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O.M.W. SPRAGUE (THE MAN WHO "WROTE THE BOOK" ON FINANCIAL CRISES) AND THE FOUNDING OF THE FEDERAL RESERVE

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This paper was prepared for a conference on alternatives to the Federal Reserve held at George Mason University on November 1, 2013. I thank the organizers of the conference George Selgin and Larry H. White; my discussant, David Wheelock; and other participants in the discussion for many helpful comments. Elmus Wicker and Eugene White read an earlier draft and made many helpful suggestions. The opinions expressed here and the remaining errors are mine. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

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ABSTRACT

O.M.W. Sprague was America's leading expert on financial crises when America was debating establishing the Federal Reserve. His History of Crises under the National Banking Act is one of the most enduring legacies of the National Monetary Commission; a still frequently cited classic. Since the Commission recommended a central bank, and its recommendation after some modifications became the Federal Reserve System, it might be assumed that Sprague was a strong supporter of establishing a central bank. But he was not. Initially, Sprague favored more limited reforms, a position that he did not abandon until the Federal Reserve became a fait accompli. Here I discuss the sources of Sprague's opposition to a central bank and the relationship of that opposition to his understanding of the history and structure of the American banking system at the turn of the nineteenth century.

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1. Professor Sprague[1]

Oliver Mitchell Wentworth Sprague was America's leading expert on financial crises when America was debating establishing the Federal Reserve. He was, literally, the man who "wrote the book" on financial crises. His *History of Crises under the National Banking Act* is the most enduring intellectual legacy of the National Monetary Commission; a still frequently cited classic. Since the Commission recommended a central bank, and its recommendation after some modifications became the Federal Reserve System, it might be assumed that Sprague was a strong supporter of establishing a central bank. But in fact Sprague was opposed to a European style central bank and supported more limited reforms. Sprague's views have often been ignored by historians of thought because he was not a theoretician like his contemporary Irving Fisher, or a successful businessman like investment banker Paul M. Warburg. But I think the neglect of Sprague is somewhat unfair, and I hope to redress the balance by re-examining his views on the need for a central bank. Sprague had an encyclopedic knowledge of the history and institutional structure of American banking in his day, and an examination of Sprague's views, I hope to show below, enhances our understanding of U.S. banking history prior to the Federal Reserve.

Sprague had written a series of papers in the early years of the twentieth century that established his reputation as one of America's experts on money and banking (Sprague 1900, 1903a, 1903b, 1908). He had also edited and revised Charles F. Dunbar's classic text, *Chapters on the Theory and History of Banking* (Dunbar and

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Sprague 1901). So he was already one of America's leading experts on banking and banking crises when he was chosen to write the crucial volume on banking crises for the National Monetary Commission that had been established in the aftermath of the panic of 1907.

Sprague was born in 1873. He was an undergraduate and graduate student at Harvard, where he did his Ph.D. in Political Science. His dissertation was "The English Woolen Industry in the Seventeenth and Eighteenth Centuries." His teaching career was spent mainly at Harvard where taught in the Department of Economics and from 1908 in the newly established Harvard Graduate School of Business where he was appointed to the first endowed chair. Sprague served from 1930 to 1933 as special adviser to the Bank of England, and briefly during 1933 as special adviser to the U.S. Treasury. At other times he served as consultant to the Reichsbank, the Bank of France, and the League of Nations. In 1937 he was president of the American Economic Association. He died in 1953. Cole, Masson, and Williams (1954) is a detailed obituary.

2. Warburg versus Sprague, 1908

Whether the United States should have a central bank was debated at the annual meetings of the American Economic Association held in Atlantic City in December 1908. There were two papers: the first by Paul M. Warburg made the case for a European style central bank and the second by Sprague made the case against such a bank. Warburg is widely regarded as one of the intellectual fathers of the Federal Reserve.[2]

[2] Perry Mehrling (2002) discusses Warburg's views, and describes him as "the chief spokesman for this point of view [that the U.S. needs a European style central bank], and the most important intellectual force behind the proposals put forward in the failed Aldrich Bill of 1912" (Mehrling 2002, 211-2).

An investment banker, his views had already received considerable attention. Perry Mehrling (2002, 211-2) describes him as “the chief spokesman for this point of view [that the U.S. needs a European style central bank], and the most important intellectual force behind the proposals put forward in the failed Aldrich Bill of 1912.” The Aldrich Bill, although it failed passage, was the precursor to the Federal Reserve Act, and contained many of the same features. Not surprisingly, Warburg made an effective case for a central bank along European lines to the assembled economists.

In one way Warburg had the easier task. This was the Progressive Era. Elites in both political parties had come to believe that the lot of the average American could be improved by creating federal agencies (or failing that state or local agencies) that regulated economic life. The Interstate Commerce Commission had been established in 1887, the U.S. Forest Service in 1905, the Federal Drug Administration in 1908, the Children’s Bureau of the Department of Labor would be established in 1912, and the Federal Trade Commission in 1914. In a sense the burden proof had shifted from those who like Warburg supported establishing a new federal agency to those who like Sprague opposed it. In other words, Warburg was moving with the prevailing ideological currents.

Warburg suggested several reasons for adopting a European central bank, but the heart of his case was the contrast between the European and especially the German experience in 1907 and the American experience.

> Expansion was probably more acute in Germany than with us; why then did Germany, much weaker than we, weather the storm without a panic, while we went into a most disgraceful state of utter helplessness and temporary bankruptcy? (Warburg 1909, 344)

Warburg noted several factors that accounted for the difference, but the major difference, clearly, was the Reichsbank.

> Furthermore, there was unimpaired confidence that so long as the Reichsbank was in general touch with the situation, though some things might be rotten, they would remain the exceptions; and that it would be impossible for all or even any large proportion of the financial institutions to be unsound (Warburg 1909, 344)

Contrast that with the American experience in 1907.

> Whatever causes may have combined in the United States to bring about the crisis of I907, it cannot be doubted that it would never have reached such appalling dimensions had it not been for the lack of elasticity in our currency; the utter uselessness of our reserves; our inability to apply the brakes while we were going too fast; the absence of any means to negotiate for measures of relief with other countries through a channel recognized by them as official; and finally the lack of modern American bills of exchange, which, while serving as the means of settling the daily balances of the nation, would have been assets on which the banks might have realized in Europe and in the United States, by rediscounting amongst each other or at a central bank (Warburg 1909, 345).

What about Canada? Canada did not have a central bank, but it had also weathered the storm without a financial crisis. Warburg expressed some doubts about the comparison: – Canada, for example, had a population of six million and the United States a population of 85 million – but his main concern was political. The Canadian banking system was highly concentrated. Creating a highly concentrated system of large branch banking networks in the United States would mean creating a system that "popular sentiment abhors" (Warburg 1909, 355).

Warburg then went on to provide a detailed outline for a system of currency associations which would discount paper and pass the paper along to a "central issue department" in Washington that would issue notes. It was not a full blown central bank, it was something less. It would, however, supply an emergency currency. The details of how the system would work, need not detain us here. The point is that Warburg was the man with the plan.

The case against a European style central bank was made by Sprague (1909a). In the space available, Sprague was provided only an outline of his case against a European style central bank. Soon after, in the *Quarterly Journal of Economics*, Sprague (1909b) published a detailed exposition of his case. Here I draw on both papers to summarize Sprague's views. I should add, however, that the discussants of the Warburg and Sprague papers gave short shrift to Sprague's views in part perhaps because his paper lacked the detailed plan that Warburg's paper included.

Sprague thought that American conditions raised serious questions about how a European style central bank would function in ordinary times and that there were alternatives for dealing with financial panics. Two considerations weighed against establishing a European style central bank in the United States. The first was the geographical dispersion and fragmentation of the American banking system. Political pressures would inevitably force an American central bank to allocate its lending on the basis of population, and so force the Federal Reserve into the difficult although possible prospect of lending "fairly" to thousands of local banks. A central bank would have funds to lend because, if European precedent was followed, it would become the fiscal agent of the government and the U.S. was running persistent, although highly variable surpluses. At the time, the U.S. relied on its independent Treasury system, which, to some degree, simply locked away excess reserves. Simply requiring the Treasury to deposit its excess balances in National banks, Sprague thought, would be sufficient to solve this problem. As it turned out, the Federal Reserve Act adopted the system of regional reserve banks to ameliorate concerns about fairness in the allocation of loanable funds, thus addressing the political forces that Sprague identified.

A second problem with a European style central bank was the potential for inflation. A central bank would mean the issue of a new form of currency. The amount would be limited because of the tie to gold. It might be more appropriate to think of it as middle-powered money in contrast with bank deposits (low-powered money) and gold (high-powered money).[3] But it would be treated as a reserve by commercial banks and have the power to generate multiple increases in credit. Here is how Sprague (1909a, 362) expressed it at the annual meetings of the American Economic Association.

> "By substituting the notes issued by a central bank for money now in circulation which could be counted as reserve, our banks could further enlarge the credit structure until checked by gold exports, unsound business conditions, and lack of confidence."

In his paper in the *Quarterly Journal of Economics* Sprague (1909b, 386) was more explicit.

> The conclusion would seem to be inevitable that with a highly developed deposit credit system the note of a central bank is a dangerous instrument, tending towards inflation.[4]

This danger would be especially acute, Sprague thought, during a period of excessive credit expansion preceding a financial panic. Optimistically, we might hope that a central bank would raise its discount rate, or take other actions, to limit the speculative boom.

[3]This is not something I just invented. Although Friedman and Schwartz used a simple distinction between high-powered money and low-powered money in their basic money-supply formula, in appendix B of *A Monetary History* they (1963) developed models for the gold standard that treated central bank notes as middle-powered money. In order to use the simple high-low distinction they treated national bank notes during the national banking era as high-powered money because they were backed by federal government bonds and commercial bank deposits as low-powered money.

[4] This conclusion applied to central banks that could freely choose their gold reserve ratio. An 1844 law made Bank of England notes gold certificates (covered 100% by gold). This limited the ability of the Bank of England to respond to financial panics. It could only issue more notes if it was given permission to break the 1844 restriction.

Sprague (1909b, 398), however, was skeptical. An American central bank might end up leaning with the wind rather than against it.

> Is it not certain that, in the eager search for funds in times of active business, the other banks would resort to it [the central bank] for heavy loans? Doubtless a considerable measure of accommodation would have been thus granted if we had possessed such a central bank in the years before the crisis of 1907, even though it had been managed with far more conservatism than we have any reason to be certain of securing at all times. Every dollar thus borrowed would have been an addition to the extension of credit at a time when restraint was needed, not expansion

The experience of the U.S. Independent Treasury provided some practical evidence on this point. The surplus funds in the Independent Treasury had been made available to the banks during periods of "real or fancied need" and as a result they had become less mindful of "indications of approaching emergency" Sprague (1909b).

The *Quarterly Journal* article gave Sprague the opportunity to address some of the lesser arguments for a central bank. Let me briefly consider three. (1) One of the main complaints of the Populists was the seasonal in interest rates. Interest rates rose in the fall of the year during the crop moving season. To the Populists it was a conspiracy: Eastern bankers raised interest rates when the farmer needed to borrow. A major assignment for the Federal Reserve was to eliminate this seasonal, a goal which accomplished. Sprague (1909b, 387-8), however, thought that the seasonal had a positive value because it "brings home to the banks the necessity of keeping their house in order at all times." In other words, he questioned one of the main reasons (from a political point of view) for establishing the Federal Reserve.

(2) As Sprague noted, the traditional theory of central banking, as developed by Bagehot in *Lombard Street* (1873) held that the central bank should meet financial panics by lending freely (to the market) at high rates. However, Bagehot was no longer

the last word on central banking. Sprague believe that the British and American experience showed that a central bank could increase stability by conserving the assets of large banks that were in trouble, and whose failure might precipitate a financial panic. Although Sprague did not feel that in practice a European style central bank was more likely to be successful than a clearing house. I will consider this issue in more detail below under the heading “bailouts.”

(3) Finally, there is the problem of securing gold abroad during a financial panic. As noted in the quote above Warburg thought that a major problem for the United States requiring a central bank was “the absence of any means to negotiate for measures of relief with other countries through a channel recognized by them as official” (Warburg 1909, 345). In other words, a U.S. central bank would be able to negotiate with foreign governments and central banks for a loan of gold during a threatened or actual panic. Sprague’s answer was simply that the United States had never had any trouble securing gold from abroad. In 1907 $100,000,000 million had come in.[5]

What then was to be done? How could panics like the panic of 1907 be prevented? There were, Sprague suggested, several ways forward. One was simply to persuade the six largest New York banks, for practical purposes the holders of the bulk of the usable U.S. gold reserve, to act in concert during financial crises as the lender of last resort. As a result of their central position in the financial system, as a result of their wealth and power, they had a social responsibility to act in the public interest during an emergency. In this respect, Sprague’s purpose was the same as Bagehot’s in *Lombard Street* (1924[1873]). Bagehot thought that the Bank of England had acted appropriately

[5] Rodgers and Payne (2012) uncover and describe the key role played by the Bank of France in this episode.

in several past crises. But some leaders of the Bank of England still resisted the idea that the Bank of England had a social responsibility to use its reserves during a financial panic. Bagehot's purpose was to persuade the Bank to acknowledge its responsibility to act as lender of last resort; Sprague's purpose was to persuade the six largest New York banks to acknowledge their responsibilities and act as lender of last resort. Sprague, however, does not acknowledge the huge collective action problem raised by his policy that was not an issue for Bagehot, who had only to persuade one institution that was highly dependent on special grants of power to act in the public interest.

Sprague made a similar argument in a paper in the *Commercial and Financial Chronicle*. This paper was then bundled with a paper by George Roberts, a banker, and published as a pamphlet by the Bankers Publishing Company (Roberts and Sprague, 1910). The pamphlet presented a debate over the question of whether the United States needed a national bank of issue, Roberts writing in the affirmative, and Sprague against. Here Sprague argued that a bank of issue was dangerously inflationary, and that combining the largest banks in New York, or persuading them to act in concert would create as much central banking as the United States needed.

But combining the New York banks or persuading them to act in concert for the public good during an emergency were not the only ways forward. Sprague believed that there were several ways of providing emergency liquidity. An alternative was to provide for a temporary currency that banks could take out in an emergency in order to meet extraordinary demands for cash. This proposal was embodied in the Federal Reserve Act in order to handle an emergency that might occur before the Federal Reserve could be set up, the Act called for an emergency currency that could be taken out by individual banks and used to meet over the counter withdrawals, what became known as the Aldrich-Vreeland Currency.

What about Canada? Would it be possible to solve the problem of banking panics by allowing a system of nationwide branch banks to develop? Sprague did not address the issue in his response to Warburg. But we know that he was not on board. Sprague (1903b) had addressed the issue of branch banking. He did see many advantages of branch banking, but did not number preventing panics among them. And he saw some advantages in the local system of unit banks. In the end he compromised the two visions and recommended branch banking at the state level.

As noted above, two prominent academic economists, Horace White and Joseph French Johnson (1909), discussed Warburg's and Sprague's papers.[6] In substance they were largely agreed. The chief problem of the American banking system was its fragmented structure in which small independent local banks played a large role. The experience in Canada was very different from the U.S. and very instructive. Here is how White (1909, 372-3) put it

> "The wealth of Canada is much less than ours. Moreover, the wheat crop of Canada last year was in part frosted and under suspicion, while ours was sound. Yet Canadian bank credit was not shaken. The banks did not make runs on each other, therefore the public did not make runs on the banks. There are no country banks in Canada as we understand that term, only branches of thirty-five city banks, the heads of which are near enough to each other to secure unity of action."

But adoption of a Canadian style system in the United States, White argued, was by now politically impossible, the unit bankers were too powerful politically. European countries, however, had also avoided the banking crisis (although not the commercial

[6] Horace White was a distinguished journalist and expert on banking. Joseph French Johnson was a professor at NYU and an expert on banking, including the Canadian banking system.

crisis) because central banks pumped liquidity into financial markets. Adoption of European style central banking, White thought, was feasible politically if local banks could be persuaded that a central bank would be in their interest, perhaps by making local banks part owners of the central bank.

Johnson reiterated White's view. The problem was the fragmented structure of the American banking system.[7] But this was no longer capable of being remedied. A central bank, evidently a second best solution from an economic point of view, might be possible if local bankers could be convinced it was in their interest to support it.

Neither of the discussants paid any attention to Sprague's recommendations: persuading the big New York banks to act as lender of last resort or providing an emergency currency. Neglect of the first possibility is understandable. What Sprague was suggesting was reasonable. But how could it be made to happen? What were the incentives that would make the New York banks do the right thing? Praise from public? What law would enforce compliance? Sprague's first proposal was simply out of sync with the spirit of the Progressive era: Reform meant new laws and government sponsored institutions. What about Sprague's second idea: an emergency currency? After all, this idea was included in the Federal Reserve Act and did prove successful in 1914. Here my guess is that part of the problem was that Sprague simply did not provide sufficient details for his colleagues to sink their teeth in. All that Sprague (1909a, 369) said at the meetings was "An emergency currency would be of some assistance."

[7] Some states insisted on unit banks while others permitted some or statewide branching. California, notably, permitted statewide branching. And there, A.P. Giannini, the founder of Bank of America, had already begun his storied career. Branching across state lines by state or national banks, however, was prohibited.

3. The Lessons of History

Sprague's *History of Crises under the National Banking Act* (1910d) was the capstone for the studies written for the National Monetary Commission. There were many fine studies that dealt with important topics that would be of interest to reformers of the banking system: studies of British and French banking, a fine study of seasonal fluctuations in interest rates by Edwin W. Kemmerer, and so on. But it was Sprague's book that dealt with the central questions: why did the U.S. have so many banking crises and what could be done about it. His book was a masterpiece filled with quantitative data, institutional details, and historical narrative. To this day monetary historians mine Sprague for these details, but in the process they have often ignored the underlying structure of his argument and the policy conclusions he drew. It is therefore worth summarizing what this famous and frequently cited book actually said about the causes of and possible cures for financial crises. [8]

Pooling Reserves

The basic structure of that argument is laid out in Table 1. The first thing to note is the suspension of legal tender payments. In other words, the refusal of most banks in the country to pay out legal tenders on demand in exchange for the bank's notes or

[8] There have been many important additions to the literature on the banking panics of the National Banking Era since Sprague wrote, but it is fair to say that Sprague remains fundamental. Elmus Wicker's *Banking Panics of the Gilded Age* (2000) comes closest to being the successor to Sprague. Wicker accepts the conclusions that Sprague drew about the need for collective action by the New York Clearing House in panics, but adds additional information on several issues including banking difficulties outside New York, the quantitative record of bank suspensions, and the role of J.P. Morgan in the panic of 1907.

deposits.[9] For Sprague, suspension was the ultimate disaster. Suspension demoralized (a favorite Sprague word) markets and depressed economic activity. Workers could not be paid and other transactions could not be completed. To be sure, suspensions were complicated affairs. Sometimes individual banks continued to make payments, and often exceptions were made for emergencies, for example so that factories could make wage payments. Legal tender could often be obtained, albeit at a premium, in the market place. Nevertheless, when suspensions were widespread the disaster was clear. Recent econometric work by James and Weiman (2013) confirms the negative impact of suspensions. Friedman and Schwartz (1963, 693-94), with the 1930s in mind, famously argued that a suspension had positive long-run benefits: it cut short the process of bank closures and contraction of the money supply and allowed healing to begin. Suspension was like surgery, painful in the short-run, but beneficial, hopefully, in the long-run. But Sprague did not see things that way. What Sprague took away from history was, as shown it Table 1, is that suspensions, which occurred in 1857, 1873, 1893, and 1907 were associated with – and Sprague was sure, caused – severe economic contractions, and that periods of banking distress in which suspension was avoided, 1860, 1884, and 1890 were associated milder economic contractions. In other words, suspensions were extremely bad news. How did Sprague know that suspensions were independent events that magnified contractions, and not simply symptoms of more intense contractions? Sprague did not consider the issue explicitly. His conclusion seems to have been based on the timing of the intensification of the

[9] Nowadays financial historians often prefer the term “restriction” to “suspension.” Restriction may convey a more accurate picture of the event to modern readers. Conversions of deposits into currency were (often) not permitted, while other transactions were. But Sprague and his contemporaries, who I follow here, used the term suspension.

contraction (it came after the suspension), on the common sense understanding of the problems created by suspension (such as the inability to pay workers), and on the seemingly arbitrary play of events that characterized the decisions to suspend.

In most cases, suspension of legal tender payments meant suspension of gold payments. The one exception is 1873. In 1873 the United States was still on the Civil War greenback standard, so suspension meant banks were refusing to pay greenbacks over the counter.[10] In the 1930s there was no domestic suspension and Sprague attributed the severity of the contraction to non-monetary forces. But Sprague was adamantly opposed to the United States abandoning the traditional fixed price for gold, an analogous problem – suspension, or partial suspension, of international gold payments.

Next consider the famous clearing house loan certificates. These were issued during periods of financial distress when banks had trouble meeting obligations to other banks in legal tender. They were having trouble because they were paying out, or thought they soon might be paying out, legal tenders over the counter to depositors and noteholders. The clearing house to which a group of banks belonged would then issue certificates to its members in exchange for selected assets which they could use in lieu of legal tenders to clear their obligations to other members of the clearinghouse. The clearing house loan certificate is a fascinating example of private regulation of banking and as a result has received considerable attention from banking historians including Timberlake (1984), Gorton (1985), Gorton and Mullineaux (1987), Moen and Tallman (2000, 2013), and Jacobson and Tallman (2013).

[10] The United States returned to the gold standard in 1879. The Populists with some legal justification maintained that the United States was adopting the gold standard for the first time, and that the prewar standard was bimetallic.

Sprague thought that clearing house loan certificates were important and that they were <u>one half</u> of the solution to the problem of suspensions during periods of incipient panic or realized panic. They were only half the solution because they did not solve the problem of having to pay out legal tenders over the counter. True, a bank that had a deficit with other members of the clearing house could use the certificates to pay its debts to other banks, thus retaining more legal tenders to pay out to its customers. But a bank that had a surplus was in the opposite position. It needed legal tenders, it was owed legal tenders, but it couldn't get them. It was only getting clearing house loan certificates.

Why couldn't a bank that was experiencing a run simply pay out clearing house loan certificates over the counter? In a few cases in the South and West this was done. The local clearing house issued small denomination loan certificates which its members then paid out over the counter in lieu of gold. This solution, however, was never used, on a large scale. As far as I am aware, it was never used in New York. The problem was that what the public wanted was gold, greenbacks (because they were legal tender), or national bank notes (because they were backed more than 100% by federal government bonds) not a substitute. Sprague was opposed to the issue of small denomination loan certificates to the public. He thought they were "demoralizing!"

What could be done? The <u>other half</u> of the solution to the problem of banking panics was "pooling" or "equalizing" reserves. This meant an agreement among the banks that if one was running low on gold, the reserves of the other banks would be used to supplement the reserves of the bank that was running short. Pooling reserves reassured the public that their demands for gold would be met. In effect, once the agreement to pool reserves was reached the banks had turned themselves into a central bank. It was not, to be sure, like a modern central bank that could simply print legal tender, but it was analogous to a nineteenth century central bank that had a large gold reserve that it could deploy in an emergency.

What was the evidence that a combination of clearinghouse loan certificates and pooling reserves would work? Here, interestingly, the best evidence was not from the cases that were covered in the *History of Crises under the National Banking System*. Sprague's mandate from the National Monetary Commission was to cover the crises under the National Banking Act, which was Civil War legislation. But as Sprague pointed out in his *History* (1910d, 49) the best evidence that a combination of loan certificates and pooling reserves would stop a panic was from the crisis of November 1860 which was precipitated by the secession of the southern states after the election of Abraham Lincoln. The use of the crucial combination of policies in 1860 was possible because the banks were prepared. The panic occurred only three years after the panic of 1857, and in the meantime plans had been laid – the banker George S. Coe was important here – to deal with the next crisis.

In both his argument as a whole and his use of 1860 Sprague was following his Harvard mentor Charles F. Dunbar. Here is how the 1860 agreement among the New York banks to pool reserves was described in the 1901 second edition of Dunbar's *Chapters on the theory and history of banking* which was edited by Sprague after Dunbar's death in 1900.[11]

> By this plan the banks agreed that, for the purpose of enabling them to expand their loans, the specie reserves held by them should be treated as a common

[11] The crisis of 1860 was also discussed in Dunbar (1904). The volume in which this essay appeared was also edited by Sprague.

> fund and, if necessary, should be equalized among the banks by assessments laid upon the stronger for the benefit of the weaker; and that, for the purpose of settling balances between the banks, a committee should be appointed with the power to issue certificates of deposit to any bank placing with them adequate security in the shape of stocks, bonds, or bills receivable, and that these certificates should be received in payment by creditor banks (Dunbar and Sprague 1901, 81).

What was the effect of this agreement which was announced on November 21, 1860?

> The effect of this arrangement was instantaneous. The announcement that it had been made quieted the money-market and ended the panic. In the next week the banks increased their loans rapidly, and nearly the whole of the additional loans went to swell the mass of deposits, with only an inconsiderable loss of specie (Dunbar and Sprague 1901, 82-3).

The 1860 crisis, however, was unusual. There was no speculative bubble before the crisis. The economy had been doing well in the period leading up to Lincoln's election and the banks were in good shape (Dunbar 1904, Swanson 1908a). People were not questioning the basic solvency of the banks, or at least not questioning that the banks would have been solvent given normal political conditions. Rather, the problem was that southerners were withdrawing specie from New York banks while southern banks were refusing to honor sterling acceptances normally sold in New York. This problem was faced by all of the New York banks, and there was no guarantee that the weaker banks would be hit harder. This made securing the cooperation of all of the New York banks easier than it normally was: Even the banks with strong balance sheets had an incentive to join the coalition. Sometimes the rational policy for the strongest individual is to flee and let devil take the hindmost; sometimes the rational policy is to join with others and circle the wagons. This was one of the latter cases.

This effect of this action, moreover, was to some degree confined to New York. In the South, of course, the banks faced enormous challenges as Southern states withdrew from the union. But even in the north there were a variety of effects from disunion. The Boston banks issued clearing house loan certificates on November 24, but did not pool reserves, perhaps because they saw less danger of withdrawals. On the other hand, banks in many cities closer to the South, and presumably with stronger economic ties to the South, suspended. These included the banks of Pittsburgh with one exception (*New York Times*, November 22, 1860, 4); Philadelphia (Swanson 1908b, 222; *New York Times*, November 23, 1860, 1); the District of Columbia (*New York Times*, November 23, 1860, 1); Trenton (*New York Times*, November 24, 1860, 4); and St. Louis also with one exception (*New York Times*, November 29, 1860, 5).

Clearinghouse loan certificates and pooling of reserves were used again on April 21, 1861. Dunbar did not dwell on this episode, perhaps because it occurred at the start of the Civil War: Fort Sumter was attacked on April 12. Again war news provided a common threat that encouraged adoption of common action. Despite the special circumstances in which the pooling agreements of 1860 and 1861 were attained, Sprague (1910d, 49) saw these episodes as clear evidence that a combination of clearing house loan certificates and pooling reserves could be used in peacetime to prevent suspensions.

The evidence from the crises that fell within Sprague's mandate told against pooling. In 1873 clearing house loan certificates and pooling of reserves were used, but there was still a suspension of legal tender payments and the economic contraction that followed was severe. Why didn't loan certificates plus pooling work? Here again Sprague's argument was adumbrated in Dunbar and Sprague (1901, 84-86). There were, Dunbar and Sprague suggested, two factors that explained the failure of the 1860 formula. One was that insolvency was an issue in 1873. The country was awakening from an "intoxicating speculation." Perhaps nothing could have prevented a panic and suspension.

A second factor that Dunbar and Sprague thought might explain the failure of pooling was that the banks were a bit slow in adopting pooling. The failures started on September 8th, the panic started on the 18th, but it was not until evening of Saturday the 20th that the banks acted and pooled reserves. However, this did not end the crisis: on September 24, the New York banks suspended specie payments. Granted, it would have been better if the New York banks had announced an agreement to pool reserves between the 8th and the 18th. But to demand that a group of separate banks with very different balance sheets and without the clear signal of a national threat reach a cooperative agreement in less than 10 days would appear to be asking a lot. And there is no guarantee that reaching an agreement earlier would have prevented the suspension.

Sprague (1910d, 54) thought that suspension when it happened was "amply justified" by the low level reached by reserves when pooling was finally adopted. This is, of course, a matter of judgment. Elmus Wicker (2013), after looking at the reserves of the New York banks, rejected Sprague's contention that the suspension was justified. Sprague noted, however, that the suspension was not carried as far as in subsequent suspensions, perhaps because reserves had been pooled. Many depositor requests were honored. Indeed, Sprague (1910d, 55) claims that in 1873 "money continued to be paid out by the banks – indeed almost as freely as before." Nevertheless, the bottom line was that the loan-certificate-and-pooling policy had failed to prevent a panic and at least a partial restriction of payments. Sprague nevertheless praised the action of the New York Banks in his *History*.

> During the continuance of the arrangement the banks were converted, to all intents and purposes, into a central bank, which, although without the power to issue notes, was in other respects more powerful than a European central bank, because it included virtually all the banking power of the city (Sprague 1910d, 90).

And that was it: pooling was not used in subsequent crises, although half of the solution, the issue of clearing house loan certificates was used. Two successes in an unusual political situation and one failure (or partial failure) in more typical circumstances seems a weak basis for drawing conclusions. Nevertheless, Sprague was convinced that pooling reserves was crucial to preventing suspensions. In reviewing the events of 1907, for example, Sprague argued, based mainly on the large reserves then available in New York, that the 1907 suspension could have been prevented.

> Recalling the course of events in 1873 [when pooling was used], it cannot be questioned for a moment that suspension would not have occurred had similar action been taken in 1907, nor would agreement by all the clearing-house members have been necessary. The six large banks acting in concert could have sustained the local situation by making loans and at the same time could have supplied the demands of outside banks for money (Sprague 1910d, 273).

Bailouts

Presumably reserves should be pooled so that banks that were rich in reserves could help banks that were running short. But what if the bank that was running short of reserves was insolvent? What if it was a very large bank with a superior reputation, so that its failure was bound to start or deepen a panic? Sprague never answered these questions in general terms. But it would appear from the cases that he examined that he thought that panics could be ameliorated by dispensing aid to specific firms, although the presumption would be that these firms would be illiquid rather than insolvent. As noted above, Sprague thought that the guarantee of the liabilities of the Barings in 1890 by a consortium organized by the Bank of England had marked a new departure in central bank responses to financial crises.

> More recently still another method of relief has been adopted in practice, if not in theory. Central banks have at times taken the lead, as in the Baring instance, in arrangements for the conservation of the assets of large banks which are not hopelessly insolvent, and by preventing sudden liquidation have confined the disturbance within narrow limits (Sprague 1909b, p. 401).

And as noted above, Sprague thought that the Clearing House associations could manage this as well as a central bank. It should be added that the determination of the long-run solvency of a bank could be a difficult judgment to make in the middle of a panic. Clearly, we don't want to aid a bank that was "hopelessly insolvent." But this is a formulation which suggests a grey area. A bank might be worth aiding if it was in deep trouble.

Sprague, however, did not think that the ability to engage in this sort of deal making required a central bank.

> In this matter the central bank has no very marked advantage over the clearing-house organization in American cities. The machinery for united action will hardly be set in motion in the absence of some person of commanding influence in whom the business community has confidence (Sprague 1909b, 401).

I take this to mean that the leadership in 1890 in London came from the Bank of England, but that it might as easily come from some other quarter, say the president of a clearing house bank, or as I 1907, J.P. Morgan.

Sprague's positive American case for bank-specific aid was 1884 when the New York Clearing House aided the Metropolitan National Bank. The Metropolitan, a large

New York bank, had suspended on Wednesday, May 14, 1884. The run was caused by the sudden fear that the bank's president, who was known to be a player on the stock exchange, had borrowed heavily from the bank or that the bank had loaned money to his favorites. Later, the Comptroller of the Currency was unwilling to write that evidence had been found to support the rumor, although the bank was under a regulatory cloud when the run began and had been prevented from issuing dividends when it suspended (Sprague 1910d, 348-9).[12] The New York Clearing House sent a team to inspect the books of the Metropolitan, and decided that helping it was justified, partly because the Metropolitan was a large holder of interbank deposits and that its continued suspension might endanger the entire payments system. Clearing house loan certificates were issued, and the Metropolitan was able to resume the next day. Almost 30 percent of the $24.9 million in clearing house certificates taken out during the crisis were issued to the Metropolitan. Many of the other certificates were taken as a precautionary measure and not used. By July 1, 1884 all of the certificates were cancelled with the exception of some issued to the Metropolitan. Eventually, the bank went into voluntary liquidation. Sprague believed that the issue of clearing house loan certificates, especially to the Metropolitan, had been "immediate and effective" in ending the panic and minimizing the damage (Sprague 1910d, 113).

Sprague's negative example was the run on the Knickerbocker Trust Company in 1907, the precipitant of the crisis of 1907. As in the case of the Metropolitan in 1884 the run seems to have started with the rumor that the president of the Knickerbocker was involved in Wall Street speculations that had gone bad. On Monday, October 21 the

[12] This is from an extract from the Comptroller of the Currency's report on the crisis included in Sprague (1910d).

National Bank of Commerce announced that it would no longer clear for the Knickerbocker. An unofficial committee representing banks and trust companies led by Benjamin Strong visited the Knickerbocker that evening, but no aid was forthcoming, and the next day a run forced the Knickerbocker to suspend. Sprague (1910d, 252) thought that if assistance was possible (if the Knickerbocker was not too far gone) and was provided that it was certain that “it would have been of advantage both to the banks and the other trust companies.” Assistance was prevented, however, by the size of the bank – it would have been “an undertaking of no little difficulty” – by the lack of organization of the trust companies, and by the strained relations between the banks and the trust companies (Sprague 1908; 1910d, 251). Subsequently, aid was arranged with the help of J.P. Morgan for the Trust Company of America and the Lincoln Trust Company when they experienced similar devastating runs. But in Sprague’s judgment, this aid, although important in ending the crisis, had come too late to calm fears and prevent the breakdown of the payments mechanism. Thus, Sprague’s conclusion was that aid to large institutions, today we might say systemically important institutions, was justified even if there were some questions about the ultimate soundness of the institution.

The Bottom Line

The central argument of Sprague’s great book was that no fundamental changes in the banking institutions of the United States were needed to solve the problem of panics and suspensions. All that was necessary was that during incipient panics or at least at the start of a panic the large New York banks acted in concert in the public interest. They had done so on some occasions, but failed on others. In effect Sprague had cast himself as the American Bagehot. Just as Bagehot had set himself the task of persuading the Bank of England, a private bank, to act in the public interest during emergencies, Sprague had set himself the task of persuading the large New York banks to do likewise.

In the conclusion of the book, however, Sprague acknowledged that there were alternatives. There had to be a liquid reserve in New York, but there might be several ways of tapping it. He concluded somewhat vaguely as follows.

> Provision for such a reserve power may doubtless be made in a number of different ways. This investigation will have served its purpose if in showing the causes and consequences of its absence in the past it brings home to the reader the need not only for this reserve power, but also of the readiness to use it in future emergencies (Sprague 1910d, 320)

4. Sprague offers Plan B

Sprague adapted quickly to the changing political realities after the Panic of 1907, including what he recognized as a surprising degree of support for a central bank.[13] In a series of papers published in the *Quarterly Journal of Economics* Sprague (1909b, 1910a, 1910b, and 1910c) was specific about what could be done in the way of improving the banking system and offered his plan for a central bank.[14] (1) National banks could be allowed to start savings departments that would invest in mortgages and issue time deposits to minimize the danger of runs. (2) The Comptroller of the Currency

[13] White (1983) traces the growing support in the business community for a European style central bank. Livingston (1986) reaches similar conclusions. In 1909 a survey reported by the *Banking Law Journal* showed that 60% of U.S. bankers favored a central bank (Livingston 1986, 174, ftn. 26).

[14] These papers were collected in a book (Sprague 1911c). Only minor changes were made; the main one being that Sprague now stressed that his opposition to a central bank was specifically to a European style central bank that would influence the economy through its lending operations and discount policy.

could be allowed to suspend the reserve requirements of the national banks, much as the British Bank Act could be suspended in an emergency to make more reserves available. (3) The national banks could shift from a bond based currency to an asset based currency. (4) A central bank would be a useful addition to the financial system if it could be structured so that its main function was to provide gold in emergencies.

The last point, of course, was a major concession for someone who had until quite recently opposed a central bank. Although Sprague was now willing to countenance a central bank he was still extremely skeptical about the wisdom of what he repeatedly identified as a *European style* central bank. Commercial banks, he still believed, were more likely to take excessive risks if there was a central bank on the scene, and this would especially be true in the United States with its myriad of small banks that in the aggregate exercised considerable political clout. He also thought that relying on the discount rate as a tool of monetary policy would be far more difficult in the United States than for example in England. Foreign rates were less closely tied to domestic rates in the United States, and a rate that might be appropriate in New York which was dealing with Europe would be inappropriate for the nation as a whole. The large interregional differences in rates within the United States posed a related problem. The central bank lending rate appropriate for one region would be inappropriate for another. But political pressures would push the central bank toward a common rate.

The central bank that Sprague proposed, therefore, would not normally be in the market lending to commercial banks. Rather, it would be mainly a government sponsored replacement for the clearing houses. Banks would deposit funds in Sprague's central bank and then clear with each other by making transfers on the books of the central bank. In emergencies banks could draw down their deposits, and would not have to worry about a cutoff of gold payments, as had happened during the National Banking Era. Thus, Sprague's central bank would provide for the pooling of reserves in emergencies that Sprague thought was crucial to preventing or stopping panics, but which the New York Clearing House had repeatedly failed to do. The willingness of the central bank to meet all legal demands would in itself, Sprague thought, reduce the risk of a panic. Conceivably, of course, alarm might develop if the reserve of the central bank appeared to be falling to a dangerously low level. This was, after all, the gold standard and even central banks did not have unlimited firepower.

While in normal times Sprague's bank would not be lending to banks, in emergencies, Sprague's bank would make advances to banks "whose reserves had been depleted" (Sprague 1910c, 79). This would help to calm panics. Since the lending would be restricted to banks that were at the end of their tether, there was no room here for lending that would support growth of the money supply. Monetary policy would be left to the gold standard.

A look at the initial balance sheet Sprague constructed for his bank will further clarify his proposal.

The balance sheet of Sprague's alternative to the Federal Reserve			
Assets (Millions of dollars)		Liabilities (Millions of dollars)	
Gold	$345	U.S. Central Bank Notes	$316
Silver	30	U.S. Treasury Account	160
Notes of other banks	30	Due to other banks	75
Government debt	196	Capital	50
Total	$601	Total	$601
Source and Notes: Sprague (1910c, 93). Sprague made a small numerical error in computing the gold reserves of his bank which I have corrected here.			

Commercial banks would make deposits of ($75 million) in the central bank so that they could use it to settle interbank deficits, replacing the clearing houses. Gold certificates and U.S. notes (greenbacks) would be retired and replaced by notes issued by Sprague's bank ($316). Sprague's bank would also serve as the U.S. Treasury's bank ($160) replacing the Independent Treasury and its network of commercial banks. However, there are no loans to banks on the books of Sprague's bank: Sprague's bank would not normally be in the business of making loans to commercial banks, a power that he thought would produce much inflationary mischief. The bank would not, therefore, be in a position of trying to regulate the economy through changes in its discount rate. Some loans to banks might show up on the balance sheet, but only in emergencies, and only temporarily. The bank would be in a position, however, to pay gold to banks that needed it to meet withdrawals in emergencies. Thus, Sprague's bank would provide the pooling of reserves that Sprague thought would cure panics if only the New York banks could be persuaded to do it.

5. The Crisis of 1914

The crisis of 1914 provided a test for the emergency currency that had been included in the Federal Reserve Act and had been advocated earlier by Sprague. The Aldrich-Vreeland Act passed on May 30, 1908 provided, as a stop gap measure, for an emergency currency. This provision was initially scheduled to expire on June 30, 1914, but the expiration date was extended, fortunately as it turned out, to provide protection for the banking system until the new Federal Reserve System was in operation. The emergency currency provision was complicated. The basic idea was that ten or more national banks could form a National Currency Association to issue members of the Association a currency that they could pay to note holders and depositors in lieu of legal tender. To receive the notes the banks had to deposit commercial paper or approved state and local securities. The amount of notes that could be taken out was a fraction of the assets deposited, the fraction varying with the class of asset. In order to encourage retirement of the notes after the emergency, the banks were subject to additional taxes based on the amount of currency outstanding. The Aldrich-Vreeland notes were similar to national bank notes. They were not necessarily backed by federal government bonds as the national bank notes were, but on the other hand, they were issued by a group of banks rather than one individual bank.

The outbreak of World War I led in short order to the deployment of the Aldrich-Vreeland Currency. Perhaps the biggest immediate problem created by the outbreak of the war was the sale of securities on the stock exchange as foreign and perhaps domestic holders of securities tried to turn stocks into gold. The stock market was closed, as it had been in 1873, although as it turned out for three months rather than 10 days as in 1873.[15]

They were put into circulation as soon as the threat of runs on the banks developed. At their maximum $364 million were in circulation which was nearly one-quarter of the currency in the hands of the public before the outbreak of the war (Friedman and Schwartz 1963, 172).

Sprague was pleased with the result.

> Thanks to the emergency notes, the banks were able to maintain payments without difficulty, both over the counter and between themselves. All requirements for currency for use outside the banks were met with the new notes, thus safeguarding the reserves of the banks. The notes also were a positive means of increasing reserves. Gold, gold certificates and other lawful money received by the banks over the counter in the ordinary course of business were retained, while counter payments were regularly made in the new notes, which proved in every way quite as acceptable, indeed, in one respect more so, since they were all new currency (Sprague 1915, 519).

Indeed, Sprague thought that things had gone better than in previous crises because bank lending was not adversely affected by the crisis to the same degree that it had been in earlier crises.

In some ways the situation in August 1914 was analogous to November 1860 when the election of Lincoln and the secession of the Southern states threatened the stability of the gold backed monetary system. Lincoln was elected on November 6, 1860. On November 10 the South Carolina legislature authorized a special convention to discuss secession. On November 21, two weeks after the election, bankers in New

[15] Silber (2007a, 2007b) provides a comprehensive discussion of the crisis and the issue of the emergency currency.

York authorized the pooling of reserves. The same rapid response can be seen in 1914. On the 28th of June 1914 Archduke Ferdinand was murdered in Sarajevo. On July 28th Austria-Hungary declared war on Serbia. Just four days later Secretary of the Treasury William Gibbs McAdoo declared an emergency and invited banks to apply for emergency currency. On August 4th Congress passed a bill making it easier for the large New York banks to qualify for emergency currency. In both 1860 and 1914 there were clear threats to the system as a whole, there were patriotic motives for cooperating, and in neither case was it was clear that the withdrawals would be focused on the weaker banks. These were all factors favoring collective action. It is far from clear that collective action could have been achieved under the circumstances that accompanied normal peacetime financial crises. This is especially true when one thinks about the 1930s when the banking crisis started with small unit banks in rural areas. Even the larger failures in the 1930s that are usually considered the precipitants, Caldwell and company and the Bank of United States, were outside the circle of large New York banks to which Sprague normally looked for definitive action. And there were questions about their ultimate solvency that raised further obstacles to collective action.

The Federal Reserve was not fully in operation when the crisis of 1914 hit. Sprague thought this a good thing. If the Federal Reserve had made mistakes, as might well be expected from a new institution, confidence in it would have been undermined. After the crisis, however, the Federal Reserve encouraged the banks to cooperate to supply additional loans to cotton growers and Sprague saw this as a harbinger of the good things that might be expected of the Federal Reserve in the future (Sprague 1915, 532-3).

Although Sprague saw the use of Aldrich-Vreeland currency as successful in 1914, it did not lead him to renew his opposition to a central bank. Sprague had moved on, accepted the Federal Reserve as an established feature of the institutional landscape, and begun to see its positive side. In an early review of the Aldrich plan Sprague (1911a) did not question the wisdom of establishing a central bank, he merely suggested a number of changes in the law that it would make it more acceptable to western, southern and small bank interests, and hence increase its chance of adoption.

At the annual meetings of the American Economic Association in 1912 Edwin Kemmerer (1913) presented a plan for improving on the Aldrich plan, and a number of economists including Sprague were asked to comment on Kemmerer's paper (Hollander, et. al. 1913). On this occasion Sprague simply suggested a way of tying the new institution's hands: Loans should be limited to 25 percent of reserves (Sprague 1913, 70). In that way, the inflationary dangers that Sprague foresaw could be avoided. If the total amount of bank loans was increased too much the result would be a disaster because business would begin to rely on short-term loans in circumstances when long-term investments were required. Under Sprague's 25 percent rule the Federal Reserve would become the emergency reserve that Sprague had pushed for earlier. But it was clear that Sprague was adapting to a fait accompli.

6. Conclusions

One might guess that O.M.W. Sprague, America's leading academic expert on financial panics during the Progressive era had been an early and strong advocate of a central bank. After all, at least in the usual telling the Federal Reserve followed inevitably from the findings of the National Monetary Commission. One might suppose that the expert who "wrote the book" on financial panics for the Commission would have been on board. This, however, was not the case. Sprague, in fact, was initially opposed to establishing a central bank, and thought that more limited reforms would have solved the problem of banking panics. His opposition, as explained in detail above, rested on a number of considerations. Most important was his concern that creating a central bank would be inflationary. Speculative periods leading up to financial panics, Sprague worried, would be reinforced rather than weakened by a central bank. This might not be true for central banks in Europe, such as the Bank of England, or the Reichsbank, but it would be true in the United States because of the unique political economy of American banking. When commercial banks wanted more credit from the central bank, most likely during an economic boom, they could bring political pressure to bear on the central bank to provide it.

What then could be done to stop the run of banking panics in the United States? The central argument of his *History of Crises under the National Banking system* (1910d) was that the key to stopping suspensions of specie payments, and thus preventing severe recessions, was to persuade the large New York banks to act in concert as a lender of last resort during the periods of apprehension (to use Bagehot's term) that preceded panics. This argument seems, at least to me, to be less than compelling. The evidential base was slim. Sprague had only three examples of the New York banks pooling reserves and acting as a central bank during incipient panics. His best examples, 1860 and 1861 were outside the period that he examined intensively, and in any case were the product of unusual political circumstances. The other example of pooling, 1873, is unclear at best. The banks did suspend in 1873. In all the crises after 1873 the banks issued clearing house loan certificates, but failed to pool reserves, the latter being, according to Sprague, half the solution banking panics. Thus, Sprague cast himself as the American Bagehot. *Lombard Street* was dedicated to persuading the Bank of England to assume the role of lender of last resort. And Bagehot appears to have had some success. After the repeated failures of the New York banks to act collectively for the common good, however, it is hard to believe that strong words from academic economists could have changed the behavior of the six largest New York banks during panics.

Sprague was on sounder ground, I believe, when he endorsed the idea of “reserve power” in the central money market as the key to preventing suspensions. Indeed, it would appear that the Aldrich-Vreeland currency, which Sprague (1915) thought had worked well, was precisely the sort of reserve power that he had been calling for. Again, the evidence is limited to one example, and one in unusual political circumstances, analogous to 1860. But there does seem to be a consensus that the Aldrich-Vreeland currency had worked well. Dodge (1922), Friedman and Schwartz (1963, 171-3), Wicker (2005, 47-49), Silber (2007a; 2007b, 66-85), and Jacobson and Tallman (2013) all agree with Sprague on the effectiveness of the Aldrich-Vreeland currency.[16] Indeed, Friedman and Schwartz (1963, 172) argued that the use of the Aldrich-Vreeland currency in 1930-33 would have produced better results than were produced in fact by the Federal Reserve, although they acknowledged that there were actions that the Federal Reserve could have taken that would have produced a still

[16] These are not, of course, independent assessments. The later writers acknowledge their debt to Sprague’s account.

better outcome. But whether the Aldrich-Vreeland currency, even if it had been available, would have been deployed in a timely fashion in the circumstances of the Great Depression which differed so much from the circumstances of 1914, is an open question.

Sprague's views on the Depression are a matter for another paper. One episode, however, is worth recalling here. In 1933 he resigned his position as special advisor to the U.S. Treasury in opposition to Roosevelt's gold policy. Sprague was a thorough going supporter of the international gold standard and thought Roosevelt's policy of manipulating the price of gold was a disaster. In this respect Sprague's position was at one with his earlier studies. International suspension of payments, or partial suspension, was analogous to the domestic suspensions that had long absorbed him. Sprague lived into the postwar era, but by the time of his death had ceased to comment on monetary affairs. What he would have made of the world of fiat money that emerged after World War II is anyone's guess.

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Table 1. Sprague's analysis of financial crises.

Year of Panic	Clearinghouse Loan Certificates	Pooling of Reserves	Suspension of Payments of Legal Tender	Severity of economic contraction
1857	No	No	Yes	severe
1860	Yes	Yes	No[a]	mild
1861	Yes	Yes	No	mild
*1873	Yes	Yes	Yes[b]	severe
*1884	Yes	No	No	mild
*1890	Yes	No	No	mild
*1893	Yes	No	Yes	severe
*1907	Yes	No	Yes	severe
1914	Yes	Yes[c]	No	mild
1930	No	No	No	severe

Notes: The crises marked with a star are those that Sprague explored in (1910d).

[a]There was no suspension in New York; there were suspensions in some other Northern cities. See text.

[b]Sprague noted that the restriction of payments was less complete than in subsequent suspensions.

[c]The Aldrich-Vreeland Emergency Currency

Source: Sprague (1910d, 1915, *passim*). I have added the 1930 to complete the story.