma'am," and departed.[147]

Although presumably accurate, Raven as an uncorroborated source requires a brief treatment. Was Frank Raven an extremely forceful individual? According to one now-retired NSA senior executive who dealt with Raven on numerous occasions, "extremely forceful" was an understatement. Raven was exceptionally focused; he would generally charge right through any obstacle to reach his goal, whether breaking a cryptsystem or just getting a soft drink from the vending machine. Not in any sense malicious, he was simply very, very driven, and in his drive would steamroll anyone who got in his way.[148]

Raven's oral history has small measures of praise for Driscoll but has more than one "witch" reference when he speaks of her; the one noted in the "Personality Change?" section is an example. It's reasonable to believe that young Raven, arriving in OP-20-G, expected the preeminent cryptanalyst to know everything he knew, and then some. He presumably expected that she would take the approach he would, or a better one.

Sadly, with both Enigma and Coral, that was not the case. Instead, she chose methods that would not ultimately work.

And so Driscoll got in Raven's way. She came between him and his goal. And Driscoll had clout enough that he couldn't steamroll her, and trying to could get him sent to Hawaii.

Although Driscoll undoubtedly irked others at some point, searches of NSA oral histories reveal that most of the mentions of her are factual, laudatory, or both. Only a few seem to disparage her.

What makes this pertinent is … Raven was as close as a human being is likely to get to being an unstoppable force. How much might his views of Driscoll have been colored by her desire to be something of an immovable object? How widely might his views have propagated?

There is no evidence and we can only speculate: How much might Frank Raven's personal experience have been responsible for the "witch" perception of Driscoll towards the end of her career? For the post-accident "changed personality" view? How much might this highly influential man's opinions have influenced others'?

No doubt the smoke had some sort of fire behind it, but how much is difficult to determine at this late date.

Last Navy Years: 1944-1949

Any fuming or frustration she might have felt for the Navy would not last much longer; she was one of many Navy cryptologists who were moved to the Armed Forces Security Agency (AFSA) when it was formed in 1949.

What she was working on in her last four years as a Navy civilian carried on into her time in AFSA and will be treated in the next section. But what the Navy was like in those final years is worth considering briefly, to put Driscoll in context.

OP-20-G had only eighteen civilians on 30 September 1939;[149] naval cryptologic giant Joseph Wenger's study, cited above in Neglected: Part I, had pointed out the lack of "really qualified personnel." This remained true into the postwar years, as well; Wenger's study was never acted on, as Holtwick noted:

> Unrealized by most … was the inherent inability of an effective and efficient COMINT organization to fit into the traditional concept of Naval organizational structure. Many attempts were made to reconcile the incongruities, but they never really succeeded; the lack of fit was circumvented, plastered over, or ignored (in the case of the Wenger study) in the hope it would go away. … [150]

Thus the Navy, unlike the Army, came out of World War II with only 70 civilians out of 11,000 personnel.[151] Holtwick was not the only one aware of the costs of the lack of civilian experts; Capt. Wesley "Ham" Wright was as well, at least in retrospect. When asked in an oral history about comparing technical ability between the Army and Navy, he said:

> No, they [the Army] were way ahead of us. … The only thing we had was Aggie Driscoll and a bunch of naval officers who were not very savvy. Dyer and myself were the only ones who had any real talent at all. We couldn't compare with Rowlett and the people that he had, or Friedman. … [I]t was the way we were trained. We had to go to sea for three years. … The Army methods were more sophisticated than ours because their people had been trained for longer periods of time at it. Where we had a bunch of young squirts that we just developed ourselves.[152]

The Navy had relied on reservists who could be called up and commissioned, which the Navy believed gave it better control of security, personnel rotation, assignment flexibility, and better overall control by commanders. But the Navy did realize after the war that this approach would be less likely to work in peacetime and moved to a system that included senior-grade civilians, wherein the Navy decided what was to be done, and the civilians, how to do it.[153]

Driscoll presumably welcomed this change; she had reportedly sought some level of authority, even during the times she was the head of a section, for some time:

> Raven: "She ran everybody around her and if she didn't like the look of a sailor he was sent to Hawaii. Period. That's all she had to say, 'Get that man out of here,' and he was shipped off."[154]
>
> Wright: "The main reason that we didn't talk to the Army is because if she found out about it she would raise holy hell. … [Asked if she tried to run things.] She tried to. Wenger and I would be able to calm her down pretty well. Safford never had much luck with her. Wenger was quite good at it and I was fair, I guess."[155]

Driscoll never did get to run OP-20-G; sadly, neither was she one of those moved to a senior grade. Her Navy P-6 grade converted to a government service GS-13 upon joining AFSA, but her last promotion was to that grade in 1942 (see Appendix III), and she would carry that grade to retirement.

Carrying on to AFSA: 1944-1952

"The Russian Problem"

After the ignominy of Enigma and being circumvented on Coral, Driscoll was moved to a new problem in 1944.

Raven claimed that she had been moved to Coral to get her off of Enigma, and then the Coral business broke the back of her reputation.[156]

Campaigne (the other person to refer to Driscoll as a "witch," above) expressed similar sentiments later, that Driscoll was given very difficult assignments, which others had given up on, just to "keep her busy."[157]

If that was the intent, the move was a success. Driscoll was moved in April 1944 to OP-20-G-50, the Russian Language Section corresponding to the Army section that eventually produced the Venona breakthrough. She headed the small machine-support group.[158]

Venona is the name for the Army's cryptanalytic effort that began on 1 February 1943 to attack accumulated Soviet diplomatic traffic. Mixed in with "true diplomatic" traffic was other traffic as well, including Soviet espionage messages. The extreme cryptanalytic

and analytic challenge of Venona continued until 1980.[159]

Driscoll's section consisted of herself, four civil servants, and three enlisted WAVES and was responsible for cryptanalysis, language work, and traffic analysis. She and her section were moved from what had become OP-20-G-10 in March 1945 to OP-20-G-50; in June 1946 all Russian diplomatic effort in the section, which had become NY-1, was ended; all traffic, research material, and results were transferred to Driscoll.[160]

In September 1946 Driscoll's cryptanalytic group was placed under the operational control of N-2.[161]

The Navy attacked only one Soviet diplomatic system. This part of Venona, to grossly oversimplify, was both the most voluminous and the least lucrative for intelligence content. Its primary value was in whatever light it shed on the espionage traffic that it shared with accidental one-time-pad use.

It took the efforts of cryptologic giants like Dr. Richard Leibler and Cecil Phillips, along with exceptionally advanced techniques and equally advanced equipment, to break what was finally broken in that system. Over 50 work-years of effort were expended.[162]

Unsurprisingly, Driscoll and her seven-person group did not have any success to report.[163]

AFSA was formed in 1949, and Driscoll was assigned to AFSA-24 on Christmas Day that year. AFSA-24 probably became AFSA-02A7 a year later (see Appendix I) and was formally the Special Processing Division in the Office of Operations;[164] informally, it was "the Soviet problem."[165] So the work she had been doing at the end of her time in the Navy carried on into AFSA.

It was probably this period that future coworker (and NSA's Cryptologic Hall of Honor member) Juanita Moody later remembered:

> But I knew Aggie through school. She sat in a room. Had a [pause] like a little private room at the head of the wing that I worked in, and every once in a while I would just stop in and talk with her. But, you know, nothing of any consequence. At this point she received help in and out, but I do remember a lot of people who had known her over the years would drop by. People who would be … you know, a lot of Navy people who would be back on TDY, so they'd drop in and say hello to her.
>
> I don't know [what she was working on then]. I don't think much of anything. I think they just took her some worksheets … probably nothing that made any difference. … I just felt, you know, that she kind of liked to have somebody drop in and say hello, and every once in a while I'd do that. …[166]

Technical Consultant

Driscoll was moved to AFSA-206 on 26 November 1950 (see Appendix I); this was the Technical Consulting Group, where she worked for Frank Raven, of all people.[167]

Raven, to his credit, reportedly defended her when she needed it: "… I found myself in a rather amusing situation after World War II of defending her. Some of her old Navy friends, these characters who licked her boots, were really out to do her in, and I was so pissed off that I found myself in the position of seriously defending her. … When she was down and out they were prepared to kick her teeth in. … By 1947 all her admirals had left, had all retired. She lost her clout. …"[168]

She remained in AFSA-206 until the National Security Agency was formed in 1952.

NSA: 1952-1959

Top Consultant

Given the similarity in organizational designators, AFSA-206 probably became NSA-206, Driscoll's first office after NSA was created (see Appendix I); this office was known as the Technical Projects/Services Group, an adjunct research office for Operations.[169]

She stayed in NSA-206 or 206B until sometime in 1953. A roster, or partial roster, of personnel in the office in her Civilian Personnel Record[170] shows that this was not just an office of technical experts, it was an office of stars. Her coworkers included:

- **Mary J. Dunning**, a statistician on William Friedman's team that broke Purple
- **Sydney Fairbanks**, the first editor of the *NSA Technical Journal*, lauded as an accomplished musician, brilliant teacher, expert linguist, and, once, a law clerk to the Massachusetts Supreme Court—among other things
- **Bassford Getchell**, honored as a Distinguished Member of the CryptoMathematics Institute (CMI)
- **Arthur Lewis**, also honored as a Distinguished Member of the CMI
- **Frank Lewis**, an important cryptanalyst against Japanese systems during World War II and on the Venona project after the war. A creator of crossword puzzles for decades, in 1950 Lewis was named by *Harper's Magazine* as one of the four outstanding "puzzlers" in the U.S. and UK.
- **Bill Lutwiniak**, also honored as a CMI Distinguished Member, was a major cryptanalyst in World War II, on the Venona project, and later
- **Paul Reimers**, who, with Hall of Honor member Juanita Moody, came up with the concept for the "Mathew" machine used against a highly important postwar cryptanalytic problem
- **Leslie A. Rutledge**, who led an NSA effort against an important element of the Soviet problem and later wrote the article "John Dee: Consultant to Queen Elizabeth I"[171]
- **David Shepard**, who arrived at William Friedman's SIS in 1944 and later left the Agency to form a systems development company
- **Martha Shinn**, who had become one of the top five women in pay grade only two years later, in February 1955
- **Harold Stukey**, who co-wrote, with the eminent Lambros Callimahos, the June 1971 *Basic Cryptologic Glossary*

Pacific Division

Driscoll moved to NSA-064 (later, NSA-0641) around 1954, then to C74203 between late 1955 and mid-1956 (see Appendix I). NSA-064 was presumably the Pacific Division, where she developed some machine support.[172] C74203 probably changed designators to C7403 by mid-March 1956, since she did not change raters for her performance appraisals. The latter organization was listed as "ACOM-403" in NSA telephone books of the period (again, see Appendix I).

Driscoll was recognized in the January 1954 *NSA Newsletter* for reaching thirty years' service. She, Wenger, and Friedman seem to have been among the first five people at NSA to reach this milestone.[173]

Driscoll would have been in one of the early contingents that moved to Fort Meade, moving between late 1957 and early 1958.[174] She did not relocate[175] and did not drive from Washington, DC, to Fort Meade every day, either.[176]

A former coworker remembered his first years, which were her last; his words are so eloquent they speak for themselves:

When entering the Agency in 1956 as a civilian, I was assigned initially as the Chief of a division's management staff. Part of my "other duties as assigned" was to ensure that that "kindly, but firm" elderly lady—Agnes Driscoll and her two assistants were comfortable and pleased in their physical location—a small space in one of the deteriorating World War II barracks, designated B Building in the Arlington Hall Station. It wasn't unusual to see visiting senior naval officers crawl their way through the small aisle and cramped spaces to where she was located for a courtesy visit, and on a few occasions, Dr. Abe Sinkov, then Chief (or Deputy) of Production, would stop by to personally inspect that all was well with Agnes Driscoll.

She was a kindly and brilliant-minded person, and while I was ignorant of her impressive background, she always treated me with respect and friendliness. It was obvious, however, that she was extremely loyal to her workers, and she was a fierce fighter when it came to protecting them. She performed research work, which some said would take only a fraction of the time if she would use and rely on machine support. But it was her apparent belief that there was no substitute for hard copy traffic, and she was supplied with endless boxes full of it to use for her analysis. She could often be seen with her huge magnifying glass, mounted on a special fixture, to scan each piece of traffic.

When the Agency moved to Ft. Meade, Agnes Driscoll decided that she and her assistants should sit right up against an inside wall—in the middle of a long aisle in the operational spaces! To the consternation and frustration of the Division Chief, he could not convince her to move her work spaces and thus the aisle had to be diverted around them. During an office meeting, as the Division Chief lamented the disruption to the normal work area, I volunteered to take on the job of trying to get Agnes Driscoll to reconsider. With a few snickers around the table, the Chief invited me to go into the "lion's den" and get chewed up. As it turned out, to everyone's surprise, Agnes Driscoll smiled with a twinkle in her eye and readily agreed to move after I noted the advantages of doing so. I thought it was a great accomplishment at the time, but I suspect in retrospect, that it was probably my youth, short haircut, and "courage" which reminded her of a different era with former student naval officers and compelled her to take pity on my plight and request. In any case, I believe the caution and timidity of people to approach her generally was without foundation—she was one of the most pleasant and kind persons I have ever met and certainly a very memorable individual. She readily deserves a special place of recognition and remembrance in our organization.[177]

Apparently Driscoll's last assignment before departure was one, unlike some in the last half of her career, that harnessed her talents. She was reportedly given some unreadable communications that no one else could solve. Two weeks later, shortly before her retirement, she was able to provide the solution and make the communications readable.[178]

Driscoll reached the then-maximum retirement age of 70 on 24 July 1959 and retired on 31 July 1959. She received a letter from the then-NSA Director congratulating her after "service with this Agency and its predecessors since 1918 [which] has been highly satisfactory in all respects."[179]

Fig. 16. Y1C Margaret Meyer Hamilton, Agnes's sister

Nevertheless, NSA neglected then or for the rest of 1959 to mention her retirement in its newsletter, as it had for others. Her retirement was not marked in any way. Of course, that may have been Driscoll's choice. She was generally quiet about her work, even with family.

Two Close Associates

Margaret Hamilton

Driscoll's sister Margaret Eliza Meyer was born 10 May 1897,[180] eight years after Driscoll. She too enlisted in World War I,[181] then joined her sister in OP-20-G by 7 December 1941, working for her against JN-25, Enigma, and Coral.[182] Married by then, Margaret Hamilton went on to work with Driscoll at Arlington Hall as well: as someone who knew Driscoll then related: "… [T]his was during the Korean War. … When I first saw her and Mrs. Hamilton sitting in a private office, I asked my Branch Chief who she was. His reply, 'She's a friend of the Admirals.'"[183]

Campaigne and Raven, who showed little liking for Driscoll as a person, felt otherwise about Hamilton: "a very nice person" in Campaigne's view, and Raven had nothing derogatory to say.[184]

Hamilton was unwilling to make the move to Fort Meade, unlike Driscoll, and resigned in 1957. She suffered a stroke in 1969 and fell into a coma, staying in the Fairfax Nursing Home until her death in 1980.[185]

Helen Talley

Helen Talley hired on as a stenographer in the Fifth Naval District's Commandant's Office in 1920. She transferred to the Office of the Director of Naval Communications in 1928.[186] She was, as noted in the section on JN-25, one of the Red Book copyists from 1929, was likely with Driscoll during the near-crippling car accident, and worked with Driscoll on Enigma and Coral,[187] and quite possibly for the rest of her career.

Campaigne remembered Talley as well, not with favor: "another crony named Mrs. Talley, whom she [Driscoll] said was the greatest frequency counter. And, you know, that's not very high level." Raven was even less complimentary: "She [Driscoll] had with her

Fig. 17. NSA Director Lt. Gen. John Samford, Helen Talley, and Driscoll, at Talley's 1958 retirement

[on Enigma] two or three really hack clerks. One I think was named Callie."[188]

Talley retired, with 35 years of service, on 28 February 1958 and was held in high enough regard that her picture was taken with the director of NSA at that time, Lt. Gen. Samford, and with her supervisor, Agnes Driscoll, age 69, just 17 months before Driscoll's own retirement.

Retirement: 1959-1971

Hobbies

After retirement, Driscoll and her husband Brownie had considerably more time for hobbies and recreation. According to family, she loved to garden, especially at their seven-acre property in Tyson's Corner, which had a Civil War-era dugout and a lookout post called something like Fort Freedom, which they used as a garden. They owned considerable real estate.

They traveled, before and after retirement, often with Driscoll's mother Lucy Andrews Meyer; destinations included New England, postwar Europe, and pre-Castro Cuba. Driscoll liked to go shopping and collect and redeem Green Stamps for rewards. They entered contests, and Driscoll liked to gamble. They would travel to Route 301 in southern Maryland and gamble for prizes. (Interest in gambling apparently is not unusual with cryptologists who spend as much time with probabilities as Driscoll did.) She was a good chess player, as well.[189]

Fig. 18: Driscoll gardening at the Four Corners property, mid-1930s

Personal Life

She wasn't interested in dresses or jewelry, but she did like scarves. She liked spending time with children, such as her nieces and nephews, and figuring out what their play meant ("looking deeper into them than just kids being around"). She also encouraged them in what they did; family remembered her as always encouraging.

The Driscolls didn't socialize much, especially with coworkers, but did spend Thanksgiving and Christmas with friends, one of whom was a professor at Maryland University.[190] One of her grandnephews entered the Naval Academy in Annapolis, and Driscoll was thrilled that one of the family was embarking on a career in the Navy, given her great respect for that service.[191]

She did not talk about work or coworkers much, but she did speak often and favorably of Thomas Dyer,[192] who had tried so hard to get her promoted when he headed OP-20-G.

They also attended lectures by leading scientists in fields such as astronomy and anthropology. Family remembered Driscoll as "deep" herself; even in talking, she used examples and drew unusual conclusions.[193]

Deaths

Driscoll's mother, Lucy Andrews Meyer, apparently lived on the seventh floor in the same building in Washington, as her daughters Driscoll and Hamilton, near the end of her long life.[194] She died 27 May 1964, aged 100.[195]

Brownie died later that year, on 3 December, of a heart attack.[196] Driscoll took his death stoically; family remembered her as so iron-willed, she would not react to an atomic bomb going off.[197]

Driscoll herself, in her mid- to late seventies, was beginning to decline in health. Safford visited her around 1967; she was still living on 25th St. NW with her sister but was in very poor shape and barely able to walk.[198]

Hamilton, as previously mentioned, had a stroke in 1969, collapsed, and remained unable to speak until her death in 1980. Driscoll took this very hard, and family noticed her decline as well; the two were extremely close.[199] Driscoll lost the sister who had served with her in both World Wars, through Enigma, Coral, in the Navy Building, at the Communications Annex on Nebraska Avenue, and at Arlington Hall in AFSA and NSA. Margaret Hamilton was the only one with whom she shared so much of her life.

Driscoll went into the nursing home with her sister then, so they were together, even if Driscoll could not communicate with her.[200] When Driscoll's Navy officer relative visited at one point, she was apparently unable to speak.[201]

She died in Fairfax on 16 September 1971, at the age of 82, and was buried beside Brownie, in Section 35, Grave 4808, of Arlington National Cemetery.[202]

Assessing Agnes Driscoll

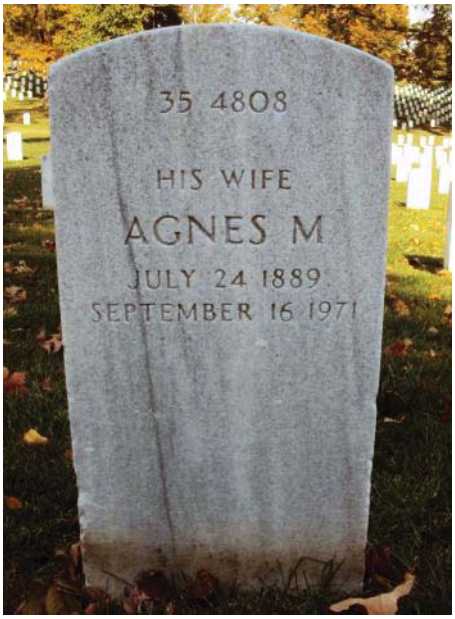
Assessing Agnes Driscoll isn't easy, given the virtual complete lack of documentation she left behind, but it can be done. We can look at others' existing views of her; we can compare her to her closest peers, namely William Friedman and his first three hires; and we can, in the process, attempt to remedy any remaining neglect.

Contemporaries' Assessments

There is no shortage of existing views on Driscoll. Quite a few, some of which will be familiar, can be found to praise her. Alphabetically:

- Cryptologic Hall of Honor member Thomas Dyer, Capt., USN (ret.): "I think she was absolutely brilliant, particularly before her accident. … I think she was fully the equal of Friedman … if not superior. … Aggie Driscoll appears at the top of the list [of Navy cryptanalysts], in my book."[203]

Fig. 19: Driscoll and her mother, Lucy Andrews Meyer, 24 August 1963, three days before Meyer's 100th birthday. Note Driscoll's right leg, in foreground.



Figs. 20 and 21: Driscoll's and her husband's gravestones in Arlington National Cemetery

- Edwin Layton, RAdm., USN (ret.): She was "enigmatic but brilliant … extremely dedicated … She not only trained most of the leading cryptanalysts of World War II, but they were all agreed that none exceeded her gifted accomplishments in the business. Injuries sustained in a bad auto accident in 1937 required her to use a cane for the rest of her life, but she continued to work miracles, as we shall see, in breaking Japanese and German codes and ciphers throughout World War II. … insightful … [an] unostentatious but spectacular career … [an] uncanny grasp of cryptology. … In the Navy, she was without peer as a cryptanalyst. Some of her pupils, like Ham Wright, were more able mathematicians. …"[204]
- Redfield "Rosie" Mason, Capt., USN (ret.): "[S]he was very good. …" When asked if she was the best cryptanalyst in the Navy, he simply answered in the affirmative.[205]
- Hall of Honor member Joseph Rochefort, Capt., USN (ret.): "[A] first-class cryptanalyst … extremely capable … a very talented person—awfully good."[206]
- Hall of Honor member Dr. Louis Tordella, NSA's longest-serving Deputy Director: "[The Navy] had the equivalent of Friedman. They had Agnes Driscoll who was really a very brilliant, very outstanding person, and to whom we owe a great bit of information and a great debt."[207]
- Duane Whitlock, Capt., USN (ret.): "I didn't learn until much later what a genius she was. …"[208]

Three top cryptanalysts can be found to give rather opposite views:

- Hall of Honor member Frank Raven: "In retrospect I am convinced that Aggie Driscoll is one of the world's greatest cryptanalysts. I am convinced that the same accident that moved her from a beautiful woman to a hag affected her mind and that when she came back she couldn't solve a monoalphabetic substitution. She was *non compos mentis* or something. …"[209]
- Howard Campaigne: "[S]he was very secretive. … For a long time she had been a shining light … their main cryptanalyst. … But she became fearful that she wouldn't be able to do things. … She would get a-hold of what she thought was good and she wouldn't let us see it and hide things. … So I was her superior. And she wouldn't tell me what she was doing. I'd go in and talk to her and she'd give me nothing."[210]
- Prescott Currier, Capt., USN (ret.): When asked, was she a talented individual? "You know, I used to think so. … [S]he had a certain amount of innate cryptanalytic sense, there's no doubt about that, but I can remember when I came back from England in '48, my job was called 'The Director of Research, Naval Security Group, OP-20-G.' I was 'N.' … Mrs. Driscoll was N-2. … She spent two solid years taking hand frequency counts of what was obviously one-time pad traffic. Now, I never felt that I should go tell her that the world had fallen, times had changed, so. …"[211]

Resolving these different views of Driscoll would be very difficult, except that it's just possible that Wesley "Ham" Wright, Capt., USN (ret.) did it for us: "Very good on the whole as a cryptanalyst. … On the stuff we were working on, she was the best. There was no question on the Blue Book and on the recovering. She had taught herself enough Japanese as Dyer and I had to do also to be able to do something with it. She wasn't much good on the machine stuff when the machine stuff started to come in. Her mathematics were not as good as the rest of us. So she wasn't as good on the machine stuff as she was on the codes."[212]

Wright's assessment makes sense of the disparate, preceding views and agrees with Layton's. Driscoll's 1911 bachelor's degree in mathematics and her OP-20-G experience were enough for the Japanese super-enciphered codes she started with and learned so well.

On the other hand, Campaigne, for example, was a PhD with a degree decades more recent than Driscoll's; he had been teaching math at the University of Minnesota when Pearl Harbor was attacked.[213] When Driscoll tackled Enigma and Coral, her degree was thirty years old. She could have kept up on developments in mathematics, but she may have felt too many reasons not to: OP-20-G was so small for so long, had so much work needing to be done, and, especially, did not need mathematical skills greater than hers for so long.

One other aspect to her assessment becomes clear if she is compared to other cryptanalysts of her era.

Comparing with Friedman

If Dr. Tordella, NSA's longest-serving deputy director, was going to compare her to William Friedman, the least we can do is the same.

In terms of training others, there is no comparison. Friedman—and especially the training he created—set up the Army, AFSA, and NSA cryptanalysts for success for decades to come. He put them on a sound mathematical basis, with thoroughly documented training. Driscoll did not come in any way close to matching this.

On the other hand, we must in justice acknowledge that the Navy never wanted her to create training programs. The officer in charge of OP-20-G was the one to set up any such programs. Driscoll's role was to work with, in Wright's word, the "squirts."

Likewise, we cannot compare her to Friedman in terms of hiring. His three initial hires, all cryptanalysts, went on to stellar careers and, like Friedman and Driscoll, entered the Cryptologic Hall of Honor. Then again, Driscoll had no input that we know of into hiring, and the Navy focused on bringing in officers and reserve officers in any case.

Where the comparison becomes more illuminating is when we compare Driscoll to Friedman and his first hires, but comparing them to the 55-year-old Driscoll, at the end of 1944. This was when she'd been moved from Enigma and Coral to something else to "keep her busy."

What were Friedman and his three first hires, Frank Rowlett, Abraham Sinkov, and Solomon Kullback, doing at age 55? (See table below.)

Simply put, Driscoll was at an age when top codebreakers are no longer breaking codes but leading organizations, working with top leaders, or retiring.

So, although she apparently remained a master of what we now call hand systems for the rest of her career, it's fair to say that, for whatever reason, she wasn't ready to tackle the latest, most modern cryptsystems in her mid-50s. The record proves that. At

Name	Year	Activity/Title	Comment
Driscoll	1944	Being removed from Coral	-
Friedman	1946	Helping reorganize cryptologic services, then (1947?) became seriously ill[214]	-
Rowlett	1963	Special assistant to director, NSA	Retired three years later[215]
Sinkov	1962	Deputy director for production, for at least part of the year	Retired that year[216]
Kullback	1962	Chief of R&D, for at least part of the year	Retired that year[217]

the same time, however, it's fair to say that cryptanalysts that age generally aren't expected to. They either lead efforts or retire.

Neglected No Longer

Driscoll lifted herself up from stenography to become the Navy's principal cryptologist for many years. The Navy, however, neglected to promote a civilian woman when its focus was on interchangeable, rotational officers. The Navy and AFSA neglected to put her in a position to succeed, with her immense strengths against hand systems. NSA has neglected to name a building, road, or auditorium after her, as of this writing. History has neglected to present her in the fullest light. And she herself neglected to leave historians the material to do so.

But perhaps much of that neglect can now be banished. The only person assigned to Riverbank, MI-8, a service cryptologic agency, AFSA, and NSA, along with private-industry cryptography, has earned a unique place in history.

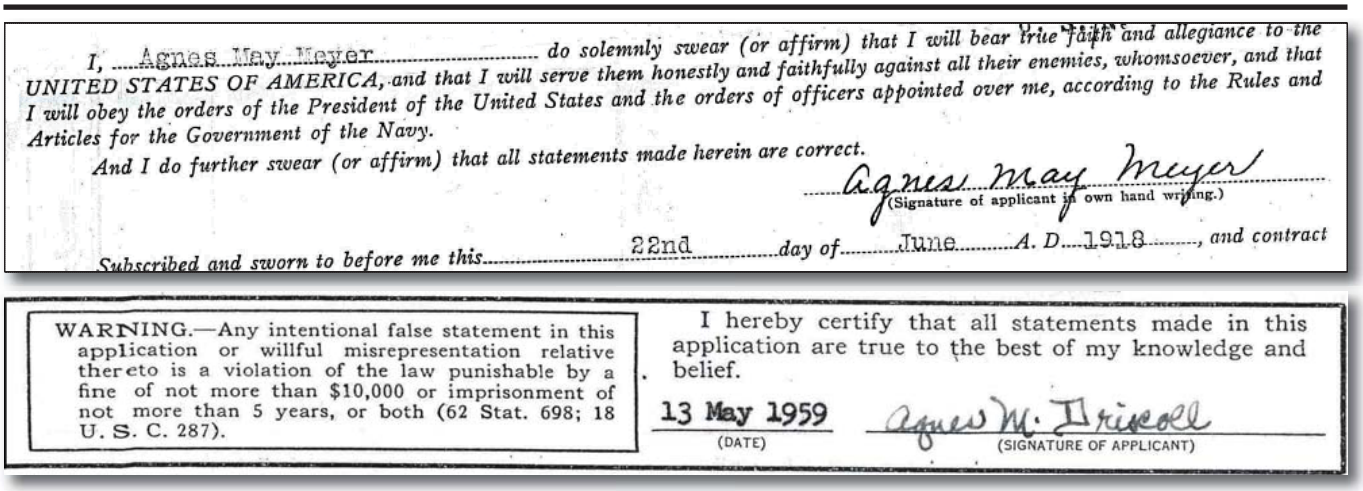
Safford observed in *Back in the Navy: 1924-1930*, the "Departure and Change" section, that it was thanks to the need for someone like Driscoll that the Navy brought him into cryptologic work. Given how important both cryptologists were to the United States in World War II and how many thousands upon thousands of Allied lives were saved due to cryptology, history cannot neglect her importance, not just to cryptologic history, but to America itself.

Holtwick made that importance quite clear:

> It is apparent that until the Japanese attack of December 7, 1941, most of the cryptanalytic work of the Navy fell upon the shoulders of a very few regular Navy officers and men, and a handful of civilians at the Navy Department. Only about 400 persons were actively engaged in COMINT work at the time of that attack, and at least 200 were newcomers who had joined the group in the preceding 18 months.
>
> Thus the accomplishments of WWII in the COMINT field were built on the foundation laid between 1924 and 1941. … It is for that reason that the names of those pioneers are mentioned in this narrative. …[218]

Likewise, at the end of her career, Driscoll might not have done the networking and managing to get ahead, but she had a reputation with the workforce as helpful and encouraging, aloof but not unapproachable, and as a top troubleshooter sent in to deal with the tough problems.[219]

She certainly wasn't unapproachable, as these two quotes make clear:



I, Agnes May Meyer do solemnly swear (or affirm) that I will bear true faith and allegiance to the UNITED STATES OF AMERICA, and that I will serve them honestly and faithfully against all their enemies, whomsoever, and that I will obey the orders of the President of the United States and the orders of officers appointed over me, according to the Rules and Articles for the Government of the Navy.

And I do further swear (or affirm) that all statements made herein are correct.

Agnes May Meyer
(Signature of applicant in own hand writing.)

Subscribed and sworn to before me this 22nd day of June A. D. 1918, and contract

WARNING.—Any intentional false statement in this application or willful misrepresentation relative thereto is a violation of the law punishable by a fine of not more than $10,000 or imprisonment of not more than 5 years, or both (62 Stat. 698; 18 U. S. C. 287).

I hereby certify that all statements made in this application are true to the best of my knowledge and belief.

13 May 1959
(DATE)

Agnes M. Driscoll
(SIGNATURE OF APPLICANT)

Figs. 22 and 23. Agnes Meyer's/Driscoll's signatures, on her Navy enlistment papers (top), and on those for her retirement from federal service

> I am so fortunate to have known this lady. I used to have coffee with her in the morning, but I had no idea she was this great a person.[220]

and:

> When I was still a young officer I had to deliver an incoming message to her. I was told to first stop by the CO's [Commanding Officer's] office and receive a briefing. I was told that she was a 'crotchety old [expletive deleted],' and that I should knock on her door, not enter until she gave me permission, then say, 'Ma'am, I have a message for you.' I did all this. She told me to sit down while she read the message, then signed for a copy, then she said, 'Young man, thanks very much for delivering this important message to me. Tell me your name.' She smiled and I did and got the hell out of there. That was the beginning of our friendship.[221]

So at least she was appreciated, rather than neglected, by part of the workforce.

And, for the latter part of her career, there may have been failures and frustrations, but they cannot have affected Driscoll too severely. She clearly was frustrated, at least at times; when working Coral, she hissed at Raven's protégé Polly Budenbach during a chance encounter in a hallway.[222] But Driscoll must have loved the work enough to put up with the frustrations.

How can we conclude that? When she died, the real estate holdings she and Brownie had amassed were worth over a million dollars.[223] She was unquestionably financially secure long before then. She did not have to work until the laws of that time forced her to retire. She could have retired in her fifties, as so many of her peers did. Yet she did not do so. She was a cryptographer for her government until that government no longer allowed her to be.

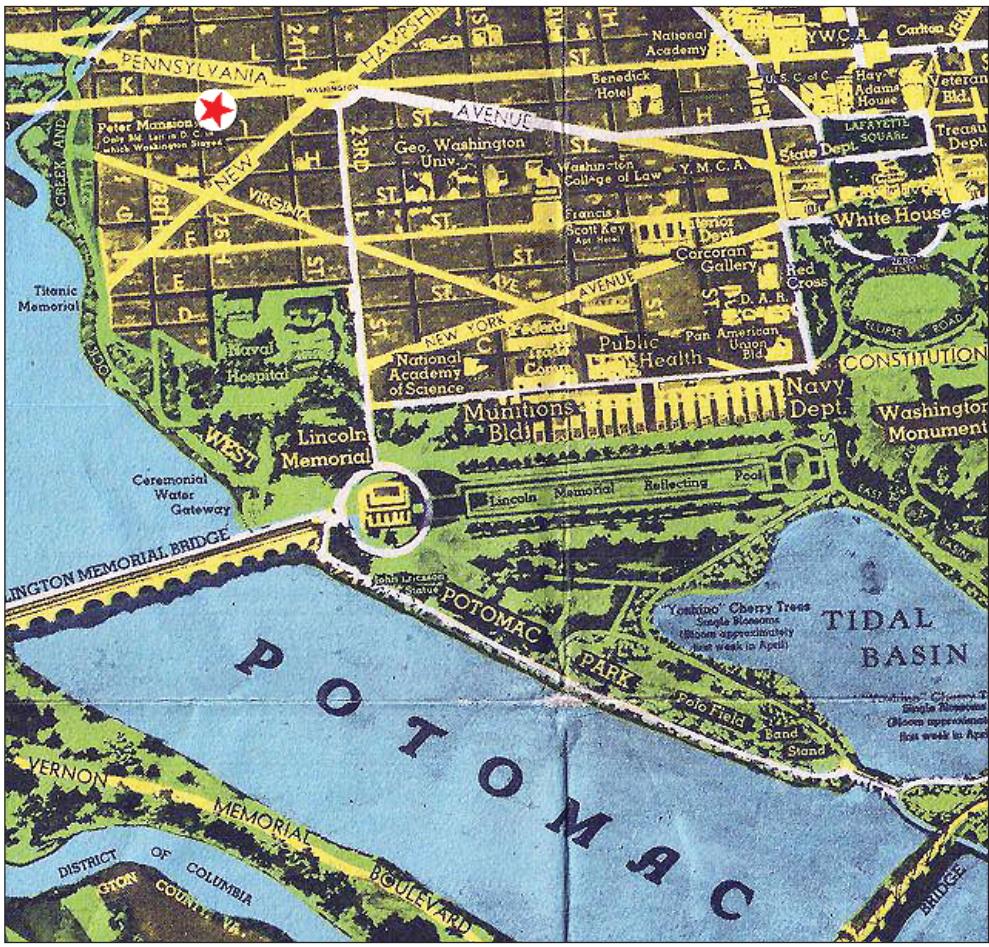


Fig. 24. Location of Driscoll's apartment in Washington; the Navy may have sent a gunboat up the Potomac to fire her a salute. (1938 map, Wikimedia)

She was in the second group inducted into the Cryptologic Hall of Honor. Family members reported that her work earned her an invitation to the White House (which she turned down, out of intense dislike for Franklin Roosevelt).[224] Near the end of her life, she might not have been able to talk but was still excitedly gratified when her young Navy officer relative visited her in the nursing home, in dress uniform, and formally saluted her.[225]

But for unique honors, the Navy might have done even better. According to family legend, during her recovery from the accident, the Navy sent a gunboat up the Potomac to fire her a salute.[226] The story is plausible, if it took place after her return to the 25th Street NW apartment.

She must have loved what she did, and she devoted her life to it. She, those she trained, and the organization she helped put on a sound footing saved countless lives as a result. She received signal honors during her life and even more after.

Agnes Driscoll unquestionably had flaws and faults. But those do not diminish what a giant she was. She lifted Navy cryptology up as high as anyone and rose high in the esteem of those she worked most closely with.

She rose as high as her talents, organizational limitations, and her wishes suited her. She towers above nearly all her contemporaries. Let us not lose sight of her limitations but still admire her for all that she did and all that she was. Agnes Driscoll is one of the true giants of cryptology, and one we can all look up to. Let us neglect her no more.

Appendix I: Driscoll's Civilian Assignments

The following table is drawn from Driscoll's Civilian Record, in chronological order, using what dates are available, along with (in italics) old NSA and predecessor telephone books, copies of which are in NSA Archives Accession 49511, Box CCH36, Folder 10. There are some discrepancies between the sources. For the Navy organizations, the name is provided rather than the designator. For AFSA and NSA, only the designator is generally available.

Organization	Date(s)	According to
Office of Director Naval Communications (Code and Signal Section)	As of 1 August 1919	Annual Acceptance Form of that date
Office of Naval Communication Service	As of 17 March 1920	Annual Acceptance Form of that date
Office of the Director of Naval Communications	As of 1 July 1920 through 1 July 1922	Annual Acceptance Forms of those dates
Office of the Director Naval Communications, Code and Signal Section	15 January 1923	Resignation letter
Bureau of Navigation	1 August 1924	Acceptance Form of that date
Office of the Director of Naval Communications	As of 13 October 1924 through 1 April 1927	Annual Acceptance Forms of those dates
Operations, Communications, Code and [or &] Signal	As of 24 November 1924 through 10 May 1926	Efficiency Ratings of those dates
Operations, Communications	As of 11 April 1927	Efficiency Rating
Operations, Communications, Code and [or &] Signal	As of 11 May 1928 and 17 May 1930	Efficiency Ratings of those dates
DNC, Code & Signal	As of 19 May 1931 through 7 June 1934	Efficiency Ratings of those dates
Operations, Communications	As of 7 June 1935 and 15 May 1936	Service Ratings of those dates
Operations, Communications, G	As of 29 April 1940	Service Rating of that date
Security Section	As of 15 May 1941	Service Rating of that date
Naval Communications, Security, GY	As of 1 April 1941 and 31 March 1942	Efficiency Ratings of those dates
Naval Communications, Security, Rdo. Intelligence	As of 1 April 1942 and 31 March 1943	Efficiency Ratings of those dates
Naval Operations, Communications, Communications Intelligence	As of 1 April 1943 through 31 March 1946	Efficiency Ratings of those dates
Navy Department, Office of the Chief of Naval Operations (OP-20-G)	As of 13 November 1946	Appointment letter of that date

Continued

Organization	Date(s)	According to
DCNO (Administration), Naval Communications, Communications Intelligence	As of 26 January 1947	Appointment letter of that date
Naval Operations, Communications, Comm. Intelligence	As of 1 April 1946 and 31 March 1947	Efficiency Ratings of those dates
CNC-CommSupAct	As of 1 April 1947 and 31 March 1948	Efficiency Ratings of those dates
Transferred from DCNO (Administrative) Naval Communications CommSupAct	30 June 1948	Intra-agency transfer notification of 21 June 1948
U.S. Navy Communication Station (CSAW)	As of 1 July 1948 to 25 December 1949	Intra-agency transfer of 21 June 1948 and Efficiency Rating of 25 December 1949
Armed Forces Security Agency 24 [AFSA-24]*	25 December 1949	Notification of Personnel Action (SF-50) of 19 December 1949
AFSA-02A7†	26 November 1950	SF-50 of 25 November 1950
AFSA-206	26 November 1950 (see footnote to previous entry) to at least 22 July 1951	SF-50 of 25 November 1950 and Pay Roll Change Slip of 22 July 1951
NSA-206	As of 6 January 1952	Pay Roll Change Slip (no DD-590) of that date
NSA-206B	4 March 1953 until before 26 June 1953	Notice to Employees (AFSA Form 985) of 3 March 1953 and NSA Form 1629 of 26 June 1953
NSA-064	*By 20 April 1953*, until before 6 September 1953, *or even after November 1955*	*NSA, Arlington Hall Station, Naval Security Station telephone directories of 20 April 1953 and November 1955* and NSA Form 1629 of 6 September 1953
NSA-0641	After 6 September 1953 until at least 14 December 1954	NSA Form 1629 of 6 September 1953 and 14 December 1954 letter regarding pay and longevity
C74203‡	By December 1955 until at least July 1956	Performance Appraisal of 8 August 1956; *the NSA telephone directory of June 1956 lists the organization as "742"*
C7403	18 March 1956 until retirement	NSA Form 1629 of 18 March 1956 and Performance Appraisals of 13 May 1957 and after, as well as undated Request for Personnel Action for retirement; *"ACOM-403" according to the October 1957 and October 1958 NSA directories*

*Her job number, 2001, stays the same from 1 July 1948 until her 26 November 1950 transfer.

†The "02A7" is marked out and replaced with "206" in one place (but not another) on the 26 November 1950 transfer form.

‡Presumably the same organization as the next, C7403, since she had the same rater; her raters from 1957 to 1959 both signed as "Chief, ACOM-403."

Appendix II: OP-20-G: Commanders, 1917-1941

The Code and Signal Section, which was originally focused solely on creating codes and ciphers, was designated OP-20-G in July 1922 and retained that designation for twenty-four years.[227]

Agnes May Meyer originally worked in the Code and Signal Section; once the Research Desk was created within OP-20-G, she worked within that. So, the following list is focused on who was in charge of her work unit, whether OP-20-G itself or a section within it.

Timeframe	Organization	Commander
1 Apr. 1917-20 Oct. 1918	Code and Signal Section	Cdr. Russell Willson
21 Oct. 1918-1 Jul. 1921	Code and Signal Section	Lt. Cdr./Cdr. Milo F. Draemel[228]
1 Jul. 1921-30 Jun. 1922	Code and Signal Section	Lt. Cdr. William F. Gresham
1 Jul. 1922-28 Jun. 1924	Code and Signal Section	Lt. Cdr. Donald C. Goodwin[229]
Jan. 1924-ca. 15 Feb. 1926	Research Desk	Lt. Laurance F. Safford[230]
Ca. 15 Feb. 1926-Sept. 1927	Research Desk	Lt. Joseph J. Rochefort[231]
Sept. 1927-Aug. 1929	Research Desk	Lt. Bern Anderson[232]
Aug. 1929-ca. May 1932	Research Desk	Safford[233]
Ca. May 1932-ca. 3 May 1933	Research Desk	Lt. (j.g.) Thomas Dyer[234]
Ca. 3 May 1933-11 Mar. 1935	Research Desk	Lt. (j.g.) T. A. Huckins[235]
11 Mar. 1935-30 Jun. 1938	Communication Security Group	Lt. Cdr. Joseph N. Wenger[236]
30 Jun. 1938-May? 1940	Crypto Intelligence Sub-Section/ Radio Intelligence Section	Lt. E. S. L. Goodwin[237]
Sept.? 1940-after 7 Dec. 1941	Radio Intelligence Section/ Communications Security Section	Lt. L. W. Parke[238]

Appendix III: Driscoll's Promotions and Pay Increases

As provided in her Civilian Record and the Standard Form (SF) 2806, Individual Retirement Record, in NSA Archives Access 49511, Box CCH36, Folder 10.

Position/Increase	Grade	Annual Salary	*2014 Equivalent**	Date	Notes
Stenographer	-	$1,400	*$18,930*	1 August 1919	Temporary appointment
Clerk	-	$1,400	*$16,374*	17 March 1920	Permanent
Clerk	-	$1,600	*$22,278*	16 January 1922	Resigned from this position
Clerk	CAF-2	$1,320	*$18,057*	1 August 1924	Reinstatement
Clerk	CAF-2	$1,440	*$19,698*	16 October 1924	-
Senior Clerk	CAF-5	$1,860	*$24,862*	16 April 1925	-
Principal Clerk	CAF-6	$2,100	*$28,070*	1 December 1925	-
Principal Clerk	CAF-6	$2,400	*$31,717*	16 January 1926	-
Junior Administrative Assistant (Adm. Asst.)	CAF-9	$3,000	*$40,330*	1 April 1927	-
Senior Adm. Asst.	CAF-9	$3,100	*$42,406*	1 June 1928	-
Cryptanalyst	P-4	$3,800	*$51,981*	1 July 1929	-
Cryptanalyst	P-4	$4,000	*$69,826*	1 November 1934	-
Senior Cryptanalyst	P-5	$4,600	*$78,541*	1 December 1935	-
Senior Cryptanalyst	P-5	$4,800	*$76,381*	1 October 1941	-
Principal Cryptanalyst	P-6	$5,600	*$80,364*	20 December 1942	-
Pay Adj./PPI†	P-6	$6,440	*$83,690*	1 July 1945	-
P. L. #390‡	P-6	$7,341.60	*$88,068*	1 July 1946	-
Pay Adj./PPI	P-6	$7,581	*$79,521*	12 January 1947	-
Pay Adj.	-	$7,911	*$76,785*	11 July 1948	-
Pay Adj./PPI	P-6	$8,150.40	*$79,108*	25 July 1948	-
Conversion/"CA"	GS-13	$8,200	*$80,593*	30 October 1949	-
Step Increase/PPI	GS-13	$8,400	*$81,531*	22 January 1950	-
Step Increase/PPI	GS-13	$8,600	*$77,372*	22 July 1951	"TOG"/Top of Grade
Pay Adj.	GS-13	$9,360	*$84,207*	24 October 1951	-
Step Increase	GS-13 step 7	$10,280	*$89,392*	5 September 1954	"Longevity"
Step Increase	GS-13 step y§	$10,495	*$87,365*	15 September 1957	"Longevity"
[unknown]	GS-13 step 9**	$11,570	*$93,647*	Before 10 October 1958	As listed on SF-50 of that date

*Per www.bls.gov/data/inflation_calculator.htm, accessed 28 February 2014; rounded to nearest dollar.

†"Periodic Pay Increase"; note that the 1950 PPI was also listed as a Step Increase. "Adj." is presumably an abbreviation for "Adjustment."

‡Unclear.

§Unknown; possibly a typographical error.

**According to her Personnel Record; the SF 2806 lists her as a GS-13 step 8.

Appendix IV: Performance Appraisals

The following lists Agnes May Meyer/Driscoll's civilian performance appraisals, in whichever system was in use then in her organization, as drawn from her Civilian Record.

Efficiency Ratings

Per a 17 May 1926 letter from the Director of Naval Communications,[239] the four-digit ratings given were a percentage with two decimal places; i.e., 1926's "9132" would be "91.32 percent"; the percent-age is given here for ease of understanding. A rating below 65 percent was grounds for compulsory demotion or dismissal, and 100 percent was the maximum possible, of course.

The dates are abbreviated; 24 Nov. 1924 is short for 24 November 1924. Some raters' and reviewers' signatures were illegible.

Score (%)	Date	Rater	Reviewer	Comment
92.40	24 Nov. 1924	L. F. Safford	H. F. Kingman	-
95.06	25 May 1925	L. F. Safford, Lt.. USN	H. F. Kingman	Reduced by reviewer Kingman from rater Safford's 97.78%
91.32	10 May 1926	Possibly M. Comstock*	(No signature)	Reduced from rater's 94.32%
89.42	11 Apr. 1927	(Same as 1926)	(No signature)	Reduced from rater's 95.64%
91.14	10 May 1928	B. Anderson	A. D. Struble†	Very high; exceptional ratings for industry, knowledge, initiative, and execution; high for judgment and middling for cooperativeness
91.24	17 May 1930	L. F. Safford	A. D. Struble	Much the same as 10 May 1928 rating
97.24	19 May 1931	L. F. Safford	J. W. McClaran	Exceptionally high, with maximum ratings in reliability, industry, knowledge, initiative, and execution; very high in judgment and cooperativeness
98.54	10 May 1932	T. H. Dyer	J. W. McClaran	Maximum or near-maximum in everything
90.14	2 May 1933	J. W. McClaran	(No signature)	Reduced from rater McClaran's 98.12%
90.56	7 Jun. 1934	J. A. Huckins	H. F. Kingman	Very high; exceptional ratings for industry, knowledge, initiative, and execution; middling for judgment and cooperativeness

Continued

*Perhaps not the Lt. Merrill Comstock listed on p. 62 of the Naval Register of 1926 (http://www.ibiblio.org/hyperwar/AMH/USN/Naval_Registry/1926.pdf, accessed 16 June 2014), who was assigned to "V-1" then.

†Presumably the Lt. Arthur Dewey Struble that the Naval Register of 1930 (http://www.ibiblio.org/hyperwar/AMH/USN/Naval_Registry/1930.pdf, accessed 16 June 2014) has assigned to Operations, the same as Driscoll.

Service Ratings

A scale for overall of 3 = best, 30 = worst, and for each factor 1 = best, 10 = worst

"Q P" is short for Quality of Performance; "Prod" for Productiveness, and "Q S J" for Qualifications Shown on Job.

Overall	Date	Factors			Rater	Reviewer	Comment
		Q P	Prod	Q S J			
7 (Excellent)	7 Jun. 1935	2	2	3	H. F. Kingman	W. A. Wright	Kingman changed Wright's Q S J 2 to 3
5	15 May 1936	1	2	2	J. N. Wenger	L. F. Safford	-
6	29 Apr. 1940	2	2	2	L. F. Safford	(None)	Reviewer changed Safford's Q P 1 to 2
7	15 May 1941	2	3	2	L. F. Safford	(None)	-

Efficiency Ratings

(Note: Not the same form or rating scale as 1924-1934. All entries are unclassified.)

Very Good/3, 31 March 1942 (Third-highest rating, after Excellent/1 and Very Good/2)

- Rated "Weak" in 1 area ("Effectiveness in promoting high working morale"), "Adequate" in 9 areas (including "Cooperativeness"), and "Excellent" in 13
- Rater: L. W. Parke, Lt. Cdr., USN
- Reviewer: John R. Redman, Cmdr., USN

Excellent, 31 March 1943 (Highest rating)

- Rated "Adequate" in "Amount of acceptable work produced," "Excellent" in 21 other areas (including "Cooperativeness" and "Effectiveness in promoting high working morale")
- Rater: H. T. Engstrom, Lt. Cmdr., USNR
- Reviewer: R. B. [Hackman or Hartman], Lt., USNR

Excellent, 31 March 1944 (Highest rating)

- Rated "Adequate" in 4 areas (including "Effectiveness in meeting and dealing with others"), "Excellent" in 7
- Rater: H. T. Engstrom, Cmdr, USNR
- Reviewer: Leon P. Smith, Lt. Cmdr., USNR

Excellent, 31 March 1945 (Highest rating)

- Rated "Excellent" in all areas (which might simply indicate a nonadministrative focus during wartime)
- Rater: [possibly G.] F. Cramer, Lt. Cmdr.
- Reviewer: Leon P. Smith, Cmdr., USNR

Very Good, 31 March 1946 (Second-highest rating)

- "Adequate" in 10 areas (including "Accuracy of final results," "Accuracy of judgments or decisions," and "Cooperativeness"), "Excellent" in 6
- Rater: H. Campaigne, Cmdr., USNR
- Reviewer: Leon P. Smith, Cmdr, USNR

Excellent, 31 March 1947 (Highest rating)

- "Adequate" in 5 areas: "Effectiveness in meeting and dealing with others" (not rated the following year), "Cooperativeness," "Physi-

cal fitness for the work," "Effectiveness in adapting the work program to broader or related programs," "Effectiveness in laying out work and establishing standards of performance for subordinates" (rated "excellent" the following year), "Effectiveness in promoting high working morale," and "Effectiveness in delegating clearly defined authority to act" (the last two not rated the following year)
- "Excellent" in 23
- Rater: Wesley A. Wright, Capt., USN
- Reviewer: [illegible], Cmdr., USN

Excellent, 31 March 1948 (Highest rating)
- "Adequate" in "Cooperativeness" and "Physical fitness for the work" (not rated the following year)
- Rater: Thomas H. Dyer, Capt., USN
- Reviewer: [illegible], Cmdr., USN

Excellent, 31 March 1949 (Highest rating)
- The overall rating was not changed, but on 24 June, the Efficiency Rating Committee changed the rating details: element 10, "Effectiveness in presenting ideas or facts," which had been marked "adequate," should not have been considered especially important to her position.
- She was also marked "adequate" in "Effectiveness in directing, reviewing, and checking the work of subordinates" (which was marked "outstanding" the following year), and in "Effectiveness in instructing, training, and developing subordinates in the work" (not rated the next year)
- Rater: P. H. Currier, Cmdr., USN
- Reviewer: J. [illegible initial] Harper, Capt., USN

Excellent, 31 March 1950 (Highest rating)
- Outstanding in "Accuracy of final results," "Accuracy of judgments or decisions," "Industry," "Ability to organize his [*sic*] work," "Initiative," "Resourcefulness," "Dependability," "Effectiveness in devising procedures," and "Effectiveness in directing, reviewing, and checking the work of subordinates"
- Rater: Lawrance [illegible, and does not look like Safford]
- Reviewer: Oliver Kirby

In AFSA's first year of existence, it apparently continued to use the services' appraisal systems.

Performance Appraisals

Three possible ratings: Outstanding, Satisfactory, and Unsatisfactory; the first and last required justification.

Satisfactory, December 1955-July 1956 (Highest: Outstanding)
- "During this period, Mrs. Driscoll has been working on a complex problem demanding a great deal of painstaking labor. She is also working on a possible machine process which, if successful, should be of great help on a number of other problems as well as her own."
- Supervisor: Elizabeth A. Whitmore, Chief, NSA-7420

Satisfactory, July 1956-February 1957
- "During this period Mrs. Driscoll has virtually completed work on a complex and laborious problem. She has also evolved a machine process which should be of value in the solution of related problems. She has effectively supervised the activities of two junior analysts assigned to the problem."
- Supervisor: Elizabeth A. Whitmore, Chief, ACOM403

Continued

Satisfactory, 28 February 1957-28 February 1958

- "During this period Mrs. Driscoll has been working on a complex and laborious problem. She has effectively supervised the activities of two junior analysts assigned to the problem."
- Supervisor: Elizabeth A. Whitmore, Chief, ACOM403

Satisfactory, 28 February 1958-28 February 1959 (her last before retirement)

- "During this appraisal period Mrs. Driscoll has performed research analysis on a very difficult problem, the solution of which would be of considerable importance to the division. Her technical background for this job is unmatched and her efforts have been most diligent and thorough."
- Supervisor: John W. Pittman, Chief, ACOM-403

Appendix V: Japanese Interwar Cryptosystems

According to Frederick D. Parker, *Pearl Harbor Revisited: United States Navy Communications Intelligence, 1924-1941*, Third Edition (2013), Center for Cryptologic History, 20-22, except as noted otherwise:

Diplomatic	**Year Introduced**
Red (machine)	Before 1939
Purple	1939

Naval Attaché	**Year Introduced**
Coral (machine)*	1939

Naval	**Introduced**
Red Book	Presumably 1918†
Blue Book	1 December‡ 1930
Black Code	1938§
Flag Officers' Code	1939
JN-25	1 June 1939
JN-25B	1 December 1940

* Coral was the naval attaché version of Purple; the fleet version, which saw a high volume of use only initially, was Jade. See "Pearl Harbor Review - Early Japanese Systems" (http://www.nsa.gov/about/cryptologic_heritage/center_crypt_history/pearl_harbor_review/early_japanese.shtml, accessed 20 June 2014).

† Holtwick, SRH-355, Part I, 30.

‡ Month and date per Safford, "A Brief History of Communications Intelligence in the United States," SRH-149, 11.

§http://www.nsa.gov/about/cryptologic_heritage/center_crypt_history/pearl_harbor_review/jn25.shtml, accessed 27 March 2014, for both of these.

Appendix VI: Height and Weight

There is anecdotal evidence that Driscoll was "tall" and "thin," not to mention a contention[240] that she had bouts of weight loss. Height and weight are measurable, and, as it happens, measurements exist. So, how tall was she, and was she indeed thin? Her Military Record and Civilian Record state:

Height	Weight	Age	Date	Source
5'7"	-	28	22 June 1918	Naval Reserve enrollment papers
5'4¾"	105 lb.; "underweight waived"	28	22 June 1918	Naval Reserve Health Record
5'4¾"	-	30	31 August 1919	Release from active duty forms
5'5"	105 lb.	35	1 August 1924	Certificate of Medical Examination
5'5"	104 lb.	53	11 January 1943	Application for Federal Employment
[5']7"	110 lb.	55	11 April 1945	Application for Federal Employment
5'7"	112 lb.	57	12 November 1946	Application for Federal Employment

So she was somewhere around 5'6" tall, in a time when the average American white woman's height was between 5'3" and 5'6".[241] Of course, the 1943 to 1946 numbers were apparently supplied by Driscoll herself, and are thus less reliable.

Appendix VII: Photo Credits and Identifications

Fig. 1: NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family; identifying information on back of photograph.

Fig. 2: NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family; identifications by the author and James Hamilton in telephone conversation, 25 November 2013.

Fig. 3: NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family; identifications by the author and James Hamilton, in telephone conversation, 25 November 2013.

Fig. 4: NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family; identifications by the author and James Hamilton, in telephone conversation, 25 November 2013.

Fig. 5: CCH Holdings; received from Victor Meyer, 9 July 2014, courtesy Meyer family; "Lucy Caroline Meyer, 15 yrs. Agnes May Meyer, 13 yrs. June 1903" on the back of the photograph.

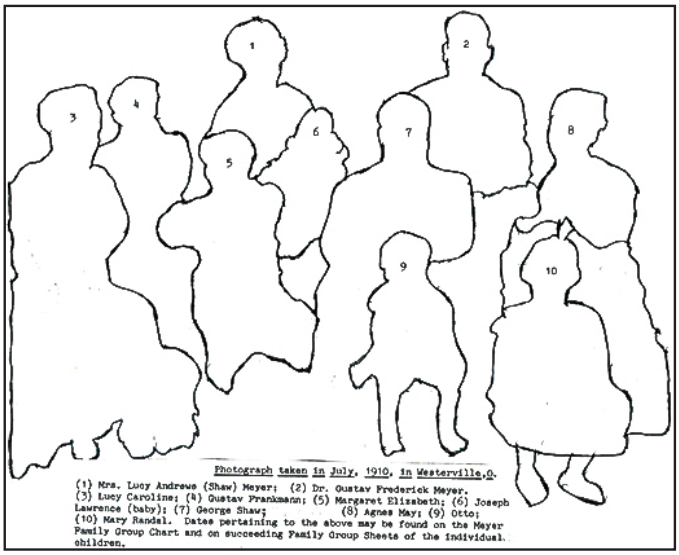
Fig. 6: CCH Holdings; received from V. Meyer, 9 July 2014, courtesy Meyer family; "Agnes at left, Lucy at right" on the back of the photograph.

Continued

Fig. 7: Cropped from this photograph in NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family.

Identifying information:

- From left to right: Lucy, Gustav, Margaret, Lucy (mother), Joseph (being held), George, Otto (in front of George), Gustav (father), Mary (front right) and Agnes. *(Source: National Cryptologic Museum Library, emailed to author on 13 November 2013.)*
- Gustav Meyer, 51 yrs; Lucy Meyer, 46 [yrs]; George Shaw [Meyer], 23; Lucy Carolina, 22; Agnes May, 20; Gustav Freckmann, 14; Margaret Eliza, 13; Mary Randal, 8; Otto, 4; Joseph Lawrence, 7 mo.; July 1910. *(Source: Back of photo received from V. Meyer on 9 July 2014.)*



Above: Also received from V. Meyer on 9 July 2014, a key to photo in Fig. 7.

Note that this photo key misspells Gustav Freckmann's middle name.

The caption reads:

Photo taken in July 1910 in Westerville, O.

1. Mrs. Lucy Andrews (Shaw) Meyer
2. Dr. Gustav Frederick Meyer
3. Lucy Caroline
4. Gustav Frankmann
5. Margaret Elizabeth
6. Joseph Lawrence (baby)
7. George Shaw
8. Agnes May
9. Otto
10. Mary Randal

Dates pertaining to the above may be found on the Meyer Family Group Chart and on succeeding Family Group Sheets of the individual children.

Fig. 8: Cropped from the above photograph in the NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family.

Identifying information from two sources:

1. Tentative date 1899; tentative identifications, left to right: Lucy Carolina, about age 11; Lucy Andrews, about age 37 (identification initially confirmed by James Hamilton, in telephone conversation of 15 November 2013; see also below); Gustav [Jr.], about age 5; Unknown (standing in back); Gustav (father) (seated); Unknown (standing in back); Margaret (front) (seated), about age 2; George, about age 12; Unknown (standing in back); Agnes, about age 10; Unknown; Unknown. James Hamilton adds: all the adults in the back row are visitors or in-laws, not blood relatives. *(Source: the author and James Hamilton, in telephone conversation, 25 November 2013. Note that the author has chosen to use the following identification information as definitive of the children.)*
2. Agnes, Gustav, Margaret, George & Lucy [children only, evidently], Agnes on left. *(Source: Back of a copy of this photograph received from V. Meyer on 9 July 2014.)*

Continued

Fig. 9: CCH holdings, courtesy Meyer family; identification by the author.

Fig. 10: CCH holdings.

Fig. 11: CCH holdings.

Fig. 12: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

Fig. 13: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

Fig. 14: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

Fig. 15: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

Fig. 16: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

Fig. 17: NSA Archives, ACC49511, Box CCH 36, Folder 10; identifying information from March 1958 *NSA Newsletter* (copy in ACC49511, Box CCH 36, Folder 10).

Fig. 18: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

Fig. 19: CCH holdings, courtesy Meyer family; identifications by retired CCH historian Robert Hanyok, in meeting with author, NCM Library, 6 May 2014.

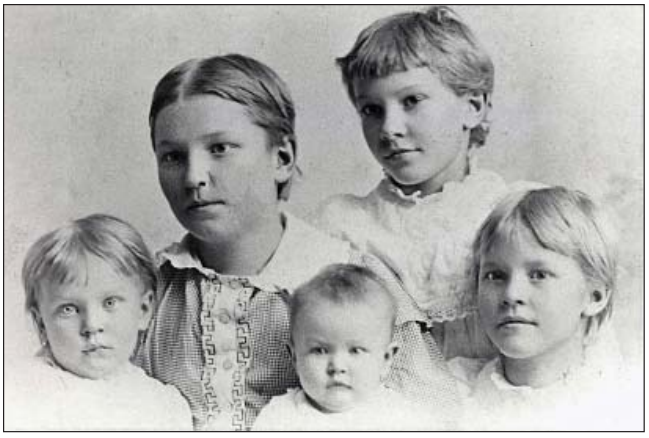
Fig. 20: findagrave.com, accessed 8 November 2013.

Fig. 21: findagrave.com, accessed 8 November 2013.

Fig. 22: Military Record.

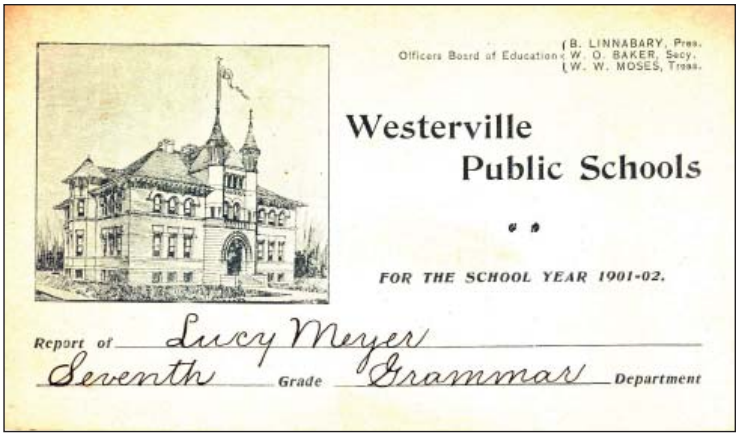
Fig. 23: Civilian Record.

Bonus Images

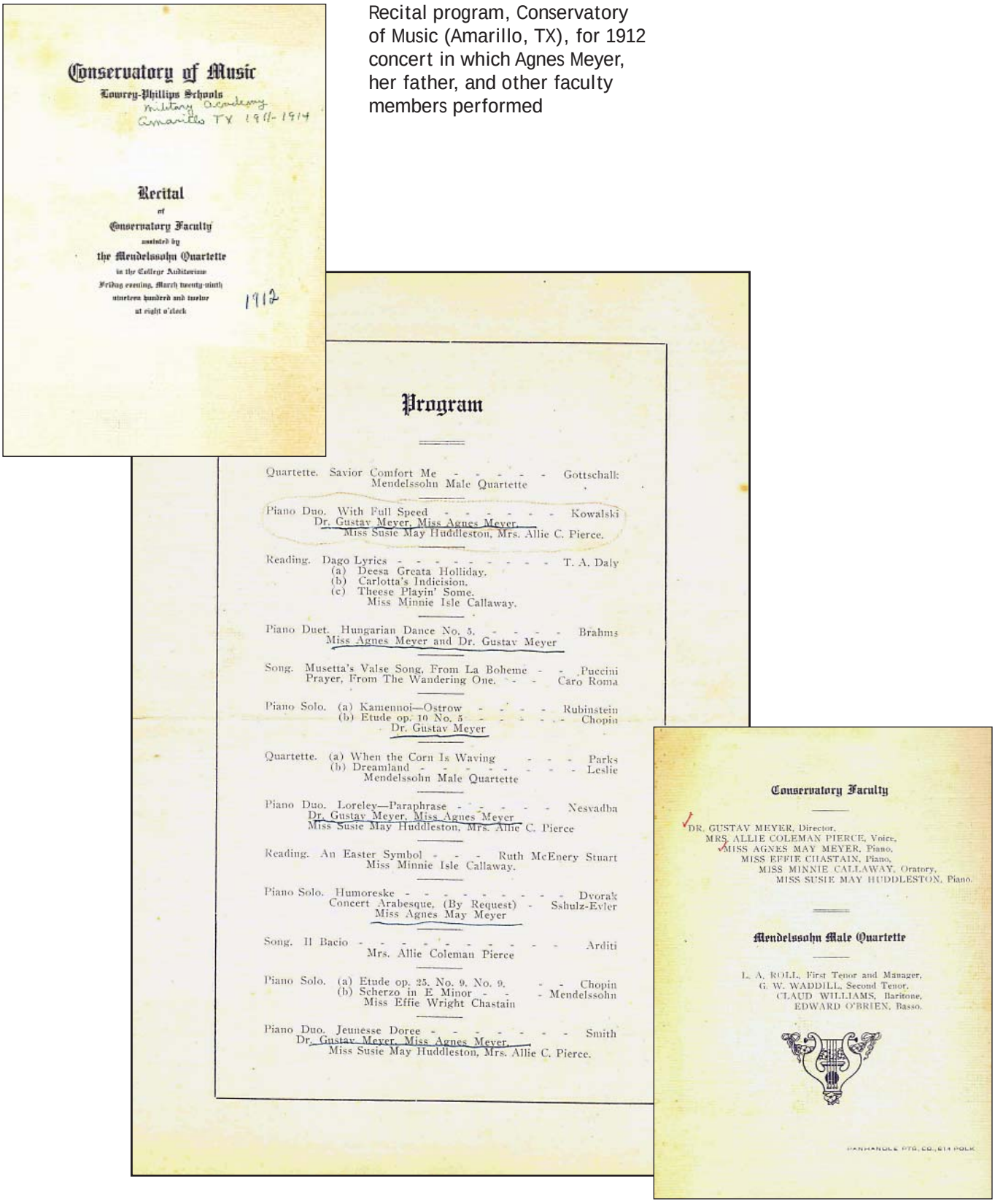


NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family; identifying information:

- "George [illegible] Meyer, 10 years old. Lucy Caroline " [Meyer], 9 " " [years old; omitting ditto marks for remainder]. Agnes May, 8. Gustav Freckmann, 2 3/4. Margaret Eliza, 5 months." *(Source: ACC49511, Box CCH 36, Folder 10; assigned to this photo by the author.)*
- "George - 10 yrs; Lucy Carolina 9 yrs; Agnes May 8 yrs; Gustav Freckmann 2 3/4 yrs; Margaret Eliza 5 mos.; Agnes on lower right." *(Source: Back of copy of this photo received from V. Meyer on 9 July 2014.)*



Lucy Meyer's report card from the Westerville, Ohio, public school Driscoll also attended. NSA Archives, ACC49511, Box CCH 36, Folder 10, courtesy Meyer family



Conservatory of Music
Towrey-Phillips Schools
Military Academy
Amarillo TX 1911-1914

Recital
of
Conservatory Faculty
assisted by
the Mendelssohn Quartette
in the College Auditorium
Friday evening, March twenty-ninth
nineteen hundred and twelve
at eight o'clock
1912

Program

Quartette. Savior Comfort Me - - - - - - Gottschalk
Mendelssohn Male Quartette

Piano Duo. With Full Speed - - - - - - - Kowalski
Dr. Gustav Meyer, Miss Agnes Meyer,
Miss Susie May Huddleston, Mrs. Allie C. Pierce.

Reading. Dago Lyrics - - - - - - - - - - T. A. Daly
(a) Deesa Greata Holliday.
(b) Carlotta's Indicision.
(c) Theese Playin' Some.
Miss Minnie Isle Callaway.

Piano Duet. Hungarian Dance No. 5. - - - - - Brahms
Miss Agnes Meyer and Dr. Gustav Meyer

Song. Musetta's Valse Song, From La Boheme - - Puccini
Prayer, From The Wandering One. - - - Caro Roma

Piano Solo. (a) Kamennoi—Ostrow - - - - - Rubinstein
(b) Etude op. 10 No. 5 - - - - - - - Chopin
Dr. Gustav Meyer

Quartette. (a) When the Corn Is Waving - - - Parks
(b) Dreamland - - - - - - - - - - Leslie
Mendelssohn Male Quartette

Piano Duo. Loreley—Paraphrase - - - - - - Nesvadba
Dr. Gustav Meyer, Miss Agnes Meyer
Miss Susie May Huddleston, Mrs. Allie C. Pierce

Reading. An Easter Symbol - - - Ruth McEnery Stuart
Miss Minnie Isle Callaway.

Piano Solo. Humoreske - - - - - - - - - - Dvorak
Concert Arabesque, (By Request) - Sshulz-Evler
Miss Agnes May Meyer

Song. Il Bacio - - - - - - - - - - - - Arditi
Mrs. Allie Coleman Pierce

Piano Solo. (a) Etude op. 25, No. 9, No. 9. - - Chopin
(b) Scherzo in E Minor - - - - Mendelssohn
Miss Effie Wright Chastain

Piano Duo. Jeunesse Doree - - - - - - - - Smith
Dr. Gustav Meyer, Miss Agnes Meyer,
Miss Susie May Huddleston, Mrs. Allie C. Pierce.

Conservatory Faculty

DR. GUSTAV MEYER, Director.
MRS. ALLIE COLEMAN PIERCE, Voice,
MISS AGNES MAY MEYER, Piano,
MISS EFFIE CHASTAIN, Piano,
MISS MINNIE CALLAWAY, Oratory,
MISS SUSIE MAY HUDDLESTON, Piano.

Mendelssohn Male Quartette

L. A. ROLL, First Tenor and Manager,
G. W. WADDILL, Second Tenor,
CLAUD WILLIAMS, Baritone,
EDWARD O'BRIEN, Basso.

PANHANDLE PTG. CO., 214 POLK

Recital program, Conservatory of Music (Amarillo, TX), for 1912 concert in which Agnes Meyer, her father, and other faculty members performed

Acknowledgments

The author wishes to acknowledge first the Meyer family, who from 1987 until today have responded to requests for help with the utmost assistance and graciousness. In particular:

- Agnes Driscoll's nephew John Hamilton, who, despite advanced age, patiently helped the author with small details from Driscoll's later life, including identifying who was who in old photographs, and
- Driscoll's grandnephew Victor A. Meyer, Capt., USN (ret.), and his son Victor A. Meyer, Jr., Cmdr., USN, who not only provided information, original photographs, and mementoes, but also carried on the Meyer Naval tradition started by Driscoll, in the Submarine Service and SEALs, respectively.

Second, the author thanks retired CCH historian Robert Hanyok and former scholar in residence Dr. Colin Burke, who, among others, first began to write up the Agnes Driscoll story for CCH (Dr. Burke's "Agnes Driscoll vs. the Enigma" goes further, and suggests how much might be waiting in the National Archives to add to the story).

A third thank-you must go to another set of archives, and the dedicated people who unearth the treasures contained within: the NSA Archives and the NSA archivists. This history would be virtually nonexistent without their enthusiastic, seemingly endless help.

Finally, the author would like to thank Gwen Cohen, whose efforts in 1987 did not bear the fruit that she wished at the time she wished it but did plant seeds in the NSA Archives, seeds which this author hopes have grown and flourished herein.

Source Notes

Three of the sources used bear comment.

First, Colin Burke's "Agnes Meyer Driscoll vs. the Enigma and the Bombe" is able to do what the author was not, namely delve deeply into the National Archives. Its depth on the period in question is matchless.

Two details in "Driscoll vs. the Enigma" do not match up well with the source material for this history. First, that her religion caused her to refuse newer treatments for her injuries in the 1937 accident (see Burke's footnote 18); this seems inconsistent with the Presbyterian faith she professed to follow when enlisting in the Navy. To be sure, she might have changed religions in the nearly twenty years that followed.

The second detail was her "frequent bouts of weight loss" (Burke's footnote 13). Appendix VI does not show any such pattern, but, of course, that does not mean none such existed.

Second, oral histories with Navy cryptanalysts do not tend to feature much praise for fellow codebreakers. While illustrative of how competitive the Navy was for cryptanalysts, if taken out of that Navy context, they can appear to reduce all the giants of OP-20-G to ants.

Third, Raven's oral history in particular is problematic.

He does not compliment much of anyone except fellow OP-20-G officers Joe Eachus and Howard Engstrom over the course of the interview, so his remarks about both Talley and Driscoll are difficult to evaluate. A giant himself, Raven seems not to have noticed the heights his fellows had attained, but rather their flaws and foibles. This must be taken into account when deciding whether those people should be looked up to or down upon.

Notes

1. Agnes May Meyer's Naval Reserve Health Record and her Record of Allotments, Family Allowances, and Insurance of Enlisted Men, 22 June 1918, *Official Personnel Folder, Military Personnel Records*. St. Louis, MO: National Personnel Records Center (hereafter, Military Record).
2. Letter postmarked 20 July 1987 to Assistant Curator Gwen L. Cohen of the National Cryptologic Museum, from Driscoll's niece Lucy Johnson (no relation to the author) in NSA Archives Accession 49511, Box CCH 36, Folder 10, and partial copy of Meyer family tree, National Cryptologic Museum Library and Center for Cryptologic History (CCH) holdings.
3. Ibid.
4. *Geneseo* (Illinois) *News*, 20 February 1912 (courtesy of Lucy Johnson in 1987); copy in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
5. Email from Victor A. Meyer, Capt., USN (ret.), to the Center for Cryptologic History (CCH), 23 January 2014.
6. Lucy Johnson letter of 20 July 1987, NSA Archives Accession 49511, Box CCH 36, Folder 10.
7. Agnes May Meyer's Enrollment Record into Naval Reserve, Military Record.
8. Information Sheet, Military Record; undated, but from June 1918, based on internal evidence.
9. Conservatory of Music, Lowrey-Phillips Schools, 29 March 1912 recital program, in CCH holdings. In the program, her father Dr. Gustav Meyer is listed as Director of the Conservatory Faculty [*sic*]. Which of the *Humoresque* pieces she played is not specified.
10. Ibid., and Agnes Driscoll's 11 January 1943 Application for Federal Employment, *Official Personnel Folder, Civilian Personnel Records* (St. Louis, MO: National Personnel Records Center) (hereafter, Civilian Record). Unfortunately, there appear to be no yearbook photographs or newspaper articles of Agnes May Meyer during this time. See the negative responses to letters from Gwen L. Cohen in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
11. Information Sheet, Military Record.
12. Enrollment Record into Naval Reserve, Military Record; Information Sheet, Military Record.
13. Military Record.
14. Office of the Chief Cable Censor letter of April 25, 1919, in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
15. Military Record.
16. 3 February 1919 letter from the Office of the Chief Cable Censor to Chief Yeoman Agnes May Meyer, USNRF, in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
17. Capt. Laurance F. Safford, interview by [no first name] Schmidt, Naval Institute, 3.
18. Information in the bullets drawn from *The United States in the First World War: An Encyclopedia*, Anne Cipriano Venzon and Paul L. Miles, eds. (New York: Routledge, 1999), 759-60.
19. Captain Jack S. Holtwick, USN (Ret.), *Naval Security Group History to World War II*, National Archives Special Research Histories series SRH-355, Part I, 157-58.
20. Standard Form 2806, Individual Retirement Record, in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
21. 27 October 1919 letter from Cdr. Milo Draemel, Navy Communication Service, OP-58-M, in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
22. Notes in CCH holdings, sourced to Biographies of People at Riverbank Series II D.
23. Both letters, along with a 1 March 1920 letter from George Fabyan to Draemel, and a 23 June 1925 letter from Safford to Fabyan, are in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
24. 17 June 1920 letter from Office of Naval Intelligence to OP-16-B, with copy to Agnes May Meyer, in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
25. Standard Form 2806, Individual Retirement Record, in NSA Archives Accession AC49511, Box CCH 36, Folder 10.
26. Civilian Record.
27. Holtwick, SRH-355, Part I, 22.
28. Civilian Record.
29. Safford, Naval Institute interview, 3.

30. Holtwick, SRH-355, Part I, 35, which notes that the Army's William F. Friedman also solved it.
31. Ibid., 161.
32. Outside the scope of this paper, but described in Holtwick, SRH-355, Part I, 16.
33. Holtwick, SRH-355, Part I, 18-19.
34. Safford, Naval Institute interview, 10-12.
35. Holtwick, SRH-355, Part I, 19, and NSA Archives Accession 49000, 31, 33, 37.
36. Civilian Record; photocopy in NSA Archives Accession 49511, Box CCH 36, Folder 10.
37. Civilian Record, 11 April 1945 Application for Federal Employment.
38. All three letters are in NSA Archives Accession 49511, Box CCH 36, Folder 10.
39. David Kahn, *The Codebreakers: The Story of Secret Writing* (New York: MacMillan, 1967), 418.
40. Civilian Record, 11 April 1945 Application for Federal Employment; 1924 Acceptance Form.
41. http://www.nsa.gov/about/cryptologic_heritage/hall_of_honor/1999/safford.shtml, accessed 28 February 2014.
42. Holtwick, SRH-355, Part I, 35; Safford, Naval Institute interview, 3.
43. Safford, Naval Institute interview, 3.
44. Holtwick, SRH-355, Part I, 30, 36.
45. Frederick D. Parker, *Pearl Harbor Revisited: United States Navy Communications Intelligence, 1924-1941*, 3rd ed. (Ft. Meade, MD: Center for Cryptologic History, 2013), 21-22.
46. Holtwick, SRH-355, Part I, 83-84.
47. Ibid., 35-36, 45, 84; Joseph Rochefort, interview by Cdr. Etta-Belle Kitchen, USN (ret.). Naval Institute, 1970, 29. See also Safford, *The Undeclared War, "The History of R.I.,"* SRH-305, 5.
48. Edwin T. Layton, R.Adm., USN (ret.), *"And I Was There"*: *Pearl Harbor and Midway—Breaking the Secrets* (New York: Morrow, 1985), 58-59; Holtwick, SRH-355, Part I, 353-55.
49. Holtwick, SRH-355, Part I, 29 and especially 42-43; Rochefort, Naval Institute oral interview by Cdr. Kitchen, 1970, 6-7.
50. http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_14_83_campaigne.pdf, 33; accessed 14 April 2014. Layton, *"And I Was There,"* 33.
51. Rochefort, Naval Institute interview, 1970, 7, 28-29.
52. Capt. Thomas Dyer, interview by R. Farley and H. Schorreck, CCH, OH-1982-01-Dyer, 8, 10-11, 24-25.
53. Layton, *"And I Was There,"* 33.
54. Rochefort, Naval Institute interview, 1970, 28-29.
55. Dyer interview, CCH, OH-1982-01-Dyer, 24-25.
56. Layton, *"And I Was There*," 58-59; Duane L. Whitlock, *"And So Was I," A Gratuitous Supplement to "And I was There" by Rear Admiral Edwin T. Layton, USN (Retired)*, October 17, 1986, unpublished manuscript, Mucklow Papers, Center for Cryptologic History, 1.
57. Layton, *"And I Was There,"* 33, sourced to Mrs. Eunice Willson Rice letter to one of the co-authors on 28 June 1985. Layton's description is the source of the similar description of Driscoll in Elliot Carlson, *Joe Rochefort's War* (Annapolis, MD: Naval Institute Press, 2011), 36.
58. Civilian record: 1959 civilian Application for Retirement; December 1947 Loyalty Data form; and 12 November 1946 Application for Federal Employment.
59. James, Nancy, and James Hamilton, interview by Robert J. Hanyok, CCH, OH-1998-07-Hamiltons.
60. Email from Capt. Victor A. Meyer, USN (ret.) to author, 23 January 2014.
61. Layton, *"And I Was There,"* 58-59; Hamiltons interview, CCH, OH-1998-07-Hamiltons.
62. In the CCH interview OH-1998-07-Hamiltons, none of the family members recognized any of the names of the notables Driscoll had worked with, except Safford's and Dyer's.
63. "Madame X": see, for example, Layton, *"And I Was There,"* 58-59.
64. Conversation between retired CCH historian Dr. Timothy Mucklow and the author, 13 November 2013; see also Holtwick, SRH-355, Part I, 311-12.
65. Military Record, 1918 enrollment and health record: "Blue eyes, light brown hair, fair complexion." The health record adds that she had 20/20 vision in each eye, 15/15 hearing in each ear, a vaccination mark on her left arm, and a small scar on her left wrist.

66. Holtwick, SRH-355, Part I, 71-73; Layton, *"And I Was There,"* 45.
67. Holtwick, SRH-355, Part I, List of Abbreviations and Code of Cover Terms Used Before WWII, in the front matter: "ORANGE: Euphemism for 'JAPANESE' (from color system used for Naval War Plans, wherein all plans for against [redacted], Japan, ORANGE, and so on. BLUE was U.S.; BLACK was an unspecified enemy, in fleet problems usage for designating opposing fleets.)"
68. Cf. Holtwick, SRH-355, Part I, 74-76.
69. Dyer interview, CCH, OH-1982-01-Dyer, 10-11.
70. Holtwick, SRH-355, Part I, 68-71.
71. Dyer interview, CCH, OH-1982-01-Dyer, 10-11.
72. Holtwick, SRH-355, Part I, 85-91; Safford, SRH-149, 11; Layton, *"And I Was There,"* 45-46.
73. Safford, SRH-149, 11.
74. As is in fact the case; these three Japanese values, along with KOMINATO in the following paragraph, are weather stations in the two-part JN-25 code (covered later in the text), as passed by OP-20-G on 121821 JUNE 1945. See the page with that heading in "OP-20-G to all BRUSA stations 8/1/45 - 13/9/45," in National Cryptologic Museum Library holdings.
75. Holtwick, SRH-355, Part I, p. 87.
76. Safford, SRH-305, 11-12 and SRH-149, 11; Holtwick, SRH-355, Part I, 87, 89; Howe, ACC49106, 15-16.
77. Holtwick, SRH-355, Part I, 90-91.
78. Ibid., 80, 88.
79. Ibid., 80.
80. Prescott Currier, interview by R. Farley and H. Schorreck, CCH, OH-1983-38-Currier, 35.
81. Holtwick, SRH-355, Part I, 161-62, 164; Layton, on 79, said that OP-20-G became aware of the M-1 in 1935.
82. Holtwick, SRH-355, Part I, 224-25; Howe, NSA Archives ACC49106, 18.
83. Holtwick, SRH-355, Part I, 159-60.
84. Ibid., 239.
85. Ibid., 224-25.
86. Frank Rowlett, Abraham Sinkov, and Solomon Kullback interview, CCH, OH-2011-86-Rowlett, Sinkov, Kullback.
87. Holtwick, SRH-355, Part I, 160.
88. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
89. Letter postmarked 20 June 1987 from Meyer family member Lucy Johnson, in NSA Archives Accession 49511, Box CCH 36, Folder 10. It is difficult to ascertain how reliable this information is; Ms. Johnson, in relating what she heard within the family, thought the accident might have happened in 1934 or 1935, and understood that Driscoll needed crutches, rather than a cane, for the rest of her life. However, the apparent dubiety of some facts does not invalidate all.
90. Retirement Record Card, in NSA Archives Accession 49511, Box CCH 36, Folder 10.
91. Holtwick, SRH-355, Part I, 239.
92. Ibid.
93. Ibid. For example, 138, 254, 292.
94. Rochefort, 1970 Naval Institute interview, 28.
95. Wesley Wright interview by R. Farley and H. Schorreck, CCH, OH-1982-11-Wright, 11.
96. Dyer interview, CCH, OH-1982-01-Dyer, 24-25.
97. 6 July 1935 letter from the U.S. Civil Service Commission to Driscoll, advising her that her appeal was pending, in NSA Archives Accession 49511, Box CCH 36, Folder 10. The results of the appeal are unknown at this time.
98. http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_14_83_campaigne.pdf, 33.
99. Frank Raven, interview by R. Farley and H. Schorreck, transcript, CCH, OH-1980-03-Raven, 37-38.
100. Holtwick, SRH-355, Part I, 308-309.
101. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
102. Parker, *Pearl Harbor Revisited*, 22; CCH, "Pearl Harbor Review - JN-25," http://www.nsa.gov/about/cryptologic_heritage/center_crypt_history/pearl_harbor_review/jn25.shtml, accessed 27 March 2014.
103. These are the first four characters in the first row of Conversion square No. 10, applied to JN-25 ciphers. See the page with fourth line "T.O.O. 160411 MAY 1945," in "OP-20-G to all BRUSA stations 8/1/45 - 13/9/45," in National Cryptologic Museum Library holdings.

104. Parker, *Pearl Harbor Revisited*, 22; "Pearl Harbor Review-JN-25"; Capt. Duane L. Whitlock, USN (ret.), *The Silent War against the Japanese Navy*, http://www.ibiblio.org/pha/ultra/nwc-01.html.
105. Layton, in *"And I Was There"* (77), says 33,333 entries; Parker, in *Pearl Harbor Revisited* (21), 30,000; "Pearl Harbor Review - JN-25," says 27,500; Whitlock, in *The Silent War against the Japanese Navy*, says 45,000, but perhaps exaggerated in distant retrospect.
106. Parker, *Pearl Harbor Revisited*, 22.
107. "Two to five people," which would include Driscoll; Parker, *Pearl Harbor Revisited*, 22.
108. Holtwick, SRH-355, Part I, 376.
109. Ibid., 339-40.
110. Ibid., 82.
111. Parker, *Pearl Harbor Revisited*, 22; "Pearl Harbor Review - JN-25."
112. "Pearl Harbor Review - JN-25."
113. Ibid.
114. http://www.nsa.gov/about/cryptologic_heritage/center_crypt_history/pre_1952_timeline/index.shtml, accessed 10 April 2014.
115. See Stephen Budiansky, *Battle of Wits: The Complete Story of Codebreaking in World War II* (New York: The Free Press, 2000), 215-16.
116. NSA Archives Accession ACC8741, Document Reference A82274, which duplicates ACC4765, Document Reference A83353 and ACC1406, Document Reference A10415.
117. Wright interview, CCH, OH-1982-11-Wright, 38-39.
118. Telephone conversations between James Russell Hamilton and author, 6 and 25 November 2013.
119. They were ordered to do so on 3 December; Parker, *Pearl Harbor Revisited*, 65.
120. Parker, *Pearl Harbor Revisited*, 44.
121. http://www.nsa.gov/public_info/_files/crypto_almanac_50th/Madame_X_Agnes_in_Twilight.pdf, accessed 14 April 2014.
122. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
123. NSA Archives Accessions A2405085, 2, and AC46793, 2. Driscoll's name at the top of the list is undoubtedly because she was in charge; what order was used for listing the four who follow is not clear.
124. United States Navy File of Correspondence with Department of State, 1919-1950, SRH-281, CCH Holdings, 74.
125. http://www.nsa.gov/about/_files_cryptologic_heritage/publications/misc/tiltman.pdf, 38, accessed 14 April 2014.
126. NSA Archives accessions A2405055, 2, and AC46793, 2.
127. Budiansky, *Battle of Wits*, 73.
128. http://www.nsa.gov/public_info/_files/crypto_almanac_50th/Madame_X_Agnes_in_Twilight.pdf, accessed 14 April 2014; Colin Burke, "Agnes Meyer Driscoll vs. the Enigma and the Bombe," http://userpages.umbc.edu/~burke/driscoll1-2011.pdf, accessed 15 May 2014.
129. Ibid.
130. Burke, "Agnes Meyer Driscoll vs. the Enigma and the Bombe." See also Robert Hanyok, "Madame X: Agnes in Twilight, the Last Years of the Career of Agnes Driscoll, 1941-1957, http://www.nsa.gov/public_info/_files/crypto_almanac_50th/Madame_X_Agnes_in_Twilight.pdf.
131. NSA Archives accession ACC48999, 214.
132. Ibid., 216.
133. Raven interview, OH-1980-03-Raven, 14-16.
134. Budiansky, *Battle of Wits*, 127-28; Hanyok, "Madame X."
135. NSA Archives accession ACC48999, 212.
136. Burke, *It Wasn't All Magic: The Early Struggle to Automate Cryptanalysis, 1930s-1960s*, Center for Cryptologic History, National Security Agency, 2002, http://www.nsa.gov/public_info/_files/cryptologic_histories/Magic.pdf, accessed 22 May 2014, 113.
137. NSA Archives Accession ACC48999, 88-91; Hanyok, "Madame X."
138. http://www.nsa.gov/public_info/_files/crypto_almanac_50th/Francis_A._Raven.pdf, accessed 22 May 2014, 2.
139. Raven interview, CCH, OH-1980-03-Raven, 56-62.
140. Ibid., 24.
141. Ibid., 39.
142. Burke, *Magic*, 49 and 69.

143. NSA Archives accession ACC48999, 93, 96, 112, 128, 156, 173, 179, and 186.
144. Ibid., 191.
145. Ibid., 201-02.
146. Raven interview, CCH, OH-1980-03-Raven, 10, 11, 14-15, and 18.
147. Bill Price, an individual favorably inclined towards Driscoll, in his email of 21 April 2000. As to the accuracy of this story, Driscoll's 11 January 1943 Application for Federal Employment (Civilian Record) lists "Comdr. J. Wenger" (who became an admiral), "Admiral M. Draemel," "Admiral Russell Willson," and "Admiral Hooper" as references. She listed "Capt. [Earl] Stone" (who became an Admiral) as "Name of Employer" under "Present Position."
148. Conversation between the author and William Kvetkas, 19 March 2014.
149. Holtwick, SRH-355, Part II, Appendix IX, 91.
150. Holtwick, SRH-355, Part I, 242.
151. Thomas L. Burns, *The Quest for Cryptologic Centralization and the Establishment of NSA: 1940-1952*, http://www.nsa.gov/about/_files/cryptologic_heritage/publications/misc/quest_for_centralization.pdf, 50, accessed 11 June 2014.
152. Wright interview, CCH, OH-1982-11-Wright, 10 and 75.
153. Burns, *Quest for Centralization*, 50.
154. Raven interview, CCH, OH-1980-03-Raven, 11.
155. Wright interview, CCH, OH-1982-11-Wright, 10-11.
156. Raven interview, CCH, OH-1980-03-Raven, 56, 63.
157. Campaigne interview, CCH, OH-1983-14-Campaigne, 33-34.
158. Hanyok, "Madame X." [see note 137, e.g.]
159. Robert L. Benson, *The Venona Story*, http://www.nsa.gov/about/_files/cryptologic_heritage/publications/coldwar/venona_story.pdf, 1, 3, 5, accessed 11 June 2014.
160. Naval Communications Activity—Russian Language Section History, NSA Archives Accession 45021 (no page numbers).
161. NSA Archives Box CCH 620, Folder 11.
162. Robert Louis Benson and Cecil James Phillips, *History of Venona, Vol. I: Chronology*, National Security Agency, 1995, 152-55, 159.
163. Hanyok, "Madame X" (unredacted version).
164. AFSA Organization and External Relationships chart, http://www.nsa.gov/about/cryptologic_heritage/60th/interactive_timeline/Content/preNSA/documents/19500324_PreNSA_Doc_3985846_AFSA.pdf, accessed 9 April 2014.
165. Oliver Kirby oral history, http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_20_92_kirby.pdf, 52, accessed 9 April 2014.
166. Moody interview, CCH, OH-2001-28-Moody, CCH holdings.
167. Hanyok, "Madame X."
168. Raven interview, CCH, OH-1980-03-Raven, 63-64, 86.
169. Ibid.
170. Personnel Record, Notice to Employees of 3 March 1953.
171. http://www.nsa.gov/public_info/_files/tech_journals/John_Dee.pdf, accessed 11 June 2014.
172. Hanyok, "Madame X."
173. January 1954 *NSA Newsletter*, 4; copy in NSA Archives Accession 49511, Box CCH 36, Folder 10. The other two recognized were Edith Stanley and John E. Harbin.
174. Civilian Record, orders of 25 July 1957, which gave a date range of 12 October 1957 to 6 January 1958.
175. Civilian Record; the address she gave on her civilian Application for Federal Employment of 11 April 1945 (for continued employment) was 1010 25th Street NW, Washington, DC, Apt. 802; on her Application for Retirement, 1959, 1010 25th Street NW, no apartment number given.
176. OH-1998-07-Hamiltons; from NSA Oral History OH-1984-15-Chamberlin, 95-96, we know that she rode to and from Arlington Hall (in her AFSA days) with long-time OP-20-G member Lt. Cmdr. Milton Gasch; sadly, according to Chamberlin's interviewer, Gasch was unwilling to be interviewed himself.
177. 1 July 1987 letter from Vincent A. Las Casas to Gwen Cohen, received by CCH from Victor Meyer, Capt., USN (ret.) on 9 July 2014.

178. Email from Charles Hagedorn to the Cryptologic Museum Foundation, nominating Driscoll to the Cryptologic Hall of Honor on 8 July 1999, included in 21 April 2000 email by Bill Price; copy in CCH holdings.
179. Civilian Record.
180. Family tree. [see note 2]
181. Burke, "Agnes Meyer Driscoll vs. the Enigma and the Bombe"; see also Figure 18.
182. Burke, "Agnes Meyer Driscoll vs. the Enigma and the Bombe"; NSA Archives Accessions A2405085, AC46793, 2; A2405055, AC46793, 2; ACC48999, 88-91.
183. Bill Price email of 21 April 2000.
184. http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_14_83_campaigne.pdf, 35; OH-1980-03-Raven, 11-12, respectively.
185. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
186. March 1958 NSA Newsletter, 3; copy in Archives Accession 49511, Box CCH 36, Folder 10.
187. NSA Archives Accessions A2405085, AC46793, 2; A2405055, AC46793, 2; ACC48999, 88-91.
188. http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_14_83_campaigne.pdf, 35; OH-1980-03-Raven, 12, respectively.
189. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
190. Ibid.
191. Meyer interview, CCH, OH-2014-07-Meyer.
192. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
193. Ibid.
194. Ibid.
195. https://www.westerville.org/Modules/ShowDocument.aspx?documentid=8257, accessed 8 November 2013.
196. http://www.findagrave.com/cgi-bin/fg.cgi?page=pv&GRid=49129856, accessed 8 November 2013.
197. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
198. Safford, Naval Institute interview, 1.
199. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
200. Ibid.
201. OH-2014-07-Meyer.
202. findagrave.com; 20 July 2000 letter from Arlington National Cemetery Administrator, in CCH holdings.
203. OH-1982-01-Dyer, 24, 97.
204. Layton, *"And I Was There,"* 33, 34, 45-46, 58-59.
205. Mason interview, CCH, OH-1985-04-Mason.
206. Rochefort, Naval Institute oral interview, 1970, 28.
207. Tordella interviews, CCH, "OH-1995-07 and 1995-xx-Tordella."
208. Whitlock, *"And So Was I,"* 1.
209. Raven interview, CCH, OH-1980-03-Raven, 37.
210. http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_14_83_campaigne.pdf, 33-34.
211. Currier interview, CCH, OH-1980-38-Currier, 35-40.
212. Wright interview, CCH, OH-1982-11-Wright, 10-12.
213. http://www.nsa.gov/public_info/_files/oral_history_interviews/nsa_oh_14_83_campaigne.pdf, 2.
214. Ronald Clark, *The Man Who Broke Purple*, Little, Brown and Company, Boston, Toronto, 1977, 205.
215. http://www.nsa.gov/about/cryptologic_heritage/hall_of_honor/1999/rowlett.shtml, accessed 17 May 2014.
216. http://www.nsa.gov/about/cryptologic_heritage/hall_of_honor/1999/sinkov.shtml, accessed 17 May 2014.
217. http://www.nsa.gov/about/cryptologic_heritage/hall_of_honor/1999/kullback.shtml, accessed 17 May 2014.
218. Holtwick, SRH-355, Part I, 372.
219. October 2013 conversations between the author and retired Director, Program and Budget Office, Intelligence Community Staff William Kvetkas and retired NSA Deputy Director for Administration Gene Becker, both of whose careers started at Arlington Hall.
220. Bill Price email to author of 21 April 2000.
221. Email from George McGinnis included by Bill Price on 21 April 2000.

222. Polly Budenbach, interview by Jill Frahm, CCH, OH-2001-27-Budenbach.
223. Meyer interview, CCH, OH-2014-07-Meyer.
224. Hamiltons interview, CCH, OH-1998-07-Hamiltons. Unfortunately the actual invitation had been lost, and they did not know the details, e.g., why she had been invited.
225. Meyer interview, CCH, OH-2014-07-Meyer.
226. Hamiltons interview, CCH, OH-1998-07-Hamiltons.
227. Holtwick, SRH-355, Part II, 2.
228. Willson and Draemel per Holtwick, SRH-355, Part I, 23, and Part II, Appendix II, 009.
229. Gresham and Godwin per Holtwick, SRH-355, Part II, 2, and Part II, Appendix II, 009.
230. Holtwick, SRH-355, Part II, 4; Safford, Naval Institute interview, 25.
231. Safford, Naval Institute interview, 25-26, and Holtwick, SRH-355, Part I, 68-69.
232. Safford, Naval Institute interview, 26-27, and Holtwick, SRH-355, Part I, 62 and 68-69.
233. Safford, Naval Institute interview, 26-27, and Holtwick, SRH-355, Part I, 62.
234. Safford, Naval Institute interview, 27-28, and Holtwick, SRH-355, Part I, 106.
235. Holtwick, SRH-355, Part I, 106 and 326, and Part II, 5.
236. Holtwick, SRH-355, Part I, 136, 305, and 326, and Part II, 5.
237. Holtwick, SRH-355, Part I, 305, 326, 340, and 368.
238. Holtwick, SRH-355, Part I, 133, 326, and 394, and NSA Archives, Accession 2405085, 1.
239. NSA Archives Accession 49511, Box CCH 36, Folder 10.
240. Burke, "Agnes Meyer Driscoll vs. the Enigma and the Bombe"; see his footnote 13.
241. Found to be 5'4" for American women between approximately the early 1960s and early 2010s; http://www.abcnews.go.com/Technology/story?id=98438; surveyed at 5'3" in 1937, and dress-making patterns designed for 5'3" to 5'6" in 1940; http://analogme.typepad.com/analog-me/2011/11/history-of-measurements.html, both accessed 10 March 2014.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