Annie Mosimann

Roman Fruit
Oil on canvas
2010
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<tr>
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<th>Names</th>
</tr>
</thead>
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Front Cover: Catherine Bradford  
*Master Study*  
Oil on canvas  
2010

Back Cover: Carrie Baker  
*Recompose*  
Screen print with spray paint on waferboard  
2011

University of Dallas // 1845 E. Northgate Dr. // Irving, Tx, 75062  
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Dear Reader,

The former U.S. Poet Laureate Elizabeth Bishop turned 100 this year. In her honor, we have invited Ms. Bishop to deliver the introduction to our biannual publication. Consider her words from “Sandpiper”:

The world is a mist. And then the world is minute and vast and clear. The tide is higher or lower. He couldn’t tell you which. His beak is focussed; he is preoccupied,

looking for something, something, something. Poor bird, he is obsessed!
The millions of grains are black, white, tan, and gray mixed with quartz grains, rose and amethyst.

We deposit in the following pages, dear reader, our own humble offering of mottled earth, scooped fresh from the strand, still dripping with the vagaries of last semester. You will find that it too contains fragments of all the precious gems and crystals of the earth. We urge you to join us, along with our fitful feathered friend, in perusing the glistening surf for “something, something, something.”

The Editors
The University Scholar

Contents

Front  Master Study  Catherine Bradford

Inside  Roman Fruit  Annie Mosimann

Front  New Naphthalenyl-substituted Organotin Complexes for Better Catalysis  Anna Marie DeLaRosa

4  “Sonnet XXIX”  Jacob Reilly

4  “The dead bird”  Jessica Williamson Kane

5  The Rhetoric of Tyranny  Kevin J. Burns

14  Modern Liz  Yesica Moran

15  Milton’s Satan: Icon or Iconoclast? Winner of the Raymond D. DiLorenzo Essay Contest Award  Christina Witkowski

21  “Pringle Bay”  Jessica Williamson Kane

22  The American Banking System and the Birth of the Federal Reserve System  José Healy

30  Vibrations A  Tasha Hobbs

31  In Situ Optical Spectroscopic Study of Annealing in Tin-doped Gold-Ruby Glass  Clare McDonough

Ins Back  Another Man’s Treasure  Clare McDonough

Back  Recompose  Carrie Baker
New Naphthalenyl-substituted Organotin Complexes for Better Catalysis

Organotin compounds are important catalysts in the industrial production of polyurethanes; however, their potential toxicity makes it desirable to minimize the amount and rate of leaching of any residual catalyst in the final polymer. Changing the organic ligands can improve the binding capability and thermal stability of the catalyst in the polymer, thus reducing leaching. This project was to explore the effect of relatively-unstudied aromatic ligands on tin catalysts in this regard, specifically fused-ring (naphthalene and anthracene) structures with potentially interesting thermal properties. The summer’s research accomplished the synthesis and characterization of several tetraaryl- and diaryl-dichlorostannanes, substituted with naphthalene or anthracene, which may be useful as precursor molecules to hydrostannanes or other catalysts. Syntheses were confirmed by $^1$H, $^{13}$C, and $^{119}$Sn NMR data and X-ray analysis. Crystal structures and NMR spectra were obtained for two novel tin complexes with 2-naphthalene: tetra-2-naphthalenyltin and di-2-naphthalenyltin dichloride, synthesized respectively by a Grignard reaction of 2-bromonaphthalene and magnesium with tin tetrachloride and by a subsequent chlorination-exchange reaction with SnCl$_4$. 

Figure 1: Tetra-2-naphthalenyltin structure

Figure 2: Di-2-naphthalenyltin dichloride structure
Sonnet XXIX

Arise, my dear, the winter is now past: 
The magpies chant the bloom, of lavender 
The by-ways smell perfumed, cicadas purr 
In the liquid summer heat. Our hearts have passed 
Through seasons as the slowly shimmering lapse 
Of the birch’s silver leaves. The time has come; 
Sounds silence: Grasshoppers no longer hum 
In the flaxen sun-burnt weeds since Autumn wraps 
Around the silted edges of our pond 
Where the pelican feeds its famished young 
Its breast stained pure as the sky after a dawn 
On the cold crystal crust, crackling along 
As it melts and shatters through the winter hush 
A song. Soon our heart’s music shall be made flesh.

The dead bird

“The woman wants a salad”
– Ange Mlinko, “A Few Leaves of Salted Rocket”

But not to eat. Instead, someone must go 
to plant romaine and spinach round her grave, 
with a dash of dill at the foot, 
because their roots release a protein 
deadly to worms and soil-things, 
consequently saving her body from them.

That poor old bird, 
who lived in terrible fear of airborne spores, 
had nervous compulsions to throw bread at ducks 
and avoided oranges because those seeds, 
if swallowed, might cause growths in the stomach. 
It’s a wonder they didn’t cremate her 
and toss her crumbs to the wind.
Among Thucydides’ many rhetors in his *History of the Peloponnesian War*, Pericles is preeminent. He alone, of all the Athenian political leaders, rises above the fray. He controls the people, instead of being controlled by them. He maintains their trust and avoids ostracism, unlike Alcibiades, the other notable Athenian leader of the war. Pericles succeeds because of his rhetoric, by what he says and how he says it – and also by what he does not say. Pericles makes the argument for Athenian imperialism. He enunciates the Athenian Thesis: that the strongest city must rule. What he does not say – what he cannot say – is that the inevitable consequence of this thesis is that the strongest man will rule. Thucydides, himself an Athenian rhetor, must point this out. Thucydides’ narrative is not merely a history of a war. It is a political history, meant to instruct those who can see through the veil of the history. Through his characterization of Pericles, Thucydides shows his reader not only that the strongest man should rule, but moreover that the strongest man must use rhetoric to control the fears of the *demos* so that he may continue to rule for the good of the city.

Thucydides’ history is plainly much more than a mere recounting of events. Thucydides has his own political teaching which he conveys through his narrative. Therefore, his history may not be entirely and perfectly historical. Thucydides admits that the speeches he recounts are not literal transcripts, but claims that he has attempted to adhere “to the general sense” of the original speech.1 The speeches are not to be taken as word-for-word representations of Thucydides’ characters. The speeches, however, are integral to the work. It is through speeches that Thucydides introduces his readers to his major characters. Furthermore, it is through his speeches that he presents his political teaching. They often hold “broad, far-ranging, speculative statements about politics and the nature of man and society.”2 The speeches in Thucydides’ history are not merely the collected speeches of many great *rhetors*. Instead, they are the coherent work of one

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man, through which he displays for his readers his political teaching. \(^3\) Thucydides hopes to lead his audience to a greater knowledge of political society, relying on “observed traits of [the] human character and the lasting tendencies of society” to look into the future. \(^4\)

Thus, Thucydides carefully molds his characters and the speeches he attributes to them, to raise certain issues and ideas for his readers. His characters are not fully rounded; Thucydides is presenting a political text, not a character study. Rather, Thucydides emphasizes particular traits in his characters, to exemplify his ideas through those men. His characters merge with their traits, becoming symbols of the “higher issues of the [work].” \(^5\) In the case of Pericles, Thucydides clearly emphasizes his moderation, domination of the \emph{demos}, and foresight. \(^6\)

At the same time, this characterization may not be entirely historical. Although it is clear that the historical Pericles had enormous power over the \emph{demos}, Thucydides seems to have exaggerated his prominence. \(^7\) He claims that the Athenian democracy was in actuality ruled by Pericles as the first citizen. \(^8\) However, Thucydides glosses over various historical facts that would limit or even discredit his high praise for Pericles. For example, there is significant evidence that the \emph{demos} sought a peace treaty with Sparta against Pericles’ advice. \(^9\) Additionally, Thucydides conveniently forgets to mention that the \emph{demos} deposed Pericles – instead, he merely mentions that Pericles was fined, but promptly chosen as general for another term. \(^10\)

Thucydides presents the character of Pericles to his audience in four major passages. He recounts three speeches made by Pericles and gives his own eulogy for Pericles. \(^11\) Although two of Pericles’ speeches are clearly political speeches in the Athenian forum, Thucydides never presents the speeches of politicians opposing

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\(^3\) Kagan, \textit{Greek Historians}, 77.
\(^5\) Ibid., 323.
\(^6\) Ibid., 323.
\(^11\) Strassler, 80-5, 111-8, 123-7, and 127-8, respectively.
Pericles. Historically, Pericles did have prominent political foes. Cleon, for one, was a major longtime opponent of Pericles. However, Thucydides never presents a speech by Cleon until well after Pericles’ death. Instead, as part of his characterization of Pericles and use of him as a symbol, Thucydides continually presents him as a “brilliant politician of the rarest talents,” apparently without any opposing rhetors worthy of note, and all but dictator of Athens. Consequently, Thucydides presents his history in such a way as to “substantiate in the narrative the judgments he offers” in his descriptions of, and asides regarding, Pericles.

Thucydides uses Pericles’ final speech to show his dominance over the *demos* through his rhetoric. Of the three speeches of Pericles, the final speech is clearly in response to accusations. In his final speech, Pericles addresses the concerns of the assembly in regards to his defensive war strategy and the terribly destructive plague that has recently ravaged Athens. Thucydides writes that the Athenians began to “find fault with Pericles, as the author of the war and the cause of all their misfortunes.” While Pericles had previously urged the Athenians to wage war and given a funeral speech as a wise and upstanding citizen, the final speech of Pericles is essentially a defense of his actions at his own trial. Pericles argues in favor of the Athenian Thesis first enunciated at Sparta: that the stronger will always rule the weaker. While he admits that the Athenian Empire is tyrannical, he argues that it must be maintained for the safety of Athens. Essentially, Pericles argues that man naturally seeks empire; and empire, in turn, cannot be safely relinquished. Consequently, Athens must rule or be ruled.

Pericles begins his defense by stressing the importance of the city for the individual. Although his own political good rests on the judgment of the *demos*, he attempts to convince them that he is more concerned about the good of the city than his own good.

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14 Ibid., 97.
16 Strassler, 123.
17 Ibid., 43. One should note that the Athenians in question do not specifically state that the strongest city will always rule, only that the strongest will always rule. This obviously leads us to the conclusion that the strongest member of the city will rule.
The University Scholar

This personal moderation is central to his success. He argues that "national greatness is more to the advantage of private citizens than any individual well-being" and "a state can support the misfortunes of private citizens, while [private citizens] cannot support hers."\(^\text{19}\) Clearly, this is a premeditated effort to convince the _demos_ that he, their leader, is acting out of national interest, not self interest.

Having attempted to convince them of his motives, Pericles turns to a more obvious appeal to _ethos_. He appeals to his own reputation for wise decision-making particularly in contrast to the common man. Put simply, he argues that he is unlike the multitude and far more patriotic and knowledgeable than the _demos_. He tells them that he is speaking to remind them of "certain points" which they have forgotten, leading them to be "unreasonably irritated."\(^\text{20}\) He claims that unlike them, he is proven to be preeminent "in knowledge of the proper policy" and furthermore that they have no reason to distrust him, as he is "not only a patriot but an honest one."\(^\text{21}\)

Only after protecting his own reputation and reminding the _demos_ of his past service and prudence, does Pericles turn to his major premise. In reiterating the Athenian Thesis, Pericles relies heavily on arguments from necessity. He argues that Athens cannot merely end the war and give up its empire. Giving up empire means that Athens will not be free; instead "the only choice [is] between submission with loss of independence and danger with the hope of preserving that independence."\(^\text{22}\) He forces the people to recognize that they must fight unless they are willing to face not only "slavery . . . but also loss of empire and danger from the animosities incurred in its exercise."\(^\text{23}\) As a result, he admits that the empire is a tyranny, and those under that tyranny do not love their overlords. The Athenians cannot merely relinquish empire; they must fight as conquerors or submit as slaves.

Next, Pericles reminds his audience that they chose to fight this war. He attacks his accusers, whose arguments Thucydides has omitted, saying "you must not be seduced by citizens like these, nor be angry with me who, if I voted for war, only did as you did yourselves."\(^\text{24}\) This argument shows Pericles' remarkable moral bravery. His control over the assembly is due, in great part, to his willingness to remind them of painful truths. He forces the people to

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19 Strassler, 124.
20 Ibid., 123.
21 Ibid., 124.
22 Ibid., 124.
23 Ibid., 126.
24 Ibid., 126.
realize that the blame for Athens’ actions lies with those who made the decision – with the demos, not the popular leader who merely enunciated the plan of action.\textsuperscript{25} He urges them to imitate his actions, ordering, “cease then to grieve for your private afflictions and address yourselves instead to the safety of the commonwealth.”\textsuperscript{26}

In concluding, he briefly appeals to the honor of the people and the city. He argues that even should Athens be defeated, “still it will be remembered that we held rule over more Hellenes than any other Hellenic state.” Thus, he concludes by urging the city to fight on, “for glory [in the future] and honor now.”\textsuperscript{27}

Pericles alone manages to rule the city well and maintain the trust of the demos. This impressive feat is only possible because of the moderation of his rhetoric. Driven by fear, he correspondingly rules the people by manipulating their fears in his speeches.\textsuperscript{28} Both his motives and his method of argument are based upon this most reasonable passion. Thucydides implies that only rule because of fear is good. The Athenian envoys to Sparta argue that their empire is justified because Athens took over the leadership of Greece out of fear, not a desire for honor and profit.\textsuperscript{29} Fear is the best of the three aforementioned motivational passions because it is most closely tied to necessity, which is, in turn, tied to justice.\textsuperscript{30} In a similar way, Thucydides praises Pericles for ruling out of fear, not out of a desire for personal honor or profit. In the eulogy for Pericles, Thucydides repeatedly praises Pericles’ foresight.\textsuperscript{31} Later in the narrative, Hermocrates argues that fear is the most useful of the passions as it alone can lead to foresight.\textsuperscript{32} Clearly, Pericles himself is fearful, or he would not have gained foresight. He leads not out of a desire for personal gain, but out of a desire to preserve the city. Despite his brief

\textsuperscript{25} Kagan, \textit{Peloponnesian War}, 82. Thucydides makes it abundantly clear that the demos loves to forget inconvenient truths about their own previous actions. Instead of taking responsibility for their own choices, they prefer to blame popular leaders who urged them on. See Strassler, 180, 481.

\textsuperscript{26} Strassler, 124-5.

\textsuperscript{27} Ibid., 126-7.

\textsuperscript{28} Grene, 126.

\textsuperscript{29} Ibid., 44. Interestingly, Hobbes seems to agree with Thucydides on these three passions. See Thomas Hobbes, \textit{Leviathan}, ed. Edwin Curley (Indianapolis:Hackett Publishing Company, 1994), XIII [6-7].

\textsuperscript{30} Ibid., 44.

\textsuperscript{31} Ibid., 126.

\textsuperscript{32} Ibid., 264. In this passage, Hermocrates laments the irrationality of mankind and man’s failure to avoid war, despite the fact that man knows war is bad and peace is good. Hermocrates concludes that fear may be useful to tamp down man’s hopes, so that man will not foolishly engage in war in the irrational hope for some gain.
appeal to honor, the main tool with which he controls the *demos* is fear.\(^{33}\)

As if to drive home Pericles’ moderation, Thucydides does not show Pericles acting as if he is, indeed, the first citizen of Athens. Although we are told that he rules Athens virtually unopposed, Pericles does not behave in a way befitting a dictator. While Pericles does praise himself, he does so carefully. He does raise himself above the many and differentiates himself from them by arguing that his own judgment is superior.\(^{34}\) However, he does this only after twice insisting that his own good is only possible through the good of the city.\(^{35}\) His rhetoric soothes the people, allaying fears of tyranny.

Indeed, to a great extent, Pericles is Athens. During the early war, Athens “was hardly separable from the figure of Pericles.”\(^{36}\) Pericles, by haranguing the citizens, imposes on them his own fear and moderation. He presses upon them the necessity of their situation and forces them to accept the consequences of their choices.

In contrast to Pericles, Thucydides presents Alcibiades as a talented political leader who rules for all of the wrong reasons and is ultimately unable to maintain the trust of the *demos*. Alcibiades is not moderate. Like Pericles, he argues in favor of Athenian Empire. However, he is primarily motivated by his own honor and profit.\(^{37}\) Although he does make arguments based on necessity, he does so only after arguing that empire is beneficial to his – and the city’s – honor and profit.\(^{38}\) He does not hesitate to praise himself. Unlike Pericles, he does not claim that the city’s good is necessary for his own good. Instead, he argues that his own personal good will lead to the city’s greatness.\(^{39}\) Ultimately, his *hubris* leads to his destruction. The *demos*, although beguiled by his promises of honor and profit, is unable to trust him and he is ostracized at the first safe opportunity. Although the official accusation made against him is impiety, the real fear is that he will attempt to rule tyrannically.\(^{40}\)

However, Thucydides does not seem to reject tyranny as an evil. We see this both through Thucydides’ apparent acceptance of the Athenian Thesis and through his discussion of the Pisistrian Tyranny.

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\(^{33}\) Grene, 126.

\(^{34}\) Woodruff, 53.

\(^{35}\) Ibid., 52-3.

\(^{36}\) Finley, 112.

\(^{37}\) Woodruff, 117.

\(^{38}\) Ibid., 119.

\(^{39}\) Ibid., 117.

\(^{40}\) Strassler, 390.
Thucydides seems to accept the Periclean Thesis, and even defend its justice. He does not embrace an idea of justice bounded by right and wrong. Instead, his ideas of justice seem to be linked to necessity and expediency. During the Athenian occupation of Delium, the Athenians argue that “even in the eye of the god” their use of the sacred site is acceptable because the gods too must recognize the rights of conquest and necessity. To this argument on justice, their opponents have no response. Thucydides makes the issue even more clear not by words, but by deeds. The Spartan massacre of the Plataeans is carried out not because of any wrong done to Sparta by the Plataeans. Instead, as the Thebans wish to see Plataea massacred, the Spartans carry out the act. While the Plataeans have not been useful to Sparta, the Thebans have been useful allies. Thus, Sparta implicitly admits that justice is tied to expediency, that the necessary act must be just; therefore, the Athenian Thesis and the resulting Athenian Empire are based on justice. At the same time, Thucydides admits that the two poles of civilized humanity – Athens and Sparta – agree that justice is the expediency of the stronger. Thucydidean justice, then, is not based on morals, but on necessity, which in turn is based on and recognized in the universal nature of man.

However, if the Athenian Thesis is just when applied to the city, it is also just when applied to individuals. If it is just for the strongest city to rule, it is also just for the strongest man to rule. However, this principle cannot be stated openly. Pericles himself willingly applies the thesis to the city: the strongest city must rule. However, he is unwilling to explicitly apply the thesis to individuals. He will not and cannot admit that the inevitable consequence of the Athenian Thesis is that the strongest man will rule the strongest city, which will rule the world. He is prevented by Athenian fears of tyranny. Instead, through his narrative, Thucydides makes the argument for the rule of one strong man, the one capable of both imposing his will on others and maintaining his control over the demos.

However, even Thucydides cannot argue openly for the rule of the strongest, beneficial though that rule might be. The author, therefore, makes his argument subtly, throughout his narrative. He admits

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41 Strassler, 277.
42 For Thucydides on the primacy of speech over deeds, see Strassler, 15-16.
43 Strassler, 193.
44 Ibid., 181.
that his narrative will not be understood by the common man.\textsuperscript{46} He apologizes that his history is not decorated with "romance," which will "detract somewhat from its interest;" however, he hopes that it will "be judged useful by those inquirers who desire an exact knowledge of the past as an aid to the understanding of the future."\textsuperscript{47} Obviously, this work is not directed towards the many, as they will fail to understand the true nature of the work. Instead, it is a useful possession for the few who understand it. The reader whom Thucydides instructs is the one who "desires to look into the truth," to see the future from the past, according to the cyclical nature of history.\textsuperscript{48} Pericles is writing to the political reader, who will inevitably be confronted with similar problems; his history is a "manual of statecraft."\textsuperscript{49} It is this rhetor – the strongest man, who must rule – whom Thucydides instructs.

Clearly, Thucydides instructs the few because he does not believe that the \textit{demos} can be trusted to make wise decisions.\textsuperscript{50} The city needs a strong ruler, who can manipulate the \textit{demos} instead of being controlled by it. This is the ultimate problem of the Athenian Thesis in action. Although one man may be a good ruler and best for the city, he may, like Alcibiades, be too open about his own ambitions, making it impossible for the city to trust his rule. Thucydides attempts to remedy this difficulty by holding up Pericles as the shining example of the successful first man of the city.\textsuperscript{51} Pericles realizes that his judgments are best for the city, and manages to dominate the Athenian democracy as the "principal man."\textsuperscript{52} Thucydides does not object to this tyrannical control of the \textit{polis}.\textsuperscript{53} In fact, Thucydides goes so far as to quietly praise some tyrannies. He argues that the Pisistrian Tyranny "was not grievous to the multitude" and

\textsuperscript{46} Strassler, 15.
\textsuperscript{47} Ibid., 16.
\textsuperscript{48} Grene, 13.
\textsuperscript{49} Finley, 104.
\textsuperscript{50} See Woodruff, 53, 54, and 57: Pericles, who clearly understands how the \textit{demos} must be governed, denigrating the wisdom of the assembly. See also Strassler, 381-2: the Syracusans do not follow the wise advice of Hermocrates. Additionally, see Strassler, 481: description of democracies only acting prudently in an emergency.
\textsuperscript{51} Grene, 126.
\textsuperscript{52} Woodruff, 32-33 and Grene, 126.
\textsuperscript{53} Unlike Aristotle, Thucydides does not clearly distinguish between a tyranny and a monarchy. Instead, he refers to any untraditional control (i.e. control gained by assassination or a coup, not a change of constitution) by one man (or one city) over others as a tyranny. Pericles, although ostensibly a representative of the people, has such control over the \textit{demos} that his rule as "the principle man" can essentially be considered a tyranny – he rules as one man without a change of the constitution. See Donald Kagan, \textit{Pericles of Athens and the Birth of Democracy} (New York: The Free Press, 1991), 12.
even “cultivated wisdom and virtue.”54 In a similar way, he praises Pericles’ own undemocratic rule, writing “he governed the [city] with moderation ... and in his time it was at the greatest.”55 However, not all tyrannies are acceptable. Tyrannical rule may be good, but it must be justified by fear and necessity and the ruler must be moderate and rule for the common good.

Thucydides accepts the Athenian Thesis. He recognizes both that the strongest city will rule and that the strongest man will rule the city. Thucydides clearly does not trust the judgment of the demos, and believes that a moderate tyranny can be truly beneficial to the city. The problem is how to convince the people to submit to the rule of one man. The answer proposed by Thucydides is rhetoric: the ruler must control the city through his rhetoric. He must be able to assure the people that he rules for the good of the whole, not for his own good. Pericles managed this, by using his rhetorical skill to control the fears of the people. By his use of fear, Pericles relied on the most reasonable of the passions. In contrast, Alcibiades openly flaunted his abilities and implied that his own honor and profit were more important than the good of Athens. The Periclean rhetor, however, must maintain the public trust by assuring the people of his good motives. To be a truly excellent ruler, he must moderate himself. To be a successful ruler, he must convince the demos that he is moderate. Thucydides’ tyrant must be not only a ruler, but a rhetor.

54 Strassler, 390-1.
55 Grene, 125.
Yesica Moran

Modern Liz
Pencil
2010
Milton is notorious for inveighing against idolatry, the worship of physical objects in place of or over God. A “physical object” need not be a golden calf or pillar of stone, however; Barbara Lewalski reveals that “Milton...insisted that anything could be made into an idol...he believed that the disposition to attach divinity or special sanctity to any person...was idolatrous” (214). In *Paradise Lost*, Milton expands on the traditional definition of the sin to maintain that Satan commits idolatry through the adulation of his own person. Satan initially appears iconoclastic in refusing to worship Milton's seemingly earthly and monarchic God; however, his attempt to usurp the role of monarch, ludicrous efforts to imitate divine behavior, and denial of his ultimate inferiority to the divine nature indicate that the fallen angel truly embraces self-idolatry.

In general, critics of Milton’s Satan are divided into two camps in regard to the degree to which the fallen angel commits idolatry. A small group of critics from the nineteenth century, containing most notably Percy Bysshe Shelley and Sir Walter Alexander Raleigh, maintained that Satan serves as an iconoclast as opposed to an idol. Citing the fallen angel’s aversion for the oppressive monarchy of the Father, the Romantic critics asserted that Milton—a lifelong proponent of iconoclasm and the downfall of divine-right monarchy (Lewalski 222)—related to and sided with Satan’s rebellion against the Father’s kingdom. The majority of critics—William Flesch, C.S. Lewis, Barbara Lewalski, and Stanley Fish among others—believe that Satan, rather than exhibiting disgust for the servile adulation of a seemingly earthly monarch, embodies the qualities of an idolater in that he hypocritically attempts to assume the place of the Almighty he professes to abhor.

Satan’s attempts to assert himself to a position of equality with God constitute the character’s most obvious displays of idolatry.
Despite his noble status in the Heavenly ranks, Satan erroneously dreams that “one step higher / Would set me high’st” (IV. 50-51). Glorifying in the name of “Antagonist of Heav’n’s Almighty King” (X. 386), the fallen angel first displays idolatrous tendencies in leading droves of rebel angels against God. A superficial examination of the text at this point seems to indicate that the character of Satan behaves according to Milton’s iconoclastic sentiments. He denounces the “the Tyranny of Heav’n” (I.124), raises an army of angels to rebel against an apparently oppressive overlord, and protests against the servile pomp which Milton himself opposed in the English monarchy. Shelley lauds the fallen angel as a force persevering in a “purpose which he has conceived to be excellent, in spite of adversity and torture” (A Defense 394) at the hands of a God Shelley perceived as unfit to rule. Flesch, playing the Devil’s advocate, points out that indeed Satan’s rebellion against the kingship of God seems justified in that the Father’s reign bears a resemblance to earthly monarchy and that (at the time of the rebellion) the Son had not yet demonstrated his worth (Flesch 425). To the Romantic critics, Satan’s opposition to God’s reign mirrored Milton’s own opposition to the unmerited adulation of monarchs. The role of dissenter against the reign of God, Raleigh maintains, is the most admirably iconoclastic role in the poem. When Milton realized that he had allotted the honors of his own position almost entirely to Satan, he “attempted to allay his scruples…[by] (dividing) the honors of dissent” and subjecting the character of Satan to a progressive degradation (Raleigh 140-141).

The problem with adhering to the notion of Satan as an iconoclastic “Prometheus”1, however, lies in Shelley’s own admission that Satan is not immune from the “taints of ambition, envy, revenge, and a desire for personal aggrandizement” (Shelley, Prometheus 393). Hamilton maintains that while the behavior of Milton’s God makes it “difficult not to sympathize with rebellion against the Divinity in whom it is expressed…[the rebellion worthy of sympathy is that of] a Prometheus, not of a Satan”—that is, rebellion motivated by selfless love for liberty rather than self-idolatry. Rather than embodying a true departure from the monarchical state of Heaven, Satan desires only to recreate it with himself as monarch: “to set himself in glory ‘bove his peers / He trusted to have equaled the Most High” (I. 39-40). Raphael confirms the idolatrous nature of the fallen angel when he

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1 Percy Bysshe Shelley and Sir Walter Raleigh frequently compare the plight of Satan to the plight of Shelley’s Prometheus, who engaged in virtuous and selfless opposition to the unjust reign of the gods.
describes Satan’s entrance into war against the faithful angels: “High in the midst exalted as a god / Th’ Apostate in his sun-bright chariot sat, / Idol of majesty divine, enclosed / With flaming cherubim and golden shields, / Then lighted from his gorgeous throne” (VI. 99-105). Such regal imagery illustrates the extent to which Satan embraces the monarchic and idolized position. The contradictory behavior of the “revolutionary” detracts from the credence of his efforts to depose the tradition of divine monarchy, as Flesch points out: “Satan never sustains the iconoclasm that makes him admirable because it exists side by side with a desire to be the worshiped icon” (427). C.S. Lewis also points out the paradox of Satan’s rebellion: “His revolt is entangled in contradictions from the very outset, and he cannot even raise the banner of liberty and equality without admitting... that ‘Orders and Decrees Jarr not with liberty’ (V. 789). He wants hierarchy and does not want hierarchy” (96). Echoing the accusations of the angel Abdiel, critics of Satan’s purported iconoclasm highlight the hypocrisy of a revolutionary embracing the qualities of the regime he seeks to overthrow.

Aside from directly attempting to overthrow and recreate the stronghold of the Most High, Satan exudes self-idolatry in attempting to imitate godlike qualities and actions, particularly those of the Son. As a true iconoclast, Satan would not imitate the qualities of the monarch he was rebelling against. Shelley asserts that Satan, indeed, behaves differently from and more morally than God (Defence 394). Raleigh elaborates on the fallen angel’s purported “morals”: gentle pity for his fallen troupe and courage in journeying alone to free his followers from bondage in Hell (137-139). Rather than contrasting with the divine ruler’s morals, however, these qualities are mere images of the Son’s own behavior. While imitation of the divine is certainly not idolatrous in and of itself 2, Satan’s “God-like imitated state” (II. 511) is a sinful attempt – born in “envy against the Son of God” (V. 662) – to glorify himself by way of a cheap imitation of godlike qualities and actions. This “indirect idolatry” is first made evident in the construction of Pandemonium: the demonic stronghold, Raphael declares, is crafted “in imitation of that mount whereon / The Messiah was declared in sight of Heav’n” (V. 761-762). Pandemonium becomes a bastion of idolatry and a symbol of the fruitlessly vain attempt to recreate the glory of the Son’s ascendency to the mount

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2 Milton refers to many created characters as “godlike” (IV. 289, VII. 110) in regard to the subject’s behavior in accordance with his nature as a created being made in the image of God.
of Heaven. In conference at Pandemonium, Satan – the “Father of Lies” – presents a façade of “counterfeited truth” (V. 771) to comfort his adulators, vainly attempting to replace the Christ who “single hast maintained / …the cause of truth… / And for testimony of truth hast borne universal reproach” (VI. 30-34). Stella Revard notes that while it seems that Satan “is an assiduous, if not successful, imitator of the Almighty...[his imitation] serves only to point out the deep irony of dissimilitude” (197). This becomes especially evident in another distortion of divine goodness, when Satan executes a “sacrificial act” of his own to rival that of the Son. During the conference at Pandemonium, Satan suggests that he travel “abroad / Through all the coasts of dark destruction / [To] seek deliverance for us all! This enterprise none shall partake with me” (II. 462-466). Oddly similar to Christ’s mission of redemption laid out in Book III, Satan’s “sacrifice” differs from Christ’s in that Satan’s is not truly sacrificial; it is merely a prideful attempt to gain the adulation of his fellow demons. Though it is likely that Satan is unaware of Christ’s sacrificial offer, the similarity nevertheless symbolizes Satan’s fruitless and tainted efforts to engage in behavior best suited for God. Far from shunning the behavior of the one he rebels against, Satan’s self-serving emulation of the Son’s behavior renders him the “icon of his [own] envy” (Revard 198).

Another error in the Romantic notion of Satan as a representation of Milton’s iconoclasm lies in the fact that while Milton could ground his iconoclasm on the worship of the true God, Satan’s rebellion against God Himself is unfounded because he is rebelling not against a temporary vessel of power but against the source of power itself (Flesch 426). Milton’s God – despite surface resemblances to an earthly monarch – is nevertheless the Almighty Source of all being. Rather than a created king assuming the idolatrous power of divine right, He is the divine – and as such, should be rightfully obeyed. Recalling that Milton’s God is not the earthly monarch of Romanticist fancy turns Satan’s rebellion from an iconoclastic revolution to a pitiful, idolatrous attempt to rebel against the source of his own power. To combat the inferiority his created nature logically imparts, the fallen angel denies that he was made by God in the divine image but came into existence “self-begot, self-raised” (V. 860). Raphael asserts that while created beings are indeed “magnanimous to correspond with Heaven... / [they must also be] grateful to acknowledge whence [their] good descends” (VII. 511-512). Perhaps Satan’s most blatant statement of idolatry, his assertion of
self-creation, denies what is wholesomely and legitimately divine in him—God’s image—and replaces it with idolatrous falsity; supremely arrogant, Satan futilely attempts to usurp the creative role reserved for God alone. C. S. Lewis emphasizes the absurdity of this statement: “A creature revolting against a creator is revolting against the source of his own powers—including even his power to revolt” (97). Rather than imposing Romanticist notions of “equality” on the divine and the created in the poem, Stanley Fish reminds the reader that God is Satan’s source as opposed to his rival; he implies that any attempt by a created being to “bootstrap himself... to deity” is an idolatrous attempt to deny that “deity is an order of being fundamentally different from, and infinitely superior to his own” (99). This inability of Satan to maintain equality with God is illustrated in his response to the worship of his followers. Whereas God rejoices in the adoration of his disciples, Satan is inwardly tormented: “They little know /... / Under what torments inwardly I groan / While they adore me on the throne of Hell” (IV. 86-89). Despite his vain ambitions, Satan fully realizes that the idolatrous praise the demons heap upon him is sinful and undeserved. Instead of releasing himself from the tyranny of authority (as iconoclastic action in accordance with the Romantic notion ought to have done), Satan’s behavior merits only misery and self-enslavement, the logical result of asserting oneself to a position one is unfit to occupy.

While a superficial examination of the text paints Satan as a virtuous Prometheus defying the idolatry of an oppressive monarchic force, it is clear that a deeper, more deplorable motive lies behind Satan’s rebellion—self-idolatry. Satan defies God not because of a disgust for unmerited monarchy, but because of his own desire to serve as monarch; additionally, his perverted imitation of divine behavior illustrates that far from despising God, Satan desires to assume His role. Finally, God’s essential identity as all-powerful Source of Satan’s being renders any notion of Satan’s iconoclasm void. It is clear that the fallen angel renders himself an idol, pitifully attributing divine status to a being created only in divine resemblance.

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3 Barbara Lewalski agrees that only the proper recognition of God alone as worthy of adoration leads to true liberty: “The great evil of idolatry is that it invites [created beings] to offer implicit faith and special devotion to... something that is not God...Only by worshiping a God who is transcendent, and rejecting all...material embodiments of the sacred, Milton supposes, can [created beings] preserve their proper freedom and dignity” (215).
Works Cited


In the Rehabilitation Area
pale and resolute
stands a house on a dune.
The sign keeps others out of sight.

The whitewashed walls
and corrugated roof
have little company for most the year
except for baboon in the rain or
cautious fisherman on his way
with illegal crayfish in a plastic bag;
except for two or so weeks around Christmas
when we face the sun and chilly waters
to make up for the rest of the year.

The built-in concrete bench
is cleared of webs, the cushions
 fetched from the closet.
The scorpion is swept from the fireplace
and the cards laid ready on the table.
Abalones double as ashtrays
and machetes crunch and swing
through the rehabilitated scrub,
opening the path to the beach.

We sprint down the sandbank
because red ants on the way
will make you pay for disturbing them.
The mad bush grabs you with knuckles
so black they look burnt
and spurs you forward with promises
of relief in the Benguela backwash.

Days sail past in the specks
of freight ships on the horizon
while seals circle in the muddy kelp,
keeping watch for sharks and surfers.
The agrarian America of the eighteenth century did not have a high regard for banks. Americans at the time valued the virtue of frugality and encouraged “avoidance of debt.” Successful businessman Benjamin Franklin wrote at the time in his *Way to Wealth*: “He that goes a-borrowing goes a-sorrowing.” A cohesive banking system did not develop until the nineteenth century in the United States. During the congressional debates about whether or not to create the Bank of the United States, only three banks existed in the country—the Bank of New York, the Bank of North America, and the Massachusetts Bank.

The First Bank of the United States gained its charter in 1791 due mostly to the efforts of Secretary of the Treasury Alexander Hamilton, who viewed the bank as a necessary element to launch America as an industrial power. The bank began its central operations in Philadelphia, but also opened branches in Baltimore, Boston, Charleston, and New York. It provided loans and a place for deposits for the government. It also made collection of taxes easier and afforded clearing services for payments on the national debt. The bank issued bank notes, extended credit, and even at times acted as a lender of last resort to other banks. In 1811, however, the federal government under the control of Jeffersonian Republicans and President James Madison decided to let the bank’s charter die.

After the bank disappeared, an explosion of state banks ensued, followed by a proliferation of bank notes and loans. The banking system no longer had a central institution to regulate and temper fluctuations in the banking industry. Madison, however, recognized the need of the nation and the government for a bank and at last reconstituted it as the Second Bank of the United States in 1817.

The bank would have continued developing as the center of America’s financial system and perhaps grown into a central bank,

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4 Cowen, “The First Months of the First Bank,” 35.
5 Cowen, 14 and 161.
such as the ones that developed in Europe. President Andrew Jackson, however, put an end to the progression of the banking system into a central bank. Jackson withdrew all government deposits from the Bank of the United States in 1833 and let its charter die out in 1836. The actions of Jackson and his decision to do away with a central banking institution left the nation dependent on local banking institutions. His actions also stifled the growth of what could have developed into a central bank, an institution that could have taken on the role of lending to other banks in times of financial trouble and providing monetary relief to those banks.7

During the Civil War, the federal government attempted to create a safer banking system, one that would minimize risk for banks and depositors and for the economy as a whole. In 1864, the federal government passed into law the National Banking Act. The new law established higher capital reserve requirements for banks, limited bank branching to keep a few banks from gaining excessive control of the industry, and established stricter regulations over banking practices. The National Banking System, brought about by the act, did not make membership mandatory for banks. In other words, only banks that adopted national charters were required to adhere to the reserve requirements, the stricter supervision by the Comptroller of the Currency, and, of course, the abandonment of state charters. As a result of that stipulation, countless banks preferred to retain their state charters, which enabled them to operate with lower reserves in their vaults and not be subject to federal government supervision.8

The National Banking System not only permitted the growth of state-chartered banks, but it also enabled the development of trust companies, which competed for business with state and national banks. Trust companies proliferated, because they were subject to little regulation, like the state banks. Trust companies began as corporations that served the wealthy by holding money in trust for them and purchasing securities of business firms. However, trust companies gradually took on more functions and began to compete for deposits with national and state banks.9

A fragmented system of competition among state and national banks as well as trust companies developed under the National Banking System.

Banking System. To make matters worse, the system did not have a central bank or institution that could act as a lender of last resort or provide currency to banks undergoing shortage of reserves or suffering from seasonal shifts of funds from one region of the country to another. The government’s restrictions on branching compounded the problem of the absence of a central banking institution, or a lender of last resort to banks. Banks, for the most part, could not have branches and therefore were obliged to cooperate with other banks to clear checks and provide loans in times of trouble. For instance, a bank located in the countryside with customers in the city would often rely on a city bank to clear its checks and take deposits on its behalf.10

The banks’ desire to retain customers and to remain fiscally afloat during economic crises prodded them to establish clearinghouses. Clearinghouses originally began as institutions to clear checks and collect deposits for member banks in big cities. The New York Clearing House—established in 1854—was the first clearinghouse to be incorporated. Following the example of New York, clearinghouses sprang up over the next two decades in cities such as Boston, Philadelphia, Baltimore, Cleveland, Chicago, and Saint Louis. By 1913, a total of 162 clearinghouses functioned in the United States.11

The clearinghouses established minimal reserve requirements for their member banks in order to prevent a shortage of funds to cover their operations. The success of the clearinghouses, therefore, depended on their members remaining solvent. As a result, the member banks decided to also confer on the clearinghouses the ability to issue loan certificates to member banks victimized by a seasonal shortage of funds or by a financial panic. Banks that wanted to use the clearinghouse facilities were required in turn to accept clearinghouse certificates from other banks.12

The financial panic that occurred in 1907 illustrates well the role that clearinghouses played in times of financial trouble and reveals the inadequacies of the National Banking System as well as the public’s dissatisfaction with it.13 Clearinghouses had already issued loan certificates to try to avert or respond to panics. During the panic of 1893, clearinghouses around the nation issued over $68 million in loan certificates, with the New York Clearing House accounting for more than half of the amount issued. The panic of 1907, which resulted

11 White, “Federal Banking Reform,” op. cit. 74-75.
12 Ibid., 75-76.
from a seasonal shift of funds and a drop in the business cycle that tightened the money supply in New York, triggered bold actions by the clearinghouses. During the panic of 1907, clearinghouses issued a total of $238 million in loan certificates, according to Harvard economist A. Piatt Andrew. In New York City, eight banks benefitted from the loan certificates from the city’s clearinghouse.¹⁴

Despite the assistance that they provided, the clearinghouses’ efforts fell short of lessening the effects of the panic. As a result, runs on banks and trust companies ensued. The inability of the New York Clearing House to provide assistance to a trust company, Knickerbocker Trust, accounted for the extension of the panic and the inability of the New York Clearing House to ameliorate its effects. For almost two decades, the national and state banks in New York had faced strong competition from trust companies. Hence, the New York Clearing House had refused to admit trust companies as members. In 1903, the clearinghouse dictated that trust companies could not clear checks through clearinghouse member banks unless they raised their level of reserves. That new rule had engendered significant hostility on the part of trust companies towards other commercial banks.¹⁵

During the panic, Knickerbocker still cleared through member banks. However, the national bank that acted as Knickerbocker’s clearing agent at the New York Clearing House refused to extend a loan to the trust company, which suffered from negative balances and a weak position in the stock market. The absence of a loan and the news of the national bank’s refusal caused a run on the trust company, which soon spread to many other trust companies and then to banks. Eventually, the New York Clearing House decided to extend loan certificates to all institutions—including trust companies.¹⁶ Still, the rivalry between the different institutions under the National Banking System persisted, and the financial woes that battered the nation in 1907 led bankers and politicians to re-examine the banking system with a view to reform.

Movements for reform in the banking industry had been gaining momentum for the past few decades. Specifically, the panic of 1907 enkindled the efforts in the U.S. Congress to establish financial reform and to provide more stability in the fluctuations of the economy. In 1907, Congress passed the Aldrich-Vreeland Act, sponsored by Senator Nelson Aldrich of Rhode Island and Representative Edward Vreeland. The bill was a compromise between the interests of New York

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¹⁴ “Federal Banking Reform,” 81-82.
¹⁵ Ibid., 81.
¹⁶ Ibid., 82.
bankers and Midwestern bankers. The bill created voluntary currency associations that could issue “loan certificates as an emergency legal tender” that would supply currency to banks in times of drain.\textsuperscript{17}

Congress, however, considered the Aldrich-Vreeland bill to be only a temporary solution to the defects of the banking industry, and so it established alongside the bill the National Monetary Commission, chaired by Aldrich himself. The commission would report to Congress “what changes are necessary or desirable in the monetary system of the United States or in the laws relating to banking and currency.”\textsuperscript{18}

During the consideration of banking reform proposals, certain ideas were unpopular or even out of the question in the American cultural climate of the period. One of these ideas consisted of establishing a central bank such as the ones in place in countries like England. Under this European-style banking system, a centralized authority held the power to determine monetary policy and to control fluctuations in interest rates. The New York bank reformers were convinced that a centralized bank could provide stability amidst the fluctuations in the U.S. economy. At the same time, they knew very well that “an institution patterned after European central banks was politically unacceptable.”\textsuperscript{19} Such was the hostility towards central banks in the United States that leading economic theorists believed a central banking institution in the United States would have to be “a decentralized institution.”\textsuperscript{20}

Many Americans particularly feared that a centralized institution would become a monopoly under the control of powerful Wall Street financiers and would be used for extravagant bursts of speculation in the stock market. In fact, the Money Trust Investigation under the House Committee on Banking and Currency had already blamed the big New York City banks for creating a “cartel-like club in the New York Clearing House.”\textsuperscript{21} The investigation, which represented populists and progressives, was suspicious of the functions carried out by the New York banks and feared that the large banks had “manipulated the stock market for their own benefit and to the detriment of others” during the panic of 1907.\textsuperscript{22}

The National Monetary Commission—created immediately after the panic—made recommendations that shaped the new Aldrich bill of 1911, which mandated the establishment of the National Reserve

\textsuperscript{17} Ibid., 89-90.
\textsuperscript{18} Ibid., 91.
\textsuperscript{19} Ibid., 87.
\textsuperscript{20} Ibid., 87.
\textsuperscript{21} Ibid., 87.
\textsuperscript{22} Ibid., 87.
Fall 2011

Association. The association would consist of fifteen regional districts, with a branch in each district. The banks operating in each district would elect the board of directors for that district’s reserve branch, and the association would also establish a central office in Washington, D.C. However, the government would not be involved in running the head office in the capital. The district branches established by the National Reserve Association would have the power to rediscount notes and bills of exchange endorsed by member banks for agricultural, industrial, or commercial transactions. In other words, the reserves in the district branches could not discount bills endorsed to carry “stocks, bonds, or other investment securities in order to sever the relation between banking and the stock market.”

Although the Aldrich bill had the elements to appeal to those fearful of a centralized institution controlled by Wall Street financiers, the Democrats opposed it in their 1912 political platform. They did so primarily because the new association would be controlled solely by bankers, and many Democrats were only open to the establishment of a central bank subject to political control. The Democrats gained control of both chambers of Congress in 1912 and Woodrow Wilson won the presidency the same year.

The Democratic takeover of 1912 marked the death of the Aldrich bill. Carter Glass became the new chairman of the House Committee on Banking and Currency, and Wilson met with him soon after his election to propose what later became the Federal Reserve Act. Wilson envisioned the emergence of a compromise between the two main factions of the banking reform movement—one favoring a government-controlled central bank, and the other supporting a central bank controlled by bankers.

Wilson’s legislative proposal—which made it into the final bill—consisted of a decentralized banking system, composed of regional reserve banks controlled by bankers. The plan also included a politically appointed board in Washington, D.C. with “no clear division of authority between” the reserve banks and the Board, as political economist Allan H. Meltzer writes in A History of the Federal Reserve.

The final legislation passed as the Federal Reserve Act of 1913, and it created a system of twelve reserve bank districts headed by

23 Ibid., 94-95.
24 Ibid., 95.
26 Ibid., 66-67.
27 Meltzer, “In the Beginning, 1914 to 1922,” 67.
The act stipulated that the Board would consist of seven members, two of them—the Secretary of the Treasury and the Comptroller of the Currency—serving ex officio. The President of the United States would have the power to appoint the remaining five members “by and with the consent of the Senate.” In addition to the Board, the legislation also created the Federal Advisory Council that would advise the Board. The council consisted of as many members as Federal Reserve Banks, with the board of directors of each bank electing one member to represent each reserve district.

Harvard Professor of banking and finance O.M.W. Sprague wrote in February of 1914 that the new system established by the Federal Reserve Act of 1913 aimed to “make certain that there will always be an available supply of money and credit in this country with which to meet unusual banking requirements.” Sprague outlined the powers of the Federal Reserve System in a very detailed and analytical manner shortly after the passage of the act. Perhaps the most important feature of the new system was that it allowed member banks to rediscount commercial loans from the Federal Reserve Banks. Member banks would keep a portion of their reserves in the Federal Reserve Bank of their district. Specifically, Federal Reserve Banks would store in their vaults six percent of the “capital and surplus of the member banks in its district.”

The reserve banks would then use the funds proceeding from the subscribing banks to rediscount—that is, to lend to a bank to provide it with currency for loans that have not yet matured. Reserve banks could only rediscount “commercial loans maturing within ninety days.” Commercial loans eligible for rediscount at a reserve bank consisted of “notes, drafts and bills of exchange issued or drawn for agricultural, industrial or commercial purposes, or the proceeds of which have been used or are to be used for such purposes.” Congress wished to exclude the rediscounting of loans not strictly linked to commerce, industry, and agriculture, in order to prevent the use of Federal Reserve currency for speculation in the stock market. The “real bills doctrine” in economic theory provided the foundation for this stipulation in

31 Sprague, 213.
32 Ibid., 228.
33 Ibid., 243.
35 Meltzer, “In the Beginning, 1914 to 1922,” 70-71.
rediscounting. According to the real bills doctrine, the rediscounting or lending by the central bank to commercial banks for loans linked to commerce, industry, and agriculture did not contribute to inflation. The extension of credit for loans in real estate, bonds, and other speculative assets, did lead to inflation, according to the doctrine.\textsuperscript{36}

In addition to rediscounting loans, the Federal Reserve also had the power to set the discount rate—the rate at which member banks lend to one another. By raising or lowering the discount rate, the Federal Reserve could control the amount of lending in the economy. It could thus either contract or expand the extension of credit according to the present state of the business cycle.\textsuperscript{37}

The Federal Reserve could also engage in more direct operations in the open market, such as buying or selling bills of exchange directly from “individuals, firms, corporations, as well as domestic or foreign banks.”\textsuperscript{38} Through “open market operations,” the Federal Reserve could affect the elasticity of currency and the extension of credit, especially at times when banks failed to take advantage of the rediscount option to meet their currency needs. At the same time, the Federal Reserve could also use its surplus funds to help finance “the foreign trade of the country with domestic capital.”\textsuperscript{39}

The Federal Reserve System also possessed the power to issue notes “secured by commercial assets,” and thus was able to provide an elastic currency. Finally, just as the clearinghouses had attempted to do in the past, the Federal Reserve Banks could also conduct the clearing and collecting of checks throughout the country, thus establishing a cohesive nationwide system for business transactions.\textsuperscript{40}

Eleven months after the passage of the Federal Reserve Act, the country inaugurated the twelve reserve banks on November 16, 1914. William McAdoo, Secretary of the Treasury under President Wilson, hailed the opening of the Federal Reserve Banks with high hopes of what they could achieve and prevent:

They will put an end to the annual anxiety from which the country has suffered and would give such a stability to the banking business that the extreme fluctuations in interest rates and available credits which have characterized banking in the past will be destroyed permanently.\textsuperscript{41}

\textsuperscript{36}Meltzer, 71.  
\textsuperscript{37}Meltzer, 67.  
\textsuperscript{39}Sprague, 246.  
\textsuperscript{40}Sprague, 215.  
\textsuperscript{41}Quoted in Meltzer, “In the Beginning, 1914-1922,” 74-75. Meltzer took it from Board of Governors File, box 659, November 15, 1914.
Tasha Hobbs

Vibrations A
Pastel, charcoal, and acrylic on paper
2011
In Situ Optical Spectroscopic Study of Annealing in Tin-doped Gold-Ruby Glass

The famous ruby color of gold-ruby glass is due to a colloidal dispersion of metallic gold nanoparticles in glass brought about by reheating a quenched gold-doped glass above the glass transition temperature (annealing). In our particular research, the effects of tin on the formation of gold nanoparticles in sodium trisilicate glass during the annealing process were studied. Samples of sodium trisilicate (NaO·3SiO₂) glass were doped with a constant concentration of gold (0.1 mole% Au) and variant concentrations of tin (0 to 0.1 mole% Sn⁴⁺). The quenched-glass samples were mounted on a heating platform so that optical spectroscopic measurements could be collected during the annealing process. It was found that the addition of tin to gold-ruby glass reduced the amount of time required at the glass transition temperature for the formation of gold nanoparticles in sodium trisilicate glass. Preliminary analysis indicated that the presence of tin also significantly increased the rate of formation of gold nanoparticles. A blue shift in absorption was observed for tin-doped gold-ruby glass. This indicated smaller gold nanoparticle size in a tin-doped gold-ruby glass than in an undoped system. Further research is required to determine by what mechanism tin interacts with gold nanoparticles in a sodium trisilicate glass.
Another Man’s Treasure (scrap glass)
Ruby-gold glass in platinum crucible
(Sample 9: 0.01% Au, 0.01% Sn$^{4+}$)
2011