

NAVAL WAR COLLEGE
NEWPORT, R.I.

The Influence of Powerful Leadership in Technically Oriented Enterprises

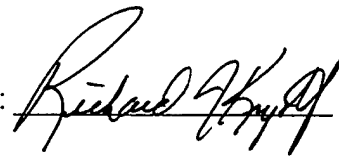
By

Richard J. Krystof
LCDR, USN

A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Joint Maritime Operations

The contents of this paper reflect my own personal views and are not necessarily endorsed by the Naval War College or the Department of the Navy

Signature:



05 February 2001

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

CAPT J.T. Dugene, USN

20010510 170

REPORT DOCUMENTATION PAGE

1. Report Security Classification: UNCLASSIFIED			
2. Security Classification Authority:			
3. Declassification/Downgrading Schedule:			
4. Distribution/Availability of Report: DISTRIBUTION STATEMENT A: APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED.			
5. Name of Performing Organization: JOINT MILITARY OPERATIONS DEPARTMENT			
6. Office Symbol: C		7. Address: NAVAL WAR COLLEGE 686 CUSHING ROAD NEWPORT, RI 02841-1207	
8. Title (Include Security Classification): The Influence of powerful leadership in technically oriented enterprises (U)			
9. Personal Authors: Richard Krystof, LCDR, U.S. Navy			
10. Type of Report: FINAL		11. Date of Report: 05 February 2001	
12. Page Count: 22			
13. Supplementary Notation: A paper submitted to the Faculty of the NWC in partial satisfaction of the requirements of the JMO Department. The contents of this paper reflect my own personal views and are not necessarily endorsed by the NWC or the Department of the Navy.			
14. Ten key words that relate to your paper: Stock Market, Network Centric Warfare, Alan Greenspan, volatility, Information Technology			
15. Abstract: Network Centric Warfare proposes to leverage the as yet undefined military capabilities of Information Technology to bring about a "Revolution in Military Affairs". To examine the concepts of NCW, analogies to business or industrial applications of similar technologies are made. The Stock Market, which possesses mature Information Technology systems provides a place for case study because of the extent to which people are involved with, and influenced by both technology and the stresses associated with making fast paced, high stakes decisions. This paper seeks to examine several of NCW's concepts using the Stock Market as a backdrop, to better understand the human response to operating while immersed in Information Technology, and begin to assess the role of traditional military leadership over the emerging concepts of NCW.			
16. Distribution / Availability of Abstract:	Unclassified X	Same As Rpt	DTIC Users
17. Abstract Security Classification: UNCLASSIFIED			
18. Name of Responsible Individual: CHAIRMAN, JOINT MILITARY OPERATIONS DEPARTMENT			
19. Telephone: 841-6461		20. Office Symbol: C	

ABSTRACT

Network Centric Warfare proposes to leverage the as yet undefined military capabilities of Information Technology to bring about a "Revolution in Military Affairs". To examine the concepts of NCW, analogies to business or industrial applications of similar technologies are made. The Stock Market, which possesses mature Information Technology systems provides a place for case study because of the extent to which people are involved with, and influenced by both technology and the stresses associated with making fast paced, high stakes decisions. This paper seeks to examine several of NCW's concepts using the Stock Market as a backdrop, to better understand the human response to operating while immersed in Information Technology, and begin to assess the role of traditional military leadership over the emerging concepts of NCW.

The Influence of Powerful Leadership in Technically Oriented Enterprises

Network Centric Warfare (NCW), a “Revolution in Military Affairs”¹ is a proposal to leverage the power of information technology to reshape the battlefield of tomorrow. In an effort to assess the potential impact of NCW’s employment, we will examine human interactions and responses that frequently occur in a mature information technology infrastructure, specifically the U.S. stock market. To establish a foundation for comparison, a quote from Vice Admiral Cebrowski’s “Network-centric Warfare: An Emerging Military Response to the Information Age.” is modified by appending words or phrases addressing the stock market, which are bracketed for clarity, to the Admiral’s original text. The NCW concepts under comparison are underlined.

“[The modern stock market] Network-centric Warfare is about human and organizational behavior. It focuses on attaining access—access to gather, process and manage information to take advantage of the growing power in [the stock markets] information networks. It offers a method to build information superiority, a key factor to success in the future [stock market] battlespace. It facilitates the creation and sustaining of shared awareness at all [stock market] command levels. [Modern stock markets] Network-centric Warfare supports speed of command—the conversion of a superior information position to action. Because geographically dispersed [investors] forces enjoy information superiority, they can self-synchronize or self-organize to accomplish time urgent tasks. In brief, [the stock market] NCW is not narrowly about

[trading] technology, but broadly about an emerging [investor] military response to the information age.”²

Technology has empowered individual investors with tools to directly influence the financial battlespace. Open market access, personal trading, instant transactions, and the availability of volumes of precise “data” on market activities have accelerated the pace and altered daily functions. But has such unprecedented individual access to the stock market, made available by sophisticated information technology, reduced or eliminated the role of leadership? Likewise would personal leadership lose its central theme in a military that applies information technology through NCW? Or does the enduring nature of man himself require leadership to become an even more important attribute in a system dominated by technological advances? In examining the stock market the intent is to describe what role leadership has played prior to and following the advent of modern information technology, in order to assess similar outcomes under a system dominated by NCW.

Background:

An exchange, in broad terms, is a medium for the transfer of an item of value. From its inception the stock market has placed buyers and sellers in a strategic setting, establishing a forum for “data dissemination, order routing, and order execution.”³ Similarly, NCW is defined as being “built around the concept of sharing information and assets.”⁴ Though we will concentrate on the U.S. market, it is important to note that currently there are “about 250 institutions recognized as

exchanges in the world, and both individually and collectively they play a crucial role in most national economies and also at the global level.”⁵

The first organized traders in the United States met at 22 Wall Street each day starting in 1792.⁶ Their activities coincided with the establishment of the Federal Government, and the selection of Alexander Hamilton to be Secretary of the Treasury. As a first action “he recommended that the newly created government should fund all the Revolutionary War Bonds of both the Continental Congress and all Thirteen Colonies [through the sale of bonds]. The holders of these issues were to get new 6 [sic] and 3% stock. Great speculation swept the country as bankers, brokers, governors, congressmen, and speculators scoured the nation to buy up the heavily depreciated bonds. Vast fortunes were made in the process.”⁷ In recognizing the vast potential of investor sentiment Mr. Hamilton created powerful action by geographically dispersed and economically diverse groups whose common system was the market. This first example describes a pattern, which would repeat itself for the next 180 years of market advances and declines. Improvements in the structure and efficiency of markets occurred in tandem with powerful investor willingness to speculate on the great investment opportunities of the day: commodities; real estate; banks; railroads; canals; and industrial technology.⁸ In the period from 1870 to 1933 a maturing economy and great excesses in the market forced the creation of government regulation to establish fairness and promote equal access. Despite unprecedented market democratization investors turned to sympathetic leaders for guidance, names like Carnegie, Rockefeller, Morgan and Schwab. Because such men

were perceived to possess uncommon foresight they became synonymous with great power and influence, often moving markets by the words they spoke or investment positions they assumed.⁹ “In the Gilded Age, [1890’s] financial powerhouses such as J.P. Morgan had stopped panics [in the trading markets] by stepping on to the floor of the Exchange and ostentatiously placing large buy orders [demonstrating confidence].”¹⁰ The true power these men possessed was keen insight into how to shape the actions of the masses to achieve stated objectives.

Throughout the market’s formative stages investors were empowered by improvements in both functionality and equality. Powerful belief systems and sentiment, though, compelled individuals and groups to seek out and repeatedly respond to personal leaders who were willing to step forward and wield great market shaping or market saving influence. The complexity of the trading activities of the day, growing sophistication of the investor, and introduction of extensive government regulation appeared to have enhanced, rather than negated the ability of powerful leaders to act decisively.

Several events spurred the stock market toward adoption of information technology. First, in 1972 the Securities and Exchange Commission cited the need for the stock exchange to develop a “Central Market System”. The system would evenly distribute bid [price to buy] and ask [price to sell] information between the New York Stock Exchange and regional exchanges, promoting greater fairness for consumers. Such a system was only possible through technological reform. Second,

an internal audit of the NYSE recommended that in order to promote better access to current market information “greater use of modern communications systems, development of a national exchange system, and development of a consolidated exchange tape”¹¹ needed to occur. Third, deregulation of the securities industry on 01 May 1975 ended price-setting policies for exchange services and created a competitive environment where discount brokerages could develop.¹² These events spurred competition, broadened customer base, and improved market access for the individual investor.

As a result what market existed following the full integration of current information technology? “Progress in automation has had a range of important effects. It has made possible the construction of new types of dealing facilities which would otherwise have been difficult, if not impossible, to build. It has allowed organizations to compete selectively with exchanges by choosing to offer some, but not all, of the services that historically only exchanges provided. It has eliminated the need for person-to-person contact required by traditional market mechanisms such as trading floors or telephone networks. It has reduced the costs of establishing new trading systems, thereby making it easier for new entrants to enter the market for markets. It has increased the power of the buyers of the services offered by trading systems, and in the case of low cost systems such as those that operate via the internet, has democratized access to the trading environment. Finally it has meant that orders and market data can be routed and manipulated more easily, and transmitted both more quickly and to a much larger group of participants, than was previously feasible. These effects, in turn, have encouraged the development of new products, the process of disintermediation [removal of an agent from between the buyer and the seller], and the growth of cross-border trading.”¹³ Many of these advances would support NCW’s concepts of the “creation and sustaining of shared awareness” and “the ability to self-synchronize or self-organize to accomplish time-urgent tasks?”¹⁴ Was overall leadership eliminated at this point as a guiding force for the markets? If not, what examples of strong common leadership does the market have, and what role does it play?

Modern sources of market leadership

If modern markets now possess information superiority, from which they create and sustain shared awareness and the ability to self-synchronize, who is in charge, traditional leaders, or empowered individuals backed by technology? For the U.S. stock market people frequently answer the question by saying 'The Fed'. After all, isn't it the Federal Reserve, specifically its Open Market Committee or its Chairman, that is responsible for controlling the activities of the markets? The short answer: No. That job falls to the Securities and Exchange Commission, the agency that creates regulations and enforces oversight of the markets. So why is it that when the Fed speaks, investors listen?

The Federal Reserves congressionally mandated goals are (1) to create price stability in the general economy and (2) generate conditions conducive to full employment. The Fed relies on three levers of power to fulfill its mandate: Open market operations, or the buying and selling of Treasury Bonds, its most powerful lever; Reserve requirements of member banks, which is cash on hand to cover short term demand; and interest rates charged to member banks, specifically the prime or discount rate.¹⁵ The discount rate, the interest rate banks charge each other for borrowed funds, turns out to be the most important Fed controlled factor where investors are concerned. "Because the Federal Reserve controls both the supply of money and the cost of certain kinds of money, and therefore influences interest rates throughout the economy, it has great prominence in our economic lives. Discount rate shifts, or strong hints of them, typically generate immediate and sometimes profound reactions in the securities markets. And of course, Fed driven interest rate

changes affect what the average consumer pays for mortgages, credit cards debt, and other forms of borrowing. But we should not lose sight of two fundamental facts: The Fed does not control the budget [Federal Budget]; *The Fed does not control the securities markets.*¹⁶

“Why then, does the stock market care about the Fed? Because when the Federal Reserve raises or lowers the discount rate—the rate at which it loans money to member banks—interest rates tend to move *sympathetically* throughout the economy. When interest rates fall, stock prices tend to rise, because corporations find it cheaper and easier to borrow.”¹⁷ The use of the word “sympathetically” is important. Since establishment of its mandate the Fed has recognized its ability to influence the direction of the economy by use of a small lever [interest rates changes], carefully applied. Interest rate changes take six to nine months to create a measurable effect on the overall economy. The market, however, frequently responds immediately to interest rate changes due to investor sentiment. Such actions ignore the sophisticated analytical tools that tell the market that no real change in present economic conditions has occurred, and that change may not occur in the future. Further, when investors react, their sentiments are displayed in the form of executed trades, which are instantly communicated to all other investors. Using this backdrop we will examine three instances where the market, possessing the latest in information technology tools, acted on collective sentiment in manners that ignored the foundations in place at the time. Concurrently the role of leadership will be examined.

First, by the spring of 1987 inflation and interest rates had been in decline for 5 straight years and investor sentiment was strongly positive, resulting in high stock valuations. At this point the economy began to slow and powerful economies like Germany and Japan separately weakened, creating global instability. The dollar's value began to fall, crude oil prices doubled, and the Fed was compelled to raise interest rates in order to cool rising inflation. "Then crisis hit. Following a week of harrowing losses [12-16 October the market dropped from 2507 by 261 points], on October 19 soon notorious as "Black Monday" the stock market plunged a catastrophic 508 points (to 1738.74) for a [one day] paper loss of half a trillion dollars. The percentage loss for the day-22.6%- was twice that of the legendary Black Tuesday "Great Crash" of 1929."¹⁸ In Robert Shiller's book "Market Volatility" he offers these insights. 72% of individual investors and 84% of institutional investors felt that the market at 2507 was already overpriced.¹⁹ During the week of 12 October there were no specific news reports or stock market events so significant to trigger the initial drop from 2507. No new information emerged from the market from the close of trading on Friday the 16th until the open on Monday the 19th.²⁰ Nevertheless, on Monday the 19th the market fell an additional 508 points.

Although in surveys following the markets drop investors stated that they appreciated both the recent decline in the general economy and the short-term volatility of the market, "It was as if people did not realize how many others shared the view that the market was overpriced."²¹ An unintended consequence of investors unrealized shared concerns was that their self-synchronized actions resulted in the

one-day 508-point drop in the market. In his presentation from June 1999 Vice Admiral Cebrowski stated "speed of command is facilitated by self-synchronization or self-organization... This means that forces, empowered with high situational awareness, will be able to recognize and act on a situation without further direction."²² In the case of the market on the 19th Shiller states that investors were communicating actively amongst themselves and were accessing and analyzing all available data in great detail throughout the trading day, finding no hard evidence to support the need for a free fall sell-off in the market.²³ Nowhere in his analysis of the events did he find a person in a stock market leadership position who assessed the overall direction of the market and the perceived forces acting on it, then stepped in to provide an objective perspective that all investors could assess before they took further action. The lack of situation specific assessment of the forces at work on the market at the critical moment led to a situation that NCW proposes should not occur. Strong leadership needed to reestablish situational awareness and stop the self-synchronization that was occurring, change the collective mood and intentions of investors, and then establish a suitable short-term course of action before further actions were initiated.

An additional phenomenon, "The Weekend Effect", a term by Shiller, describes the effect of an operational pause which further aggravated the events leading to the drop on the 19th. "Both the October 19, 1987 and October 28, 1929 crashes occurred after a preceding week of great turmoil. It is plausible that the magnitude of the drops had something to do with the fact that a weekend gave people the time to reach decisions

to act on Monday.”²⁴ The implication here is that people were unable to come to terms with the immediacy of the drops in the market as they were occurring during the week of 12 October. Given the weekend with the markets closed, people individually arrived at a decision to act. One of the tenets of NCW is that operational pauses will be rare. What effect will occur if pauses are rare and situational awareness is breaking down in forces “able to recognize and act on a situation without further direction”? In this case sympathy overruled reason.

Shiller goes on to state that “the timing of the crash was related to some internal dynamics of the investor thinking, investor reactions to price, and [reactions] to each other.”²⁵ Of note he found that despite the fact that ample technical analysis of stock prices in relation to value and current market trends was conducted, few investors would *admit* to having conducted much analysis, relying instead on “gut feeling” as their forecasting method.²⁶ Because of significant emotional buy-in into the market, investors appeared to believe that they understood the ‘mind of the market’. “That so many investors think that market psychology is the reason for market movements is consistent with their holding stocks when they also thought they were overpriced.”²⁷

Following the stock market drop on the 19th the Federal Reserve, mindful of the events of 28 October 1929, acted to protect the general economy. Recall that any action taken by the Fed is indirect, real impact would take months to be reflected economically. One hour before the opening bell on 20 October 1987 the new Fed Chairman, Alan Greenspan, issued the following: “The Federal Reserve, consistent

with its responsibilities as the nation's central banker, affirmed today its readiness to serve as a source of liquidity to support economic and financial systems."²⁸ Alan Greenspan, with no control over the stock markets ensured that the nations *banks* would not fail. In doing so he restored general faith in the substance of the overall economy. The market decline stopped. Within a few months of the Black Monday crash the markets had regained all of the previous losses. In his statement Mr. Greenspan made no mention of the stock market, and offered no explanation for the markets decline. He stated that he could put in place the resources necessary to protect the *general economy*, and because investors collectively believed in *his fundamental leadership attributes* the market rallied around strong leadership. This is not to say that people were swayed by Alan Greenspan's charisma, for anyone who has heard him speak would not describe him as engaging. It is what he said, backed by what he could do, that created so powerful a force.

As a second example, following the economic decline in calendar year 2000 the Fed's Open Market Committee, in a surprise move, agreed to a 50 basis points [0.5%] drop in the discount rate effective 03 January 2001. This step asserted the Fed's mandate to create price stability in the overall economy, not the stock market, while creating an environment conducive to full employment. Reacting to the surprise news the Dow shot up in 15 minutes by more than 300 points, with an even larger gain on the tech laden NASDAQ. At the close of trading that day the tech-heavy NASDAQ was up a one day record 14% or 324 points, on record setting volume, while the Dow gained 299 points.²⁹ The Fed announcement did not immediately

place one more dollar in the U.S. economy, nor did it support the sagging performance of the stock market. But delighted investors were swayed dramatically by sentiment, and in defiance of months of hard data that described declining markets they exuberantly purchased the same beaten down stocks that they had been selling at any cost, simply because of the confidence instilled in them by the actions of leadership they trusted. Of note, by 05 January 2001, the end of the trading week, the Dow and NASDAQ had each lost all of the gains they registered on the afternoon of the 3rd.

Irrational Exuberance in markets supported by modern information technology?

In this final example Alan Greenspan offers additional insight into investor psychology. On December 5th 1996 Mr. Greenspan gave a speech at the Washington Hilton sponsored by The American Institute for Public Policy Research. It's title: "The Challenge of Central Banking in a Democratic Society." In the midst of a dissertation on how the Fed works to maintain stable economic conditions he spoke these words which would shake the worlds markets: "But how do we know when *irrational exuberance* has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan [referring to the Real Estate and Banking collapse] over the past decade? And do we factor that assessment into monetary policy? We as central bankers need not be concerned if a collapsing financial asset bubble does not threaten to impair the real economy, its production, jobs, and price stability. Indeed the sharp stock market break of 1987 had few negative consequences for the economy."³⁰

His comments that evening served three powerful purposes. First, he illustrated that in spite of the hard economic data available to them, investors were allowing sentiment to create asset values out of line with reality. Mr. Greenspan challenged the shared awareness of investors, and their subsequent self-examination caused a significant drop on world markets as asset prices fell back into line. Second, that

irrationally exuberant actions do occur in mature and highly regulated systems, and leadership must be prepared to assess the impact and when necessary intervene.

Third, that investor behavior was directly threatening Mr. Greenspan's mission as Fed Chairman by rapidly escalating asset values, requiring swift and decisive action.

Economic forces in the stock market that he relied on to control inflation through prudent analysis and planning were not supporting him. A means to cool inflation in the general economy is raising interest rates to contract the money supply, a move that would hurt investors. Mr. Greenspan accomplished the purpose of lowering inflationary pressures simply by rearticulating his commander's intent to fight inflation with every tool available to him, putting the markets on notice. "And here is where the real lesson of Irrational Exuberance becomes clear. As well as anyone, Greenspan knew (and knows) the power of his words. So why raise interest rates when some modest posturing will do the trick? One Wall Street sage—Christopher Quick of the Quick & Reilly Group—summarized Irrational Exuberance well: "Instead of raising interest rates, he is going to make speeches."³¹ The power of leadership, in this case illustrated by Mr. Greenspan's words, served to rapidly reorient a mature and empowered force that possessed the tools but misused the means available to them to achieve their common investor objectives.

Conclusions

A recurrent theme of this writing is the need for strong leadership. Markets and militaries throughout their histories have sought leaders who possessed the ability to

see beyond the moment, to discern what was fundamentally important, and who were personally willing to act. Their actions have relied little, or perhaps not at all, on the power of technology in widespread use at the time, employing instead sound, time tested principles. Along the way leaders have had to counter the overpowering desire of subordinates to follow gut or emotional reactions when confronted by unbridled success or unexpected difficulty.

The internal emotional conflicts experienced by investors in the marketplace are little different from those found in service members on the field of armed conflict. Actions taken in crisis result from a blending of strongly held personal beliefs with the rules or doctrine imposed by the organizations people belong to. Highly stressful situations often create emotional responses that override reason. For example, irrational exuberance is often a key feature of the response to great success. Alternately, when trying to rationalize the reason why a negative situation is occurring, individuals often form the belief that events are not controlled by rules but by a psychology internal to the process they are working in, known widely in trading circles as “the mind of the market.” Finally there is the sobering reality that in the midst of crisis human nature often relies on gut feeling, not fact, as the basis for making a decision. All of these phenomena occur frequently, even in mature information technology based systems. In his book “Success and Survival on Wall Street” author Charles W. Smith offers the following to explain why investors exhibit such conflicting perspectives, “The key to understanding this apparent paradox is to recognize that people are seldom, if ever, interested in simply knowing what is going

on. People want to know what is going on in order to know what is going to happen so that they can adjust their own actions to serve their own interests—whatever those interests might be. Knowledge serves as a guide to action. For knowledge to serve as a guide to action, however, it must tell us more than what is going on; it must also tell us something about why and how it is happening”³²

What is the implication for NCW? Information technology is indeed here to stay, and provides powerful tools. Such technology will move the battlefield as swiftly as it moves all aspects of our daily lives. But courses of action on the information technology laden battlefield of tomorrow will, of necessity, need to be influenced by the interaction and guidance of strong leadership. The strength in technology may lie in its ability to rapidly and evenly distribute information to a wide array of users. This “shared awareness” however, needs to be enhanced by insightful leadership that provides the “why and the how”, so that the relevance, timeliness and accuracy of the information being used is validated, and an assessment is made of the influence that the information will have on the actions of those who are granted access to it. Additionally the end user must always be able to turn to trusted leadership to get the most current analysis and intent as the situation changes. Command by negation has its place, but as more information becomes available to the empowered end user, personal bias and deep-seated emotions possess the potential to become even greater overriding influences. Strong leadership provides the filters that technology is incapable of employing, filters necessary to process out sentiment or bias, reducing or

eliminating that possibility that such influences will adversely influence the desired outcome.

Any system that embraces technology must place at its core respect for the power of people to both shape and respond to the world as they choose to see it. Under such circumstances those who lead must possess even greater insight than before into the intrinsic motivations of those they lead, and use the technological tools at their disposal to ensure that forces go where strong leadership and good intentions are designed to take them.

NOTES

- ¹ Arthur K. Cebrowski, Vice Admiral USN and John J. Gartska, "Network Centric Warfare—its Origin and Future", U.S. Naval Institute Proceedings, January 1998, Vol. 124 No. 1/1, 139 pp.28-35. Reprinted as NWC 1140, 29
- ² Arthur K. Cebrowski, Vice Admiral USN, "Network Centric Warfare: An Emerging Military Response to the Information Age. Published as NWC 1141, 1
- ³ Rubin Lee, What is an Exchange? (New York: Oxford University Press Inc, 1998), 1
- ⁴ David S. Alberts, John J. Gartska, Frederick P. Stein, Network Centric Warfare Developing and Leveraging Information Superiority, 2nd ed, (DoD C4ISR Cooperative Research Program, 1999), 94
- ⁵ Rubin Lee, What is an Exchange? (New York: Oxford University Press Inc 1998), 4
- ⁶ Edward S. Bradley, Richard J. Teweles, The Stock Market, 7th ed, (New York: John Wiley & Sons, Inc, 1998), 107
- ⁷ Ibid., 108
- ⁸ Ibid., 111-112
- ⁹ Ibid., 113-127 (summary of relevant information)
- ¹⁰ Jeffrey L. Cruikshank, David B. Sicilia, The Greenspan Effect, (New York: McGraw Hill, 2000), 10
- ¹¹ Edward S. Bradley, Richard J. Teweles, The Stock Market, 7th ed, (New York: John Wiley & Sons, Inc, 1998), 127
- ¹² Ibid., 128
- ¹³ Rubin Lee, What is an Exchange? (New York: Oxford University Press Inc 1998), 4
- ¹⁴ Arthur K. Cebrowski, Vice Admiral USN, "Network Centric Warfare: An Emerging Military Response to the Information Age. Published as NWC 1141, 1
- ¹⁵ Jeffrey L. Cruikshank, David B. Sicilia, The Greenspan Effect, (New York: McGraw Hill, 2000), 13
- ¹⁶ Ibid., 22
- ¹⁷ Ibid., 23

- ¹⁸ Ibid., 9-10
- ¹⁹ Robert J. Shiller, Market Volatility, (Cambridge MA, MIT Press, 1999, 6th printing), 392
- ²⁰ Ibid., 385-386
- ²¹ Ibid., 392
- ²² Arthur K. Cebrowski, Vice Admiral USN, "Network Centric Warfare: An Emerging Military Response to the Information Age. Published as NWC 1141, 4
- ²³ Robert J. Shiller, Market Volatility, (Cambridge MA, MIT Press, 1999, 6th printing), 398
- ²⁴ Ibid., 393
- ²⁵ Ibid., 398
- ²⁶ Ibid., 399
- ²⁷ Ibid., 394
- ²⁸ Jeffrey L. Cruikshank, David B. Sicilia, The Greenspan Effect, (New York: McGraw Hill, 2000), 10
- ²⁹ Randall Hackley, "In Stunning Surprise, Fed Cuts Interest Rates", 03 January 2001, <<http://www.smartmoney.com/breakingnews/>
- ³⁰ Jeffrey L. Cruikshank, David B. Sicilia, The Greenspan Effect, (New York: McGraw Hill, 2000), 58-59
- ³¹ Ibid., 61
- ³² Charles W. Smith, Success and Survival on Wall Street, (Lanham MD: Rowman & Littlefield Publishers Inc., 1999), 12

BIBLIOGRAPHY

Alberts, David S, John J. Gartska, Frederick P. Stein, Network Centric Warfare, Developing and Leveraging Information Superiority 2nd ed. (Washington DC: DoD C4ISR Cooperative Research Program, 1999). Publication cited.

Barnett, Thomas P.M. "The Seven Deadly Sins of Network Centric Warfare", U.S. Naval Institute Press Proceedings, January 1999 issue. Reprinted with permission as NWC 1079. Publication reviewed.

Bradley, Edward S., Richard J. Teweles, The Stock Market, 7th ed. (New York, John Wiley & Sons Inc, 1998). Publication cited.

Cebrowski, Arthur K., Vice Admiral USN, John J. Gartska, "Network Centric Warfare-Its Origin and Future", U.S. Naval Institute Proceedings, January 1998, Vol. 124, No. 1/1, 139, pp 28-35. Copyright 1998 U.S. Naval Institute. Reprinted with permission as NWC 1140. Publication cited.

Cebrowski, Arthur K, Vice Admiral, USN, "Network Centric Warfare: An Emerging Military Response to the Information Age", Naval War College Publication NWC 1141, Publication cited.

Cruikshank, Jeffrey L, David B. Sicilia, The Greenspan Effect, (New York: McGraw-Hill, 2000). Publication cited.

Dawson Jr., J. Cutler, Rear Admiral, USN, James M. Fordice, CDR, USN, "The IT-21 Advantage", U.S. Naval Institute Proceedings, December 1999 issue, pp 28-32, reprinted with permission as NWC 1082. Publication reviewed.

Hackley, Randall "In Stunning Surprise, Fed Cuts Interest Rates", 03 January 2001, <<http://www.smartmeney.com/> then select "breaking news" [03 January 2001]. Publication cited.

Lee, Rubin, What is an Exchange? (New York: Oxford university Press Inc, 1998). Publication cited.

Lescher, William K., CDR, USN, "Network Centric Warfare: Is it Worth the Risk?", Naval Institute Proceedings, July 1999 issue, pp 58-63, reprinted with permission as NWC 1081. Publication reviewed.

Shiller, Robert S., Market Volatility, (Cambridge MA: MIT Press, 6th printing, 1999). Publication cited

Smith, Charles W., Success and Survival on Wall Street Understanding the Mind of the Market, (Lanham MD, Rowman & Littlefield Publishers Inc, 1999). Publication cited

Tyson, Eric, Investing for Dummies, 2nd ed. (Foster City CA: IDG Books Worldwide Inc, 1999. Publication reviewed

Zimm, Alan D, CDR USN (Ret), "Human Centric Warfare", U.S. Naval Institute Proceedings, May 1999 issue, pp 28-31, reprinted with permission as NWC 1080. Publication reviewed.