2004 MTA Lifetime Achievement Award

Sherman and Marian McClellan

Technical Analysis in Los Angeles In the 1960s and 1970s

This booklet was prepared to accompany Sherman McClellan's May 14, 2004 presentation before the Market Technicians Association, in honor of his Lifetime Achievement Award. It helps to tell the story of the development of the McClellan Oscillator and Summation Index, and why they are still relevant today.

Marian McClellan passed away in November 2003, so Sherman accepted the award for their joint work on her behalf. To read the text of Sherman's acceptance speech, visit Sherman's speech.

Contents

*The booklet Measuring Trend Values, by P.N. Haurlan, was originally published in 1968 by Trade Levels, Inc. It is reprinted here in its entirety with permission of David Holt, current holder of Trade Levels' copyrights.

Other sections of this booklet are taken from the writings of Tom McClellan, who is the editor of *The McClellan Market Report* and the son of Sherman and Marian McClellan.

Part I
The Development of the McClellan Oscillator

The McClellan Oscillator, and its companion tool the Summation Index, are among the earliest purely technical indicators used by market technicians to decipher the actions of the Advance-Decline Line. These indicators were first created in 1969 by the husband and wife team of Sherman and Marian McClellan. In this article, the McClellans' son Tom explains how the McClellan Oscillator came about, and offers insights into why it is an important tool for market analysis.

What is the McClellan Oscillator?

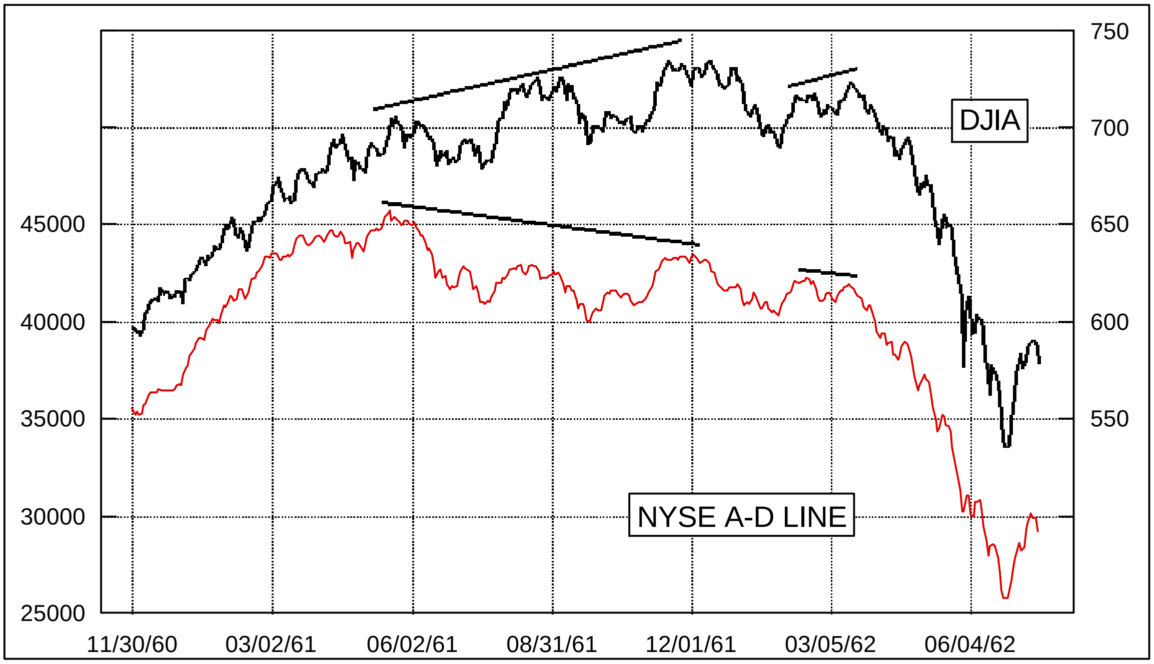
The McClellan Oscillator is a tool which measures the acceleration in daily Advance-Decline (A-D) statistics by smoothing these numbers with two different exponential moving averages, then finding the difference between them. It became well known among technical analysts, first in Southern California where Sherman and Marian McClellan lived, and later across the United States as word spread about this new tool. But the steps leading to the development of the Oscillator go back many years before its creation in 1969.

A-D Origins

Analyzing Advance-Decline data was first done back in 1926 by Colonel Leonard Ayres, an economist and market analyst working at the Cleveland Trust Company. He wanted to have a different way of looking at the market aside from examining the prices of individual stocks or averages like the Dow Jones Industrial Average. He shared his work with other analysts, including James Hughes who helped pioneer the use of "market breadth" statistics. The weekly financial newspaper *Barron's* first began publishing Advance-Decline numbers in 1931.

For many years, the most common use of A-D data was to construct a cumulative A-D Line. This is done by computing a running total of each day's value for the "daily breadth", defined as the number of advancing issues minus the number of declining ones. On each successive trading day, the A-D Line changes by the value of the daily breadth. One weakness of this method is that a changing number of issues traded can affect the amplitudes of the movement of the A-D Line, especially when one examines this indicator over long periods of time. One way around this problem is to use a ratio instead of a raw value for A-D. Many analysts do this by taking the daily A-D difference, and dividing it by the total of advances plus declines, thereby eliminating the effect of a changing number of issues.

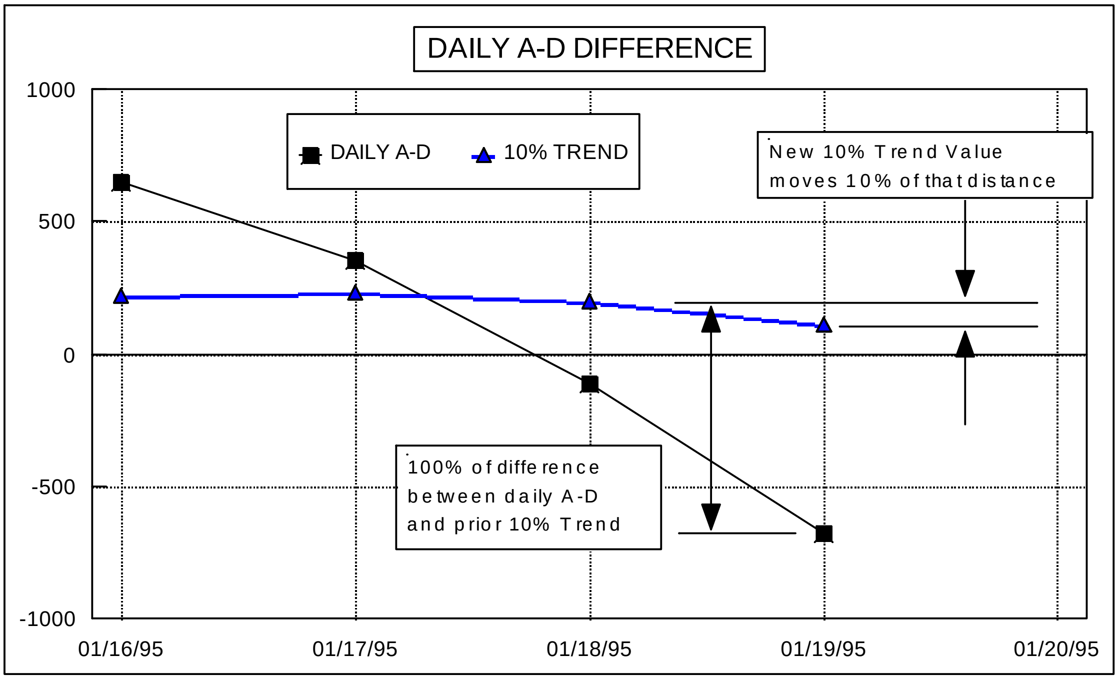
The use of this data did not become widespread, however, until the early 1960s when it was publicized in the writings of Richard Russell (*Dow Theory Letters*) and Joseph Granville (*The Granville Market Letter*). One reason for its popularity was that the A-D Line had done such a good job of indicating a divergent top compared to stock prices at the 1961 top, just ahead of a 27% decline in the Dow Jones Industrial Average (DJIA) in 1962.



Haurlan Introduces Exponential Moving Averages

This use of A-D statistics caught the eye of a man named Peter N. Haurlan, who worked as a rocket scientist for the Jet Propulsion Laboratory (JPL) in Pasadena, CA. You may have heard of JPL recently in the context of acting as control center for the Mars rovers. Haurlan also had an interest in stock market technical analysis, and was among the first people to ever use a computer to help him do technical analysis. This is because in the 1960s, he was one of only a handful of people in the world with access to a computer. Haurlan did his day job of plotting trajectories of satellites and other work for JPL, and then at night he would tabulate stock prices and other data from the newspapers and encode that onto IBM punch cards. This way, he could enter and process data into JPL's computer, the only one west of the Mississippi River at the time, during evening hours when it was not being used it for work-related purposes. Haurlan was also the first to employ exponential moving averages (EMAs) of price and breadth data. EMAs were a mathematical technique which he had employed for tasks of missile and satellite tracking, and so it seemed an appropriate method to use for tracking the movements of stock prices.

An EMA differs from a simple moving average (SMA) because it weights the more recent data more heavily. An EMA employs a factor known as a "smoothing constant" to give a certain amount of weight to the current period's data. An EMA which uses a 10% smoothing constant, for example, would count today's price or breadth data value as 10% and yesterday's EMA value as 90% for calculating today's new EMA value. Haurlan simplified the terminology by referring to such an EMA as a "10% Trend". A slower EMA which employs a 5% smoothing constant was termed a "5% Trend", and its value would be calculated by adding together 5% of today's price or breadth data and 95% of yesterdays 5% Trend value. Haurlan advocated the use of a variety of different smoothing constant values for stock market analysis, depending on whether one wanted a faster or slower reaction by the EMA. He also recommended using the somewhat round-numbered smoothing constants of 1%, 2%, 5%, 10%, 20%, and 50%, since he knew that most analysts in the 1960s would be doing the math longhand for calculating these EMAs, and the round-numbered smoothing constants made the calculations easier.



A copy of Haurlan's pamphlet, *Measuring Trend Values*, is included in Part II of this booklet. In it, he outlined the techniques for calculating and interpreting EMAs.

In the years since Haurlan introduced these tools, most of the technical analysis community has migrated away from the original terminology, e.g. 10% Trend, because of the public's greater comfort with thinking of moving averages as corresponding to some particular time period. The conversion factor is as follows:

$$\text{Smoothing Constant} = \frac{2}{(n + 1)} \qquad \text{where n is the number of days}$$

Thus, a 19-day EMA equates to a 10% Trend as follows:

$$2 \div (19+1) = 2 \div 20 = 0.10, \text{ or a 10\% smoothing constant}$$

Although the rest of the world prefers the reference to a set number of days associated with moving averages, we still employ Haurlan's original terminology. This is partly out of respect for the original work, and partly because using a set number of days for an EMA is misleading. In a Simple Moving Average (SMA), only the data that is contained within the specified lookback period has any influence on the value of the moving average. For the calculation of a 50-day SMA, the 51st day has no voice at all, and the 50th day back has the same voice as yesterday's data. For EMAs, each day of past history still remains in the EMA, but its voice just becomes increasingly fainter, so ascribing a day count label to it does not convey the true nature of what the data are doing within that moving average calculation.

Haurlan's stock market avocation quickly became a new career, and he started the *Trade Levels Report* newsletter which featured his computer-aided technical analysis using his own newly acquired computer. Sherman and Marian McClellan became aware of this work because of a local business related TV station operating in Los Angeles known as KWHY. Haurlan's *Trade Levels Report* was the sponsor of an end of market day chart analysis program called *Charting The Market*, which was hosted by Gene Morgan.

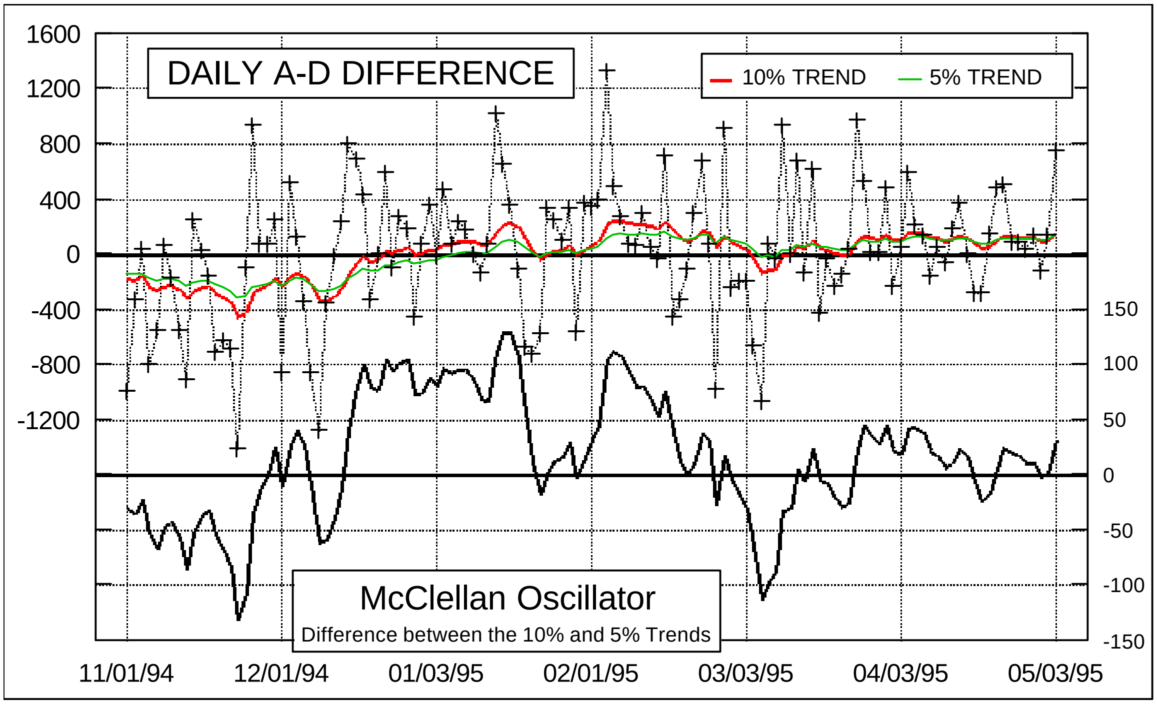
Using EMAs for A New Indicator

By 1969, Haurlan had already employed EMAs for analyzing breadth data. The additional insight that Sherman and Marian McClellan added was to calculate the difference between two different EMAs of the daily breadth figures, a 10% Trend and 5% Trend. This provided a different view than looking at the indications from either of these EMAs on their own. Mathematically, this is similar to the Moving Average Convergence-Divergence (MACD) technique developed at about the same time by Gerald Appel, although MACD is usually employed with simple moving averages rather than EMAs.

Coming up with the McClellan Oscillator took the combined talents of both Sherman and Marian McClellan. They had met in 1953 during college where Marian was a mathematics major (back when few women chose that major) and Sherman was a business and economics major. Sherman had been taught all of the conventional analysis techniques that every good fundamental analyst should know, but was frustrated because these methods did not work consistently. Accordingly, he turned to technical analysis for greater insights about the market. Back in the 1960s, most stock investors bought stocks for the dividends they paid, and not so much for the growth prospects. Trading in mutual funds was almost unheard of. So the goal was to buy in such a way as to maximize the dividend yield which one could earn on one's stock purchases. Sherman knew from looking at some price charts that about two or three times year, there were nice price bottoms at which one could buy to help with the maximizing of dividend yields, but these bottoms seemed to come at different times of the year, and seemingly without any rhythm. He wanted a way to better identify when these bottoms would come, or at least tell when the bottoms were in, and he turned to examining breadth numbers to help with this task.

Sherman and Marian noticed that when the stock market declined sharply, both the 10% Trend and 5% Trend of the daily breadth numbers would moved to deeply negative levels. During most of an uptrend, these two EMAs would see positive values. The problem was that waiting for an EMA of daily breadth to move from deeply negative to positive meant missing out on the first part of the up move, and that was where much of the price gains were to be made. Seeing the 10% Trend move above the 5% Trend, even though both were still negative, gave advance warning that a reversal had taken place. Thus, they calculated the difference between the 10% Trend and 5% Trend of daily breadth to monitor when such crossovers were taking place. A side benefit of doing this was that they could detect extremely overbought or oversold conditions when the difference between these EMAs became very large. The McClellans recognized that this new indicator was an "oscillator", because it moved back and forth between extreme values, and was neutral at the zero level.

The Oscillator could never have seen fruition back in 1969 were it not for the help from Marian. In addition to helping Sherman sort through the logic of the indicators, she was able to do the EMA calculations much more easily due to her math background. Remember that this was back before hand-held calculators were invented, so all of the calculations were done on scratch paper, and tallied on ledgers. Charts were created entirely by hand.



When Gene Morgan invited anyone that had developed tools for market analysis to contact him, Sherman was the only one to respond. It was Morgan who coined the name "McClellan Oscillator" to refer to the indicator that the McClellans had created, which became a daily feature on Morgan's TV show. The invitation onto the show led to an introduction to Pete Haurlan, who invited Sherman and Marian McClellan to further publish their work. The booklet *Patterns For Profit* was the result of this work, and was published originally by Trade Levels in 1970. It included charts with 8 years of history of the McClellan Oscillator and Summation Index, all of which were manually calculated by Marian and hand plotted.

With the continued exposure on KWHY-TV and a few seminars, the indicators quickly gained appreciation among the technically inclined investors in the Los Angeles viewing area, and word slowly spread across the United States. It gained a wider following in the 1980s after the advent of the personal computer, when early technical analysis programs like Computrac featured the McClellan Oscillator and Summation Index among their packages of technical tools. The McClellans updated their book slightly in 1989, adding text which reflected the fact that calculations could now be done with personal computers. McClellan Financial Publications still sells reprints of this edition along with chart history of the McClellan Oscillator and Summation Index from 1960 forward.

MEASURING TREND VALUES

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Table of Contents

ABSTRACT

If you'd like to start calculating TREND VALUES for your data with a minimum of instruction, then read only the SUMMARY section below. If you'd like a deeper insight into how and why this technique works, or how to optimize its use, then consult the remaining sections of this report.

SUMMARY

1. PRINCIPLES

This report describes a technique for calculating the TREND VALUE of any stock market data. It is based on the principle of "Proportional Control" by which a guided missile "tracks" a target. In essence, the technique calls for measuring how far the current price has departed from the TREND VALUE and then adjusting the TREND VALUE into the direction of the price move by a fraction (a fixed "proportion") of the distance away.

The effect of this procedure is to generate a TREND VALUE curve which is smoother to random movements than a moving average, but more responsive to changes in trend. This technique has the further advantage of being much simpler to calculate than a moving average and not requiring retention of a long list of back data.

2. SELECT TREND

To start a TREND VALUE computation, first select the type of trend you wish to calculate and determine its Tracking Rate from the following table:

Type of Trend	Tracking Rate
Reversals every few days (short term)	50%
Reversals every few weeks (short to intermediate)	10%
Reversals every few months (intermediate term)	1%

3. SELECT INITIAL VALUE

When first starting a TREND VALUE for a new stock, use the first day's price as your initial TREND VALUE. Each day following, perform step 4 below, but allow sufficient time for the TREND VALUE to stabilize before using it for trading.

The stabilization period required varies as follows with the trend you select:

Tracking Rate	Stabilization Period
50%	5 days
10%	20 days
1%	200 days

If you can find some justification for estimating the initial TREND VALUE more accurately than the first day's data (as for example a moving average which you have been keeping), then the stabilization period will be reduced proportionally to the validity of your estimate.

4. CALCULATE

Suppose your Tracking Rate is 10%.
Suppose yesterday's TREND VALUE of your stock was 120.
Suppose today's closing price of the stock is 140.

Since today's data is 20 points higher than the TREND VALUE (140-120), then adjust yesterday's TREND VALUE upwards by 10% of 20 or 2 points. Today's TREND VALUE thus becomes 120+2 = 122. If today's market data had been lower than the TREND VALUE, then the TREND VALUE would have been reduced by the same process.

Continue this process for each market day to generate a continuing TREND VALUE measurement.

MEASURING TREND VALUES

I. THE PROBLEM

Any series of stock market data, such as a market average, the price of a stock, volume of trading, odd lot sales and purchases, advances and declines, and many others, is the result of a constant tug-of-war by forces of many kinds.

These forces can range from a long-term component (usually called the "trend") which varies slowly over several decades, down through "bull markets and bear markets" lasting several years, through seasonal cycles, through the so-called "intermediate trends" lasting several months, down to short term variations lasting a few weeks or days and, of course, down to the very minor fluctuations lasting hours or minutes.

Important to any trader or investor is the knowledge that in any given stock, he must consider the existence of forces varying over any and all periods of time. Furthermore, as a trader/investor, you must decide which period of time you prefer to trade into--whether to buy or sell every few days, few weeks, few months, few years or many years.

Once you have selected the kind of trend that best suits your own particular outlook, you then need to locate or develop a market analysis technique which can separate your selected trend from the infinite variety which exists. You want a technique which will smooth out movements with a shorter period than yours, but respond quickly to changes which will affect your trend period.

II. THE AEROSPACE SOLUTION

The aerospace industry faced a very similar problem some years ago with the advent of guided missiles. In their case, the problem was one of determining the proper guidance and control signals to apply to the missile in flight in order to correct for the various deflecting forces which were present. These forces included a set of more-or-less small-order random variations due to noise in the electronic circuits, to variations in wind velocities, to local variations in air density, in fact, to several varying forces whose randomness was so great that in the long run they tended to cancel one another out.

But they also included some forces which were not random and which, if not corrected, would cause an error at the target.

A guided missile is quite capable of measuring accurately the net force acting on it at any moment, but cannot separate the forces into their individual components.

What was required then was a process for minimizing the target error with a minimum of en-route maneuvering.

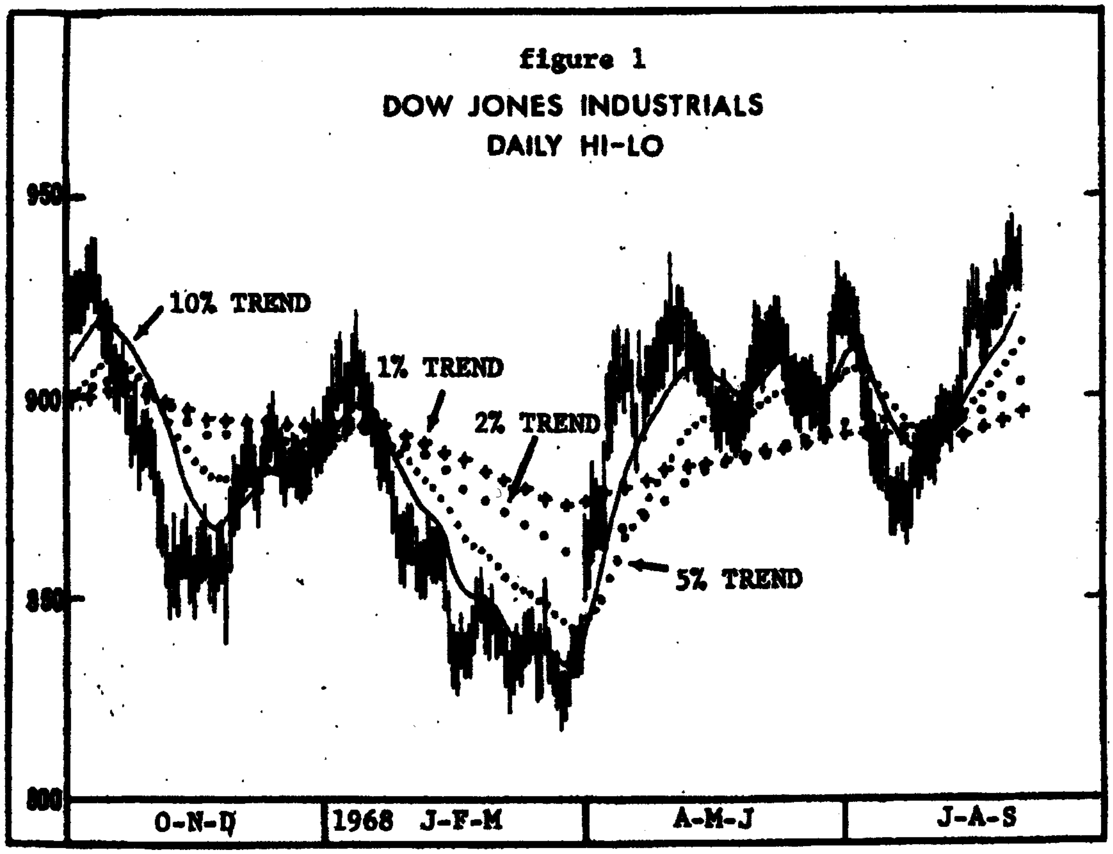


figure 1
DOW JONES INDUSTRIALS
DAILY HI-LO
10% TREND
1% TREND
2% TREND
5% TREND
950
900
850
800
O-N-D
1968 J-F-M
A-M-J
J-A-S

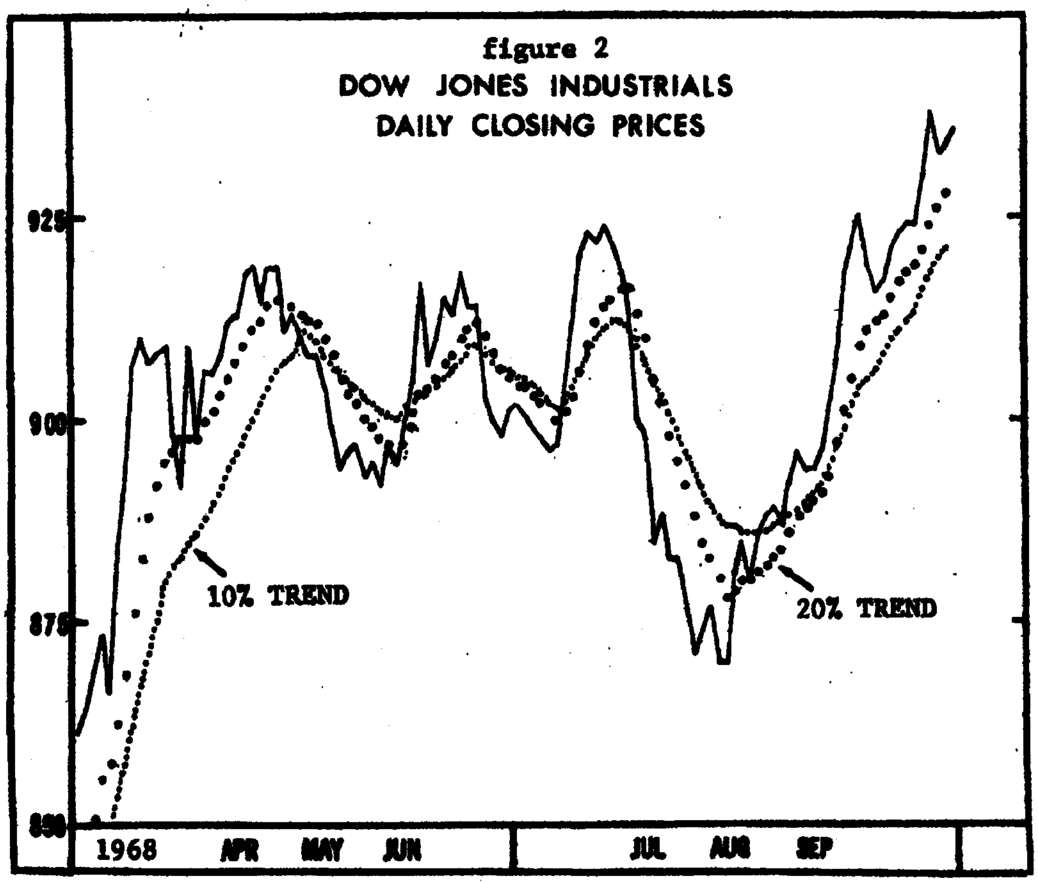


figure 2
DOW JONES INDUSTRIALS
DAILY CLOSING PRICES
10% TREND
20% TREND
925
900
875
850
1968
APR
MAY
JUN
JUL
AUG
SEP

The technique developed to solve this problem is called Proportional Control. Through an involved mathematical analysis, it was determined that if the missile continuously corrected for a portion of the measured forces during flight, then the target error would be minimized with a minimum of continuous maneuvering.

The exact proportion which was best to use depended among other things on the relative magnitudes of the random versus the continuous forces.

The solution has been an effective one, as can be attested to by the recognized accuracies of guided missiles in accomplishing their missions.

This technique of Proportional Control is now being applied to the analysis of stock market data, although, instead of concentrating on minimizing the error at a "target", it is used to develop a continuous best estimate of the trend of the data as separated from the random hour-to-hour and day-to-day variations.

III. SELECTING THE TREND PERIOD

The technique of PROPORTIONAL CONTROL as applied to stock market data has the properties of filtering out short term moves while at the same time responding quite rapidly to significant changes in trend.

Selecting the desired trend period for this technique is a matter of selecting the Tracking Rate. This rate can vary from 0 to 100% where 0 provides no tracking at all and 100% means complete tracking, or, in other words, reproducing the original market data exactly.

Perhaps a better way of saying it is that the higher the Tracking Rate is, the more closely the trend follows the original data and, hence, the more sensitive it is to minor variations.

This variation in sensitivity for different tracking rates is shown in figure 1 using the Dow Jones Industrial Average as an example. Superimposed on the daily high-low ranges of the DJIA are TREND VALUES resulting from four of the longer-term Tracking Rates in the range of 1% to 10%. For shorter term moves, a portion of this figure is expanded in figure 2, and TREND VALUES for Tracking Rates of 10% and 20% are shown.

Probably the simplest way to relate the selected Tracking Rate to the frequency of buy/sell signals for that trend is to note how often the actual price crosses through the TREND VALUE. Treat the crossing of price <u>down</u> through the trend as a sell signal and <u>up</u> through the trend as a buy signal and you can quickly evaluate how often the signals would come in the different kinds of moves.

In individual stocks, moves are generally more exaggerated than in a market indicator, so for a given trend period, a stock requires a slightly lower value of Tracking Rate than a market average.

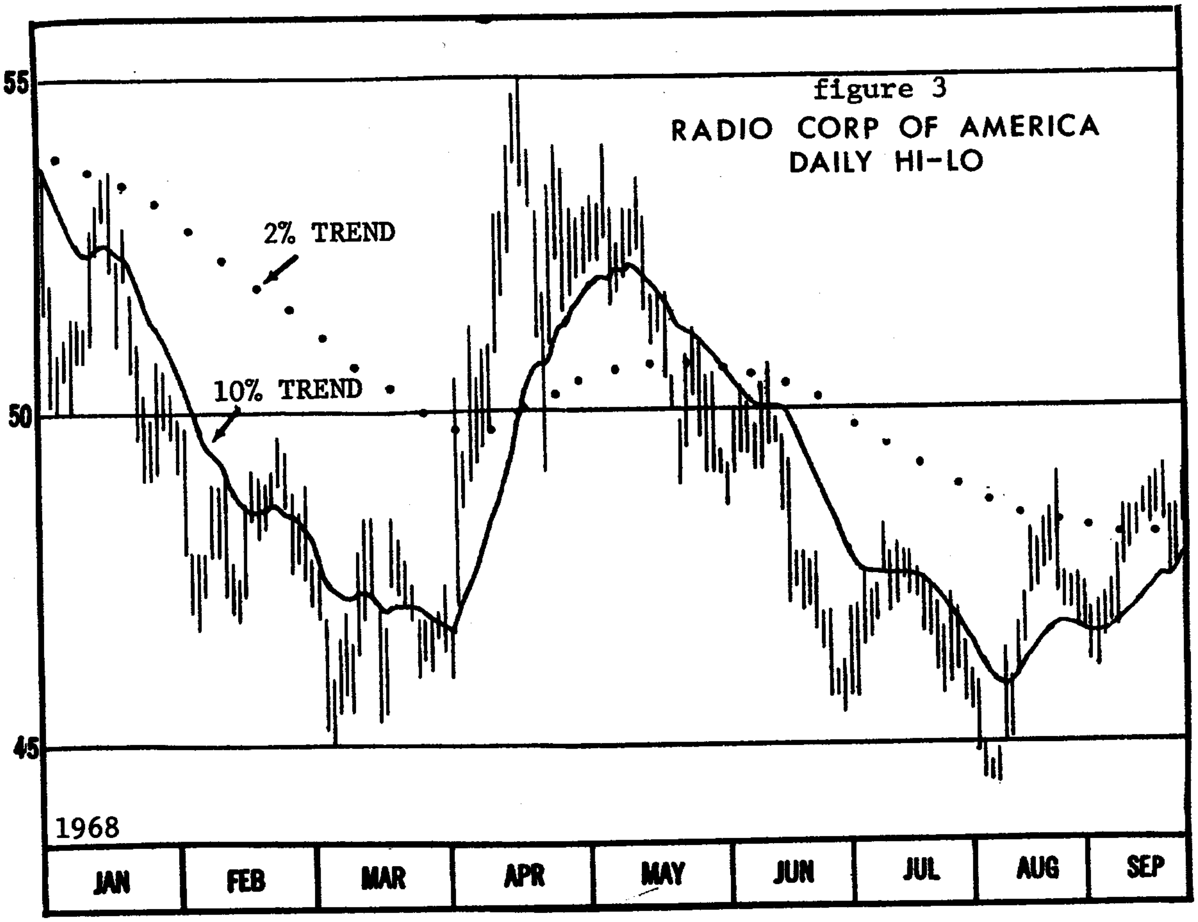


Figure 3 shows the effect of different Tracking Rates on a daily chart of the common stock of Radio Corporation of America.

For your own particular stock, you may want to do a bit of experimenting to find the optimum for your type of trading. In general, the following table can be used as a guide to selecting the desired period.

Frequency of Trend Reversals	Tracking Rate
Every few days	50%
Every few weeks	10% to 20%
Every few months	1% to 5%

In selecting your trend period, it is helpful to keep in mind that the Tracking Rate will be used in your calculations and, therefore, choosing a round number like 1%, 10%, 20%, 25%, 50% will speed up your numerical work.

IV. SELECTING THE INITIAL VALUE

When first starting to develop a TREND VALUE for a market time series, the simplest approach to use is to treat the first day's data as the initial TREND VALUE, and then update it on each new market day for a long enough period of time that the TREND VALUE becomes stabilized at its proper level before using it for trading.

As you can see on any of the sample charts in this report, seldom does a day's price coincide exactly with the trend in that period. So starting with an actual market price, in general, will start off the series with an unwanted bias in the TREND VALUE.

Like all "averages", this TREND VALUE will eventually find its proper level and be stabilized at the correct value from then on. As a general rule, the following periods of time should be sufficient for such stabilization:

Tracking Rate (percentage)	Approximate Stabilization Period (number of data points)
50	5
25	10
20	12
10	20
5	45
2	100
1	200

Particularly for the lower Tracking Rates, you'll need to either have a great deal of historical data or wait a long time before the system stabilizes. In "moving average" language, it's like saying that you have to wait 200 days before you can calculate the first 200-day average.

In the TREND VALUE concept, this start-up period can be reduced if you can find some logical way to estimate the initial TREND VALUE to a better accuracy than the first day's data can provide.

Frequently this estimation can be a very simple process and can, therefore, quickly pay dividends. For example, if you have been keeping the traditional kind of "moving average" of comparable sensitivity, you can just take the current value of this moving average as your initial TREND VALUE and your stabilization period should be substantially reduced.

As an alternative, many chart services publish a 200-day moving average; for a long-term trend such an average will form a good starting point.

For shorter term trends, such as a 10% Tracking Rate or higher, a chart of the daily prices can be used to estimate the initial TREND VALUE. In particular, if your stock has had a sideways move for a period of time, the TREND VALUE by its normal "tracking" procedure will be quite close in value to the price at the end of the horizontal move and this would be a good spot to make your estimate. See the accompanying charts for examples.

In summary, then, when first starting a TREND VALUE measurement on a new series of data, you can use the first day's data as the initial TREND VALUE and then perform your calculations long enough for the system to stabilize. Or you can cut down on the waiting period by using whatever means you can find to estimate the initial value to a better accuracy than the first data point. Wherever you start, however, the tracking principle of the TREND VALUE concept will reduce the start-up error progressively day by day until it reaches its stabilized value.

V. PERFORMING THE CALCULATIONS

One of the most significant and delightful properties of the TREND VALUE concept is its simplicity.

First of all, no voluminous back records are required. The total effect of all past history which will have an effect on today's TREND VALUE is stored in proper proportion in yesterday's TREND VALUE. No matter how long a trend you are pursuing, the only record you need to keep is yesterday's TREND VALUE. This is clearly a tremendous advantage over the traditional type of moving average which has to retain daily records back as long as the period of the moving average.

Secondly, updating yesterday's TREND VALUE to account for today's market is quite a simple procedure and can be made almost trivial by an intelligent choice of Tracking Rate.

In essence, the updating procedure is as follows:

> Each day the old TREND VALUE looks out to see where today's market data is--it notes whether today's data is above it or below it and by how much. It then takes a step towards today's data, always moving the same percentage of the distance to the data. The percentage is, of course, the selected Tracking Rate.

Example 1. Suppose you are working to a 50% Tracking Rate. Suppose your initial TREND VALUE is 30 and you have a sequence of daily prices as follows: 32, 33, 31, 28

The TREND VALUE calculations for these four prices would be performed as follows:

<u>1st day</u> The TREND VALUE of 30 sees a market price of 32. The market is 2 points higher, therefore, the TREND VALUE moves <u>up</u> one-half (50%) of 2, or 1 point higher. The TREND VALUE is now 30+1 = 31.

<u>2nd day</u> The TREND VALUE of 31 sees a market price of 33, which is 2 points higher. Again it steps 50% of the way, by going to 32.

<u>3rd day</u> The TREND VALUE of 32 sees a market price of 31 which is one point lower. Therefore, the TREND VALUE slips down one-half the distance and ends up at 31.5.

<u>4th day</u> The TREND VALUE of 31.5 sees a market price of 28, which is 3.5 points lower. It needs to move down by one-half of 3.5 points or 1.8 points lower. The new TREND VALUE is 31.5-1.8 = 29.7.

Note that fractions are rounded off. In fact, for fast moving price series fractions can be ignored entirely. In the above example, it would be quite satisfactory to round off the 3rd day's TREND VALUE at 32 and then the 4th day's calculation would be as follows.

4th day The TREND VALUE of 32 sees a market price of 28 which is 4 points lower. The TREND VALUE thus moves down one-half of 4 points or 2 points to 30.

Example 2. Suppose you are working to a 10% Tracking Rate. Suppose also that your initial TREND VALUE is 30 and your daily data, as before is as follows: 32, 33, 31, 28

Now the calculations would be performed as follows:

1st day Market price is 2 points above the TREND VALUE. Therefore, adjust the TREND VALUE upward by 10% of 2 or 0.2. The new value is 30+0.2 = 30.2.

2nd day Market price is 33-30.2 = 2.8 points above the TREND VALUE. Therefore, adjust the TREND VALUE upward by 10% of 2.8 or 0.3 (rounded off). The new TREND VALUE is 30.2+0.3 = 30.5.

3rd day Market is 31-30.5 = 0.5 points above the TREND VALUE. Hence, the TREND VALUE moves up by 10% of 0.5 or 0.1 (rounded off) to 30.5+0.1 = 30.6.

4th day Market is 30.6-28 = 2.6 points below the TREND VALUE. Therefore, the TREND VALUE is adjusted downward by 10% of 2.6 or 0.3 (rounded off) to 30.6-0.3 = 30.3.

VI. SIMPLIFYING THE CALCULATIONS

From the examples shown above, you can see that calculating TREND VALUE is based on taking a percentage of a number and adding the result to the old TREND VALUE.

It should be obvious that even this simple procedure can be further simplified by choosing a Tracking Rate which is a nice round number. For example, if you want a rate in the vicinity of 10 to 20%, choose 10%, for that means you'll be dividing by 10.

For a longer term trend, 1% is a good number, for here you'll be dividing by 100.

Depending on your facility with numbers, select a nice round fraction to work with. The effort required then will become almost trivial.

VII. CHANGING TREND PERIODS

There is a rather unique flexibility available in the TREND VALUE concept which concerns changing trend periods.

Suppose, for example, that you have been developing a TREND VALUE for a particular stock for a Tracking Rate of 20% and you've decided that this close a track is just too sensitive and results in too many trend changes followed by quick reversals.

Because of the properties of the TREND VALUE concept, you can change the Tracking Rate quite a substantial amount on a moment's notice. In our example, if 20% is too high, then on the very next day's data, you can change your Tracking Rate to 10% without changing your back data. Just take the latest TREND VALUE calculation at 20% and use it as the initial value for the 10% rate.

So long as you keep your new Tracking Rate within a factor of 2 or even 3 of the old rate, then the old TREND VALUE calculations will still be close enough to the accurate new one so that only a very brief stabilization period will be required.

Even this limitation can be removed if you wish to take the few minutes necessary to go back along your TREND VALUE history for a week or two, convert to the new Tracking Rate at that point, and recalculate the recent values.

Just by contrast, in the traditional moving average, such a change could not generally be made without a sharp, and possibly misleading, jump in the moving average value.

There are also other reasons besides sensitivity which may cause you to want to change the Tracking Rate.

These other reasons arise when, due to some fundamental change in the market place, the price of your stock takes a sharp jump which you <u>want</u> to reflect in your TREND VALUE. An example of such a situation might be an unexpected tender offer for your company's stock which suddenly raises its market value by a substantial amount.

Another example more general in nature would be the unanticipated hope of a Vietnam peace settlement which arose from President Johnson's speech in early April of 1968. This fact provided an impetus to the entire market and effectively varied the market values of almost all stocks (some upward, some downward).

In such sudden situations, where it is clear that the fundamental value of your stock has suddenly changed, it makes a great deal of sense to change to a very high Tracking Rate (say 25 to 50%) for a temporary period, usually a few days, to raise (or lower) your TREND VALUE to account for the sudden change in value. When you think the high Tracking Rate has brought your trend near the expected new value, then you convert back to the Tracking Rate you used previously in order to track the stock at your desired rate.

VIII. USING TREND VALUES IN TRADING

Once you have set up the TREND VALUE concept for your own market analysis, you'll find that it has several applications. Here are a few of them.

1. It's generally difficult to detect volume trends when studying the usual bar chart presentation. Some of the random variations can be eliminated while still leaving the short term trend by using a fairly high Tracking Rate, say 10% to 50%. By this bit of effort, you'll find it much easier to see whether volume is expanding or contracting on short term price moves. Thus, you'll be able more readily to determine whether a move is healthy or not.

2. By its very nature of "tracking" a move, a TREND VALUE will be moving upward when the price it is tracking is above it, and down-

ward when the price is below it. So even if you are a short-to-intermediate term trader, you'll find that plotting a long term trend (Tracking Rate of 1% to 5%) will tell you whether the market climate is aiding or hindering your trade. For example, if you wish to buy for a short-term rise when the long term trend is declining, you will be able to recognize that your risk is high and your objective may be limited.

3. When a stock reaches a distribution or topping area and starts to move sideways, the TREND VALUE which is tracking that particular period begins to slow down its rate of rise and as the topping phase continues, the TREND VALUE reaches it and levels out.

When you see such a levelling out, you should then start looking for a reversal of trend. If and when it occurs, if your Tracking Rate is proper for that stock and that move, the price will suddenly drop through the TREND VALUE and begin its decline.

In a reverse sense, as the consolidation phase following a decline comes to an end, the price will suddenly shoot up through the TREND VALUE.

It should be obvious that such situations form effective BUY or SELL signals. If the ensuing move by your stock is to be a substantial one, you will get such a buy or sell signal quite early in the move and it can, therefore, be used to advantage.

If the move is to be a false one, terminating quickly, the price will move back through the TREND VALUE and this reverse crossing can be used as a stop-loss signal.

In summary, then, in addition to the general advantages of being able to measure trends of market data, the TREND VALUE concept can actually be used to determine buy and sell signals. Review the charts in this report to see examples of this technique.

By adding this aspect of TREND VALUES to the other factors which affect price moves such as earnings projections, support and resistance levels, general market climate, etc. you should find that you have added an effective tool to your arsenal of market decision-making techniques.

IX. EQUIVALENT MOVING AVERAGE

This section is somewhat of an appendix to this report, written for the market technician interested in a little more theory on the concept of TREND VALUES, perhaps for extending it to some special application of his own.

What has been presented as the TREND VALUE concept so far in this report is an expansion and application analysis of just one element of a new branch of mathematical analysis called Exponential Smoothing. It was first introduced to economic analysis in 1962 by Robert Goodell Brown, of Arthur D. Little, Inc. in a book entitled "Smoothing, Forecasting and Prediction of Discrete Time Series", published by Prentice Hall, Inc. For the experienced mathematician exponential smoothing has capabilities far beyond that of developing TREND VALUES.

For the market technician, there is one aspect of exponential smoothing which is worthy of discussion in this report, and that is the equivalence of the TREND VALUE concept to traditional moving averages.

The concept of TREND VALUES is, in fact, a <u>weighted moving average</u> with a specific pattern of weights.

That such is the case can be developed quite readily by a bit of algebra as follows:

Let P_n = market price n days ago
T_n = TREND VALUE n days ago
r = Tracking Rate
and n = o represents the current day

Now our procedure for developing today's TREND VALUE T_o from yesterday's T_1 can be expressed algebraically as follows:

$$T_o = T_1 + r(P_o - T_1)$$

This can be rewritten as

$$T_o = rP_o + (1-r)T_1$$

But this merely says that today's TREND VALUE consists of today's market data weighted to a value of r percent along with yesterday's TREND VALUE <u>discounted</u> by r percent.

But yesterday's TREND VALUE was determined in a similar manner from the previous day's value from

$$T_1 = rP_1 + (1-r)T_2$$

Substituting this value of T_1 in the equation for T_o we get

$$T_o = rP_o + r(1-r)P_1 + r(1-r)^2 T_2$$

Carrying this procedure back for N terms to the start of the series we get

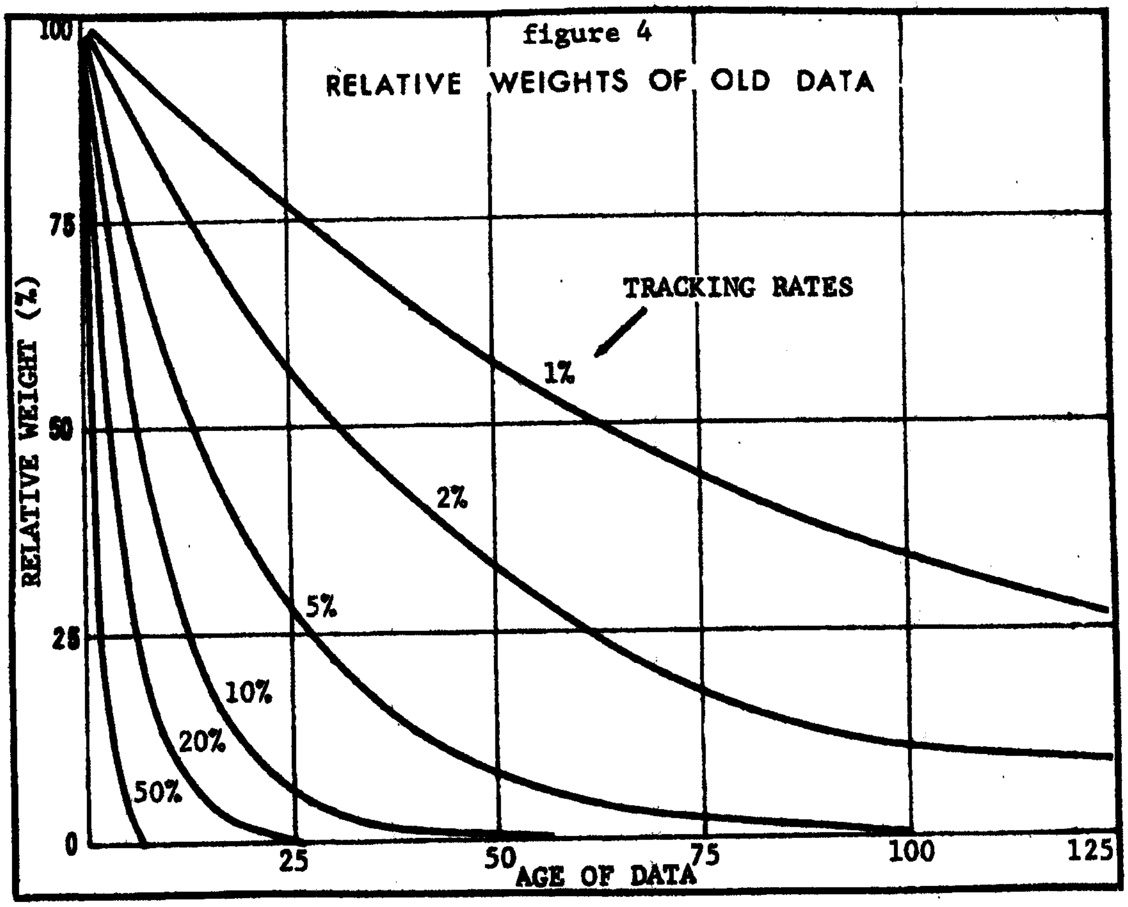
$$T_o = r[P_o + (1-r)P_1 + (1-r)^2 P_2 --- + (1-r)^{N-1}P_{N-1}] + (1-r)^N T_i$$

where T_i = initial TREND VALUE

From this form of the equation it can be seen that today's TREND VALUE consists of a weighted sum of <u>all</u> back terms in the series including the initial value. The relative weights of the terms show that each time the TREND VALUE is updated, all back data is discounted r percent of its previous value.

To use a numerical example, if we select a Tracking Rate of 10%, then the tracking procedure used is the equivalent of reducing the weight of each back term by 10% every time the TREND VALUE is updated.

The weights of back terms for a 10% Tracking Rate would thus be 0.10 for today's value, 0.09 for yesterday's, followed in turn by 0.081, 0.073, 0.066, 0.059, etc.



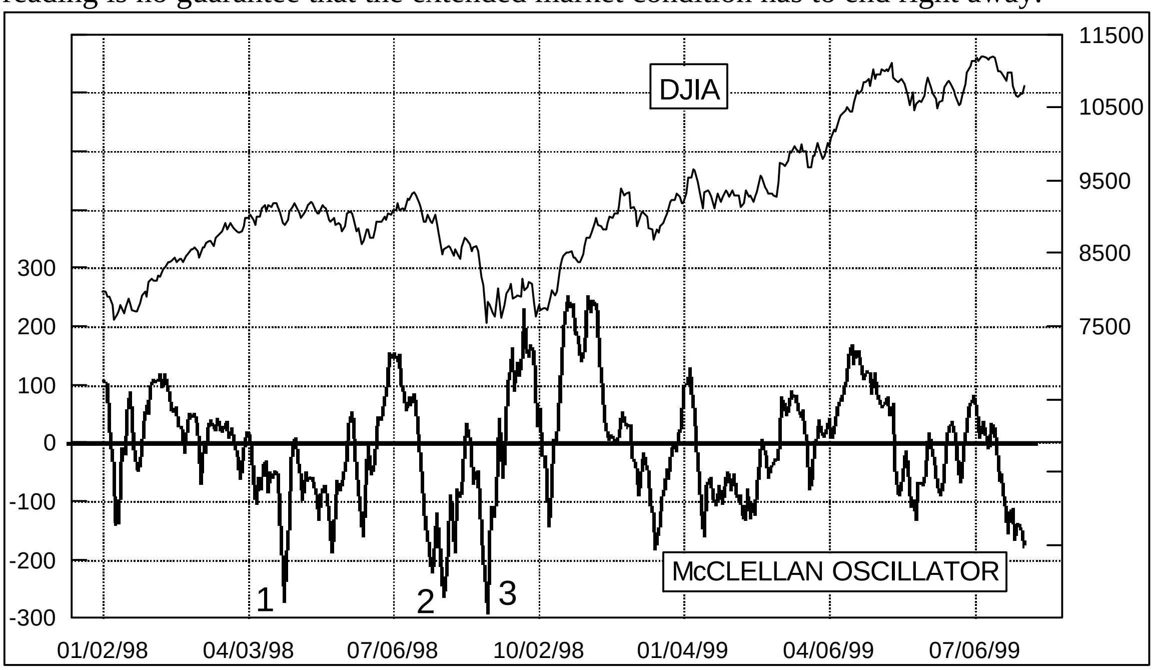
The speed with which back data is discounted for different Tracking Rates can best be seen in chart form in figure 4. For those familiar with moving averages, this chart can perhaps show more clearly the equivalence of TREND VALUES to moving averages.

Part III
How Technicians Use The McClellan Oscillator

The Oscillator's most elemental indication is its position relative to the zero line, which is the Oscillator's neutral level. The market is nearly always accelerating or decelerating, in one direction or the other, and rarely has a neutral acceleration condition. A positive Oscillator reading is an indication of upward acceleration, while a negative reading is a sign of downward acceleration. But there is so much more that the Oscillator has to tell us that elevates the Oscillator's value well beyond a simple positive or negative indication.

Overbought/Oversold

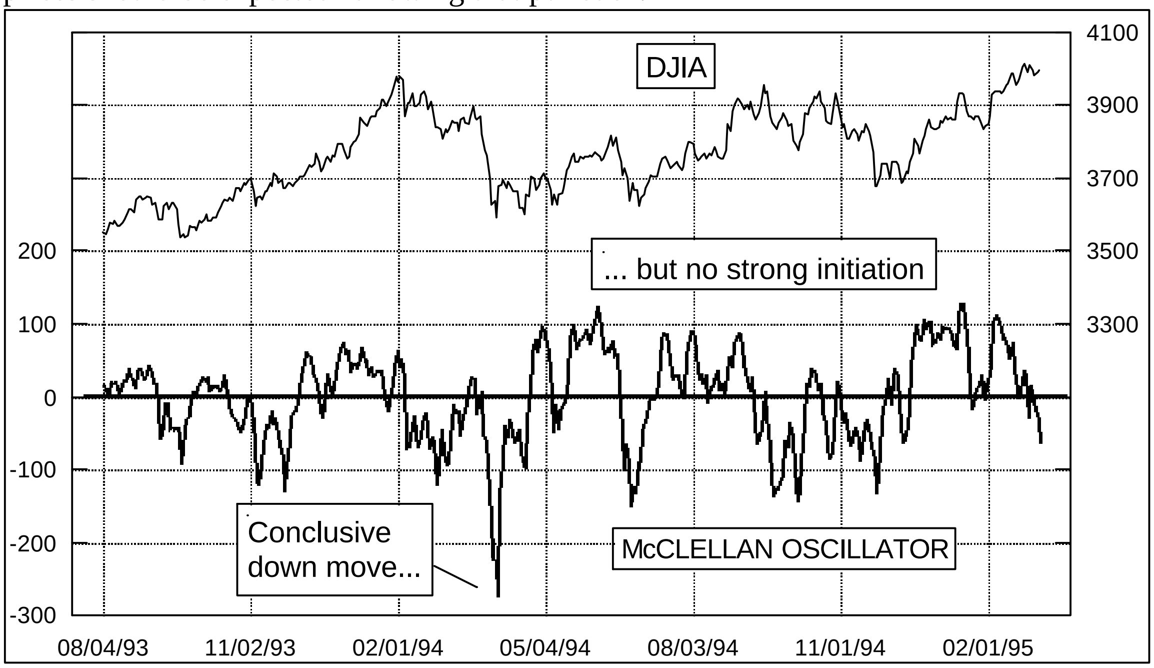
When the McClellan Oscillator reaches an extreme level, either high or low, it indicates an extended condition for the market. In this respect, it is like many other overbought/oversold indicators, and like the others, an extended McClellan Oscillator reading is no guarantee that the extended market condition has to end right away.



Oversold readings on the McClellan Oscillator offer us some additional insights when interpreted properly. First of all, deeply negative readings tend to indicate conclusion of a down move, whereas extremely high readings tend to show initiation of a strong new up move. Also, a deeply negative Oscillator reading which comes along after a long period of quiet is a harbinger of more trouble to come.

We see great examples of all of these principles in Chart 1, portraying the Oscillator in 1998 and 1999. Point 1 in this chart was a deeply negative reading (-271) which came along after a long quiet period. As such, it gave us warning of the weakness that arrived later in 1998 when the "Asian Contagion" hit the markets. Points 2 and 3 in this chart were also very low, but rather than being indicative of future weakness to come they were the fulfillment of the weakness forecasted by point 1. They also marked the end points of strong down moves, with prices either reversing or at least moving sideways for a while as the bears gathered more strength.

For several months prior to point 3, there had been no strong up moves accompanied by very high Oscillator readings. The postings above +200 beginning in September 1998 were a sign that the bulls were going to be coming rushing back in, and that they had a lot of money in their pockets to push prices higher for a sustained period of time. These high postings differed from the very low readings because low readings are indicative of the conclusion of a down move, whereas the high readings tend to occur at the very beginning of a strong up move. We almost never see the highest price high for a move occur on the highest Oscillator reading. So when one sees a very high reading, it may be a sign that a brief pullback is needed, but it is also a sign that higher prices should be expected following that pullback.



In the second chart, we see a great example of a conclusive indication from a very oversold Oscillator reading. This bottom was not followed by any really strong positive readings for a long time, and the result was a choppy, range-bound period for stock prices.

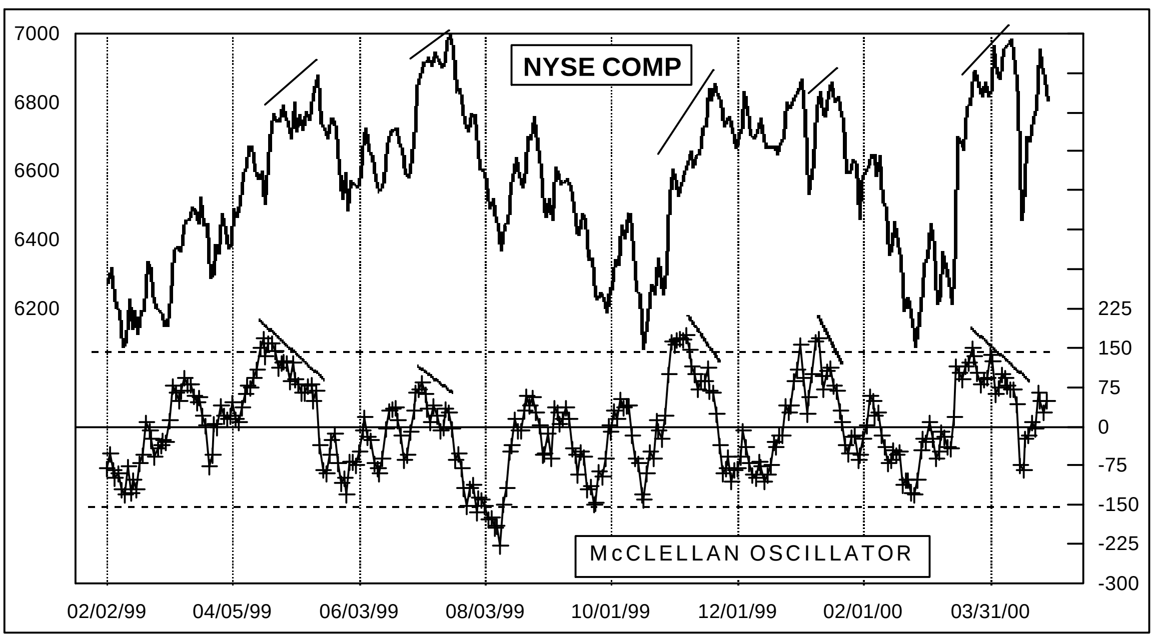
Some sources on technical indicators will prescribe specific Oscillator values that represent overbought and oversold levels, but we discourage people from following such guidelines. A wide variety of factors can affect the amplitudes of Oscillator moves at various times, including market volatility, the strength of price moves, and changes in the number of issues traded on the exchange. So an Oscillator value that might indicate an extreme condition during one period may only be a routine high or low during another period. One way to adjust for this is to calculate a “Ratio-Adjusted” McClellan Oscillator (see Part IV). Using Ratio-Adjusted McClellan Oscillator values does indeed adjust for the changing number of stocks on the exchange, but it does not adjust for other factors such as fluctuating market volatility or changes in the diversity of issues represented which may produce greater or lesser Oscillator swings.

For periods of less than 2 years, we believe that it is fine to use the conventional McClellan Oscillator. Rather than focusing on the specific numerical value, an examination of the chart pattern will give much more information about what the Oscillator has to tell us. Certain chart structures and behavior can be enormously revealing.

Divergences

To the extent that the Oscillator's movements diverge from price action, it can signal an impending change in direction for prices. This is where it helps to understand that the Oscillator serves as an accelerometer for the market breadth statistics. A rocket that is fired into the sky will undergo a deceleration before it reverses direction and starts to fall back to earth, and the same behavior is usually true for stock prices. So measuring the acceleration can be helpful to signal an impending change in trend direction.

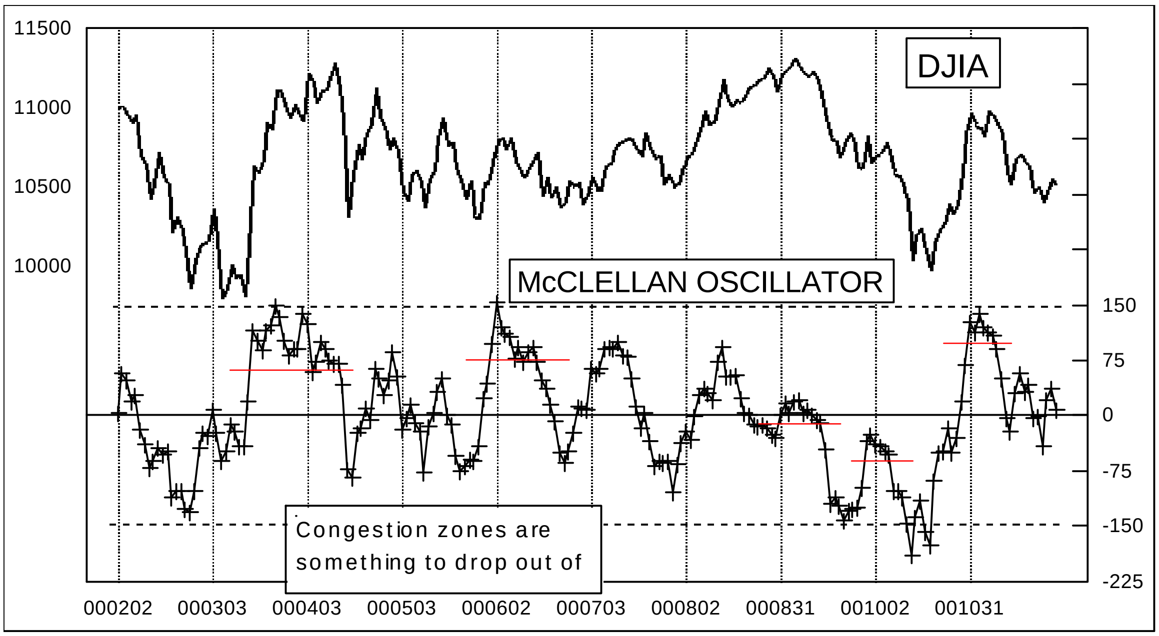
The chart below shows several divergences between the price action in the NYSE Composite Index and the McClellan Oscillator. Notice that these divergences tend to occur more often at tops than at bottoms, which is due in part to the way that the U.S. stock market tends to have more rounded tops and exhaustive (spike) bottoms. This is not to say that no divergent bottoms can be found, just that divergent tops are much more frequently seen.



Congestion Zones

A congestion occurs when the Oscillator fluctuates by very small increments over several days. One or two days of small changes is not enough, it has to be a sustained period. The Oscillator value area where a congestion occurs is called a "congestion zone", and they usually form above the zero line. We seldom see them form at extended negative values.

The basic rule to remember is that a congestion zone is something to drop out of. The chart below illustrates a few examples of congestion zones. The common characteristics of each are that they show several days of postings with the Oscillator in a relatively small range, and once the Oscillator breaks down out of that range the market begins to decline sharply. A couple of these examples even have the congestion zone forming at or below zero, but the result was still a drop down out of the congestion zone. Looking at one day's Oscillator value would not convey this information; it takes a chart, and someone to interpret that chart, to notice behaviors like congestion zones and divergences developing.

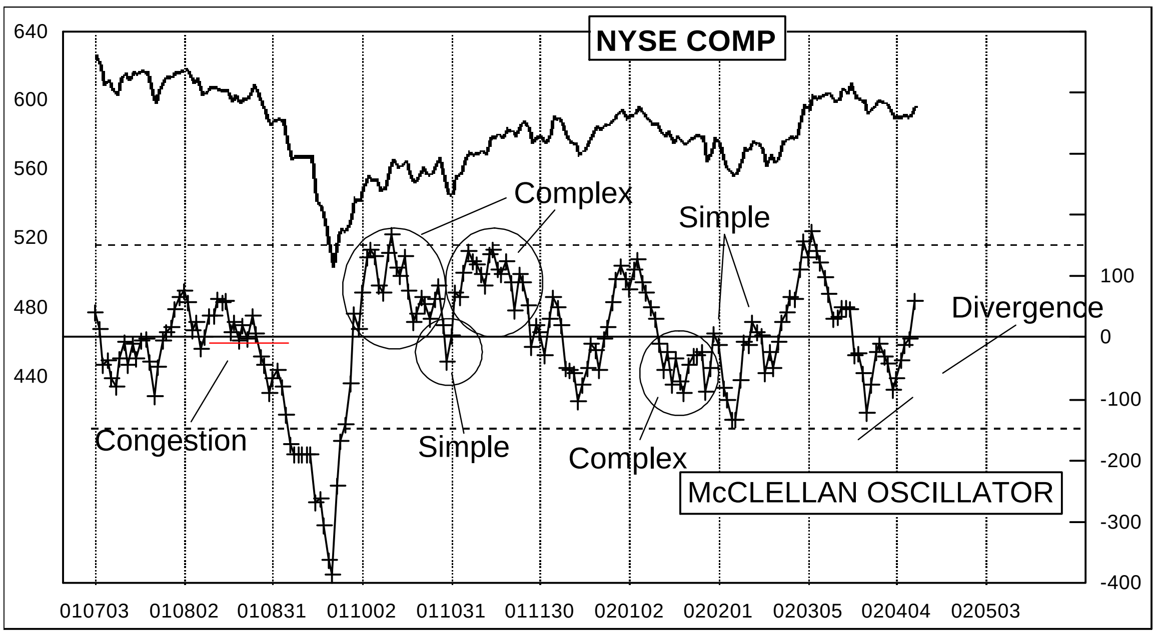


Complex Versus Simple Structures

When the Oscillator moves up and down over a period of days on one side of the zero line, we call that a "complex structure". Complexity of a structure implies strength for the side of zero upon which it forms, whether positive or negative. A "simple structure" is one in which the Oscillator crosses zero in one direction in a move lasting from one day up to a few days, and then turns around and heads directly in the opposite direction without forming any complex structure. Simple structures imply weakness for the side upon which they form, although that weakness may not be manifesting itself during the period that the simple structure is formed.

For example, the Oscillator could be chopping up and down below zero, implying that the bears are strong, and then it might pop briefly above zero as the bulls try to regain control. But if (in this example) the Oscillator moves straight up through zero and then turns around and moves straight back down through zero again, it is a sign that the bulls do not really have the strength to carry on their mission for more than a brief period, and the bulls cede control back to the bears.

The chart below shows a few examples of each type of structure. Where a complex structure forms, it implies more strength to come for that side of the market corresponding to the side of the zero line where the structure formed, i.e. complexity above zero is bullish, and below zero is bearish. That strength may be temporarily interrupted while the other side tries to exert its influence, but where complexity has formed we have the expectation that more strength will be manifested in that direction. Often we will see trending price moves, either upward or downward, made up of a succession of complex structures that are interrupted only briefly by simple structures. When such a succession of complex structures gives way to a simple structure, it can mean that the trending side of the market is ready to give up control for a while, and the opportunity is there for the other side to pick up the ball. Sometimes, neither side will form a complex structure, meaning that both the bulls and the bears are equally hesitant to take charge.

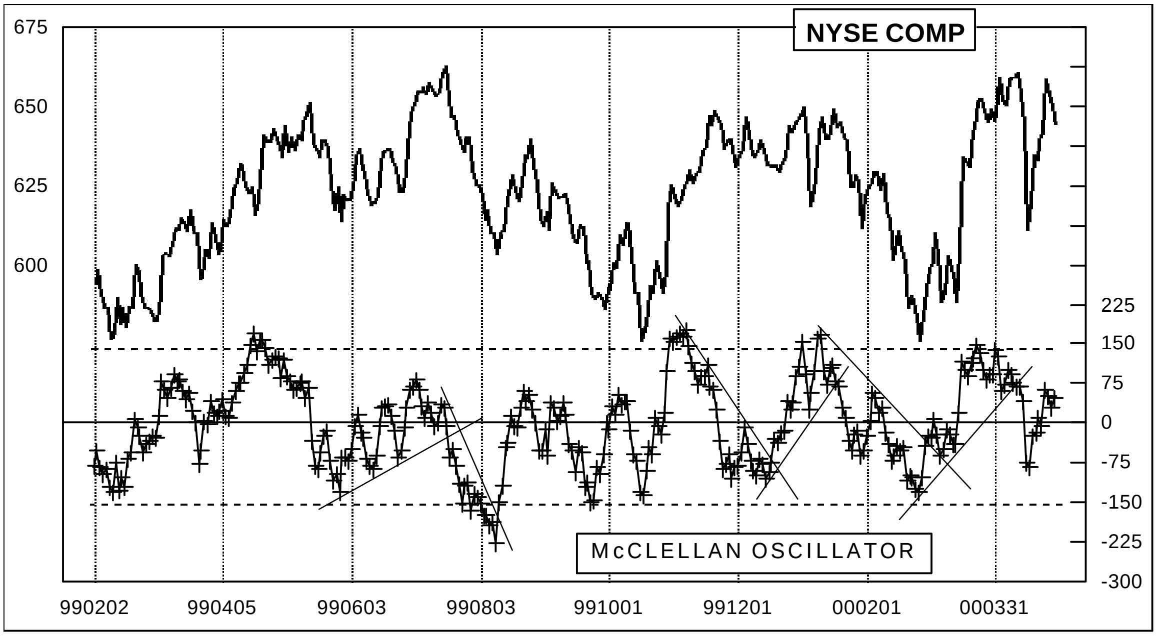


Oscillator Trendlines

One interesting feature of the Oscillator is that it forms trendlines just like price charts do, but the Oscillator trendlines will usually be broken before the corresponding price trendlines are broken. The next chart shows a few examples of Oscillator trendlines, and in each case the breaking of the trendline signaled a reversal of the prevailing short term trend. And also in each case, the trendline break in the Oscillator preceded the breaking of the trendlines which could be drawn on the equivalent price points.

It is important to be careful when drawing such lines, and more importantly, when drawing conclusions from them. Generally speaking, trendlines which span longer periods become less meaningful, and it is a better practice to stick to the steeper trendlines which span 3-6 weeks. As with price trendlines, it is not unusual for the

Oscillator to break out above a downtrend line and then go back down to test the top of that line before continuing higher.



Additional Points In Conclusion

The McClellan Oscillator has much to tell us if we are willing to listen. To properly hear the Oscillator's message, one must use a chart of the Oscillator's movements and not just focus on the number.

The Oscillator is based on the daily closing values for the NYSE's totals of advancing and declining issues, and so it does not exist as an intraday indicator. Having said that, it is possible to take the intraday values for the number of advances and declines, and calculate a "what if" value for the Oscillator that assumes those A-D values are the closing ones.

It is also possible to use other data to calculate McClellan Oscillators. We calculate and employ in our analysis breadth versions of the Oscillator which are derived from A-D data on the Nasdaq market, the stocks in the Nasdaq 100 Index, the 30 stocks in the Dow Jones Industrial Average, the corporate bond market, plus a subset of the NYSE breadth data for the "Common Only" stocks (filtering out preferred stocks, rights, warrants, and closed end funds). It is even possible to create a McClellan Oscillator out of any other breadth statistics you might think of, such as a portfolio of stocks or a subset of the market that includes all of the stocks in a particular sector.

The problem with subset breadth statistics like this is that they tend to all behave in a homogeneous way. In a narrow sector like gold mining or semiconductor stocks, for example, it is typical to see all of them go up one day and then all go down the next day. Other industry groups and sectors show this same effect to a greater or lesser degree. By narrowing the focus to small groups like this, we end up losing the key indication given to us by looking at breadth statistics. By examining the behavior of a diverse collection of stocks, we can see if there is a different indication from what we see in prices alone.

Breadth statistics are valuable because they give some of the best indications about the health of the liquidity that is available to the stock market. A small amount of money can be employed to make a handful of stocks go up or down, and if they are the right stocks then even the major market indices can be moved. But to affect the breadth numbers, which measure all of the stocks on the exchange, requires major changes in the liquidity picture. The available money has to be so plentiful that it can be spread far and wide in order to make the majority of stocks close higher, and especially so in order for the market to show positive breadth for several days.

By measuring the acceleration in the breadth statistics, which is what the McClellan Oscillator does, one can gain important insights about impending trend direction changes for prices.

Part IV
McClellan Oscillator Calculation

The standard McClellan Oscillator is calculated as follows: First calculate the daily breadth, which is the difference between the number of advances and the number of declines:

(A-D) = Advances – Declines

Then calculate two separate exponential moving averages (EMAs), known as the 10% Trend and the 5% Trend (so named because of the smoothing constants used in their calculation).

$$(10\%\ \text{Trend})_{\text{TODAY}} = 0.10 \times (\text{A-D}) + 0.90 \times (10\%\ \text{Trend})_{\text{YESTERDAY}}$$

$$(5\%\ \text{Trend})_{\text{TODAY}} = 0.05 \times (\text{A-D}) + 0.95 \times (5\%\ \text{Trend})_{\text{YESTERDAY}}$$

The McClellan Oscillator is calculated as the difference between these two exponential moving averages.

McOsc = 10% Trend – 5% Trend

Many of the current technical analysis software packages contain pre-built modules for calculating the McClellan Oscillator. It is also very easy to build in any spreadsheet program. A copy of one such spreadsheet file in Excel format is available at http://www.mcoscillator.com/user/OSC-DATA.xls.

Ratio-Adjusted Oscillator Calculation

The number of stocks traded on the NYSE is constantly changing, and this can affect the amplitudes of indicators that are tied to the number of issues traded, such as the McClellan Oscillator.

To factor out the effect that a the changing number of issues has on values of the McClellan Oscillator, we divide the daily breadth number (A-D) by the total of advances plus declines (A+D) to come up with a ratio instead of a raw number. We ignore the number of unchanged issues. We then go to the extra step of multiplying this ratio by 1000 to get it back up out of the realm of tiny decimals and into the range of “normal” numbers. In effect, this mathematical step pretends that there are always exactly 1000 stocks traded on the exchange. In a formula, it looks like this:

$$\text{Ratio-Adjusted A-D} = \frac{(\text{A-D})}{(\text{A+D})} \times 1000$$

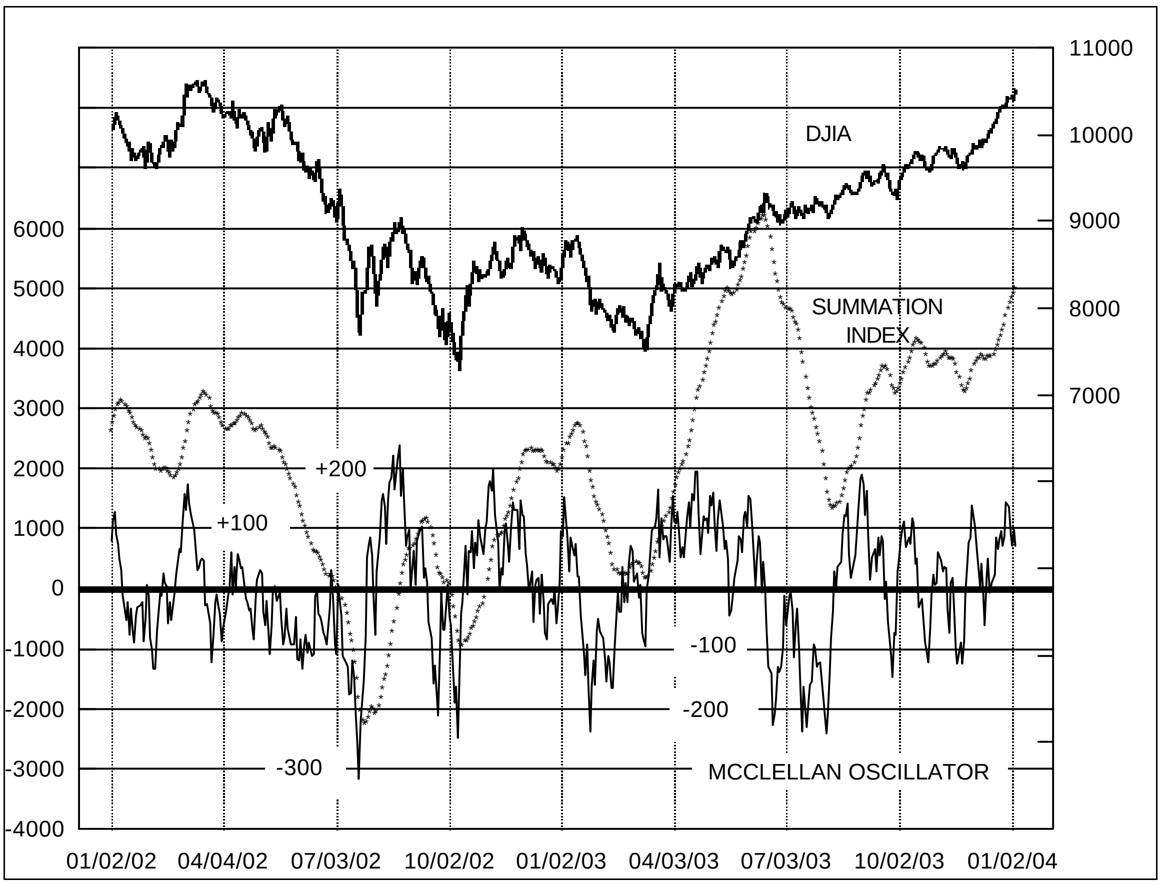
Once this number is obtained, the rest of the calculations for the EMAs and the Ratio-Adjusted McClellan Oscillator proceed in the same way as for the standard version.

Summation Index

When Sherman and Marian McClellan were first working with the McClellan Oscillator, it occurred to Marian that the "area under the curve" was an additional important feature of this indicator. This stemmed from Marian's background as a mathematician, familiar with the techniques of differential calculus.

To calculate the undulating amount of this area, they added each day's value of the Oscillator to a running total of all previous Oscillator values and in the process they created the Summation Index. This indicator changes each day by the value of the Oscillator, and protracted conditions of either a positive or negative Oscillator result in an extended value for the Summation Index.

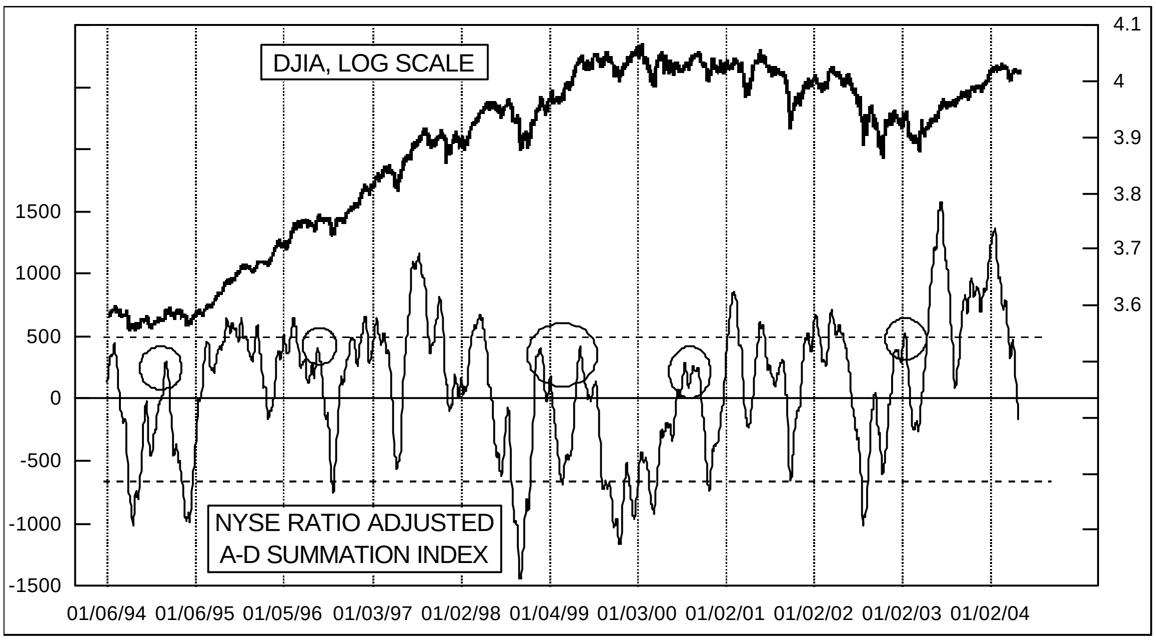
The chart below shows the Oscillator and Summation Index together and compared to the Dow Jones Industrial Average. When the DJIA is trending upward, we typically see positive Oscillator values and so therefore a rising Summation Index. When the Summation Index reaches a high value, it is normal for it to fall back downward as the market consolidates, the better to set up the market for the next leg of the move.



During their early work with the Summation Index, Sherman and Marian McClellan noticed that this indicator had a total amplitude of about 2000 points. Since all calculations were done manually at the time, and since some users had difficulty with adding and subtracting negative numbers, the McClellans artificially adjusted the values of the Summation Index upward by 1000 points so that its neutral level would be at +1,000. This way, it would oscillate between 0 and +2,000 under normal conditions, and any rare negative readings would be a sign that a truly unique and extreme condition in the market was being exhibited. The +1,000 neutral level for the normal McClellan Summation Index remains the standard to this day.

What was not contemplated in 1970 was the large increase in the number of issues traded on the NYSE, and this increase has led to an increase in the amplitudes of both the Oscillator and the Summation Index. To deal with this issue, one must make an adjustment to the values of the Summation Index. This can either be done mentally, with a subjective factoring of changes in chart amplitudes, or computationally by using Ratio Adjusted values for the Oscillator and Summation Index (see above).

The Ratio-Adjusted Summation Index (RASI) is still calculated as a running total of all previous Oscillator values, but in the case of the RASI we are calculating a total of Ratio-Adjusted Oscillator values. Rather than the artificial neutral level of +1000 introduced for the conventional Oscillator in 1970, we employ the more standard value of zero as the neutral value.



One of the great benefits of the RASI is that it gives us intermediate term (several months) overbought and oversold values. It also tells us when to expect further strength in the major averages, and when to expect weakness. If the RASI is able to move from an oversold reading to above +500, it promises us higher highs. The market may undergo a routine correction, but higher highs should ensue once the correction is done. When the RASI fails to get above +500, as shown in the circled instances in the chart above, it says that further weakness should be expected on the ensuing downtrend.

For more information, visit our web site at www.mcoscillator.com.

The use of Advance-Decline (A-D) statistics was first conceived back in 1926 by Col. Leonard Ayres[1] *and James Hughes*[2] *of the Cleveland Trust Company. Use of a cumulative A-D Line gained wider attention in the early 1960s thanks to the writings of Richard Russell*[3]*, Joseph Granville*[4]*, and others, who noted that it did a great job of showing a divergent condition in the 1961-62 market top*[5]*. Since then it has become an important tool in most technicians' toolboxes. Its chief value lies in providing a different view of the market's behavior than what is portrayed by individual stock prices or price-based stock indices.*

Evolution of the equity markets has brought changes to this indicator, leading some analysts to question the continued validity of its indications as being useful. But many of these criticisms of the A-D Line stem from untested assumptions and an improper understanding of what the A-D Line really has to tell us.

Advance-Decline (A-D) Line Basics

Technicians construct A-D Lines in a variety of ways. The simplest way is to sum each day's "daily breadth" (advancing issues minus declining issues). This way, the A-D Line changes in value by each new day's breadth reading. While this is mathematically simpler, it poses problems for long term comparisons. Recent years have seen an expansion in the number of issues traded compared to several years ago. An A-D difference of 100 meant a lot more in the 1930s, when only 600 or so issues traded, than it does now when the NYSE has 3400+. For this reason, a "raw" or "normal" A-D Line suffers from mismatched amplitudes of strong or weak breadth days in long term comparisons, which may interfere with proper interpretation.

One way to get around this is to use an A-D Ratio instead of the raw breadth statistics for calculating an A-D Line. We do this calculation by taking the daily breadth (advances minus declines), and dividing that number by the total of advances plus declines. To get this tiny decimal ratio back up in the realm of real numbers, we then multiply it by 1000.

$$\text{A-D Ratio} = \frac{(A-D)}{(A+D)} \times 1000$$

In effect, we are pretending that the stock market always has exactly 1000 stocks. It would be just as valid if we used another number instead of 1000, as long as we are consistent throughout the data.

Figure 1 shows that for short periods of time, up to a couple of years, there is very little difference in appearance of the A-D Lines calculated with raw A-D data or with ratio-adjusted A-D numbers. For this reason, many technicians stick with the raw data for their short to intermediate term analysis (days to weeks).

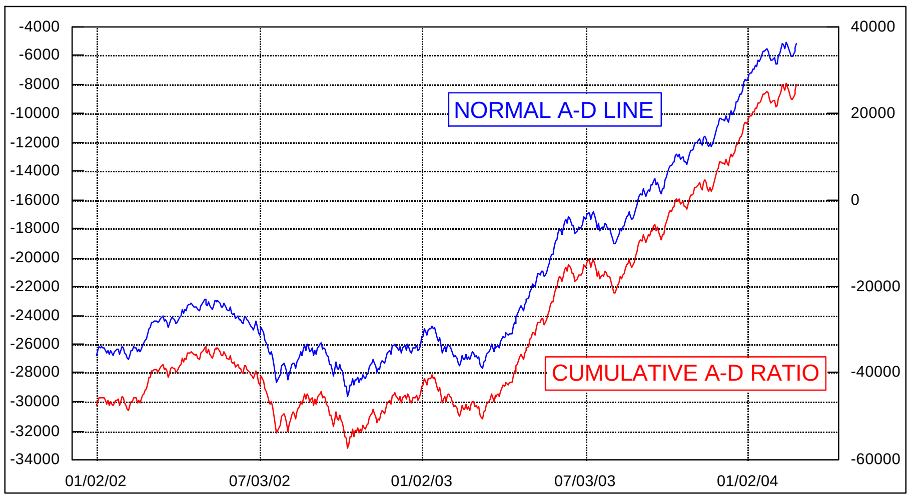


Figure 1

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[1]Dysart, Paul, quoted by James Alphier for Dysart's 1990 MTA Annual Award, attributes Colonel Leonard P. Ayres with being the first to ever use advance/decline data. Ayres shared this work with James Hughes and others who expanded on it. Dysart himself began employing breadth data in 1930, and notes that Barron's first began publishing breadth data in 1931.

[2]Harlow, Dr. Charles V., writing in "An Analysis of the Predictive Value of Stock Market 'Breadth' Measurements" (Investors Intelligence, 1968) credits James F. Hughes with formulating the approach of examining advancing and declining issues back in 1926. The earliest publication of this work is "The Birth of the Climax-Breadth Method," an article published by Hughes in *Analysts Journal*, Third Quarter 1951, pp 25-35.

[3]Richard Russell, personal recollections, 2004.

[4]Granville, Joseph. "Strategy for Daily Market Timing," p. 131, 1963.

[5]Walter Deemer, personal recollections, 2004.

As time horizons are expanded, the effects of the changing number of issues traded begins to be more important. Figure 2 shows a multi-decade view of these two methods of calculating an A-D Line. Notice that the normal version has already eclipsed its 1958 high, while the ratio-adjusted version has not. The latter version is indeed acting quite strong, and is at a higher level than its 1998 top which is a very bullish condition, but it is not looking as strong as the normal one which gets distorted by the larger number of issues traded.

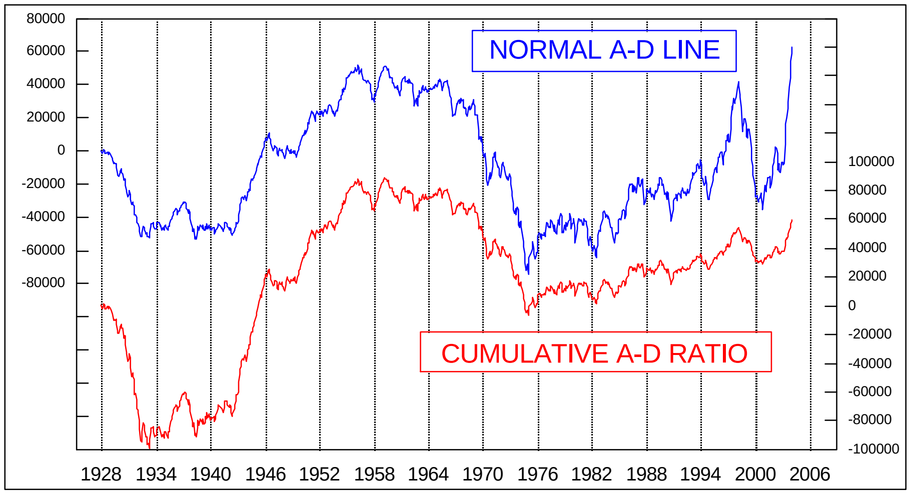

Figure 2

A-D Line Uses

One of the most important indications given by the A-D Line is the confirmation (or denial) of the legitimacy of an up move in prices. If a price index such as the Dow Jones Industrial Average (DJIA) makes a higher price high but the A-D Line makes a lower high, this is known as a "divergence". It is a sign of weakness for the overall market when breadth numbers do not confirm price movements.

It is important to operate in the proper time context in making such a determination of a divergence. Divergences which span a few days are numerous, and can be misleading. Divergences which span across a few weeks to a few months are better, because they can measure the strength of a successive upward impulse following an intermediate cycle low. When a divergence spans several years, it becomes problematic to assume a lack of strength by the market. For example, the fact that the Cumulative A-D Ratio in Figure 2 has not exceeded its 1958 high should not be taken as a sign that the great bull market of the 1980s and 1990s was just a "failing rally". That would be too long of a time horizon.

A couple of great instances of A-D Line divergences are shown in Figures 3 and 4. In Figure 3, we look at what the breadth numbers were saying ahead of the great 1929 crash. The A-D Line itself topped out in May 1928, more than a year ahead of the price top for the DJIA. As such, it showed that there were problems for the broader list of stocks which were not apparent in the big name companies making up the DJIA.

Figure 3

A more recent example appears in Figure 4. Here we see how the higher high in the DJIA back in July 1998 was not confirmed by the A-D Line, which had already started its long decline. After the late 1998 bottom, the DJIA was able to surge higher on the coattails of the technology boom, but the A-D Line was not as enthusiastic and it said that the rank and file stocks in the NYSE were not enjoying the same boom that the large cap stocks were demonstrating. In each case, the A-D Line had an important message about the liquidity situation for the overall market, a message which many analysts, investors, and portfolio managers were not ready to hear. Indeed, several analysts have pointed to the very strong A-D Line since late 2000 and concluded that it is no longer useful for market analysis because of the terrible job it did in describing what was happening to the overall market. But this presumes that the major indices, which are dominated by larger capitalization stocks, are themselves the true view of the market's behavior. Because of that market cap dominance, a small number of big-cap stocks can skew the indices with their own price behavior, regardless of what the rest of the market is doing. The A-D Line, on the other hand, is much more egalitarian: each stock gets the opportunity to cast one vote every day, up or down. And the daily breadth statistics reflect a composite view of the results of thousands of battles between the bullish and bearish forces being applied to every issue traded.

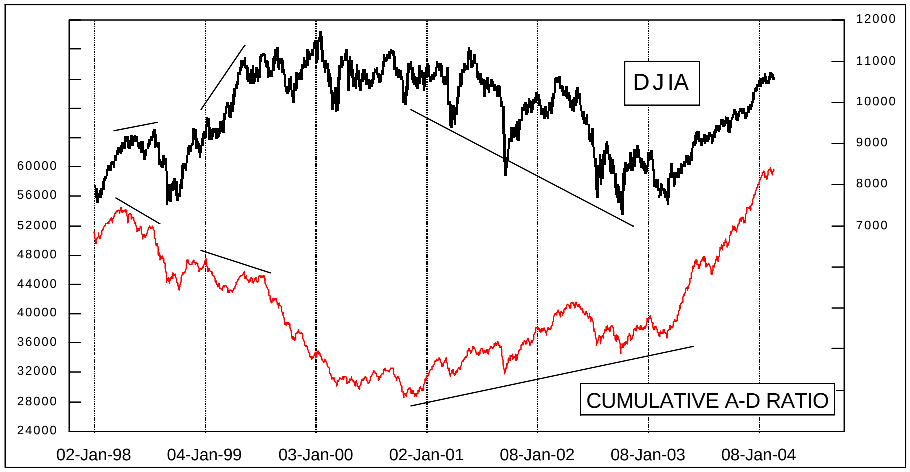

Figure 4

The 1928-29 and 1998 examples are classic cases of how the A-D Line can signal trouble by making a divergent top relative to prices. But it does not always provide a divergent top indication, which is somewhat frustrating to technicians who watch and wait for one. Examination of breadth data all the way back to 1926 reveals that when the A-D Line does not make a divergent top, the ensuing corrections are not as severe as the declines that followed price tops which have featured A-D Line divergences.

Since the large capitalization stocks which dominate the major averages are reduced to plebeian status in the A-D Line calculations, it may help to look at the market in another way in order to be able to ascertain what the A-D Line reveals about the market. Figure 5 shows the Cumulative A-D Ratio versus a relative strength line which compares the index value of the Russell 2000 to the Russell 1000. The Russell 1000 Index consists of the largest 1000 stocks in terms of capitalization, as ranked by the Frank Russell Company, and constitutes approximately 92% of the capitalization of the U.S. equities market. The Russell 2000 Index is made up of the companies which ranked 1001 through 3000 in market capitalization according to Russell, and it is the recognized benchmark index for small cap stocks.

The relative strength line is calculated by simply dividing the Russell 2000 Index value by that of the Russell 1000. When this relative

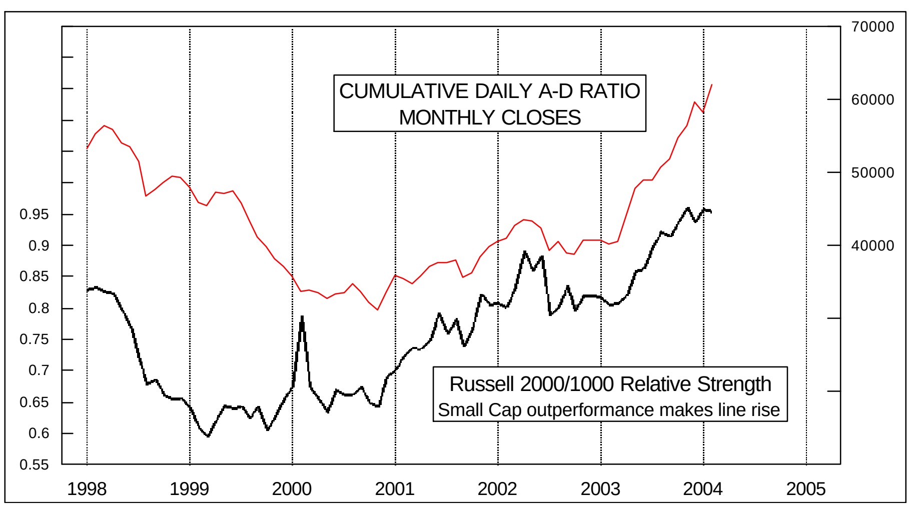

Figure 5

strength line is moving upward, it means that smaller cap stocks are outperforming larger cap stocks on a relative basis. This may mean that small caps are going up more quickly than large caps, or that they are falling more slowly; the key is *relative* performance.

There is a strong correlation between the A-D Line and this relative strength line, and this makes a lot of sense. Since the small cap universe casts a lot more votes each day in the tally of daily breadth statistics, it stands to reason that the breadth numbers should match what the small caps are doing.

Why is this important? Because the small cap stocks are more sensitive to interruptions in the flow of liquidity (money availability). They are like the canaries that coal miners once employed for warning of deadly methane gas pockets; small cap stocks are much more likely to suffer if liquidity begins to dry up. When liquidity is strong, it is easier for the entire market to go up, since there is plenty of money to go around. But when liquidity gets tighter, only the strongest can survive as investors abandon their more marginal stocks in favor of the more liquid ones.

A Recession Predictor

Because of the sensitivity of the A-D Line to disruptions in the orderly flow of liquidity, it can be a tremendously effective predictor of economic recessions. But one has to know the secret to how this works.

Figure 6 shows three different measures of economic/market strength. On top is the Cumulative A-D Ratio, with which you are no doubt familiar by now. The middle line is the Federal Reserve's Discount Rate, which was formerly the means by which the Federal Reserve loosened or tightened its grip on the liquidity supply. Beginning in 2002, monetary policy was enacted through changes in the "Fed Funds target" rate[6]. The Discount Rate is shown here because it was the primary tool for enacting monetary policy for so many years, and so it is still a useful way to describe the changes in Federal Reserve monetary policy across many years of history. On the bottom is the 12-month rate of change in the Gross Domestic Product (GDP), and since 1968 there have been 6 different instances of a negative growth rate in GDP. One may argue about how many quarters of negative GDP growth are required to constitute a "recession", but any period of negative GDP growth is considered undesirable by both policy makers and those who are at the receiving end of those policy changes.

Most economists who have studied recessions have noted that every instance of negative GDP growth has been preceded by a period of rising short term interest rates, courtesy of the Federal Reserve. But as the 1994 example shows us, not every period of rising interest rates leads to a negative GDP growth.

The secret referred to above has to do with the interrelationship between Fed rate hikes and the A-D Line. When the Federal Reserve raises interest rates into a period when the A-D Line is strong, the economy can generally withstand the pressure of higher interest rates. But if the A-D Line is acting weak when the Federal Reserve decides to initiate interest rate increases, the results can be terrible for the economy. The best

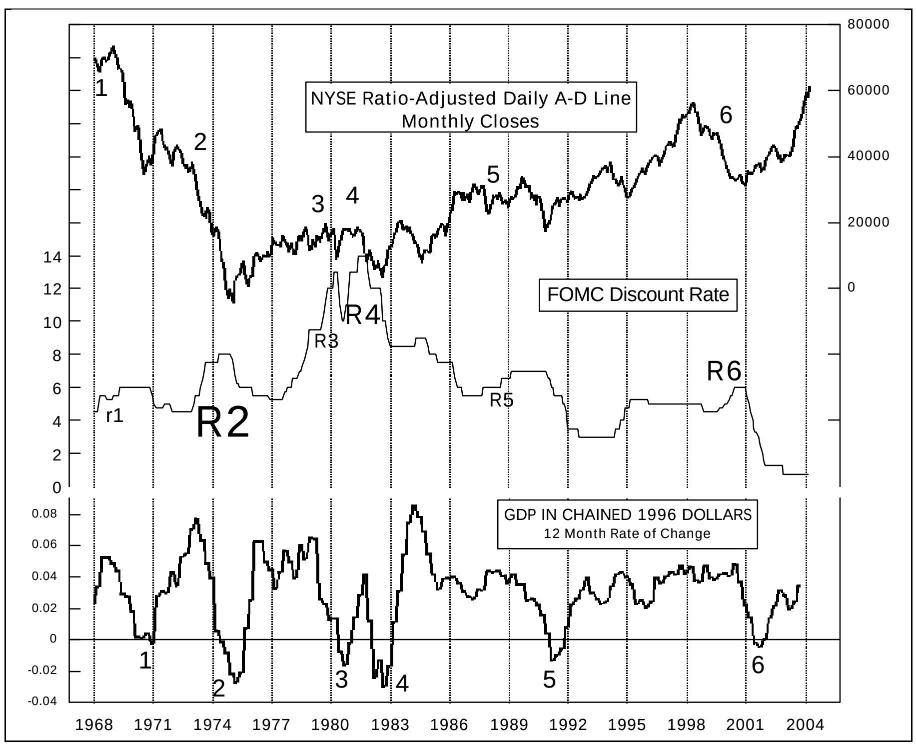

Figure 6

6http://www.federalreserve.gov/boarddocs/press/bcreg/2002/20020517/default.htm example of this principle was the 1974-75 recession (#2 in our chart). Liquidity at that time was already constrained by the oil embargo, and the Fed piled onto these troubles with an increase in short term interest rates. The result was the longest and deepest recession since 1958.

Using this principle, it was a foregone conclusion that the economy would see a period of negative GDP growth following the tech bubble in 2000. In 1999, the Federal Reserve decided to begin hiking short term interest rates in order to fight inflation which was not yet apparent, but which was described as being "over the horizon"[7]. The set of rate hikes in 1999-2000 came amid a period of terrible weakness in the A-D Line, when liquidity was already constrained. So the Fed's further constriction of the money supply was an unwelcome burden on the economy, and the negative GDP growth was a foreseeable result.

Problems With Breadth Statistics

In recent years, the A-D Line has come under increasing criticism from several camps due to perceived problems with its composition and its calculation. Closer inspection of the actual data shows that the A-D Line is still a good indicator, and that the supposed problems do not really have an effect on the validity of its indications.

The first criticism is that there are too many issues traded on the NYSE which are not "real" companies. These include preferred stocks, rights, and warrants, in addition to closed end funds. The belief is that these "non-operating" companies are spoiling the real A-D numbers because they are too interest sensitive, and because they drown out the votes of the "real" companies. But there have always been interest sensitive issues traded on the NYSE; back in the old days, they were known as "stocks which pay a dividend".

One approach that some analysts have taken is to construct their own "purified" A-D Line numbers by selecting only stocks that they like for inclusion. Some stick to the SP500 list of stocks, or some other similar list. Others take the whole list, and filter out what they don't like. But one problem with this method of including only "real" companies is knowing which ones to include or exclude. For example, General Electric is a conglomerate with subsidiaries ranging from light bulbs to plastics to jet engines to mortgages. It is generally considered to be an "operating company", yet there is little difference between its collection of holdings and that of a mutual fund. Another example is Danaher, which at last count has 34 separate subsidiary companies, more than the number of holdings of some mutual funds. But no one who is filtering out issues from consideration would likely exclude these two examples. Knowing who to include and exclude can become a troubling proposition.

Another way to assess the effect of these issues which are not "real" companies is to take the A-D numbers apart from the top down, rather than from the bottom up. Most people are unaware that the composite A-D statistics do not come from the NYSE, but rather from the various data vendors who calculate these statistics based on the raw data feed from the exchanges. The NYSE does provide one piece of A-D data, which is for the "common only" stocks. This data is available each day at its web site, and can also be found each week in *Barron's*. The way that the NYSE filters out stocks to generate these numbers is by excluding any issue which has a symbol longer than 3 letters. This takes out all of the preferred stocks, warrants, and rights, but it leaves in all of the bond funds, closed end stock funds, and country funds. There is definitely a difference between the "Common Only" A-D Line and the composite A-D Line, with the Common Only version usually acting a bit weaker.

To go a bit further, and evaluate the effects on the A-D Line from the closed end funds (CEFs) which trade on the NYSE, requires a bit more digging. In order to investigate the effects of the CEFs, I gathered historical data on all of these CEFs, and computed an A-D Line based upon this subset of the market. I then subtracted the A-D numbers for CEFs from the Common Only numbers as published by *Barron's* to create what I call a "Pure Common A-D Line". Figure 7 shows a long term comparison of these indicators. The two lines at the bottom of the chart are the Common Only A-D Line, using the statistics listed in *Barron's*,

[7]The phrase "over the horizon" was first used in relation to inflation worries in a speech by Fed Governor Laurence H. Meyer on Jan. 16, 1997, (see http://www.federalreserve.gov/boarddocs/speeches/1997/9970116.htm) and subsequently became part of the general media lexicon when describing why the Fed was keeping rates high despite low inflation.

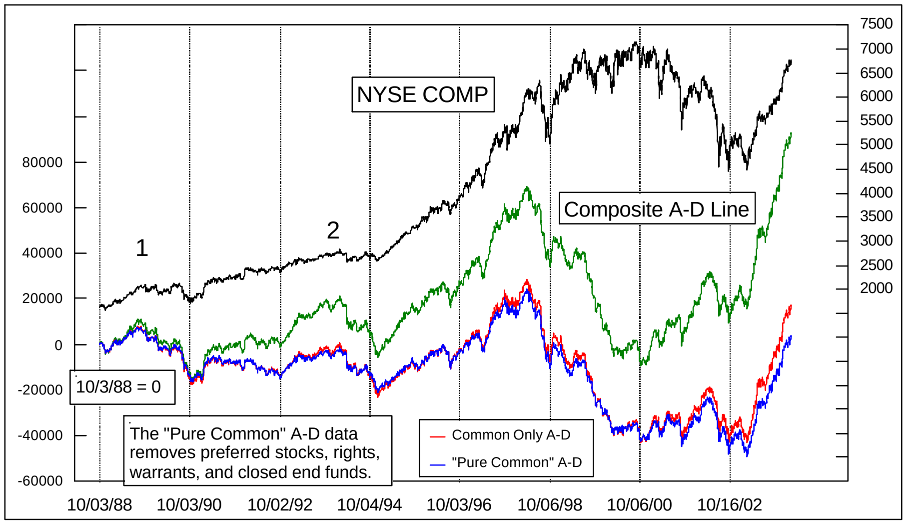

Figure 7

and the Pure Common A-D Line, which removes the closed end funds' contributions. The two lines are very close together; This illustrates that the CEFs are not having very much of an impact on the overall numbers. Indeed, they tend to mirror quite well the movements of the rest of the market's A-D numbers.

When it comes to the question of which version of the A-D Line is "better", let us consider this. All of these A-D Lines made a top together at point 1 in August 1989 and then moved lower to signal the weakness which would eventually bring a big price decline in 1990. At point 2, all of them topped together again, but the Common Only A-D Line and the Pure Common A-D Line made their tops at a lower level than at point 1, whereas the Composite A-D Line made a higher top. It was the Composite A-D Line that had the truer message about the strength of the overall market, and it was not even until June of 1997 that the Common Only and Pure Common A-D Lines eclipsed their 1989 highs. So it seems that the greater diversity of inputs into the Composite A-D Line makes for an arguably better indicator than one would get by filtering out the supposedly undesirable elements.

It also turns out that the story being told by those undesirable elements is one worth listening to in another context. Rather than being discarded, the A-D data for the issues which are not operating companies can be actively collected, much like a wheat farmer harvests straw in addition to the grain.

If one takes the daily Common Only numbers of advancing and declining issues and subtracts them from the Composite A-D numbers, then the result is the A-D numbers for those stocks which the NYSE filters out. I call these the "Uncommon" A-D statistics, and as you might expect they are indeed very sensitive to movements in interest rates.

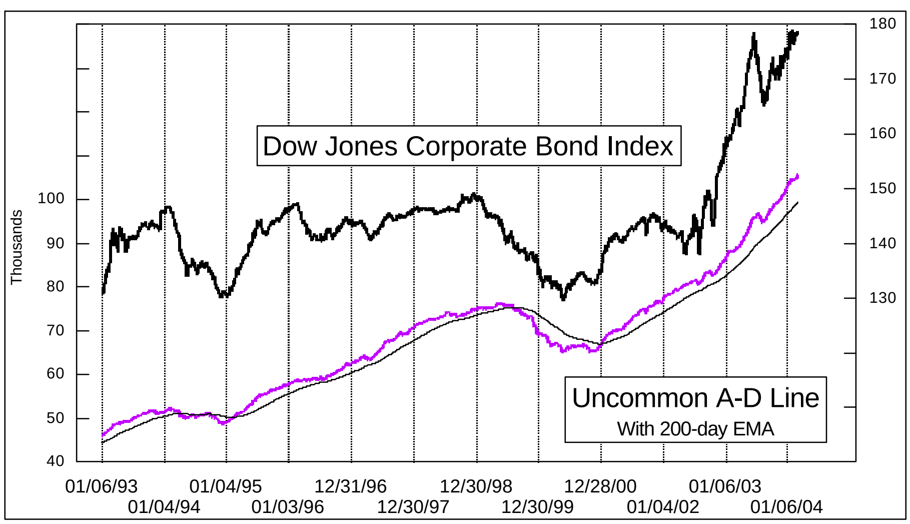

Figure 8

Figure 8 shows a daily A-D Line constructed from the Uncommon advance-decline numbers, and to illustrate the interest sensitive nature of this data we compare it to the Dow Jones Corporate Bond Index. When the Uncommon A-D Line is healthy and is well above its long-term moving average, bond prices tend to do very well. But when this A-D Line begins to lose strength and move closer to its moving average or even below it, that indicates a weaker period for bond prices. During 2003, this indicator saw a tremendously strong year, and it correctly described the strength which was also evident in bond prices.

Effects Of Decimalization

One of the more recent factors to have an effect on A-D numbers has been the move to trading stocks in decimal increments. Years ago, most stocks traded in increments of 1/8 of a point. This price increment was known as a "tick". That rule was changed in 1997, with a drop to 1/16 point increments. Full conversion to decimal increments was implemented by the NYSE on Jan. 29, 2001 (and on April 9, 2001 for the Nasdaq).

To count as an advancing or declining issue back in the old days, a stock would have had to change its closing price from one day to the next by at least 1/8 of a point. But now all it takes is a single penny of price change. Some analysts have put forth the premise that since more stocks now get to "vote" in the daily A-D statistics than was the case previously, the A-D Line is therefore biased by these stocks that have small price changes and hence it is unusable for analysis. There is also the suspicion that floor specialists[8] might be manipulating the closing postings to show tiny gains for these stocks just to notch another up day, and that this may explain some of the recent strength in the NYSE's A-D Line.

To test this hypothesis, I did a study of NYSE-supplied closing price data from Nov. 1, 2001 to Mar. 5, 2004, and calculated A-D data for 3 separate categories of issues: (1) Composite, which includes all stocks which traded each day, (2) greater than 1/16 point price change, and (3) less than 1/16 point price change. The reason for the 1/16 point (6.25 cents) threshold is the assumption that if a stock closed up or down by 7 cents, for example, then its change should be rounded up to the old increment level of 1/8 of a point (12.5 cents) and therefore be counted as a legitimate advancing or declining stock for that day. If it closed up or down by 6 cents or less, I rounded it down to unchanged. This is not a perfect solution for adjustment of the decimalized data, because a stock might hypothetically move up by 1 penny a day for 12 days and never be counted in these statistics, while that same move in the old days would have eventually generated an up-tick and therefore one advancing issue. But that is not a very good description of how most stocks trade, so such a fictitious scenario is fairly unlikely in the aggregate. Such behavior would also be balanced out by other issues doing the same thing to the downside, and mitigated by the large sample size of stocks being examined.

To get an understanding of the effects of the "sub-tick" price changes, I constructed Cumulative A-D Ratios for each of the three groups, i.e. the composite, the greater than one tick group, and the sub-tick group. If the sub-tick group is really skewing the data and making the A-D numbers better than they should be, then such an effect should show up in these Cumulative A-D Ratios. Keep in mind that the membership in each group changes each day, and is determined solely by the direction and amount of price change each day for each stock in the NYSE.

Figure 9 shows the results of this study, with 3 different Cumulative A-D Ratios. During this study period, the "sub-tick" A-D Line has moved higher just as the composite A-D Line has also moved higher. But the strength of these sub-tick A-D readings has been less robust than the

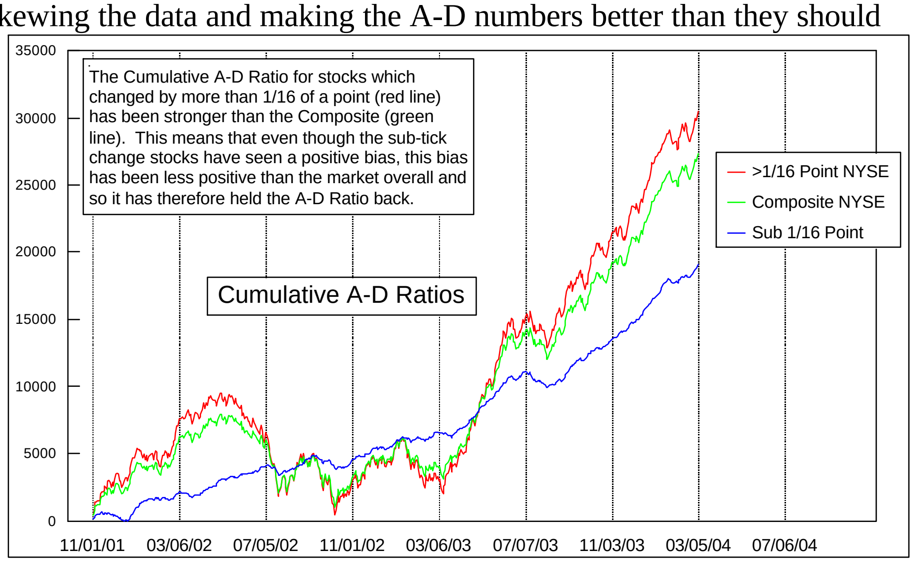

Figure 9

[8] In 1872, the NYSE implemented a new system of continuous trading to replace calls of stocks at set times. Under the new system, brokers dealing in a particular stock remain at one location (post) on the trading floor, giving rise to the "specialist" system wherein one independent trader or company manages the auction market in specific securities. Specialists are charged with "making a market" in their specific issue(s), and use their own capital to bridge temporary gaps in supply and demand to reduce price volatility. Because specialists have enormous influence over a stock's price and also have a vested interest in the shares of that issue, there is a concern among many market participants that specialists may have too much power to "rig" the market for their issues. See http://www.nyse.com/gloassary/1042235996028.html.

overall numbers. In other words, when it comes to ratio-adjusted A-D statistics, the inclusion of stocks with sub-tick price changes has actually held back the Composite Cumulative A-D Ratio. Saying it another way, the Cumulative A-D Ratio for the stocks which have closed up or down by greater than 1/16 of a point is now at a higher level than the Composite Cumulative A-D Ratio which includes the sub-tick changes. While the sub-tick A-D stats have helped to push up the raw A-D numbers, they have actually held back the daily Composite A-D Ratio numbers from showing an even more bullish condition. This appears to refute the notion that the A-D Line has been made to show a more bullish picture as a result of decimalization.[9]

Conclusions

(1) The A-D Line is still a useful indicator, but we as analysts must be mindful to listen to exactly what it is telling us instead of denigrating it for not telling us what we think it should.

(2) The very strong A-D statistics seen in 2003-2004 suggest that there should be much more upside to come for stock prices. Ordinary, garden-variety declines may appear from time to time, but the strong breadth suggests that it will be many months before we see a more meaningful decline.

(3) A series of Fed rate hikes beginning now would not result in negative GDP growth because the A-D statistics have been very strong.

(4) The strong breadth statistics among the "Uncommon" or interest rate sensitive issues traded on the NYSE tell us that bond prices should continue to move generally higher. Bond prices will still suffer through ordinary corrections, but the strength in bond prices is not yet over.

[9] A similar study by the Leuthold Group in September 2001 showed the same conclusion.